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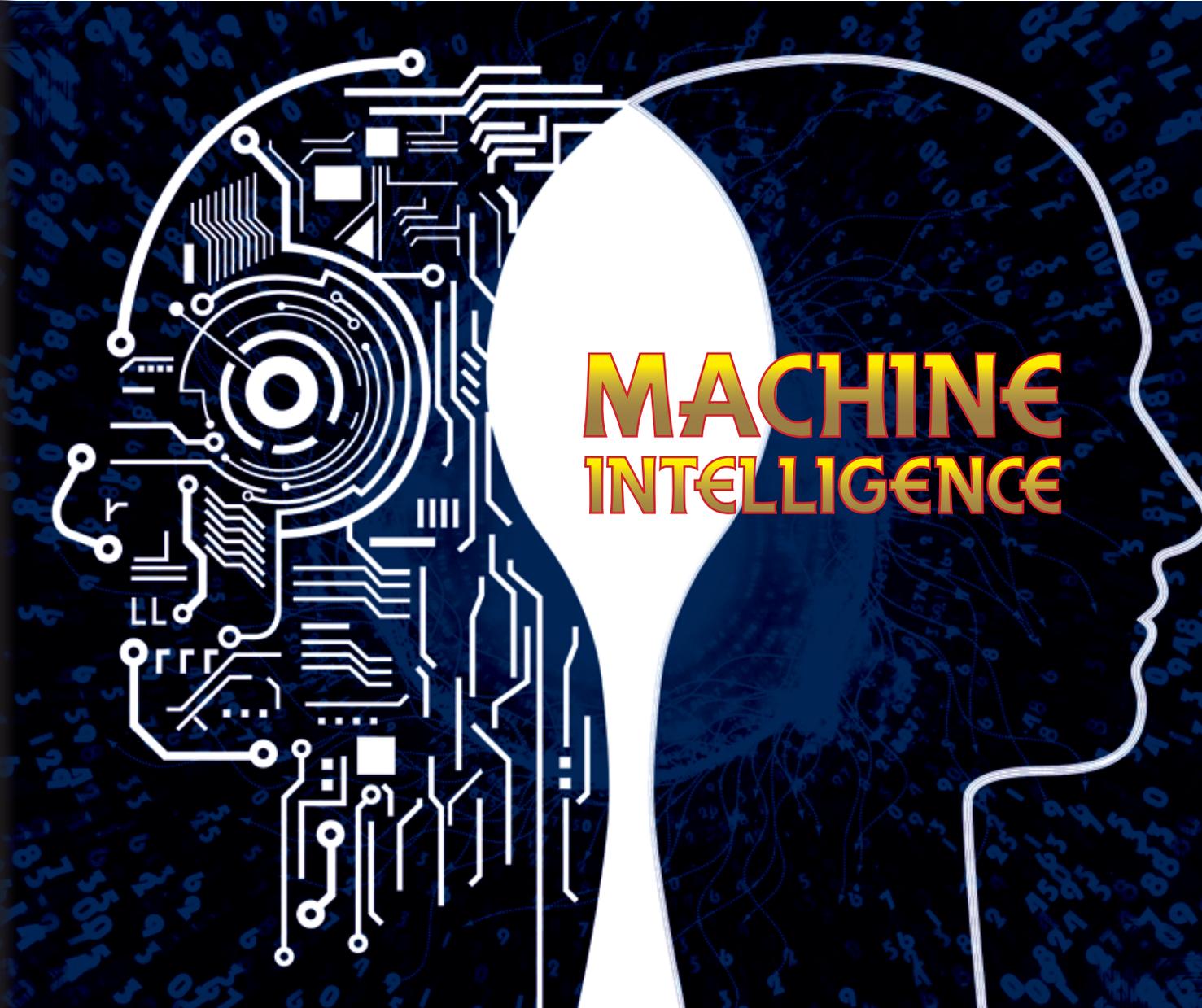
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D/204, Kanan Tower,
Patia Square, Bhubaneswar
Email : president@csi-india.org



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(E) vp@csi-india.org



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Director, Indian Institute of Business
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3/294, Vishwas Khand,
Gomati Nagar, Lucknow-226010. UP
(E) rvp1@csi-india.org



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Mr. Devaprasanna Sinha
73B Ekdalia Road,
Kolkata - 700 019
(E) rvp2@csi-india.org



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Dept. of CSE, Jaypee University of
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(E) rvp3@csi-india.org



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School, A. G. Office Road, Doranda,
Ranchi - 834002, Jharkhand
(E) rvp4@csi-india.org



Region-V
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No. 774, 2nd Stage, Indiranagar,
Bangalore 560038
(E) rvp5@csi-india.org



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(E) rvp6@csi-india.org



Region-VII
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Professor and Head,
Dept. of IT, Bharathiar University,
Coimbatore - 641046, Tamil Nadu.
(E) rvp7@csi-india.org

Division Chairpersons



Division-I
Mr. Apoorva Agha
8, Katra Road, Allahabad, UP - 211002
(E) div1@csi-india.org



Division-II
Prof. P. Kalyanaraman
Plot No. 139, Vaibhav Nagar,
Phase I, Opp VIT Gate 3, Vellore - 632014.
(E) div2@csi-india.org



Division-III
Mr. Raju L. Kanchibhotla
Aashirvad, 42/260/1/2,
Shramik Nagar,
Moulali Hyderabad-500 046, India
(E) div3@csi-india.org



Division-IV
Dr. Durgesh Kumar Mishra
H-123-B, Vigyan Nagar,
Annapurna Road, Indore
(E) div4@csi-india.org



Division-V
Dr. P. Kumar
Professor and Head
Dept. of Computer Science and Engineering,
Rajalakshmi Engineering College, Chennai - 602 105.
(E) div5@csi-india.org

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Prof. K. Subramanian
B 28, Tarang Apmts,
Plot 19, IP Extn,
Patparganj, Delhi - 110092
(E) ksmanian48@gmail.com



Dr. Brojo Kishore Mishra
Associate Professor, Dept. of IT,
C. V. Raman College Engineering,
Bhubaneswar - 752054, India
(E) brojokishoremishra@gmail.com
brojokishoremishra@yahoo.com



Mr. Subimal Kundu
Flat No. 1A, Block - 7,
Space Town Housing Complex,
P.O. Airport, Kolkata - 700052
(E) subimalkundu@yahoo.com
kundu.subimal@gmail.com

- 1 is an individual.
- 2 are friends.
- 3 is company.
- more than 3 makes a society. The arrangement of these elements makes the letter 'C' connoting 'Computer Society of India'.
- the space inside the letter 'C' connotes an arrow - the feeding-in of information or receiving information from a computer.

CSI Headquarter :

Samruddhi Venture Park, Unit No. 3,
4th Floor, MIDC, Andheri (E),
Mumbai-400093, Maharashtra, India
Phone : 91-22-29261700
Fax : 91-22-28302133
Email : hq@csi-india.org

CSI Education Directorate :

CIT Campus, 4th Cross Road, Taramani,
Chennai-600 113, Tamilnadu, India
Phone : 91-44-2254 1102-03
Fax : 91-44-2254 2874
Email : director.edu@csi-india.org



CSI Registered Office :

302, Archana Arcade, 10-3-190,
St. Johns Road,
Secunderabad-500025,
Telengana, India
Phone : 91-40-27821998



Chief Editor
S S AGRAWAL
KIIT Group, Gurgaon

Editor
PRASHANT R NAIR
Amrita Vishwa Vidyapeetham, Coimbatore

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Editor: Prashant R. Nair

Editorial



Prof. (Dr.) S. S. Agrawal
Chief Editor

Dear Fellow CSI Members,

At the outset, we wish all our esteemed CSI members, a happy, prosperous and productive New Year 2018.

The theme for the Computer Society of India (CSI) Communications (The Knowledge Digest for IT Community) January 2018 issue is Machine Intelligence.

"Artificial intelligence will reach human levels by around 2029. Follow that out further to, say, 2045, we will have multiplied the intelligence, the human biological machine intelligence of our civilization a billion-fold."

Ray Kurzweil



Prof. Prashant R. Nair
Editor

After a series of thematic issues focusing on ICT in applications such as education, governance, agriculture and health, CSI Communications is focusing on machine intelligence in this issue after issues on the research topics of cyber physical systems and machine learning.

Machine intelligence is intelligence displayed by machines. In other words, any device that perceives its environment and takes actions that maximize its chance of success at some goal. Machines are becoming increasingly capable and performing high-end tasks such as understanding human speech, competing at a high level in strategic game systems, autonomous cars, intelligent routing in content delivery networks, military simulations, and interpreting complex data, including images and videos.

The Cover story in this issue is Machine Learning by Chandu Vaidya & Shubham Uttarwara. In the cover story, the authors have traced the evolution, tools and applications of machine intelligence.

The technical trends showcased are "A Roadmap for Biological Network Analysis" by Nikhila T Suresh, Sreeja Ashok and U. Krishnakumar and "Blockchain : A Distributed Ledger Technology" by V. Sai Chandrahaas & V. Ravi Sankar

In Research front, we have 2 contributions, "Collaborative Development of Electro-Optical Payload Evaluation Software [XSCoPEXpress]" by Nutan Kumari, Jitendra Sharma and Amit Dave from Indian Space Research Organization (ISRO) and "Text Detection and Recognition in Natural Scene Images" by Sharath Kumar Y.H. and Puneeth P.

Other articles in this issue on Machine Intelligence provide us information on its applications in image processing, video processing, agricultural development and military robotic control. The articles are:

- "Make friendship with your Machine :The HUMachine" by Anila M.
- "Imaging Applications using Machine Intelligence" by Akila K. and Jayasri P.
- "Understanding Machine Vision by Human Activity Recognition" by Dushyant Kumar Singh
- "Role of Machine Intelligence for sustainable agricultural development" by Mahendra Balkrishna Salunke and Ashish V. Salunkhe
- "Machine Intelligence Challenges in Military Robotic Control" by S Balakrishnan and D Deva

The Security Corner has 1 contribution, Cyber Crime and Social Security – The Dark side of Internet by Priyanka Tomar

This issue also contains reports of various premier CSI conferences such as CSI IT 2020, CSI activity reports from chapters & student branches, call for R&D funding proposals and calendar of events

We are thankful to entire ExecCom for their continuous support in bringing this issue successfully.

We wish to express our sincere gratitude to the CSI publications committee, editorial board, authors and reviewers for their contributions and support to this issue.

We look forward to receive constructive feedback and suggestions from our esteemed members and readers at csic@csi-india.org.

With kind regards,

Prof. (Dr.) S. S. Agrawal, Chief Editor

Prof. Prashant R. Nair, Editor



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President's Message

From : President, Computer Society of India
Date : 01 January, 2018
Email : president@csi-india.org / Cell : (91) 9861010656

Wish all our esteemed CSI members and their families a Happy and Prosperous New Year 2018!

International Summit: 2017 India-Africa ICT Summit @ NCR Region



Mr. Sanjay Mohapatra, President, CSI represented CSI at the 2017 India Africa ICT Summit & Excellence Award conducted at Hotel Ramada, Gurgaon Central on 1 & 2 December, 2017. CSI partnered with Innovation society India, Ministry of Electronics and Information Technologies, WAIMS and Public Opinion International Uganda in organizing the summit with the theme, "Confronting ICT and Cyber Challenges, Developing India and Africa through ICT, Opportunities, Challenges and way forward". CSI President participated in the inaugural ceremony along with Mr. Saurabh Tiwari, Dy. Director, Department of Telecommunication, Govt. of India; Mr. N. K. Goyal, President CMAI; African Delegation headed by Justice Ralph Ochan, Chairman, Public Service Commission Uganda and others. In the inaugural ceremony, CSI President emphasized upon

present situation of India and Africa towards ICT Growth, Opportunities and ways forward and stressed upon need of developing India and Africa bilateral relations through Information and Communication Technologies. A suggestion was given to have a delegation meet visit to Uganda for analyzing the grass root level issue and Challenges and ways forward with the support of Bilateral resource sharing during Mid February 2018. This summit was an excellent opportunity for CSI to expand its international collaborative footprint. CSI President also addressed all delegates on the theme of "Setting up of IT Parks for promoting IT-ITeS business in Africa".

CSI 2017 Convention @ Kolkata

CSI ExecCom met at Kolkata on 9 December 2017 to review the preparations for the CSI 2017 annual convention scheduled at Science City, Kolkata from 19 to 21 January, 2018. The theme of the convention is "Social Transformation- Digital Way" and full-fledged preparations are on by the CSI 2017 organizing team and Kolkata chapter for making it a grand success. After rigorous review and quality check, 64 papers have been short-listed for presentation and the proceedings will be published by our partner, Springer Nature. The organizing team has put together an impressive array of distinguished speakers from top universities, institutions and companies such as IBM, Tata Consultancy Services (TCS), Microsoft, Kansas State University USA, Nanyang Technological University (NTU) Singapore, IISc Bangalore, IIT Kharagpur, ISI Kolkata, Jadavapur University, Saha Institute of Nuclear Physics, Internet Corporation for Assigned Names and Numbers (ICANN), CDAC etc. It is my humble request that all our CSI members from industry, student branches etc register and participate in large numbers and make this another historic convention for CSI.

Membership growth & CSI portal

Sustainable growth of membership is going on and membership data validation process online is in progress. CSI portal is presented with a new look and all dynamic & status pages are designed by CSI Vice-President, Dr. Gautam Mohapatra & Team. Dr. Mohapatra, despite his very extremely busy schedule at DRDO is devoting a good quantum of time for CSI portal.

Please write your valuable ideas for growth of CSI at president@csi-india.org

With kind regards

Sanjay Mohapatra
President, CSI





Computer Society of India & Patna Management Association jointly organize One-day seminar on Cashless Economy

Patna Management Association with technical collaboration of Computer Society of India organised a one-day seminar on 'Cashless Economy for New India' on 25th November, 2017 at Dr. Zakir Hussain Institute Auditorium, Patna. The Seminar was inaugurated by Hon'ble Mr. A N Singh, Former speaker of Bihar Legislative Council. He said that, the drive of digitalization in economy has led to inclusive growth and reduction in corruption. The Guest of honor Dr. Dolly Sinha, Pro Vice Chancellor of Patna University told that the drive of digital money transfer has brought huge amount of black money back into the system.

Presenting the Key note address in the Seminar, Prof. A K Nayak, the Director of Indian Institute of Business Management & National Secretary of Computer Society of India threw light on various technical aspects of the ecosystem of digital economy. He also highlighted about exponential growth in cashless transaction after the de monetization process & explained about growth in e-transaction in various sector

In his presidential address, Prof. U K Singh, Director General of IIBM & ZHI group of institutions praised



the present govt. for setting up a proper mechanism to implement cashless economy. Mr. Arun Kumar, former General Manager of Bank of Baroda, talked about various practical aspects and suggested few points for successful implementation of this drive.

In the beginning, Mr. S K N Haider, President of Patna Management Association welcomed the guests. Prof Alok Kumar, Hony Secretary, Patna



Management Association Proposed the Vote of thanks. Others Who were Present, prominent among them Dr. Bhawana sinha, Vice Chairman CSI Patna Chapter & Head MCA Dept. Patna Women's College, Prof. Ganesh Panday, Dy. Director, IIBM Patna & Former Bihar State Student Coordinator, CSI & Mr. Manoj Sinha, Vice President, Patna Management Association.



Prof. Mike Hinchey, President, IFIP has agreed to grace CSI Annual Convention at Kolkata as Keynote Speaker

Mike Hinchey is President of IFIP (International Federation for Information Processing), founded by UNESCO in 1960, and Professor of Software Engineering at University of Limerick, Ireland. He is Chair of IEEE UK and Ireland for 2018-2019.

Until end of 2016, for 8 years he was Director of Lero-the Irish Software Research Centre, a multi-university research centre with a footprint in each of Ireland's universities. Previous positions include Director of the Software Verification Research Centre at University of Queensland, and Director of the NASA Software Engineering Laboratory at Goddard Space Flight Center; he has also served as a

NASA "Expert".

Hinchey holds a BSc in Computer Systems from University of Limerick, an MSc in Computation from University of Oxford and PhD in Computer Science from University of Cambridge. He is a Fellow of IET, British Computer Society, Irish Computer Society (of which he is also Vice President), Engineers Ireland and Engineers Australia. He is the author or editor of more than 20 books, including the forthcoming "Software Technology: 10 years of innovation in IEEE Computer" (Wiley, 2018), more than 200 papers, and holds 26 patents. He is Editor-in-Chief of Innovations in Systems and Software Engineering: a NASA Journal" (Springer) and Journal of the Brazilian Computer Society (Springer).

Machine Learning

▶ Chandu Vaidya

Assistant professor, Rajiv Gandhi College of Engineering & Research

▶ Shubham Uttarwar

Rajiv Gandhi College of Engineering & Research

1. Machine Learning – An Introduction

[1] Machine learning can be broadly defined as computational methods using the experience to improve the performance or to make accurate predictions. In layman's term, we define machine learning as a series of mathematical manipulations performed on important data in order to gain valuable insights. More specifically, it is the study of algorithms that learn from examples and experience instead of hardcoded rules. ML is evolved from the study of pattern recognition and computational learning theory in artificial intelligence, machine learning explores the study and construction of algorithms that can learn from and make predictions on data – such algorithms overcome following strictly static program instructions by making data-driven predictions or decisions by building a model from sample inputs.

Machine learning is closely related to and often overlaps with computational statistics, which also focuses on prediction-making through the use of computers. It has strong ties to mathematical optimization, which delivers methods, theory and application domains to the field. ML involves learning from different experiences and then using those experiences to predict the correct outcomes in the later stages of its use. [1] To define it in a computational language we say that, "A computer program is said to learn from experience **E** with respect to some class of tasks **T** and performance measure **P**, if its performance at tasks in **T**, as measured by **P**, improves with experience **E**".

For example, if we need to create an application that recognizes a specific species of the flower named iris. In absence of machine learning, we would have to write a bunch of different functions to detect all the different features of the iris flower. However, the problem is that there is a large number of corner cases and there is no way we

can account for each one of them ahead of time. Take for example, what if a certain leaf is obstructed or flower is of a different color or the shape is totally different from what we expected. We just simply cannot code it beforehand and thus we have to use machine learning to solve this problem. To solve any machine learning problem there are 4 steps that need to be followed.

We **Collect Data** for one. Secondly, we **pick the model**. Third, we **train the model** and then finally we **test the model**. By simply adding the data to the model it will start recognizing patterns for us. Now the data sets can come in the whole bunch of different forms namely csv, pdf, holograms, images but should be in a well-known format which we can parse from. The dataset then has different features according to our requirement. The sign of **good features** is that they should be **simple** for one. Secondly, they should be **independent** and third they should be **informative**.

Then we choose one of the different models that are available already for machine learning. Choosing a model can be tiresome, however, we can narrow our search by determining the type of problem we are solving and how large our dataset is and what are our other requirements on the whole. Again, it's a matter of choice. Since we are classifying whether an image is of iris flower or not, ours is the classification problem and thus we use a **classifier**. Now that we have our dataset and model, we train the model. Training is the step where the actual learning occurs as our model iterates through the dataset, it gets better and better at prediction over time. And we are done! Next time, when we provide our model image of any flower it will be able to predict whether the flower supplied is iris or not.

[3] Generally, there are three main types of machine learning problems: **supervised, unsupervised and reinforcement**. **Supervised machine learning problems** are problems where

we want to make predictions based on a set of examples. **Unsupervised machine learning problems** are problems where our data does not have a set of defined set of categories, but instead, we are looking for the machine learning algorithms to help us organize the data. Put in another way – supervised machine learning problems have a set of historical data points which we want to use to predict the future, unsupervised machine learning problems have a set of data which we are looking for machine learning to help us organize or understand. Again, there is a further classification of both supervised and unsupervised problems which can be studied. Reinforcement includes a specific task or goal that the system must complete. Throughout the process, it receives feedback in order to learn the desired behaviors. For example, the system encounters an error while performing the action or a reward for achieving the most favorable outcome. Thus, the program is able to learn the most effective approach via "reinforcement signals".

2. Tools available:

To use machine learning in your application or even to learn it, there are two ways. First being, learning how to use libraries that act as black box i.e they provide each functionality, but you just cannot know what is happening inside. Secondly, to learn how to write algorithms and find coefficients, fit the model, find optimization points and much more so that you can curate your application as per your requirement. The latter requires a pre-requisite of a stronghold on calculus and probabilistic theory and many such mathematical concepts. Though it might look a formidable task, but it's the best way to learn machine learning, because then you get to understand how things work behind the scene. However, if you just want to play along, there are a number of libraries and application programming interfaces that can get you your job done. To name a few good

libraries out there, there is **TensorFlow by Google, Scikit-Learn** (it comes preloaded with a ton of datasets, which you can use to play around a get a feel of the whole process).

3. Areas of Application

Giants like Google, Microsoft, Uber, Amazon, Facebook, Instagram, Apple constantly use machine learning to gain valuable insights from data, recognize new trends and thus use them to increase their customer base as well as profits. [2]The value of machine learning technology has been recognized by companies not only in technology sector but across several industries that deal with huge volumes of data. By leveraging insights obtained from this data, companies are able to work in an efficient manner to control costs as well as get an edge over their competitors.

1. Financial Services

Companies in the financial sector are able to identify key insights in financial data as well as prevent any occurrences of financial fraud, with the help of machine learning technology. The technology is also used to identify opportunities for investments and trade. Usage of cyber surveillance helps in identifying those individuals or institutions which are prone to financial risk, and take necessary actions in time to prevent fraud

2. Marketing and Sales

Companies are using machine learning technology to analyze the purchase history of their customers and make personalized product recommendations for their next purchase. This ability to capture, analyze, and use customer data to provide a personalized shopping experience is the future of sales and marketing.

3. Government

Government agencies like utilities

and public safety have a specific need FOR ML, as they have multiple data sources, which can be mined for identifying useful patterns and insights. For example sensor, data can be analyzed to identify ways to minimize costs and increase efficiency. Furthermore, ML can also be used to minimize identity thefts and detect fraud.

4. Healthcare

With the advent of wearable sensors and devices that use data to access the health of a patient in real time, ML is becoming a fast-growing trend in healthcare. Sensors in wearable provide real-time patient information, such as overall health condition, heartbeat, blood pressure and other vital parameters. Doctors and medical experts can use this information to analyze the health condition of an individual, draw a pattern from the patient history, and predict the occurrence of any ailments in the future. The technology also empowers medical experts to analyze data to identify trends that facilitate better diagnoses and treatment.

5. Transportation

Based on the travel history and pattern of traveling across various routes, machine learning can help transportation companies predict potential problems that could arise on certain routes, and accordingly advise their customers to opt for a different route. Transportation firms and delivery organizations are increasingly using machine learning technology to carry out data analysis and data modeling to make informed decisions and help their customers make smart decisions when they travel.

Machine Learning is now an important part of our daily lives, shaping our society, culture and ever

our future. It affects how we work, socialize and play. For example, after one week of watching your favorite movies on Netflix, but when you sit down next time to watch a movie on Netflix, you realize that NetFlix actually recommends movies that you will enjoy watching. Machine learning here is helping create this experience for you by recommending movies you might love. Similar is the case on Amazon, next time you buy something, Amazon automatically recommends you things that it thinks you might be interested in, based on your past purchases.

Again, when you are out somewhere, having a gala night with your friends and it's late in the night, you ask Siri to find an Uber for you and thanks to machine learning that Siri and uber both uses which take you home safely. By observing closely you will see that machine learning is everywhere and that it has become an integral part of our lives. We are already using it, augmenting our lives and moving into future. Machine learning uses algorithms to create immersive, interactive experiences between technology and humans. Thus forming and personalizing a connection to technology by automating tasks that are typically repetitive or tasks that humans are unable to do such as analyzing the huge amount of data in forms of text, images or videos. Machine Learning will thus continue to shape our world, connecting us with our friends, family, and work.

References:-

- [1] Wikipedia : https://en.wikipedia.org/wiki/Machine_learning
- [2] <https://www.outsource2india.com/software/articles/machine-learning-applications-how-it-works-who-uses-it.asp>
- [3] <https://www.practicalai.io/categorizing-machine-learning-problems/> ■

About the Authors



Mr. Chandu D Vaidya working as Asst. Professor at Rajiv Gandhi College of Engg. & Research. Have completed post graduation from RTM Nagpur University (RKNEC), and Graduation from Shivaji University Kolhapur (Walchand College of Engg. Sangli). Interested areas of research are networking, parallel processing, operating system and cloud computing and published more than 22 papers in different agencies like Scopus, IEEE, IJCA etc. Have membership of CSI, and others. Also published the book on operating System and working

on Distributed Operating System. Have Copyright of poster, filled patent on IoT application.



Shubham Atul Uttarwar have completed Graduation in Computer Science & Engineering. Currently applied for MS and working on Machine Learning.

A Roadmap for Biological Network Analysis

► Nikhila T Suresh, Sreeja Ashok and U. Krishnakumar

Department of Computer Science & IT, Amrita School of Arts and Sciences, Amrita Vishwa Vidyapeetham, Kochi

Significance of Machine learning in Biological Network Analysis

The human system is made up of many interaction networks to carry out the biological functions in a coordinated manner. The data intensive nature of biology demands computational tools to analyze and transform the bulk amount of data into a meaningful prediction for qualitative treatment of diseases in health care domain. Machine learning is an effective platform to implement expert systems in drug design, diagnosis of genetic diseases, detection of root cause of disease, prediction of new diseases etc. Here various machine learning approaches for analysis of biological network have been investigated along with its wide range of application areas.

Human System

Human system can be considered as a network of components that are synchronized with each other to perform various functions by ensuring coordination or rhythm among its different biological entities (Fig. 1). The healthy state of a body is conceptualized as the synchronized and uncorrupted processing of these biological modules or networks. The major categorization of these networks are i) Protein-Protein Interaction Networks [PPIN] ii) Gene Regulatory Networks [GRN] and metabolic Networks [MBN].

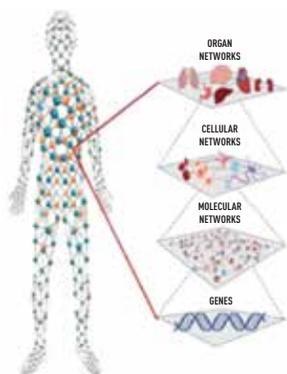


Fig.1: Network model of human system

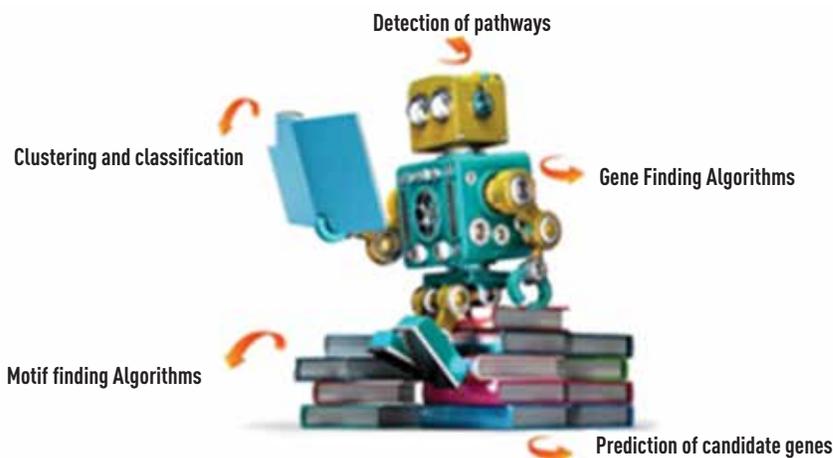


Fig. 2 : Machine learning applications in biological network analysis

Biological Networks

Protein-Protein Interaction Network [PPIN]

PPIs are mathematical descriptions of physical connections between proteins in the cell. These connections are specific, occur at defined regions and have a particular function or a specific biological meaning. These models are useful for building scientific abstractions and for enhancing the biological and biomedical applications.

Gene Regulatory Network [GRN]

GRNs have groups of molecular regulators that network in the cell to manage the gene expression levels of mRNA and proteins. Thus it can be defined as a network inferred from gene expression data. It represents physical biochemical interactions among genes and gene products and is highly phenotype specific.

Metabolic Network [MBN]

MBN represents the whole set of metabolic and physical interactions that decides the physiological and biochemical properties of a cell. Understanding the topological properties of these networks helps

in analyzing its function. Graph approaches have been widely used for extracting the network properties.

Challenges of Modeling Biological Network

The huge and evolutionary data booming out from biological field through the study of proteins (proteome), whole set of information about genes (genome), metabolites (metabolome), RNA sequence and clinical data generated from history make it impossible to analyze manually and take a drift from manual based analysis to computational analysis. For e.g. Single genome sequence is around or greater than 140GB in a hard disk memory size.

Hence the main challenges are the storage, retrieval and analysis of these complex and heterogeneous biological data. Extracting relevant and vital information which would be beneficial in diagnosis of disease, drug designing, drug target identification etc needs efficient computational solutions. Machine learning algorithms help in processing these large messy datasets to enable intelligent decision-making in a natural way [Fig 2].

Machine learning approaches

Machine learning process includes various steps: problem definition, data collection, data visualization and data validation. Data collection deals with gathering of data based on features to ensure the quality. Data preparation involves the randomization to identify relationship, data imbalances, duplication based on parameters. Further improvement can be done by selecting the parameters which ensure optimality to the model is termed parameter tuning. Particularly, the operations such as clustering, classification, feature selection and motif detection gains importance in biological network analysis.

Cluster is a family of similar or related entities and clustering is a process by which the proteins or genes of similar functions are grouped together. Classification is identification of subgroups on the basis of training data and in biological graphs mainly it is used to unravel the functionalities associated with proteins or genes in PPIN, GRN respectively.

In PPI, the clustering algorithms can be helped in prediction of protein functions [Li et al. 2016], prediction of interactions [Zahiri et al. 2013], and diagnosis of biomarkers [Wang et al. 2015]. Similarly various classification techniques are used to evaluate the druggability of protein-protein interactions [Sugaya and Ikeda 2009], prediction of protein interaction [Park et al. 2009], viral genome classification [Remita et al. 2017] etc. The feature selection methods in PPI are mainly used for prediction of essential protein [Zhong et al. 2009].

In GRN, the clustering facilitates the analysis of target genes and visualization of expression patterns [Ni et al. 2016; Pirim et al. 2012]. The classification and feature selection operation in GRN implies GRN inference, gene function prediction and identification of candidate drug targets [Madhamshettiwar et al. 2011; Guo et al. 2016; Bari et al. 2017].

The classifiers in MBN networks help in the prediction of side effects of drugs [Shaked et al. 2016], identifying essential genes in metabolic pathways [Plaimas et al. 2010; Dale et al. 2010]. The

choice of feature selection method also determines the classification success [Pirooznia et al, 2009].

Conclusion

The data outburst in the field of biological research necessitates the development of systemic approaches for data pre-processing and analysis. The critical advancements in machine learning techniques help system biology in a great manner. New discoveries like drug design, drug target identification, personalized medicine, effective diagnosis of genetic diseases are taking place in the field of molecular biology and its one of the promising field of not only this era but also in the coming future.

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About the Authors



Ms. Nikhila T Suresh is a former Assistant Professor at SNGIST Group of Institutions, N Paravur and completed M.Tech in Network Engineering from Rajagiri School of Science & Tech, Kakkanad and B.Tech from SNGCE, Kolenchery. Currently pursuing research in Computational Biology at Amrita School of Arts and Sciences, Amrita University, Kochi.



Dr. Sreeja Ashok is currently working as an Assistant Professor in the Department of Computer Science, Amrita School of Arts and Sciences, Amrita University, Kochi. She has blend experience in industry and academic fields. Her industrial experience includes Data Analytics, Project Management, Software Development, and Quality Assurance (Wipro and Avenir). Her research is broadly in the fields of computational biology, developing machine-learning algorithms for modeling biological and clinical data; has a strong publication record to her credit.



Dr. U. Krishnakumar, a Life Member of CSI, is Director, Amrita School of Arts and Sciences and Dean (Arts, Media and Commerce) of Amrita Vishwa Vidyapeetham University. He has more than three decades of experience in teaching and research. Areas of interest include Data Mining, Medical Informatics, Media and Science Communication. Has published research papers in various national and international journals

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Only general articles in the categories of Technical Trends, Security Corner and Practitioner Workbench may be submitted for this issue. Please send your contributions by 20th January, 2018.

The articles should be authored in as original text. Plagiarism is strictly prohibited. Please note that CSI Communications is a magazine for members at large and not a research journal for publishing full-fledged research papers. Therefore, we expect articles written at the level of general audience of varied member categories. Equations and mathematical expressions within articles are not recommended and, if absolutely necessary, should be minimum. Include a brief biography of four to six lines, indicating CSI Membership no. for each author with high resolution author photograph.

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(Issued on the behalf of Editorial Board CSI Communications)

Dr. S. S. Agrawal
Chief Editor

Blockchain : A Distributed Ledger Technology

▶ V. Sai Chandrahaas

Indian Institute of Technology(IIT), Madras
Email: mm15b030@smail.iitm.ac.in

▶ V. Ravi Sankar**[1]

Dept. of CSE, Gandhi Institute of Technology and Management(GITAM), Hyderabad
[1] Corresponding Author. Email: ravisankar.vadali@gitam.edu

Introduction

Technology experts feel that the block chain technology will be a game changer and is likely to be adopted by banks and government departments in the near future. This technology, which is seeing a large scale implementation abroad, is expected to make huge inroads in India too. Blockchain will facilitate distributed computing in a big way.

Definition of Blockchain

A blockchain stores list of records in terms of blocks. As the number of records increase, a new block is created. There are countless number of such blocks connected to each other in a linear, chronological order. Each block is chained to the next block using a cryptographic signature. The blockchain has complete information about different user addresses right from the genesis block to the most recently completed block. In a blockchain, the data is stored on decentralized locations and any change made in the records is immediately sent to all the users i.e. each node in the network gets a copy of the changed block. As the records are stored using cryptography, they cannot be modified and tampered by hackers. Blockchain technology can work as an open, online ledger that can record transactions between two parties without the help of a third party. Hence the need to get authentication from a third party is eliminated.

Application Areas

- Blockchain technology has great potential in the public sector area. Crucial information like Aadhaar card numbers, vehicle registration, pensions, tax payments, patents and real estate records can be registered on the blockchain.
- Governments of Telangana and Karnataka have taken initiatives

in implementing blockchain technology in the areas of property registration and land records.

- For financial institutions involved in stocks, shares and mutual funds, blockchain technology can help shorten the time involved in trade settlement.
- In stock market trading, this technology can be used in streamlining payments, asset trading, securities issuance and clearing and settlements.
- This technology can be implemented in the insurance sector which requires maintenance of huge amounts of records of premiums, claims and payments.
- Industries such as media, diamonds, music and healthcare have already started developing applications using blockchain technology.

Advantages

- Blockchain technology provides cost-saving advantage, swift transactions, tamper-proof records and absence of a middle party.
- As the technology requires no third party involvement, it is beneficial in cross-border trades, which usually take much longer because of time zone issues.
- As the transactions on the network can be done in a decentralized manner, the technology offers the ability to create flexible and secure business operations.
- The electronic ledgers are cheaper to maintain when compared to the traditional accounting systems.
- The technology helps in minimizing the processing delay of stock trading transactions.

Banks' Perspective

Banks all over the world have started experimenting with blockchain technology. This technology is being adapted for transactions within a bank, between two banks and between banks and financial institutions.

Instead of recording ledger entries in a single sheet of paper, a blockchain is created as a distributed database that collects all the transactions and places them in a block. This enables the blockchain to be used as a Distributed Ledger Technology(DLT). The DLT enables banks to authenticate ownership of assets digitally.

- State Bank of India(SBI), along with other banks, started working on this technology in maintaining Jan Dhan accounts.
- BNP Paribas, a French investment bank, has taken up efforts in how blockchain technology can be applied to currency funds and order processing.
- Other banks all over the world like – Deutsche bank, Standard Chartered, Commonwealth Bank of Australia have invested in research and deployment of this technology.
- Companies like TCS and Infosys have already started investing in blockchain technology to create core banking platforms for banks.

Tech and Financial Companies' Perspective

- Citigroup and Goldman Sachs have invested in the development of payment service engines using blockchain technology.
- IBM's Hyperledger is an open source platform that can be used to build applications in cloud environment using blockchain code.

► TECHNICAL TRENDS ►►►

- In December 2015, Microsoft Corporation and ConsenSys announced Ethereum Blockchain as a Service(EBaaS) on Microsoft's cloud computing platform, Azure. The two companies have already started developing an open source, blockchain based identity system for people, products, apps and services.
- Google's Alphabet has started a project to track usage of healthcare records based blockchain technology in the early part of 2017.
- R3[1], an enterprise software firm, is working with over 80 banks, financial institutions, regulators, trade associations, professional services firms and technology companies - has developed Corda, a distributed ledger platform designed specifically for financial services. Corda meets the highest standards of the banking industry and it is also applicable to any other commercial scenario. With Corda, participants can record, manage and execute financial agreements in perfect synchrony with their peers, creating a world

of frictionless commerce.

Blockchain Technology and Bitcoins

These days a new crypto-currency called bitcoin has emerged in the world markets. Satoshi Nakamoto, a cryptographer, created the bitcoin crypto-currency in 2008. Bitcoin is a digital currency that allows you to perform peer-to-peer transactions without the interference of a third party such as banks. Blockchain is the underlying technology in developing the bitcoins.

Issues in implementation of Blockchain Technology

- Regulation is the most important aspect in creating an open digital environment for commerce and financial transactions. Questions like – Who is responsible for maintaining and managing the blockchain? Who admits new participants to the blockchain? Who determines which users see what transactions? Who validates the transactions? – are yet to be properly answered.
- Banks are not interested in an open source model for their operations as they want to maintain a close

control.

- Custom software design and front and backend programming are still required to link up the new blockchain ledgers to the current business networks.

Conclusion

Blockchain technology has started to evolve making its debut in many areas of business and industry. The Distributed Ledger Technology is already adopted by several banks and other companies to manage data and interact with customers and suppliers. The technology has caught the attention of policy makers all over the world and millions of dollars will be invested in the coming years. This technology is behind the bitcoin and other crypto-currencies. It is being endorsed to the government advisory bodies by prominent financial institutions. Blockchain technology is here to stay as it will reduce costs, increase transparency, store records in a tamper-proof manner and promote innovation and economic growth.

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About the Authors

V. Sai Chandrahaas is currently pursuing third year B. Tech in Indian Institute of Technology(IIT), Madras. He is the Head of Electronics Club at the Centre For Innovation (CFI) in IITM. He also heads the sub module of Navigation, Control and Communication in IIT Madras's team in SpaceX's Hyperloop pod design competition. His areas of interest are Artificial Intelligence and Machine Learning.

Dr. V Ravi Sankar (CSI Member No. F8000538) is an Associate Professor at Gandhi Institute of Technology and Management(GITAM), Hyderabad. He received MS(Computer Science) from New Jersey Institute of Technology(NJIT) and Ph.D from Jawaharlal Nehru Technological University(JNTU), Hyderabad. His research areas are Semantic Web, Data Mining and Big Data Analytics.

Collaborative Development of Electro-Optical Payload Evaluation Software (XSCoPE^{xpress})

► Nutan Kumari, Jitendra Sharma and Amit Dave

PCSDV/PCEG/SEDA, Space Applications Centre, ISRO, Ahmedabad – 380015. E-mail: {nutan, jitendrasharma, amitdave}@sac.isro.gov.in

Electro-optical Payload Evaluation Software System, caters to important requirements like Data Acquisition, Instrument Control, Evaluation of Performance Parameters, Archival and Offline Analysis of data. It has been implemented as client-server based layered architecture, wherein the processing and archival is taken care by a pool of high-end servers and data visualization is handled on suitable clients. Server side development is carried out in C/C++ and Tcl/Tk, Client side development is using JAVA, and database is around Oracle 11g. It is essential to have a team comprising multiple and different skill sets for concurrent development of such a critical and complex system, thereby requiring standard procedures to develop, change and monitor the source code. Version control tools manage the source code with complete change history and enables synchronization of the code amongst team members. This paper describes in detail, a need for source code management for complex systems and also, a practical experience with two most popular version control systems viz. CVS and SVN under LINUX environment.

Keywords: XSCoPE^{xpress}, Subversion, Configuration Management, VCS

I. Introduction

Space Applications Centre is responsible for realization of Electro-Optical Remote Sensing payloads for Earth Observation as well as Interplanetary missions. Each payload is tested exhaustively in all aspects during development to meet its performance requirements. Also the payloads are different in configurations and hence test methodology varies from payload to payload, where large number of performance parameters are evaluated through different test benches and through the various phases of development. Development of generic software on a collaborative model, which caters to characterization of different types of sensors is a challenging task.

XSCoPE^{xpress} (UNIX based System for Payload Evaluation [1]) caters to the checkout and evaluation requirements of Electro Optical payloads. Subsequent sections bring out the reasons for collaborative development and how it has been achieved.

II. System Configuration

XSCoPE^{xpress} has both direct and indirect

interfaces with checkout sub-systems like Payload Data Acquisition System (PDAS), Spacecraft Interface Simulator (SIS), Command and Monitoring System (CMS) apart from COTS Instrumentation and Database etc.

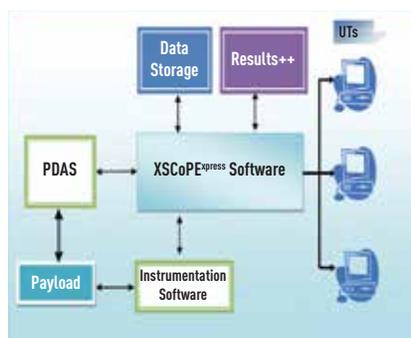


Fig. 1: System Configuration

III. Why Version Control

Version control systems (VCS) are essential for any form of distributed and collaborative development. XSCoPE^{xpress} system also falls in this development category as it has different subsystems which are integrated to

perform the payload evaluation tasks. At the same time each subsystem is developed, tested and maintained separately. The system has different sub-system categories like Video data acquisition, House Keeping data acquisition, Data Processing, Data Archival and Retrieval, Results presentation, Visualization, Optical Test Bench control etc. All of above call for very specialized skill sets and expertise. Final integrated software product is released to accomplish the tasks.

XSCoPE^{xpress} has an agile and accommodative model [2], which facilitates interaction and based on the requirements, necessary changes are made. These changes fall in following different categories:

1. **User request based changes:** Changes in UI, computation, algorithms with respect to the specific needs. Some changes sometimes apply to all subsequent developments.
2. **Technological changes:** As underlying systems and/or APIs

change, change at top becomes mandatory.

3. **Improvements:** With progress in payload development, fresh understanding emerges asking for design changes, interface changes, optimization and up-gradation.

These aspects need proper version control to have smooth transition from older to newer system as well as traceability. This calls for:

1. Synchronization of work from different developers;
2. Keeping track of changes from different team members through change history;
3. Integrating the final product with unique version number and distribution to users;
4. Maintaining multiple version, if demands come from different category of users or from different projects at the same time;
5. Possibility to revert back the changes and restore the previous version, if the need arises.

IV. Configuration Management Tools

Tools make the work easy to manage the different versions where collaborative work is pursued. Many tools, in Open Source and Commercial domains, are available for the configuration control of the software. Concurrent Version Control (CVS), Subversion (SVN) and Mercurial are most popular amongst the developers in Open Source category. ClearCase (IBM Rational), Team Foundation Server (Microsoft), AccuRev SCM (Micro Focus International) are some of the commercially available version control software.

XSCoPE^{xpress} is based on client-server architecture and therefore the requirements are catered to by server side and client side components. The server side requirements are handled by ASH!Server component. ExpressClient(s) is a set of user interface applications through which payload evaluation activities can be accomplished.

CVS is used as the version control tools to manage the server side packages, which are developed in C++

and Tcl/Tk. Whereas SVN is used as the versioning system to share the changes of the client side development, work which are implemented on JAVA platform.

Reason for the choice was team's overall knowledge at the initial phases of development. With progress and experience, deeper insights were gained with regards to both the version control systems.



Fig. 2a: SVN-Creating Repository

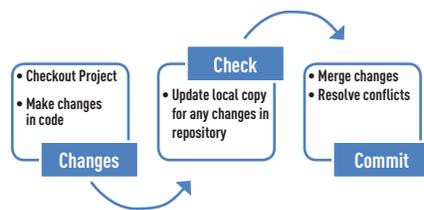


Fig. 2b : SVN-Work Flow

V. What is CVS?

CVS is the concurrent versioning system which has client-server architecture and is used for revision control. It has centralized repository, where the server side modules are stored. Developer takes the latest code from the repository for editing the existing module and then updates the repository after the modifications. Both CLI based and GUI tools like Cervisia, Tortoise CVS, Emacs etc. are available for CVS. GUI tools provide easy user

interface for check-in/checkout and graphical comparison of version, code branching etc.

VI. What is SVN?

SVN is used as the client-server architecture based version control tool to manage files and directories, and the changes made to them over a period of time. This allows sharing the changes, recovering older versions of data or examining the history of how data has changed. It is distributed as free software under the Apache License.

Modern IDEs like NetBeans and Eclipse are equipped with SVN support. CLIs are also available for management tasks of SVN repositories.

Repository of software is established on the server and users are created for authentication using SVN configuration files. New project can be added (checked-in) to the repository using SVN client after authentication.

Fig. 3. depicts breakup of the XSCoPE^{xpress} client applications with dependencies in the form of common module libraries. Therefore, the development needs to be synchronized for versions and making of final client application for deployment purpose.

VII. How SVN is used in collaborative development of XSCoPE^{xpress}

• Access of project from repository

Any number of members can be added in the XSCoPE^{xpress} team at any time and they can start the work immediately. All that is needed is to check out the respective files and source code from repository using user

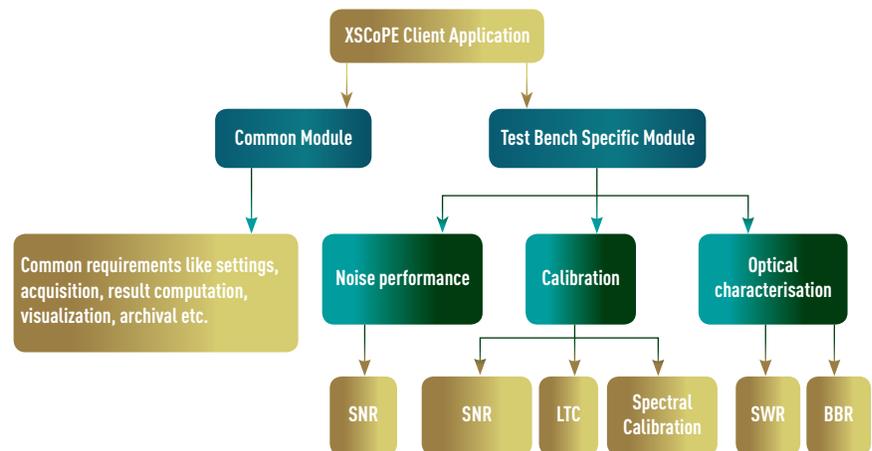


Fig. 3 : XSCoPE^{xpress} Client Structure

ID and password.

• **Development synchronization**

Everyone can keep tab on other's changes. Whenever any change in project is committed in the repository, corresponding files are highlighted in all the local working copies. Developer can check the differences in the local and remote copies and can update their code accordingly.

• **Commit the changes**

Once the development work is over and code is fully tested, it can be submitted to the repository. Developers first update their project with the repository. There are two possible cases:

1. Project will be updated successfully
2. Conflict may occur. In this case, project problems are resolved first.

After updating successfully, project is ready to be committed. Developer has the choice to either commit the project fully with all changes or partially with only subset of modules using registered user ID and password. Comments about the changes are also given in the marked area to keep track of modification in future.

• **To keep track of changes**

Team leader assigns the job to all XSCoPE team members and can check the project history at any time to see the development progress. If the short detail provided by developer is not sufficient to pin point the exact changes, he can compare any two versions to find the modifications in the code. What, where and why the changes, can be answered easily.

• **To revert back the modifications**

If the team leader is not satisfied with the changes, the changes can be reverted back and the previous version of project can be restored.

• **Easy to distribute**

Before handing over the final code to the user, following needs to be verified:

- a. Which is the latest version?
- b. Which system contains the final code?
- c. Whether that code contains all the changes from all the developers

without any conflict etc.

XSCoPE development has suitably made use of all the above provisions in SVN, thereby making it quite easy to pick the final version of code. Subversion support integrated with NetBeans IDE [3] is used for this purpose.

• **If required multiple version can be managed**

Testing of multiple electro-optical payloads always goes in parallel using same XSCoPE application. They all will have different configurations and to characterize them on ground, requirements may vary from one to another. To handle such a scenario different versions of XSCoPE may be needed at the same time. At present, this case is handled without any extra effort with the help of SVN.

VIII. Statistics of XSCoPE-Repository

XSCoPE is a complex system and has many components. Challenges involved in development and maintenance of such critical system developed over a period of time is self-explained from the statistics of XSCoPE repository generated using the StatSVN tool [4].

• **Development Statistics**

Report Generated: 2017-08-31 15:04
 Head revision: 556
 Report Period: 2013-04-11 to 2017-08-03
 Total Files:3768
 Total Lines of Code:811676
 Developers:7

• **File Statistics**

File Types			
Type	Files	LOC	LOC per file
Totals	3768 (100.0%)	811676 (100.0%)	215.4
*.c	420 (11.1%)	289903 (35.7%)	690.2
*.java	471 (12.5%)	179038 (22.1%)	380.1
*.cxx	127 (3.4%)	121101 (14.9%)	953.5
*.xml	141 (3.7%)	37184 (4.6%)	263.7
*.form	99 (2.6%)	32035 (3.9%)	323.5
*.h	368 (9.8%)	24360 (3.0%)	66.1
*.xbm	18 (0.5%)	22944 (2.8%)	1274.6

File Types			
Type	Files	LOC	LOC per file
*.hxx	126 (3.3%)	16635 (2.0%)	132.0
*.doc	6 (0.2%)	14256 (1.8%)	2376.0
*.cpp	35 (0.9%)	13240 (1.6%)	378.2
Others	860 (22.8%)	60980 (7.5%)	70.9

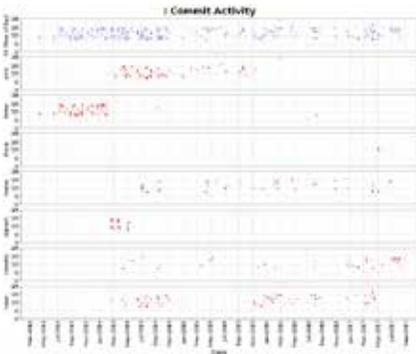
Above statistical information for a project gives an idea about various types of source files, their LOC and an average LOC per file.

Following table contains list of Top 10 source code files for a project. It contains mix of .java and .cxx files.

Largest Files (TOP 10)	
File	LOC
ExpressCommon/.../GenericApp.java	18394
ExpressCommon/.../EMGenericApp.java	9397
ExpressCommon/.../ImageBasedExplorer.java	9083
ArsenalDev/.../Aeu.cxx	6944
ArsenalDev/.../configurations.xml	6098
ArsenalDev/.../Beu.cxx	5757
ExpressCommon/.../AcqSettingsDialog.java	5607
ArsenalDev/.../bbrc.cxx	5349
ExpressCommon/.../ImgPanel3D.java	4345
ArsenalDev/.../lvdr.cxx	3568

Top 10 Files With Most Revisions	
File	Revisions
ExpressCommon/.../GenericApp.java	138
ExpressCommon/.../AcqSettingsDialog.java	84
ExpressCommon/.../PanelViewerXResult.java	37
ExpressSNR/.../ExpressSNR.java	28
ExpressCommon/.../GenrateXYPlot.java	23
ExpressCommon/.../ASatInfo.java	23
ExpressCommon/.../PanelViewerXResult.form	20
ExpressCommon/.../ImageBasedExplorer.java	18
ExpressSNR/.../SNRSettingsDialog.java	17
ExpressInstaller/.../ASH_Home.java	16

• **Developer Activity**



IX. Comparison of CVS and SVN

CVS is based on RCS files of versions control. Each file connected to CVS is an ordinary file containing some additional information. Thus, it works on file-by-file basis. Being simple, with CVS, data loss is minimal, repository corruption can be easily recovered by correcting RCS files, if necessary.

Basis of SVN is a relational database BerkleyDB composed of a set of binary files. SVN tracks the entire commit as a new revision. SVN's base being a set of binary files, allows more concurrency and is faster in terms of speed of operation.

Atomic commit operation in concurrency environment is a problem in CVS. Whereas in SVN this problem does not crop up.

CVS allows rollback of any commit in the repository, even though this may require some time, as each file is processed independently. SVN does not allow rollback of commit.

And finally, not many tools are being developed around CVS anymore. NetBeans IDE has stopped CVS support since version 7.0. Whereas, SVN has a pretty large application base on any system including IDEs like NetBeans.

X. Migration from CVS to SVN

Migration from older version control system (CVS) was inevitable because of the following important reasons:

1. To have a uniform system for all applications
2. To take the advantages of new features of Subversion over CVS.

As discussed earlier, the server code of XSCoPE is being managed using CVS repository and the client

application coding is in SVN repository. So there was a need to switch from CVS to Subversion.

Main challenge to transfer the data from CVS to SVN repository was not to just transfer the latest copy of data, but all the development history as well.

cvs2svn [5] is a tool for migrating a CVS repository to Subversion or Git. The main design goals are robustness and 100% data preservation. Conversion tool cvs2svn has been used to migrate the repository to SVN repository without losing the latest history. It converts all revisions, branches, tags, log messages, author names, and commit dates. cvs2svn also deals with many CVS oddities and is highly configurable.

XI. Challenges Faced

1. During commit, if some interruption happens and commit event is aborted in the middle, files get locked.
2. Two developers have either changed the same portions of code or modified the same variables and committed the changes in the repository.

Conflict will occur in this situation and only one change will be accepted finally. So the other developer has to get the final copy from repository and repeat the work once again.
3. Subversion does not know about the conflict free merges which makes it impossible to track who has changed which code. So when two developers are working on same set of code, then in future it will be difficult for a team leader to track the changes if changes are not properly commented.

XII. Comparison of SVN with other commercial tools

As mentioned in section IV, many tools, in Open Source and Commercial domains, are available for the configuration control of the software. One comparison chart [6] between Subversion and Commercial Tool ClearCase is shown below:

Advantages of Subversion over ClearCase:

- SVN is available on a lot more platforms than ClearCase.

- It is easy to use and install -- especially on client machines.
- Network security: Subversion can use https or svn+ssh which make it safe to use remotely. ClearCase has to be used via VPN to be truly secure and some setups of VPN filter ClearCase packets out.
- Subversion is much faster and leaner.
- Subversion makes a clear distinction between the client and server. An administrator only has to worry about the Subversion server installation and not how the clients are setup.

Conclusion

For collaborative development, version control system is a must. Lack of proper tools is one of the reasons [7] for poorly engineered product and delayed delivery. For a centralized requirement like XSCoPEExpress, where the development is confined and non-distributed, both CVS and SVN are good. Mercurial and Git are based on distributed repositories and not bundled with standard Linux distribution. SVN is more robust, reliable, newer and available out-of-the-box on standard Linux distribution. Hence, SVN turns out to be the best choice for limited projects.

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About the Authors



Mr. Amit Dave is Sci/Engr "SG" – B.E. Computer Science M. S. University, Vadodara. He is associated with development of software for ground checkout of various EO payloads. Developed device drivers for high-speed data acquisition card, payload checkout applications, algorithms, instrument control, automation, database, web based software for various EO payloads for earth-observations, inter-planetary missions and airborne sensors.



Mr. Jitendra Sharma Sci/Engr – "SF". M.Tech Computer Sc. And Technology (IIT Roorkee), B.E. Electronics (MMMEC Gorakhpur). He is currently working on High performance computing, GPGPU, Distributed Computing, Micro controllers, Airborne Imaging Systems.



Ms. Nutan Kumari, Sci/Engr "SD" – B.Tech Comp Sc. (BVP Deemed University, Pune). Presently working on payload checkout evaluation system, automation of different test benches, High performance computing, GPGPU, Airborne Imaging Systems.



IEEE MGA Leadership Award to Mr. H R Mohan

CSI Fellow & CSI Past President

CSI Communications congratulates Mr. H R Mohan, CSI Fellow and CSI Past President for having been selected as a 2017 recipient of the IEEE MGA Leadership Award. He is currently the Vice Chairman of IEEE Madras Section, the largest Section in India. The official communication to Mr. Mohan from IEEE states:

This is a very prestigious award, and we are pleased to honour you for the outstanding contributions you have made to numerous IEEE activities and the example you set in carrying forward the goals and objectives of the IEEE MGA Board.

Please accept our congratulations on being recognized for this most deserving honour.

The citation states: For dedicated and sustained commitment to member engagement through various programs, student activities and information sharing.

Text Detection and Recognition in Natural Scene Images

► Sharath Kumar Y H

Dept. of Information Science & Engg, Maharaja Inst. of Tech.,
Belawadi, Srirangapatna Tq, Mandya, Karnataka, India
sharathyhk@gmail.com

► Puneeth P

Dept. of Information Science & Engg, Maharaja Inst. of Tech.,
Belawadi, Srirangapatna Tq, Mandya, Karnataka, India
puneethkumar_p_ise@mitmysore.in

1. Introduction

In context of scanned machine written text-detection and recognition is considered a solved problem. There are several commercial and freely available systems [25], achieving recognition performance of 99%. Text detection and recognition in natural scene images is, however, a challenging, unsolved computer vision problem. Scene text has complex background, image blur, partially occluded text, variations in font-styles, image noise and varying illumination. Commercial systems do not work in these setting. The end-to-end scene text recognition problem is divided into a text-detection and text recognition task. Text-detection is a preprocessing step for the text-recognition task. The text detector has to locate words in natural scene images. Hence the detector has to distinguish text locations from non-text locations in an image. The text-recognizer predicts a word shown in a cropped image patch which is retrieved by the detector.

Scene text identification and recognition is used widely nowadays, natural scene images, especially in modern urban environment for example (posters, product tags, guide posts, electronic sign boards, shop boards and name plates etc.) consists of wide range of data which are very beneficial to a variety of applications example: navigation system, target geo-location product search, data indexing, image understanding. Scene text consists of backgrounds that are not necessarily clean and white, and more complex ones make text extraction from background difficult. Moreover scene text such as that seen in advertisements may include artistic fonts

Issues having an impact on image processing are limited to sensor noise, skewed documents and inherent degradations to the hand written document. Based on the classical acquisition method, the optical character recognition (OCR) systems have been designed for many years to reach a high level of recognition with constrained documents. The recent explosion of handheld imaging devices (HIDs), i.e. digital cameras, standalone or embedded in cellular phones or personal digital assistants (PDAs). Research on document image analysis [24] entered a new era where breakthroughs are required, traditional document analysis systems fail against this new and promising acquisition mode.

In this work, we aim to develop novel approach for detection and recognition of natural scene text. Initially the real world images have taken. The various

features are extracted from scene text. Finally, the character identification and recognition is done using OCR. Figure 1 shows the natural scene images which containing text.

2. Background Work

To understand the overall value of text detection and recognition approaches, it is useful to provide background information about the underlying problems, applications and technical challenges.

2.1 Text in Imagery

Graphic text and scene text are considered two basic classes of text, where the former refers to machine print text overlaid graphically and the latter refers to text on objects, captured in its native environment. Graphic text is usually machine printed, found in captions, subtitles and annotations in video and born-digital images on the web and in email [37].



Fig. 1: Natural scene images containing text



Fig. 2 : Text in imagery. (a) Video graphical text. (b) Point-and-shoot scene text. (c) Incidental scene text

Scene text, however, includes text on signs, packages and clothing in natural scenes, and is more likely to include handwritten material [38]. Most recent research has focused on scene text, and, to portray the challenges more accurately, it helps to further distinguish between images where the primary purpose of the image is to capture text and images where the text is embedded in the scene. Although a continuum exists between the two, we refer to the former as point-and-shoot text and the latter as incidental text, as shown in Fig. 2.

2.2 Applications

Over the past two decades, there have been numerous text related applications for both images and video, which can be broadly categorized as multimedia retrieval, visual input and access, and industrial automation.

Multimedia retrieval. Text in web images is relevant to the content of the web pages. Video captions usually annotate information about where, when and how of the happening events [29], [30]. Recognizing text and extracting keywords in such multimedia resources enhances multimedia retrieval.

Visual input and access. The expansion of mobile devices containing digital cameras has made imaging devices widely available. With an embedded module, mobile devices automatically input name cards, whiteboards and slide presentations [31], [32]. Without being forced to input by keyboard, users feel more comfortable and work more efficiently. Signs in natural scenes carry significant information. Automatic sign recognition and translation systems enable users to overcome language barriers [33]. Carnegie Mellon University developed an early PDA-based sign recognizer [33], and recent platforms include

iOS and Android, which can instantly recognize and translate text into another language [34].

According to the World Health Organization, approximately 39 million legally blind and 285 million visually impaired people live in the world. Developing personal text-to-speech devices assists them in understanding grocery signs, product and pharmaceutical labels, and currency ATM instructions [35].

Industrial automation. Recognizing text on packages, containers, houses, and maps has broad applications related to industrial automation. For example, recognition of addresses on envelopes is applied in mail sorting systems. Automatic identification of container numbers improves logistics efficiency. Recognition of house numbers and text in maps benefits automatic geocoding systems [36].

3. Literature Survey

In this section, we provide a brief review on existing work related to our work.

Baoguang Shi et al., [1] proposed a deep learning based algorithm called Multi-stage spatially-sensitive pooling network (MSPN). The convolutional neural networks (CNN) and spatially-sensitive multi-stage pooling layers are used for feature extraction and script identification. Deepak Kumar et al., [2] have proposed effective methods for segmentation and recognition; it splits the word image into individual color, gray and lightness planes and later enhance the contrast in each of these planes independently by a power-law transform. The discrimination factor is used for feature extraction. The plane that has maximum discrimination factor is selected for segmentation; finally binarized words are used for recognition. Xiang Bai et al., [3] have

proposed a method called strokelets; it's a multi-scale representation which captures the substructures of characters at different granularities with respect to the part prototype. Bag of strokelets feature is used as a descriptor for image regions that contains text strings for feature extraction and finally a random forest classifier is used for classification. KAIST et al., [4] proposed a system to detect the characters using conditional random fields (CRF). The CRF is used to form super pixel and passes them to soft OCR engine for detection of character. Neumann, L et al., [5] proposed a method for text localization and recognition by hypotheses verification framework. Here segmentation is done by maximally stable external region (MEER) and multi-class support vector (SVM) used for recognition. A Mishra et al., [6] present a framework that exploits both bottom-up and top-down cues. The bottom-up cues are derived from individual character detection from the image, top-down cues obtained from a lexicon-based prior.

Khaoula E et al., [7] proposed a novel method to recognize scene text. It uses multi-scale scanning scheme using windows with non-linear borders. Convolutional neural networks are designed and trained to classify each window in order to recognize valid characters and identify non-valid ones. Xin He et al., [8] proposed a neural network-based scene text recognition system. Sliding window is used over each connected component for segmentation purpose and MQDF classifier used for classification. B Shi et al., [9] proposed a method called robust text recognizer with Automatic Recitation (RARE) which is a specially-designed with deep neural network. An image is firstly rectified via a predicted Thin-Plate-Spline (TPS) transformation into a more "readable" image. Fiducial points are identified by localization network. By using a grid generator new set of fiducial points are identified by using Spatial Transformer Network (STN) and a Sequence Recognition Network (SRN). Xinhao Liu et al., [10] have proposed a highly accurate character recognition model called Convolutional Neural Network (CNN). Here classification is done by Multi-layer perceptron which maps the

input to the n different convolutional layers. Later Sliding window method is used for cropped image recognition. XiaohangRen et al., [11] have proposed a CNN based scene text detection algorithm with a new text region extractor. Candidate text region extraction is done by Maximally Stable Extremal Region (MSER), which improve the independency and completeness of the extracted candidate text regions and detection is done by CNN. Deepak Kumar et al., [12] proposed a midline analysis segmentation technique by choosing the labels of middle row of the image as a sub-image. Then, the labels from this segmented sub-image are used to propagate labels to other pixels in the image. Bayesian classification and Max-flow methods have been independently used for label propagation and OMNI OCR for recognition. Jay H. Bosamiya et al., [13] have proposed and introduced an approach for character segmentation which combines the advantages of connected component analysis, stroke width analysis and graph cuts.

J VivekVeeriah et al., [14] proposed a system to integrate with augmented reality technique such as translation from one language to another language. This method is capable of locating text written in different languages obtained from videos. The method uses otsu and MSER for segmentation and cascade of N filters for text region filtering. Shangkwantian et al., [15] proposed a robust text segmentation method that employs both Markov Random Field (MRF) and graph cut algorithms. Stroke feature transform is adopted to robustly identify text seeds and text edges, labeling of 1 for text pixels and 0's for background pixels using gibbsenergy E for classification. Max Jaderberg et al., [15] proposed encoding schemes like 90k-way dictionary encoding, character sequence encoding and bag-of- N -grams encoding. A deep neural network model and data produced by a synthetic text generation engines

are used for encoding of words. P Kumar Singh et al., [17] proposed page level script identification for hand written documents. The gray level co-occurrence matrix (GLCM) features and multi-layer perceptron (MLP) classifier performs the best in page level script identification. Xwang et al., [18] presented an efficient text detection method with multi-channel connected component. Shivananda V.S et al., [19] presented a hybrid methodology which extracts multilingual text from natural scene image. Edge features extracted using Contourlet transform and classification based SVM classifier.

A Mishra et al., [20] present a framework that uses a higher order prior computed from an English dictionary to recognize a word, which may or may not be a part of the dictionary. Character detection is by sliding window detector and recognition of words based on graph construction. Chunheng Wang et al., [21] propose a novel scene text detection approach using graph model. The Maximally Stable Extremal Regions (MSERs) is used to incorporate various information sources into one framework. Segmentation is done by MSER's Labeling text and non-text regions and this labeling is used for the graph construction. Baoguang Shi et al., [22] proposed a methodology which combines the deep features and mid-level representations into a globally trainable deep model. .K. C. Kim Shi et al., [23] proposed a method that extracts text regions in natural scene images using low-level and high level image features.

4. Future Nchanment

In this section, we provide a brief review on existing work related to our work.

From the literature survey, we found the existing methods with drawbacks. Many of the work proposed are deals with less dataset and inefficient scene text images. Majority of the proposed systems have used binarization, which is very sensitive to

non-uniform illumination and noise. Connected component extraction is unable to handle broken strokes and connected characters. Classification of natural scene text was not done effectively, non-horizontal text detection have been a major challenge. Sliding window produces plenty of false alarms due to significant variation in character aspect ratio.

It is also noticed that no work has been attempted towards estimation of multiple skews in multilingual scene text. This poses new challenges in the field of document image analysis and has motivated us to take up this research work. The gap between the technical status and the required performance indicates that text detection and recognition remain unsolved problems. While great progress has been made there are still numerous research opportunities.

End-to-end recognition. Compared with the performance of OCR on clean documents, end-to-end text recognition performance is still far behind. Improvement will come not only from stronger character recognition models, but also from well-designed information sharing, feedback and optimization strategies. Recently developed large scale deep learning has substantially improved character classification performance by learning hierarchical multi-scale representations [39], [40]. The integration of deep learning with optimized segmentation, recognition and high order language models could further boost the performance. **Open vocabulary recognition.** Existing word spotting approaches with small lexicons report encouraging performance with the ICDAR benchmarks. However, the utility of these approaches is limited because general lexicons are unlikely to contain the proper nouns and other words that appear in scene or graphical text imagery. To overcome the limitation, it is useful to incorporate an open vocabulary, i.e., large scale web-based language information [41].

► RESEARCH FRONT ►►►



ICDAR'11 Graphic text dataset



ICDAR'11 Scene text dataset



MSRA-II Scene Text Dataset



NECOR Scene Text Dataset



MSAR-I Graphic Text Data Set

Figure 3. Sample images of text from the ICDAR'11, MSRA-I, MSRA-II, SVT, and NECOR datasets.



Fig. 4 : Word examples from dataset ICDAR'11

It is also useful to develop approximation methods to efficiently use large scale language information for recognition. Processing incidental text. Incidental text suffers from image degradation, distortions, font variations and cluttered backgrounds. Many approaches can tackle single issues, yet few approaches process a combination of them. To address the general problem of incidental text detection and recognition, improved invariant features must be designed or learned, state-of-the-art enhancement and rectification methods must be integrated, and new sensors must be applied.

Processing multilingual text. Text from various languages shows different characteristics. Recognition of text from East Asia countries, e.g., China, Japan and India, was considered an extremely difficult problem due to the large number of character classes, complicated character structures, the similarity among characters, and the variability of fonts. Using a single method with fixed parameters to recognize text from all the languages remains difficult to achieve.

5. Methodology

Text Detection and Localization:

“Are they any image in the text and where is the text?”

Text Extraction: “How can segment text from the background?”

Text Recognition: “What does the

text say?”

Text Detection via Edge cue:

Scene text detection aims to locate the position of texts in different scenes, e.g. guideposts, store marks and warning signs, which is one of the most important steps for end-to-end scene text recognition. Inspired by the fact that edge is one of the most important cues to distinguish texts from background, our methodology consists of two main stages, i.e. candidate character region extraction and region classification. For the stage of candidate region extraction, the method extracts the edges of an input image, which will be used to determine the possible positions where the texts will be appeared and then slides multi-scales windows around the edge connected regions. For the stage of region classification, the method extracts and combines high discriminable hand-designed low level features and CNN based high-level features for region classification.

Text Extraction via Homogeneous region segmentation:

Segmentation is the process of partitioning a digital image into multiple regions of pixels. Each of the pixels in a region are similar with respect to some characteristic or computed property, such as color, intensity, or texture. Adjacent regions are significantly different with respect to the same

characteristic. From the observation, text, which exists in the natural scenes, usually appears on color uniformed surface [e.g. signboard background]. The basic idea of our methodology is to search the signboard area firstly; text is then extracted from the signboard area. So, in this section, we first segment a scene image into homogeneous regions. A mathematical morphological operator, the Toggle Mapping, is applied on a grayscale image for segmentation according to the intensities of pixels.

Skew Detection:

Hough transform algorithm is used for the skew detection. The Hough transform is a feature extraction technique used in image analysis, computer vision, and digital image processing. The purpose of technique is to find imperfect instances of objects within a certain class of shapes of voting process. this voting process is carried out in a parameter space, from which object candidates are obtained as local maxima in so called accumulator space that is explicitly constructed by the algorithm for computing the hough transform. The classical Hough transform was concerned with the identification of lines in the image ,but later the Hough transform has been extended to identify the position of arbitrary shapes especially circles or ellipse.

Text Recognition via CNN classifier and WFST-based word labeling

The word recognition task consists of identifying characters and recognizing them as text format from a given image patch. Our method uses the CNN-based word labelling approach for efficient and accurate text recognition. We are going to develop an accurate character recognition model based on Fractional Max Pooling (FMP) structure and Network in Network (NIN) module. Then for post processing, we develop a WFST based word labelling approach which encodes a mapping from the CNN labels to desired lexicon word. The benefit of the WFST based representation is that it is not only efficiently handle the ambiguous set of CNN labels, but also very flexible to incorporate with high order lexicon and language models.

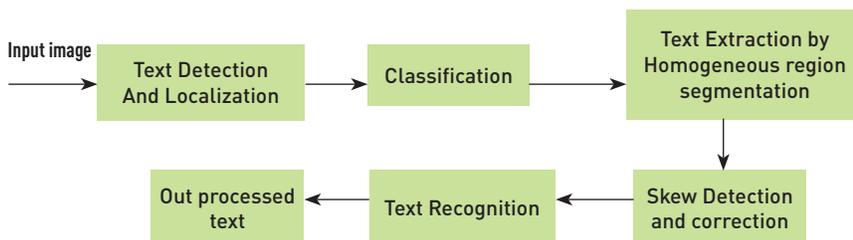


Fig. 5 : System Diagram of Natural Scene Detection Recognition

6. Conclusion

In this work we briefly discuss the Application and Challenges of Natural Scene images. In addition, we also review the various work proposed by the researchers across the world on natural scene and we also identified the drawbacks of the work proposed. Based on the drawbacks we drafted the objectives for the future work. Finally, the proposed methodology for text detection and recognition is discussed briefly.

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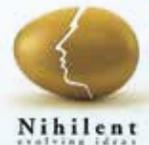
About the Authors



Dr. Sharath Kumar Y H received the M.Tech and Ph.D. degrees from University of Mysore, Mysore, India in 2009 and 2014, respectively. In 2013, he joined the Maharaja Institute of Technology, India, as a Assistant Professor. Now he is working as Associate Professor and HOD, Department of Information Science. He has published papers in referred national and international journals. His research interests include Data Mining, Machine Learning and Image Processing.



Mr. Puneeth P received the M.Tech from VTU, Belgavi, India in 2014. In 2015, he joined the Maharaja Institute of Technology, India, as a Assistant Professor. His research interests include Data Mining, Machine Learning and Image Processing.



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Make friendship with your Machine : *The HUMAN Machine*

▶ **Anila M.**
Asst. Professor, MLRIT, Hyderabad



Artificial intelligence (AI) is about autonomous learning and mimics the way a human brain learns: looking for patterns within large amounts of data, such as speech, images, text, or anything else. And, just as neuroscientists do not yet know exactly how the brain works, data scientists also often struggle to explain how AI works. Technology simply moving too fast to be complacent.

AI will quickly and undoubtedly become more than an underlying technology capability, will pervade intelligent enterprises and advance to a fundamental tool for daily engagement with people.

Because AI technology has already marked its wider role in user experiences across different interfaces. Think of people's conversations with chat bots on the web, their mobile phone queries to Google Now, and their requests to Alexa

on an Amazon Echo speaker at home. In each of these examples, people are interacting with technology through an AI intermediary. And so, It's a curator! That helps you make your own machine a friend. Following figure tells you how the AI works in machines.

First it takes role of *curator* i.e. suggests what can be done basing on previous data, then will act as an *advisor* which guides users to make steps towards best results and later changes its role to an *orchestrator*, where consumes past behaviour and integrate different tasks in-order to yield best outputs.

This is an intuitive way to relate to technology. In fact, we're already started treating technology like we treat each other(human). So instead of browsing a website to find information or a mobile app to finish the tasks, we're talking to the AI, making decisions with

it, and getting what we need and want through it.

It's an out-and-out game-changer. The swing of artificial intelligence technologies—natural language processing, computer vision, machine learning, intelligent automation, robotic process automation, deep learning and more—will amend our relationship with technology.

This changing relationship will have major implications for how businesses build systems. And it will also unlock many new opportunities to help professionals accomplish their personal and professional goals in their lives and at work.

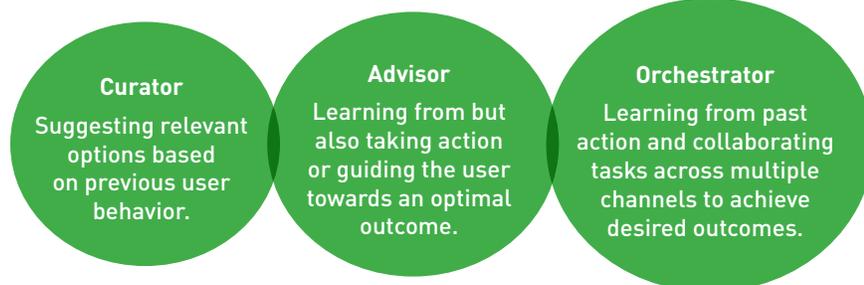
Fade your fear from automation: Few examples which led the process automated

There are many examples in which machines automate the process that humans do, like simplify hiring processes, from sorting resumés to scheduling interviews

This technology-led process casts a wider net for talent and covers more volume in lesser time than humans can. Besides, it targets not just active jobseekers but even passive talent—those who haven't even thought of quitting their jobs yet. And connecting with them is merely a matter of clicking a button.

It's not that workers have nothing to fear from automation, but rather that companies will have a fair amount of choice over what they want to do with the extra efficiencies that technology will bring.

"Journalists, beware!" is a story about a Google-funded software project that aims to automate local news articles. Similar warnings have been given to other knowledge workers: Investment bankers aren't safe. Auditors aren't safe. Insurance brokers aren't safe. Therapists aren't even safe.



Nobody's job is safe from the machines. This was supposed to be the point of Hammond's computer science for journalist's course. "You have to use technology to do what you want to do,". "The more you know how to use the technologies and the more you

understand what you want, the better the world will end up being." And, on a positive side, "Something you're in partnership with doesn't replace you." I hope it's right. The future abstractions and models are far beyond our comprehension. In 20

years, everything quantifiable especially in finance and investment will be the robots' domain. But at the same time, trust will become the ultimate currency. The rise of AI robots in our industry will — ironically and necessarily — re-humanize what we do. ■

About the Author



Ms. Anila M is currently working as Asst. Professor at MLRIT, Hyderabad and research scholar at KL University, Guntur. She have 8.5 years of Teaching experience and her main interests are Databases, Data Mining, Artificial Intelligence, Machine learning, and software Testing.

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Imaging Applications using Machine Intelligence

▶ Akila K.

Asst. Professor of CS and Engg. at R.M.K College of Engg. and Technology, Chennai

▶ Jayasri P.

Student of CS and Engg. at R.M.K College of Engg. and Technology, Chennai

In the recent times, developments in image processing have made enormous availability of information in multimodal format. Although existence of sophisticated image processing tools analyzes the data, these tools are complex and require intelligence to operate on the data effectively. For extraction of useful information from the data, a user must possess appropriate intelligent machines and image processing techniques. This article describes the use of machine intelligence to showcase various image processing applications for data discovery from images.

Introduction

Machine Intelligence process explores application and theory oriented knowledge which helps in language and speech translations, visual processing, ranking and prediction. Artificial Intelligence uses Machine Intelligence to solve most of the challenges faced in the society. Machine Intelligent systems are capable of performing intelligent tasks but using these systems we can perform operations at a higher level due to the speed and power of modern computers. The major precursors of Machine Intelligence are goal seeking, homeostasis, learning abilities. The initial requirements of machine intelligence were state oriented, value driven, perpetual learning and self-organization. The various usefulness obtained from machine intelligence are:

- Error reduction in terms of tasks performed.
- Daily applications can be performed efficiently
- Repetitive jobs can be handled making it less time consuming
- Medical operations can be easily executed.

The various domains of artificial intelligence are described below:

In the near future, Machine Intelligence will guarantee:

- Home advanced machines-robots, intelligent gadgets
- Machines having higher than human intelligence providing drastic progress in science
- Initiation of technology

development, creation of new markets and increase in economic growth.

Intelligent Image processing:

Intelligent Image Processing is the fifth generation of industrial vision systems which possess the ability to have a shared communication experience among users using devices built inside spectacle frames. This process is harmless to the human eyes. Intelligent imaging is required for military and various types of surveillance, statistical data collection in the fields of forestry,

agriculture, disaster prediction, and weather prediction. Intelligent image evolves scanning and multichannel input, progressing with content analytics and other linguistic enhancements. For achieving the benefits of image processing, we require a group of various technologies like scan and capture images, business process management capabilities, repository for managing the data. Intelligent imaging provides a platform for connecting customer inputs with business system leading to improvement in response time and anticipation of what customer

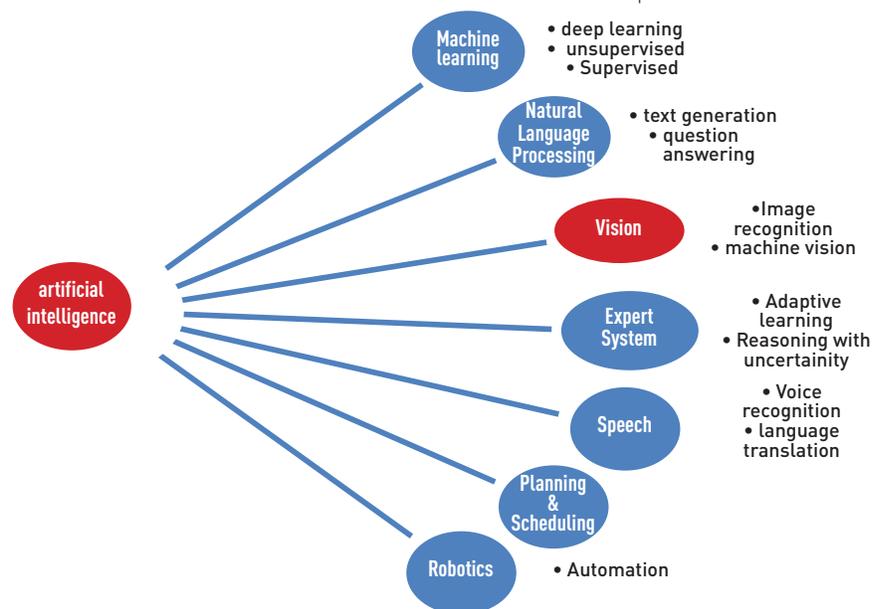


Fig.1 : Artificial Intelligence domain

needs. Some of the benefits of image processing include :

- Faster access to information
- Accuracy in data captured
- Fast imaging process
- Sustainable outcomes
- Huge volume of data can be scanned

Intelligent Image processing works on the principle of EyeTap principle.



Fig. 2 : Eyeglasses

It acts as an eye to record the scene available to the eye as well as a display. It captures the world around it and augments the image allowing it to overlay computer generated data over the top of normal view the user sees. It replaces each ray of light passing through the lens of at least one eye of the wearer, with a synthetic ray of light responsive to the output of a processor. It enables a shared visual experience that connects multiple perceptions of individuals into a collective consciousness.

WearTEL Technology:

- It is a handled device that allows tapping of our eye and turning it into a camera making a single person perspective of creating personal documents.
- The WearTel phone uses EyeTap technology to allow individuals to see each other's point of view.
- It allows each other to see what they are looking at other than only the view of the person.

Cornea AI application:

- Machine Intelligence has enhanced the possibilities of automatic photo editing / enhancement through Cornea application.
- This application makes use of neural networks to find the popularity score of photos before share them on social site and helps to improve the score by

recommending trending filters and hash tags.

- Cornea also contains basic filtering tools for users to be used on their photos containing unlimited effects.
- With Cornea, the ultimate aim is to provide an accessible usage for all, so that sharing a photo is simple.



Fig.3 : Cornea AI Application

Face2Gene:

- It is a chamber of phenotype applications that provide comprehensive and accurate genetic evaluations.
- The patient's facial description is compared to syndrome gestalt (gestalt scores) to quantify similarity resulting in a prioritized list of syndromes with similar analysis.
- By combining the gestalt scores and the glossy features we result in clinically-important variants for better elucidation.
- It contains diagnosis and analysis of the syndrome, along with editing features, heat map, gestalt meter indicating low, high and medium as parameters.



Fig.4 : Face2Gene Application

Google Cloud Vision API:

- Users can upload their images to the Cloud Vision API to understand the contents of those images.
- This helps in detecting objects as well as to reading of text within the image or identifying product logos.
- With the beta release of Cloud Vision API, one can access the API with location of images stored in Google Cloud Storage along with existing support of embedding an image as part of the API request.
- Additional capabilities to identify the dominant color and broad set of objects are exist in the image. Major features of this API include :
- Inappropriate content detection
- Identification of emotional attributes of people
- Detection of text within images

PhotoFy

- It is a social photo editing and branding application editing about 1,50,000 photos a day created by a wide range of users.
- PhotoFy indicates potentially violent and adult content on user photos along with their abuse policies and is one of the most powerful photo content creations in the world.

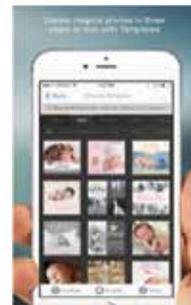


Fig. 5 : PhotoFy application

Image Insights:

Brandwatch company has developed an application for business organizations developing products to detect their product's logo shared online in the form of images. Image Insights is recognized as the world's leading logo detection technology. On a daily basis, approximately 800-900 images are uploaded that contain logos of companies. for every company, there exists a dashboard that is updated in

real time, contains information such as the location, at what time and how the logo is shared. Logos are identified even if it's partially obscured, stretched or edited. Using this information, a company can:

- Evaluate the performance of advertisements
- Identify user-generated content
- View how customers use the product
- Discover misuse of logo or any

harmful content

- Find the significant people promoting the brand

Conclusion:

New upward trends in the area of image processing prevails which are used to perform wide range of knowledge discovery. Adoption of machine intelligence techniques in image processing would develop only with the public opinion regarding the benefits

and drawbacks. In the near future, the satellite imaging and remote sensing application programs will feature a variety of sensors orbiting the earth. In the field of digital communication and telecommunication, major uplift has significant relevance to image processing. Machine intelligence will continue to change the world of creativity engaging learning accompanied by skill development.

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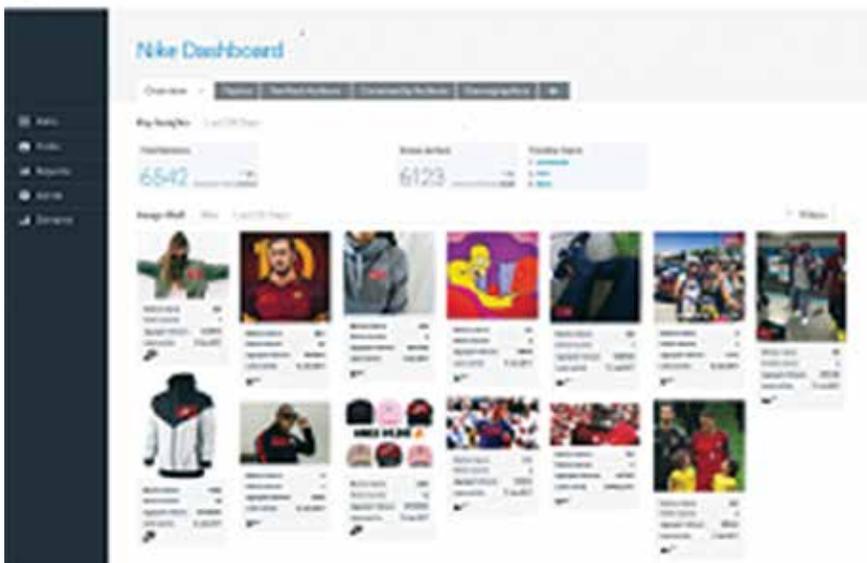


Fig. 5 : Image Insights for Nike

About the Authors



Ms. Akila K is the Assistant Professor of Computer Science and Engineering at R.M.K College of Engineering and Technology, Chennai. She completed her B.E (CSE) in the year 2003 and M.E (CSE) in the year 2005 from Sathyabama University. She is pursuing her Ph.D.(CSE) in Anna university. Her areas of interests are Data Mining, Image Processing, and Pattern Recognition. Her area of research is Digital Image Processing.



Ms. Jayasri P is the student of Computer Science and Engineering at R.M.K College of Engineering and Technology, Chennai. Her areas of interest include Web Services, doing Mini Projects, participating in various inter college activities.

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Understanding Machine Vision by Human Activity Recognition

▶ **Dushyant Kumar Singh**

Asst. Professor, Department of Computer Science and Engineering, Motilal Nehru National Institute of Technology Allahabad, Allahabad, UP

Introduction

Video data is present in insanely huge amount in every part of the world today. A huge volume of video data is produced each and every second by surveillance cameras, video cameras, mobile devices, etc. Public surveillance cameras are the single biggest source of all the videos in this world. This presents us with a challenge of maintaining and categorizing all of that data efficiently and in a human-friendly manner for easy storage and retrieval. Apart from this, a system capable of recognizing activities from a video can enable us to develop a partially or fully automated surveillance system. The underlying principle remains the same for every application, i.e. tagging each second of video with a label that represents the activity happening in it at that time instance. A system capable of recognizing the human behavior can have several applications, from visual surveillance to automatic sports commentary. In particular, a method for determining an instantaneous human action that may comprise several actions in sequence would inevitably be a core building block of the system. Efros et. al. [4] has proposed some technique for recognizing person-centred actions like walking, running, and standing.

Such a system can also help in content based storage and retrieval of video data in any vision based system. The core functions of such system could be, recognizing various human-object, human-human and object-object interactions etc. Based on these findings any video can be tagged with appropriate labels. These systems can be deployed in security applications for surveillance. Since the introduction of analog video surveillance systems back in the 1970s, tremendous strides have been made in sensing, storage, networking, and communication

technologies [3]. The consequence is that, instead of employing video surveillance mainly as an after-effect forensic tool, it is now feasible to deploy digital, network-based surveillance systems to provide interactive, real-time monitoring and surveillance. An effort is made here to propose a computer framework for video analysis to enable robust and real-time human activity recognition. Literature provides some existing proposals on techniques for human activity recognition [1, 2 & 3].

Challenges

There are still many issues and challenges that motivate the development of new activity recognition techniques to improve the accuracy under more realistic conditions.

- 1. Subject sensitivity:** The accuracy of activity recognition, especially those based on the accelerometer data, is heavily affected by the subjects participated in training and testing stages. This is mainly due to the fact that different people have different motion patterns.
- 2. Activity Complexity:** The complexity of user activities also brings
- 3. Insufficient Training Set:** collection of training data under realistic conditions is very difficult. As mentioned in the subject sensitivity challenge part, it is highly desirable that the training data must contain as many varieties of the subjects as possible. However, it is not easy to coordinate people of different ages and body shapes to collect data under a controlled lab environment, not to mention the varieties of the environment itself.
- 4. Personal Biometric Signature:** A subject motion pattern is usually exclusive and unique. For example, when people raise their hands, it is almost impossible for two people hands to share the exact same motion patterns.
- 5. Computational Power:** Neural Networks require a great deal of

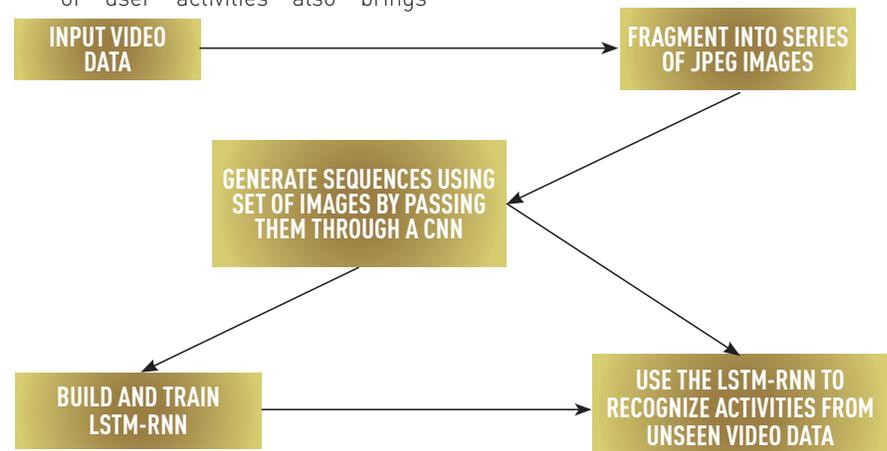


Figure 1: Human activity classification in a video using LSTM-RNN



(a) Biking



(b) Fighting



(c) Hand Gesture



(d) Jumping



(e) Running

Fig. 2: Example of predictions of Activities using CNN models DataSet <http://crcv.ucf.edu/data/UCF101.php>

computational power to run. Most of the big neural networks run on giant network of GPUs with several Gigabytes of main memory.

Methodology

The use of machine learning techniques could be one solution domain to cover the above stated challenges for human activity recognition. To handle activity complexity and learning inputs in terms of huge dataset, the Convolutional Neural Network (CNN) [5] and Recurrent Neural Network (RNN) [6] are the tools. Long Short-Term Memory (LSTM) [7], a special kind of RNN is used in a technique proposed by my students for human activity classification. The flow graph in figure 1 shows the procedure of human activity classification in a video using LSTM-RNN.

The experiment was done for classifying the video clips based on the activities it poses. The classes for which LSTM-RNN was trained were Biking, Fighting, Hand Gesture, Jumping and Running. Same are also shown in figure 2, when applied on sample video clips.

Conclusion

LSTM model is designed for recognizing 5 different activities. This model makes best use of sequential nature of video data. The accuracy achieved is high, which accounts to an average of 95%, with our considered dataset and the set of classes. The

higher training and classification time was recorded on CPU based machines. While this time was reduced by using GPU based NVIDIA Jetson TK1 SoC board.

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About the Author



Dr. Dushyant Kumar Singh (Membership No. I1500373) Areas of my research interest are Computer Vision, Image Processing, Embedded Design, Advance architectures etc. I have good number of research publications in reputed journals and conference proceedings. I frequently write articles for different magazines. Besides authoring papers, I am also the reviewer for good flagship conferences and reputed journals.

Role of Machine Intelligence for sustainable agricultural development

► Mahendra Balkrishna Salunke

Dept. of Computer Engg., Pimpri Chinchwad College of Engineering & Research, Ravet, Pune. 412101 • E-Mail: msalunke@gmail.com

► Ashish V. Salunke

Dept. of Computer Engg., Pimpri Chinchwad College of Engineering & Research, Ravet, Pune. 412101 • E-Mail: avsalunke98@gmail.com

This article expounds an overview of Machine Intelligence and its broad spectrum over different fields and aspects in near future and it emphasizes its significance in the field of agriculture, its impact in optimizing the farming practices. It highlights the associations, organizations working in Machine Intelligence to achieve a sustainable autonomous farming strategy.

Introduction

Homo sapiens—man the wise. Right from the beginning of human race, human being has consistently tried to decode how he thinks, how a mere handful of matter can perceive, comprehend, predict and maneuver an environment that is more outsized and complicated than itself.

The present scenario where AI (Artificial Intelligence), Automation has an upper hand over traditional set up, machine intelligence lays emphasis on building smarter, resilient and efficient entities and not on only studying them.

So backtracking to 1950, Alan Turing, a British mathematician, came up with Turing test which set up a platform for abilities of a machine to think, in his paper "Computing Machinery and Intelligence".

Alan Turing said, "We can only see a short distance ahead, but we can see plenty there that needs to be done.

I propose to consider the question, 'Can machines think?'

A computer would deserve to be called intelligent if it could deceive a human into believing that it was human."

Intelligence is a spectrum of phenomena. Hence through recurrent observations of evolution of intelligence, it can be concluded that considering human intelligence, there have been theoretical limitations, unlike the evolution of machine intelligence. So in near future machine intelligence is likely to outpace human intelligence. So coming back to Turing's reflections on machine intelligence, human

intelligence and relation between them were more extensive and sophisticated. They are seen to be well-considered and sound in appraisal.

So today Machine Intelligence also referred to as Artificial Intelligence has a layout as

The impact of AI and its cognitive consequences over years, has not only allowed to cut down manual calculations significantly, but through automation, gradually and precisely predict results for future outcomes. So, while technology was meant for cognitive applications in industries, the progressive onset of global warming and climate change, over the last decade, has gradually allowed AI to lance into a traditional sector like agriculture, to help cope with the intricacies in modern day farms.

Agriculture is the sector that supplemented the evolution of human race from centuries still date and thereby accomplished one of its most basic needs: food. This still remains a fore motif, but it is cohesive since it is compelled by many factors that include economic, environmental and humanitarian aspects. So agriculture together is a \$5 trillion sector, which has 10% of global consumer spending, 40% employment and near about 30% of greenhouse-gas emissions. Considering the present scenario, it is likely that the in near future or over a span of 25 years the crop demand and its consumption by humans and animal feed would undoubtedly increase by

90-95%. At that very phase, resource constraints would arise to an alarming level.

So, looking at all the states and knowing the chances, giant strides are put to seize maximum profit and yield with minimum use of resources with the help of innovative technologies that enable cultivators a broader yield.

So how would machine intelligence improve agricultural aspects?

Farm Analytics

So what is farm analytics?

As agriculture involves parameters like weather, soil type, water resources, time; analytics begins with arbitration of all these parameters and later on using all these factors for prediction of crop production process, determining valuable insights, developing a broad dataset, generating insights that are actionable, delivering them and updating them on a regular basis.

Farm Analytics with the help of neural networks can enclose large datasets, integrate various sources of information and increase crop yield and optimize resource usage, thereby cutting down the cost. Modern-Day technologies such as the Internet of Things and Cloud Computing can influence this development and introduce machine intelligence in farming. This is incorporated by using Big Data, having huge storage spaces that can be netted, analyzed and used for decision-making. Innovations like the Watson IoT platform augment

value by introducing machine learning features to sensor data, converting management systems in real machine intelligence systems.

Image Recognition

Image recognition in Agriculture includes fields such as fruit grading, weed detection, poultry inspection, detection of fruit diseases, defects, and contamination, spotting rodents and rats near granary and other outspread applications.

Image Recognition or machine vision has the prospective to add valuable assets to the agricultural industry. Image recognition can prove its value in expertise like remote sensing for natural resources valuations, process automation, product quality, grouping and precision farming.

Thermal imaging whose infrared range lies between 3 to 14 μm detects water presence. Water affects the thermal properties of plant. Water contents can be analyzed in pre harvesting operations. Thermal imaging also deals with recognition of nursery, scheduling of irrigation, forecasting of yield, level of greenhouse gases, attacks of rodents, termites. Post harvesting operations include assessment of maturity, discoloration detection, detection of extraneous substances in vegetables, fruits. Thermal imaging cannot be that helpful as climatic conditions and plant physiology varies depending on landform.

Chatbots

Virtual assistants are readily available in smartphones and they

can interact with farmers. Thus Chatbots are conversational virtual assistants who automate interactions with end users. AI powered chatbots, using Neuro-Linguistic Programming and machine learning techniques, understand natural language and interact with users in an adapted way. Though it is early for implementation it can prove to be another valuable asset.

Mixed Reality Fields/Greenhouses

Mixed Reality, a technology, with union of two virtual environments where two worlds coexist together. Basically it can be a combination of augmented and virtual reality techniques. Mixed Reality allows 3-D Mapping of actual field into a virtual environment where farmers can generate different setups or scenarios of crop farming. Headgears, VR-AR headsets can turn 3-D mapping into a virtual environment and augment physical objects. For example in greenhouse system, Sensors, cameras etc. are mounted on PVC pipes located around the perimeter of the greenhouse. All data is sent to the server and thus machine learning algorithm routes this information and evaluates the whole process. Thus Mixed Reality uses AR-glasses or VR headsets that allow farmers to see the plant with augmented objects.

Precision Agriculture

Precision agriculture is an integrated crop management system that tries to replicate the amount of inputs with the actual crop needs for trivial areas in a farm field.

So involves Global Positioning

System receivers, Yield monitoring and mapping, Grid soil sampling and variable-rate fertilizer (VRT), Remote sensing, Crop scouting, Geographic information systems (GIS) and Identification of a precision agriculture service provider. Fields have variable yields across the landscape. These variations are outlined to regulate practices on soil properties, environmental physiognomies. Such physiognomies may affect texture, assembly, moisture, nutrient status and weather, weeds, insects and disease and landscape position.

Summary

Although early in days, this new foresight for farming can be revolutionary and game changing one. Farmers with full access to these sort of revolution can come up with higher yields and profits and thereby increase economy and exports. AI, Machine Intelligence, IoT, Big Data, Cloud Computing, AR VR, and many other forms thus can be revolutionary in every aspect though there might be some clauses that can arise but they surely won't be at an alarming level. Organizations and companies like PEAT, Trace Genomics, Gamaya, aWhere, plantix and many others have come up with smart agriculture concepts and technologies. Investors invested more than \$3.2 billion in agriculture in 2016, \$200 million by Plenty and \$305 by Blue River, both agtech companies, showing the attention and investment drawn by this sector. Thus agriculture sector can grow in a broader aspect. ■

About the Authors



Mahendra Balkrishna Salunke (CSI Membership No: I1504453) is an Assistant Professor & Head, Department of Computer Engineering, Pimpri Chinchwad College of Engineering & Research Ravet, Savitribai Phule Pune University. He received Master of Technology in Computer Science & Engineering from PDEA COE Gulbarga, VTU, Begaum. He is having total experience of more than 18 years. He is a member of ACM, Life Member of CSI, Life Member of ISTE. He is having research interest in Embedded Security, Internet of Things, Deep Learning.



Ashish V. Salunkhe is pursuing Bachelor of Computer Engineering at Pimpri Chinchwad College of Engineering & Research, Ravet, Pune, Maharashtra. He is a Student Member of ACM and Students Coordinator of PCCOE&R ACM Student Chapter. His area of interest and specialization is in Machine Learning and Image Processing.

Machine Intelligence Challenges in Military Robotic Control

► S Balakrishnan

Associate Professor, Dept. of IT, Sri Krishna College of Engineering and Technology, Coimbatore, Tamilnadu, India.

► D Deva

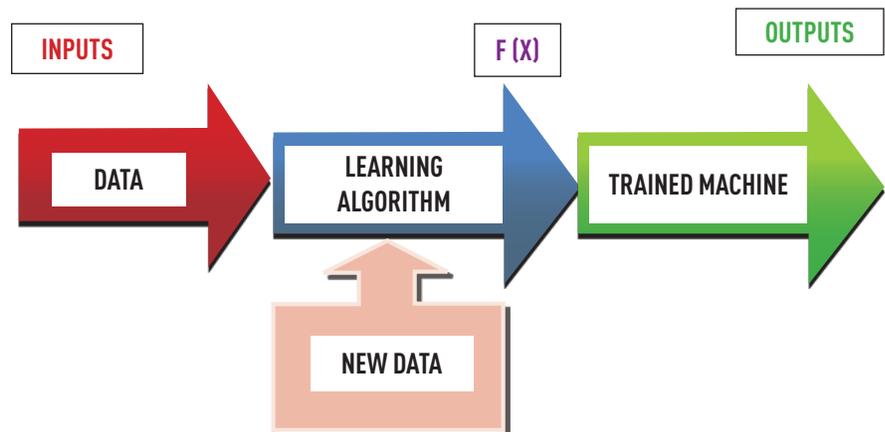
Third Year, Dept. of Mechatronics Engg., Sri Krishna College of Engg. and Technology, Coimbatore, Tamilnadu, India.

The Youngest Innovation of Universe

The youngest innovation in the world of technology is the intelligence that is incorporated in machines, that fulfils many industrial and smart home requirements. Machine intelligence may involve in two aspects, the artificial intelligence and the machine learning. It was a great evolution in the field of defense, when machine intelligence found to be applicable in its various activities.

Why Machine Intelligence in Military Robots?

The development of science and technology is abruptly spreading in all the sectors nevertheless the defense force failed to use the new innovations around the globe. The backbone of a nation is determined by its defense strength, but the personal losses to the military people are inevitable. In order to meet these losses every military force decided to use the autonomous robots which perform all the actions and duty that a trained military man does, but the percentage of demerit is more when compared to the merits of using autonomous robots. The rise of demerit is due to the lack of "intelligence" that the robot ("machine") has. The incorporation of such useful intelligence into the robot paves way for it to perform more efficiently and some times more than a military man. With the help of machine intelligence it decides whether to fight or flight at times of risky operations.



Limitations due to Human Interface

Besides its usefulness, every new innovation has its own limitations. Some of the limitations are neglected but some give rise to serious issues in the society. During the time of war, when the military robots are attacked by the opposite army, at the same place they have the ability to rehabilitate at the same place and continue its work, thus they no longer have the control of humans and become independent robots. Though this machine intelligence is invited in the field of robotics, the scientists and defense officers are taking a step backward to employ these autonomous robots in the battle field due to its lack of human interface. The put forth the report that during the war, these robots cannot cooperate human army due to the human interface issue and will cause unity problem in the force, which is to be strictly avoided at times of war. Other than military, this possibility asks many questions in the field of automation, whether to trust the machine intelligence whole heartedly, even though they are no more humans.

Hacking Issues in Machine Intelligence

The hacking of military robots

by altering the machine intelligence embedded in to it may cause unimaginable loss to the military armies. When the original intelligence programmed to the machine is changed by the victims, there are the following challenges: The autonomous robots can kill its own army persons by its wrong recognition. The robots get confused with right from wrong and it may not attack the persons, whomever it considers as its own army and it could be a great advantage to the opposition army. One of the major risks in hacking the machine intelligence is that, the victim may not only turn our own robot against us, but also he can make it explode, which is a great loss at times of war.

Causes of Machine Intelligence Disadvantage

Normally when a code in embedded systems or in any programming language is written, it performs only that particular task, thus it does not bother about the external tasks, whereas the machine intelligence takes the sole responsibility to the unexpected tasks and it volunteers itself for the execution of the same. At what so ever be the circumstance, the machine intelligence

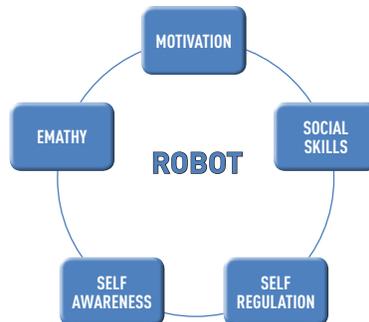
in the autonomous robots always failed to win the human intelligence.

Emotional Intelligence to Machine Intelligence

Many researchers around the world are more bothered about the emotional quotient of machine intelligence added with the general intelligence that is seen in every machine. Though machine intelligence is more than enough for a machine to do wonders, it must be emotionally satisfied too, since it is going to work along the humans who have emotional intelligence. As far as the percentage of emotional intelligence is taken in to account in military robots, it is very minimal or sometimes nil. This reason may stand for an excellent proof to limit the usage of autonomous robots in the army. Even though emotional intelligence incorporation is not that much challenging to the innovators, on the other hand allowing that such intelligence to a machine that can be hacked, remains the reason for non-incorporation of the emotional intelligence to the machine intelligence.

The military robots must have all

the below mentioned qualities to be more efficient.



Economic and Time factors

Fabrication of a simple robot itself is economically very high and in case of a autonomous military robot with the machine intelligence would be more higher. This paves no way for the economically poor countries to have their own military robot in their army. The reason behind the high cost is the software used and the programming done to think intelligently.

Every human need to be updated to be smart enough, then the same is for our military robots too! Each and every

information's must be updated in the regular basis to improve the intelligence of the machine, pessimistically this kind of updating costs very high for the armies to spend on the machines.

Even money can be compensated by the army, but not the time! Yes, the machine intelligence needs more time for any up gradation and in case of servicing the software, it consumes more time, which is not entertained in the battle field.

Conclusion

The great and rapid evolution in the field of automation by the machine intelligence is inevitable in the world of technology, nevertheless it should not compensate the security of the people and the machine-to-man relationship, since each and every development in the universe is only for the betterment of human life. As far as machine intelligence in robots are concerned, proper allotments of the autonomous robots with respect to the place of operation and the type of function must be carefully monitored in order to use machine intelligence in a better way.

About the Authors



Dr. S Balakrishnan [CSI Membership No. 1187923] Professor, Department of Information Technology, Sri Krishna College of Engineering & Technology, Coimbatore, Tamilnadu, India. He has 17 years of experience in teaching, research and administration. He has published over 15 books, 3 Book Chapters, 3 Technical articles in CSI Communications Magazine and over 30 publications in highly cited Journals. His professional awards include: Teaching Excellence Award, I2OR - Bright Researcher Award, Best Outstanding Faculty Award, Best Teacher Award, Best Research Paper Award, Best Book Publication Award and Best Book Chapter Award, Special Contributor Award and Star Performer Award. His research interests are Artificial Intelligence, Cloud Computing and IoT. He has delivered several guest lectures, seminars and chaired a session for various conferences. He is serving as a Reviewer and Editorial Board Member of many reputed Journals and acted as Session chair and Technical Program Committee member of National conference and International Conferences at China and Bangkok. Dr.Balakrishnan is a life member of ISTE, IAENG, IEAE, IARDO, CSI, UACEE, SDIWC and CSTA.



Mr. D Deva is pursuing Third year Mechatronics Engineering in Sri Krishna College of Engineering and Technology, his area of interests are Thermodynamics and conservation of Energy, he has authored a motivational book "The Ladder For Teens", and also delivered various extramural presentations and Technical seminars. He has published the articles in various International Journals.

Cyber Crime and Social Security – The Dark side of Internet

▶ Priyanka Tomar

priyankaatomar@gmail.com, priyanka@cybersecuritydelhi.com

This paper explains the dark side of the Internet and research on cyber crime cases along with the current cyber crime challenges and its effect on social security. Cyber crime has taken organized shape and fraudsters are committing it professionally. Many persons were duped of a total of nearly millions by fraudsters. Cyber crime increased post-demonetization, after the Rs 500 and Rs 1000 note ban, people switched to various online payment methods and commonly used method is mobile wallet. This led to a lot of cyber criminals taking advantage of the opportunity and scamming people of their credit card, debit card and net banking details. As per research, economic fraud tops the list of cybercrimes in India. Techniques used by cyber criminals have been explained in this research paper e.g. how and why cyber criminals gather personal information of the people, why Cyber Criminals hack into victim's Facebook account, why we receive third party weblinks into our emails and how are they being a big threat to social security along with "Do and Don'ts" to create awareness among the people. The dark side of Internet is that cyber criminals not only steal the information to make online purchases but they sell victim's personal information along with his debit/credit card details over Deep web. One can buy arms, drugs or hire/rent criminal services over deep web.

Cyber Crime and Social Security- The Dark side of Internet

Nowadays Cyber Criminals work in a very organized manner and normally are highly qualified. The online community is evolving at fast pace and have created a parallel world of Cyber Crime. Because of increased cyber crimes, the social security of people is in danger, cyber criminals not only hack and transfer money from e-banking accounts, mobile wallets illegally but they sell banking data thereafter. Likewise hackers hack the email ids or social networking websites accounts to take revenge of personal enmity. Now cyber crime has taken a form of Cyber Terrorism and almost on daily basis cyber war incidences are also being reported by the media. Defaming someone, or cyber terrorism or cyber war cases affects society in a very adverse manner. Due to the increased use of the social networking sites many accounts of the respective users are under the scanner as advancement in technology has led to innovative hacking methods. The online

banking has also lead to the increased cybercrimes because bank accounts could be hacked and money could be transferred into another account all together by finding vulnerabilities in the application or via phishing email or hackers may try to steal the bank account details. Though banks are upgrading their technology to make transactions safer. It lead to many ways by which one in present time commits Cybercrime, hence, Cyber Crime affects social security.

With the growth of e-business, cyber criminals not only exploit well known existing vulnerabilities but also find new loopholes in the web application, online software and hardware too. CCTV cameras are being used as a tool to hack a server, hackers installs malware into CCTV, as they have running Linux server and hackers are able to execute scripts like jquery, cross-site scripting etc. and cyber criminals get access in to government and corporate network.

One example is - Botnet Attack. These can be performed using CCTV

cameras. 2016 was popular for Ransom ware Attacks.

Why Cyber Criminals gather Personal Information-

They use this information to sell one country data to another, one corporate data to another business rival, commit ID fraud to escape out of the country by spoofing the actual ids, banking frauds, to lure common person for lucrative job offer, to trap teenagers to commit crime for them.

If cyber criminal has some of your personal information like date of birth, birth place, best friend name, school name etc then it becomes very easy for them to get access of your email id. Let us understand it by an example:

X has an email id xyz@rediff.com and at the time of account creation on rediff, one has to answer some secret questions which are useful when someone forgets the password and wants to retrieve it. Normally security questions are Birth Place, City you are born, Best Friend name, First School name etc. And all this information is

available on social networking websites like Facebook. Cyber criminal can gather all this information easily by being befriended with X and later on can get into X email id.

Methods used by Cyber Criminals to gather the Information

Social Engineering very popular method and cyber criminals are successful most of the time, they use various Search Engines - like Google, bing, shodan etc, Social Networking websites - like face book, twitter, LinkedIn. As per Verizone 2015 DBIR Report humans, or users, account for 90% of security incidents:

Google Dorking - Very powerful information gathering technique, google dork is a search string that uses advanced search operators to find information that is not readily available on a website. **Google dorking**, also called as **Google** hacking, can return information that is difficult to locate through simple search queries.

Many people don't secure their online directories using strong password or at times they are open to access for everyone. They store their person information like Family photographs, academics records, marks sheets, passport copy, pan card etc. Such type of open information is a big threat to social security of that individual.

Stealing the Data in Transit - People do not use proper encryption methods so while data is in transit and it transits in clear text form then a hacker can steal it easily using sniffers.

Tor - Tor is a free software enabling anonymous communication. If cyber criminal uses Tor then it is very difficult to be traced back to him to know the kind of internet activity he has done. Tor's use is intended to protect the personal privacy of users, as well as their freedom and ability to conduct confidential communication by keeping their Internet activities from being monitored but it being used by hackers too.

Social Engineering Email Fraud - cyber-criminals are very good in it.

Step 1 : Cyber criminals look for key decision maker or authorized signatory to within an organization. This can be done either by gathering information from their website or organization's

social networking accounts or sometime a phone call can be fruitful.

Step 2 : Cyber criminals send an email to that person and ask him or her to make a payment against some genuine looking invoice or reason. They use the familiar language in the emails which may give feel that some well known business vendor is communicating.

Step 4 : The cyber criminals receive the funds and disappear and at times without leaving the trail.

According to the Symantec 2014 Internet Security Threat Report, Social Engineering Fraud has sharply risen over the last few years. Cyber criminals have discovered how easily this scam can succeed with minimal cost and effort. Their study shows that Social Engineering Fraud attacks:

- Increased 91% between 2014-2015
- Occurred at a rate of over 100,000 attacks each day
- Target businesses of all sizes (34% of large businesses, 31% of medium, businesses and 30% of small businesses)
- Target 1 in 2 large businesses and 1 in 5 small businesses

Few Examples of Cyber Crime Cases : These cases shows the strategy adopted by cyber criminals and how availability of online personal information can be a threat to social security.

In a case, the Delhi high court imposed a fine of ₹ 20,000 on a man for posting on a social networking site "objectionable" photographs and the telephone number of a woman who had studied along with him in the school. The court imposed the fine while quashing a criminal case registered against the man under the Information Technology Act (ITA). While the victim and the accused may have reached an out-of-court settlement to avoid legal tangles and negative publicity, many cyber law experts say that a stringent punishment should be awarded in cyber crime cases since with widespread usage of social networking sites there is a fear of cyber harassment, and hard punishments can discourage such type of cyber crimes.

Harassment and stalking of people is common, and include variety of threats like posting of person's personal

information online, violence threat etc. Cyber stalking of intimate partners is the online harassment of a current or former spouse, boyfriend, girlfriend. Harassers send repeated insulting or threatening e-mails to the victim, monitor or disrupt their e-mail use, and use the victim's account to send e-mails to others posing as the victim or to purchase goods or services. Cyber stalkers use the internet to research and compile victim's personal information, to use in order to harass her or him. With the advent of technology, cyber crime poses as a major threat to the security of a person as a whole.

Type of Cyber Crimes - Amongst the various cyber crimes committed against individuals and society are-

1. e-mail hacking
2. Cyber stalking
3. Cyber pornography
4. Defamation via Image Spoofing
5. Email Spoofing
7. Cyber Terrorism
8. Phishing & Spam
9. Social Networking Account Hacking

Harassment includes blackmailing, threatening, cyber bullying, and even cheating via email. Cyber stalking involves following a person's movements across the Internet by posting messages on the bulletin boards frequently visited by the victim, entering the chat-rooms frequently used by the victim, constantly bombarding the victim with emails etc. Cyber Stalking usually occurs with women, who are stalked by men, or with children who are stalked by adult predators or pedophiles. Cyber stalkers target and harass their victims via websites, chat rooms, discussion forums, open publishing websites and emails.

The recent being the case of MK who was recently arrested by the New Delhi Police. He was stalking an Indian lady, R by illegally chatting on the Web site using her name. He used obscene and obnoxious language, and distributed her residence telephone number, inviting people to chat with her on the phone. As a result of which, R kept getting obscene calls from everywhere, and people promptly talked dirty with her. In another case, an engineering and management graduate, facing prosecution in a dowry harassment

case, was arrested by Delhi police for sending obscene e-mails in his wife's name to several persons. Internet has provided a medium for the facilitation of crimes like pornography. Cyber porn as it is popularly called is widespread. Almost 50% of the web sites exhibit pornographic material on the Internet today. The elementary problems, which are associated with Cyber-Crimes, are Jurisdiction, Loss of evidence, Lack of cyber army and Cyber savvy judges who are the need of the day. Judiciary plays a vital role in shaping the enactment according to the order of the day. Today with the growing arms of cyberspace the growing arms of cyberspace the territorial boundaries seems to vanish

Cyber space is a transit space for many people, including offenders. While people do not live in cyber space, they come and go like any other place. This nature provides the offenders the chance to escape after the commission of cyber crime. Human trafficking has increased along the border in WB, Bihar etc.

Cyber crime cops said that after December 12, cyber fraud cases have witnessed a steady increase. "Now we are getting at **least four cases of credit or debit card theft every week**. Apart from these cases, we are also getting **One-Time Password (OTP) frauds as well**," said Raghuveer, ACP, cyber crime cell. **Source- Times of India**

As per ASSOCHAM, in a report in October this year, the number of mobile frauds are expected to grow by 65% by 2017. Credit and debit card fraud cases have topped the charts of cyber crime and increased six times during the last three years, they said. **Source- Times of India**

3.2 million debit card details stolen as India faces one of its largest data breaches ever **Source -Economic Times**

Delhi Police busts credit card fraud, arrests 2 techies- **Delhi Police crime branch busted an online credit card fraud racket with the arrest of two people on Monday.** Jayshankar Kushwah and Rajesh Rawat, both residents of New Delhi's Sarai Rohilla with a Masters in Computer Applications, were arrested after the police received a tip off on their whereabouts.

A businessman Gautam was duped of ₹ 2.52 lakh by the duo. Gautam filed

a complaint with the Kalkaji police station(South Delhi) after the duo used his credit card to shop on Flipkart and Snapdeal.

Investigations revealed that the duo had issued a duplicate SIM card of the one owned by Gautam. On finding out about the duplicate SIM, the crime branch swung into action.

The Duo Duped Citizens across the Nation

Police said the accused had been siphoning off cash using credit cards of several unsuspecting citizens across the country for some time now. They duped citizens under the pretext of providing new credit card with enhanced credit.

The crime branch got a tip-off about Kushwah's presence near Videocon Towers in Jhandewalan. Acting on the information, they nabbed Kushwah and later arrested Rawat from Motiyah Bag locality. Cops recovered two gold coins, nine mobile phones, 22 SIM Cards, fake IDs including an Aadhar card, four dongles and a computer from the accused.

1. The duo obtained details of people interested in getting a new credit card with enhanced credit limit from the search service 'Justdial'. They registered with the online portal using the name 'j2k system Pvt. Ltd'.
2. They later visited the unsuspecting citizens and sought the details of their existing credit cards.
3. With the help of Delhi police's online registration facility for NCR, they would contact the customer care of the mobile company used by the victim.
4. They would ask the companies to block the SIM cards to prevent the victims from getting any SMS on their phones about online transactions.
5. After blocking the original SIM, they would visit the outlet of cellular company and with the help of a copy of the victim's ID proof, obtained a duplicate SIM.
6. Before making any online transactions they verified the available limit of credit cards. Based on the credit limit they used to purchase gold coins through Amazon, Snapdeal, Flipkart, etc.

7. The duo would enter an incomplete or fake address on the e-commerce websites and get the product delivered midway to avoid suspicion.
8. They sold gold coins in open market with the help of e-bills. They had even sold coins to the 'Cash for Gold in Delhi' outlet in Delhi.
9. Till now, five other victims have been identified and they have already lodged complaints.
10. Police said that efforts are being made to locate other victims with the help of CDR analysis and data of e-shopping websites.
11. While Kushwah is a native of Gwalior, Madhya Pradesh, Rawat is a native of Shivpuri in Madhya Pradesh.
12. Kushwah and Rawat have completed their Masters of Computer Application.
13. Police said that being a JAVA developer, Kushwah had made software programmes for as many as 12 government hospitals in Delhi.
14. Both Rawat and Kushwah were classmates in their under graduate course.

FBI: \$2.3 Billion Lost to CEO Email Scams - The **U.S. Federal Bureau of Investigation** (FBI) warned in April 2016 about a "dramatic" increase in so-called "CEO fraud," e-mail scams in which the attacker spoofs a message from the boss and tricks someone at the organization into wiring funds to the fraudsters. The FBI estimates these scams have cost organizations more than \$2.3 billion in losses over the past three years.

In alert posted to its site, the FBI said that since January 2015, the agency has seen a 270 percent increase in identified victims and exposed losses from CEO scams. The alert noted that law enforcement globally has received complaints from victims in every U.S. state, and in at least 79 countries.

What is CEO fraud attack

CEO fraud usually begins with the thieves either phishing an executive and gaining access to that individual's inbox, or emailing employees from a look-alike domain name that is one or two letters off from the target company's true

domain name. For example, if the target company's domain was "example.com" the thieves might register "examp1e.com" [substituting the letter "L" for the numeral 1] or "example.co," and send messages from that domain.

Unlike traditional phishing scams, spoofed emails used in CEO fraud schemes rarely set off spam traps because these are targeted phishing scams that are not mass e-mailed. Also, the crooks behind them take the time to understand the target organization's relationships, activities, interests and travel and/or purchasing plans.

They do this by scraping employee email addresses and other information from the target's Web site to help make the missives more convincing. In the case where executives or employees have their inboxes compromised by the thieves, the crooks will scour the victim's email correspondence for certain words that might reveal whether the company routinely deals with wire transfers — searching for messages with key words like "invoice," "deposit" and "president."

Findings-

After stealing personal information, cyber criminals gather target's debit card, credit card details, date of birth, mobile no, PAN number, Voter Id etc.

Cyber crime happens due to lack of cyber-crime awareness. Companies do not fully realise that protecting assets in the virtual world is more complex than protecting assets in the physical world.

Over Tor network cyber criminals sell the personal information of people after theft. They sell bank's data, corporate data, corporate secrets, government secrets and payment is received in bit coins. Moreover they offer criminal services on hire and rent basis too. One can buy drugs, arms using Tor network.

As per Symantec, spearphishing, which targets humans, was on the

increase: (<https://www.symantec.com/security-center/threat-report>)-

"In 2015, we saw a record-setting total of nine mega-breaches, and the reported number of exposed identities jumped to 429 million. But this number hides a bigger story. In 2015, more companies chose not to reveal the full extent of their data breaches. A conservative estimate of unreported breaches pushes the number of records lost to more than half a billion."

As per Kaspersky's 2015 report (press.kaspersky.com/files/2015/08/Kaspersky_Lab_Consumer_Security_Risks_Survey_2015_ENG.pdf).

In 2015, every fourth internet user had at least one of their online accounts hacked. This led to unauthorized messages being sent out in the user's name, and the loss or theft of personal data. The study was done on working employees. Therefore, every single personal account hack has the potential to grow into a full-scale cyber-attack against a business.

2016 was popular for ransom ware attacks, after cyber crime, hackers ask to pay the ransom in form of bitcoins.

Safe Guards-

1. Be careful while sharing personal information on social networking websites. Never disclose Birth place, Date of birth or selfies if you are on vacation.
2. Install licensed software
3. Use two way authentication for your email accounts or social networking websites.
4. Use OTP (one time password) for online shopping, money transfer.
5. Keep minimal amount in the bank account which is linked with online applications or shopping portals.
6. Look for "https" and crosscheck the ownership of the website by looking at the right top corner of "URL" text box.
7. Identify Phishing email- As per Verizon, phishing is the second

most common thread vector, so be careful while checking your inbox-

- A. Check "From" address carefully
- B. Don't reply to the email with the word "Urgent action required", this may be malicious email.
- C. Crosscheck the website and email address, in case of official email or email representing some government department.
- D. Setup security and privacy policies properly for each and every social networking website, you use.
- E. Never forget to use encryption while sending the emails or data across the network.

Conclusion-

Cybercrime has emerged as a serious threat, therefore we need to take proper initiatives to curb cross border cyber war threats which are taking shape. Making people aware by imparting training to them or conducting workshops can be a very fruitful technique to curb the cyber crime and provide the social security to citizens. Government mandate can play a vital role in spreading awareness about cyber crime and preventive measures.

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About the Author



Priyanka Tomar is Founder and Director New Era System Pvt Ltd., Certified Ethical Hacker and Cyber Security Professional having 16 years of experience into Information and Technology field including Software Development, System Analysis, Cyber Security & Forensics. I have written for some international cyber security magazines and did research work on firewalls and cyber security products for US based company. I am associated with CBI Academy as visiting faculty, and conducted workshops and seminars on Cyber Security and Cyber Forensics in various corporate houses, universities like Punjabi University Patiala, Jaipuria Management Institute, JIMS, BSA, Bharti Vidyapeeth College of Engineering and other educational institutes.
Academics - MCA, PG Diploma in Cyber Security, CIEH (Certified Ethical Hacker), BSc (PCM)

National Conference on Future Innovations in Computing Technologies and Machine Learning (FICTML-17)



National Conference on Future Innovations in Computing Technologies and Machine Learning [FICTML-17] was organised by the Department of Computer Science & Applications, M. D. University, Rohtak (Haryana) on 21st November 2017.

The Chief-Guest was Prof. Yogesh Singh, Vice-Chancellor, Delhi Technological University, Delhi. Keynote Speaker was Sh. Vivek Varshney, Managing Director & CEO, VTS Global, Gurgaon. Prof. Bijender K. Punia, Vice-Chancellor, M. D.



University, Rohtak presided. Prof. M. N. Hoda, Director, BVICAM, Bharti Vidyapeeth University, N. Delhi presided over the valedictory session.

The event was indeed a grand success and was attended by more than 250 delegates. There were 8 Technical Sessions (4 Tracks in parallel) chaired by Experts from other universities. There were 111 full-papers and 08 abstracts published in the Conference Proceedings (ISBN 978-93-80544-31-1).





CSI Mumbai Chapter CSI-IT 2020

Annual Technology Conference and IT Innovation and Excellence Awards 2017

6-7 October 2017

Theme : Transforming Business with Cognitive Technologies



CSI Mumbai Chapter organised its Annual Technology Conference and IT Innovation and Excellence Awards 2017 in association with (Spoken Tutorials and FOSSEE) IIT Bombay, title "Transforming Business with Cognitive Technologies" at Victor Menezes Convention Centre, IIT Bombay, Powai on October 6-7 2017

The key highlight of the conference was IT Innovation and Excellence Awards 2017. 46 winners were awarded in different verticals and industry segments in following categories:-

- 1) Best CIO of the year
- 2) Best CISO of the year
- 3) Best CRO of the year
- 4) Best Start-up Company of the year
- 5) Best Cognitive Technology Provider
- 6) Best Company in terms of Cognitive Technologies Implementation
- 7) Best Company in terms of Information Security Implementation
- 8) Best Bank in terms of Implementations of Cognitive Technologies
- 9) Best Bank in terms of Information Security Implementation
- 10) Best Government Organisation w.r.t. implementation of Cognitive Technologies
- 11) Best Government Organisation implementing Information Security
- 12) Best Company / Individual for creating Cyber Security awareness
- 13) Significant Contributor

The conference inauguration started on Day 1 with Welcome Address by Mr. Abraham Koshy, Chairman, CSI Mumbai Chapter and Opening Remark by Prof. Kannan Moudgalya, Professor, IIT Bombay.

The inaugural address was addressed by Chief Guest Mr. Nitin Sawant MD, Accenture. The Keynote address on "The New Cognitive Wave - Driving Business Growth" was given by Mr. Ashok Pai, VP & Global Head - Cognitive Business Operations from TCS on Day 1 and by Mr. Kingshuk Banerjee,

Director Cognitive Computing & Analytics Practice from IBM on Day 2.

The general technology sessions were on topics Cognitive Technologies. The invited talks were on :- 1) Panel Discussion on : *AI and Biometric Technologies* by Ms. Gopali Contractor of Accenture, Mr. Anirudh Kala from Celebal, Hrishikesh Sherlekar from TCS and Mr. Suresh Shan from Mahindra Finance 2) *Stream Analytics and IoT* by Ms. Bharati Lele, Business Head of Analytics from L & T Infotech 3) *Micro Services Architecture* by Mr. Arsh Karaf, CTO from Meta Magic Global Inc. 4) *Robotic Process Automation* by Mr. Uday Sanghani, Director, Automation Central Operations Leader

from EY 5) *EOS Blockchain Introduction* by Mr. Sanjay Mehta, Director of CORE Media 6) *Welcoming the Cognitive Future* by Mr. Devesh Rajadhyax, Founder & CEO of Cerelabs 7) Panel Discussion on : *Decision Making Applications in BFSI sector (e.g. Risk assessment in Insurance, Loan Approval etc)* by Mr. Babu Nair, MD, Publisher & Research Head of Banking Frontiers, Dr. Pradeep Pendse, Dean IT of Welingkar, Mr. Ashwin Chaudhary from E Com Infotech Ltd. and Mr. Chandrashekhar Bhide from Praxis Global Alliance 8) *How Computer Vision and AI transforming Marketing* by Mr. Manoj Shinde, Chief Do'er of Orbo.ai 9) *Industry 4.0 platforms and applications* by Mr. Anupam Tiwari, Lead - IDC PLM of Accenture 10) *AI - Rich Chat Bots* by Mr. Aakrit Vaish, Co-Founder & CEO of Haptik 11) *Hardware loop simulation for multiple vehicles* by Prof. Hemendra Arya from IIT Bombay 12) *AI in Regulatory Compliance* by Mr. C P Srivatsan from Accenture.

Overall we saw around 300 delegates including award nominees attending the session and general feedback was largely positive.

Members from the various CSI student branches worked actively while during the conference.





Team CSI 2017 in the ExecCom and Review Meeting held at Kolkata on 9 December 2017

Devaprasanna Sinha

Fellow, Computer Society of India and RVP-II, CSI. E-mail : devaprasannasinha@rediffmail.com



CSI Communications, the oldest publication of its kind and circulated amongst the members of Computer Society of India (CSI) with its name, was published as Volume 1, No. 1 in September, 1978. The earlier issues were released as Newsletters. The first Newsletter, NEWSLETTER '0' was published with the date 7 February, 1985. It was in the form of an announcement/letter in five paragraphs from Major A Balasubramanian, Secretary. The President was Prof. R Narasimhan. The address for correspondence was given as c/o Defence Research and Development Laboratory, Hyderabad-5. The contents of this Newsletter were published in earlier issues. I may mention only two paragraphs here.

1. As you may be aware, a General body meeting of the ALL INDIA COMPUTER USERS GROUP (AICUG) was held at the IIT, Kanpur on 18 Dec. 1964. It was decided at the meeting to alter the name of the group to the 'Computer Society Of India'. A Constitution was proposed and duly adopted. The meeting also elected the office bearers (the President and the Secretary) for the current year. Prof. R. Narasimhan has very kindly accepted to serve as President of the Society for the current year.
2. Presently the question of Registration of the Society is being progressed. As a prelude to this it seems necessary that a more formal version of the rules and regulations have to be made. A draft is being prepared and would be ready for discussion and approval of the next summer meeting being planned for early June. The venue and further details will be contained in forthcoming newsletter. The meeting is being planned for two days out of which half a day will be devoted to a business session.

It may not be out of place to reproduce some of the contents of the Newsletter No. '1'.

The society elected Prof. R Narasimhan of the Tata Institute of Fundamental Research, Bombay and Major A Balasubramanian of the Defence Research & Development Laboratory, Hyderabad as the President and Secretary-cum-

Treasurer respectively for the current year.

You will be glad to hear that the Society has been registered under the Public Societies Registration Act under certificate of registration No. 41 of 1965 with the Registrar of Societies, Hyderabad.

The next summer meeting of the meeting will be held at Tata Institute of Fundamental Research, Bombay on 4th and 5th June, 1965. This may be taken as notice of meeting. The meeting will devote 2 half days for presentation of papers, one half day on invited lectures, and one half day to a business meeting.

There has been a proposal for starting regional centres of the society at cities that have more than two member institutions. We could discuss this at Bombay and perhaps make a start at Delhi, Calcutta, Bombay as a first step.

I also find in this Newsletter, inter alia, the mention about Membership with the names of 10 institutions and 2 individuals, reference to IFIP meeting, details of Summer Meeting, proposal of winter meeting.

In Editorial appeared in CSI Newsletter, No. 34, June 1973, the Editorial started with this:

Communicate or.....

Living is largely a matter of Communicating. The husband kisses his wife; the customer looks at the price tags; the students raises his hand; the little kid smiles. They all are communicating. People communicate from morning to night in a modern world. For professional bodies sit is imperative that its members must communicate with each other. Conventions and seminars are opportunities for face-to-face communications of professional ideas. The amount of written and published communication is a yard-stick of the eminence of a scientist these are days. These are research communications.

A lone computer-scientist working in an isolated computer

centre feels that pinch of communication. He has problems pertaining to work, profession, training or new ideas to communicate. The CSI journals is one channel of communicating where in research ideas, etc. could be published.

The Newsletter is a more frequently appearing channel. There are many columns representing different sectors of professional activity. Members must use this channel more often for communication. No idea is too elementary for this channel. We cannot emphasise the need for communication within and outside the Computer Society of India than by repeating cliché 'communicate or perish'.

CSI Communications/CSI Newsletters with many Newsletters published from the Chapters from time to time, Proceedings, Souvenirs and other publications present a huge repository of articles, papers, photographs, news etc. In other words, along with the history, gradual developments of almost all aspects of computer science and engineering, and information technology could be traced and generated in diverse ways of hitherto unexplored areas of information technology. In the above lines, I have reproduced excerpts from only a few of these. I could produce several other excerpts only from our earlier CSI Communications, besides other publications, but due to paucity of space, I am refrained from doing this. But, in no uncertain terms, I believe there are ardent readers for this in this country and also across the world. The time has come than ever before to tell others, particularly the netxgens, to even document those - the gradual development of computers science and application, including personalia,

over the last few decades in the historical perspective. These may trigger interests not only to browse over the textual stuff for having nostalgic experiences, but also to look for new research avenues taking into account the contemporaneity and relevance of those aspects in today's world. I know, a few CSI veterans are writing blogs at regular intervals, putting oral discussions and histories – structured, semi-structured and even unstructured manner in many fora available these days. Attempts have been made in some/Special issues of CSI Communications and also in some Souvenirs published on the occasion of Annual Conventions of CSI and other publications. Special Groups and/or Taskforce have also been created from time to time, but one should say that has not yielded the desired result.

The various happenings and attempts, here and there, documented or undocumented, have formed the treasure of the a source of repository. CSI Warehousing is there – to be augmented on a perennial basis. As is natural, there is another scope for exercises of relevant CSI data mining, from time to time. It should bring to the fore many facts and decisions that might unfold the new areas, as told earlier.

Lastly I must mention that in the last Execom held at Kolkata, I heard from Mr Sanjay Mohapatra, President, Computer Society of India that he could manage to get all the old copies of CSI Communications from Mr S Parthasarathy, Fellow and very senior member of CSI. Under his leadership, CSI has taken a decision to digitize the all these pages for dissemination of the same to our members.



Team CSI 2017 in the ExecCom and Review Meeting held at Kolkata on 9 December 2017

AMRAVATI CHAPTER



CSI Amravati Chapter, has organized Faculty Development Program on Android Application Development in association with Department of Computer Science & Engineering, P. R. Pote College of Engineering & Management, Amravati from 21st to 25th Nov 2017. The Inaugural ceremony of this Faculty Development Program was held on 21st Nov 2017 which was chaired by Dr. Mrs S. D. Wakde, Principal and inaugurated by Dr. G. R. Bamnote, Chairman, CSI Amravati Chapter in presence of Mr. Amit Dengre, Asst. Commissioner, Amravati Municipal Corporation. Prof. Mohd. Zuhair, Vice-Principal, PRPCEM and the All the HODs of respective departments were also present for this ceremony. The convener of the Program, Prof. Vijay B. Gadicha welcomed the guests and all the participants and gave the brief overview of the program. Dr. G. R. Bamnote expressed his view about the importance of ongoing technologies such as Android, Cloud Computing, Big Data. He congratulated department of CSE for organizing this faculty development program and also appealed everybody present to join CSI as life member. Mr. Amit Dengre presented the need of Android Technology in the Smart city project by Gov. of India. Dr. S. D. Wakde given warm wishes for this program and quoted the importance of such activity for the development of faculties. Prof. Mohd. Zuhair expressed his thoughts regarding need of crosscutting technologies and how they will be beneficial in near future and also congratulated CSE department and CSI for organizing such a beneficial workshop for faculties. For the inaugural program HODs of respective department, all the faculties from CSE as well as other departments were present. The program was coordinated by Prof. F M Shelke, conducted by Prof. P P Pawade and Prof. K B Bijwe expressed the vote of thanks. Forty five participants participated in the faculty development program.

CHENNAI CHAPTER

Chennai Chapter conducted the Guest Lecture on Changing IT Scenarios - Changing Service Options on 18th November 2018 by Mr. Ashok, Founder & CEO of Futurenet Technologies (India) Pvt. Ltd.)



The Chapter organized a Talk on “Cyber Security-Protecting the Human Point” on 11th December 2017. Mr. Ajay Dubey-Sr. National Manager – Partner and Alliances (SARRC region) of Force Point made the presentation; it was a well attended event with about 65 persons participating; it was a lively and interactive presentation. Mr. Dubey mentioned that every year the IT industry spends more than the previous year on Cyber security but suffers more attacks than the previous year;while hardware and software securities are important, it is essential that we need to rethink on Cyber Security to make the security effective; in this context, he said that it is necessary for organisations to address the protection of the most important asset in the Organisation – which is also the most vulnerable – the Human Point. The talk was sponsored by Raksha Technologies Pvt. Limited-Chennai. IEEE Computer Society, Madras Chapter, Hindustan Chamber of Commerce and IEEE Technology and Engineering Management Society, Madras also associated themselves with CSI-Chennai chapter and members from these organisations also attended the presentation.



DURGAPUR CHAPTER

A lecture meeting was held on 9th October 2017 and attended by Past and present members of the Computer Society of India, Durgapur Chapter. The topic of the lecture was “Era of the Intelligent Enterprise”. The lecture was delivered by Dr. Subrata Dasgupta, Past Chairman and one of the founding members of the Computer Society of India Durgapur Chapter. Dr. Dasgupta touched upon the role played by the Artificial Intelligence, particularly by the e-commerce

companies. He explained how the online consumer buying behaviour is utilized by various companies through AI related software. Earlier, Mr. Gurprit Singh, Past Secretary and Treasurer, and DGM I/c (C&IT), DSP welcomed all present and Past members and expressed his keen desire to revive the Durgapur Chapter which has not been functioning since 2010 due to some compelling reasons. It may be mentioned that CSI, Durgapur Chapter started functioning in 1984. He emphasized the need for a society for the computer professionals in the area and promised to make the chapter vibrant once again. It was decided that an Ad-hoc committee would be formed on that day. Dr. Dasgupta agreed to be the president for the meeting. Two other senior members and ex-employees of DSP Mr. B Mazumdar, and Shri Salil Kumar Dutta agreed to approved the committee formation. Membership forms were distributed in hard copy to all the potential members and the drive continues after the meeting too. Mr. Rakesh Ojha, proposed the vote of thanks. The total number of participants was 35. The Ad-hoc Committee needs to be formalized by the Computer Society of India, Mumbai Headquarters. About 15 executives of C&IT are renewing their membership. All help has been promised by Mr. D Sinha, Regional Vice President (Region II) and Mr. Subimal Kundu, Nomination Committee member. All the pre-requisites for the start of a chapter were fulfilled.



GHAZIABAD CHAPTER

The Chapter & IMS Engineering College organized a National Conference on "Recent Trends in Computational Intelligence (RTCI-17)" on 11th November 2017. Conference was inaugurated by Mr. Anil Ji Garg, Chairman, Ghaziabad Chapter and Mr. Saurabh Agrawal, Patron & Past Chairman

Ghaziabad Chapter. Keynote speaker Prof. O. P. Verma delivered a technical talk on Applications of Computational Intelligence. Dr. Banerjee also lightened our participants by sharing his research on Neural Network. E-proceedings were released by the dignitaries on the occasion. There were 53 presentations in four tracks. Prof. Sraban Mukherjee (Director, IMSEC) presented certificates to the participants. Prof Pankaj Agarwal, Program Chair and Dr. Upasana Pandey, Convener of the event welcomed the guests and proposed vote of thanks respectively.



VELLORE CHAPTER

Vellore Chapter organized a two day workshop on "R - Programming for Engineers" on 9th and 10th Dec'2017 at VIT University. Mr M. Pachayappan, Data Analyst, XiM Entrepreneurship and Ltd, Chennai, explained the basics features of R tool, and data mining techniques like linear regression, classification and clustering. His talk mainly focused on Web Analytics. Around 65 members participated in workshop, organized by Dr R Rajkumar, Prof. K Govinda, Past RVP VII.



REGION-I

Sunder Deep Group of Institutions, Ghaziabad



25-10-2017 – Mr Saurabh Agrawal, Patron & Past Chairman & Mr Anil Ji Garg, Chairman Inaugurated Student Branch

DIT University, Dehradun



9-8-2017 - Life Reforming event on WHAT NEXT?

REGION-III

The LNM Institute of Information Technology, Jaipur



11-11-2017 & 12-11-2017 - Event on LNMHacks 2.0

REGION-V

KKR & KSR Institute of Technology & Sciences, Guntur



29-11-2017 to 30-11-2017 – Event on Internet of Things Start-up boot camp

REGION-V

Prasad V. Potluri Siddhartha Inst. of Tech., Vijayawada



20-11-2017 to 25-11-2017 - STTP on Intelligent Computing & Deep Learning

Aditya Engineering College, Surampalem



24-11-2017 - Guest Lecture on Essentials of Network Security by Dr Jayanthi

G. Narayanamma Institute of Technology and Science, Hyderabad



4-10-2017 - Workshop on Android App Development



24-10-2017 & 25-10-2017 - Workshop on Developing Smart Applications using IoT

▶ FROM STUDENT BRANCHES ▶▶▶

REGION-V

Lakireddy Bali Reddy College of Engineering, Mylavaram



13-12-2017 - Workshop on WEB TRENDS by Mr. Sai Satish

NBKR Institute of Science and Technology, Nellore



22-11-2017 - Training program on Artificial Intelligence Revolution

Anurag Group of Institutions, Hyderabad



17-8-2017 - Seminar on Big Data by Dr. Salman Abdul Moiz



4-12-2017 to 9-12-2017 - Short Term Training program on HTML 5.0 by Mr. Mruthyunjaya Mendu

Vasavi College of Engineering, Hyderabad



21-10-2017 - Guest Lecture on Computational Geometry by Dr Kishore Kothaplli



26-10-2017 - The winners receiving certificate and cash prize during Technical Quiz

Vasireddy Venkatadri Institute of Technology, Guntur



21-12-2017 - Event on CodeJam, Potential Professor

St Joseph Engineering College, Vamanjoor



7-12-2017 - Industrial visit to Infosys

▶ FROM STUDENT BRANCHES ▶▶▶

REGION-V

B.N.M. Institute of Technology, Bangalore



4-11-2017 & 5-11-2017 – Workshop on Webservices by Mr. Albin Xavier



4-11-2017 to 6-11-2017 – Workshop on Android Application Development by Mr. Vishwa Kiran

REVA University, Bangalore



11-12-2017 & 12-12-2017 - Workshop on R-Programming

R. V. College of Engineering, Bangalore



21-12-2017 to 23-12-2017 - International Conference CSITSS-2017

REGION-V

R.V. College of Engineering, Bangalore



21-11-2017 & 28-11-2017 - Workshop on How to Write a Technical Paper by Dr. Shantharam Nayak

REGION-VI

Late G N Sapkal College of Engineering, Nashik



4-11-2017 - Seminar on Intellectual Property Right

REGION-VI

Guru Gobind Singh Polytechnic, Nashik



22-12-2017 - Workshop on Personality Development, Etiquettes, Effective Communication by Mr. Vijay Acharya

Late G N Sapkal College of Engineering, Nashik



4-11-2017 - Seminar on Intellectual Property Right

▶ FROM STUDENT BRANCHES ▶▶▶

REGION-VII

KCG College of Technology, Chennai



24-11-2017 – Workshop on Advanced Photoshop and Dreamweaver

Kongu Engineering College, Perundurai



16-12-2017 - Interdepartmental Technical Symposium Naevus-17

VIT University, Vellore



13-12-2017 - Workshop on Python Programming

Panimalar Institute of Technology, Chennai



15-11-2017 - Workshop on Embedded Systems with IoT using Raspberry Pi

Panimalar Institute of Technology, Chennai



20-11-2017 to 26-11-2017 - Internship Program on Java

Rajalakshmi Engineering College (Autonomous), Chennai



15-12-2017 - Workshop on Python

Rajalakshmi Engineering College (Autonomous), Chennai



16-12-2017 - Workshop on IoT and its Applications

Valliammai Engineering College, Kattankulathur



23-11-2017 & 24-11-2017 - FDP on EC6504 - Microprocessor and Microcontroller

▶ FROM STUDENT BRANCHES ▶▶▶

REGION-VII

Jeppiaar Institute of Technology, Sriperumpudur



18-12-2017 - Training on Python Programming

Valliammai Engineering College, Kattankulathur



18-12-2017 - Training on Python Programming

Student branches are requested to send their report to

sb-activities@csi-india.org

with a copy to

adm.officer@csi-india.org

Chapters are requested to send their activity report to

chapter-activities@csi-india.org

with a copy to

adm.officer@csi-india.org

Kindly send **High Resolution Photograph** with the report.



▶ CSI CALENDAR 2017-18 ▶▶▶



Gautam Mahapatra, Vice President, CSI, Email: vp@csi-india.org

Date	Event Details & Contact Information
JANUARY 11-12, 2018	CSI Cyber FIF-C(2018) Organised by Mumbai chapter (www.csimumbai.org/cyberfifc/) Venue : Victor Menezes Convention Centre, IIT Bombay Contact : harsh@csimumbai.org Phone No. 022 28235476 / 28235548
JANUARY 19-21, 2018	2nd International Conference on Data Management, Analytics and Innovation (ICDMAI 2018) , jointly organized by CSI Division II; CSI Pune Chapter and Audyogik Tantra Shikshan Sanstha's, Institute of Industrial and Computer Management and Research, Pune, (IICMR). http://www.icdmai.org Contact : Dr. Neha Sharma (nvsharma@rediffmail.com , +91-9923602490) Dr. Deepali Sawai - deepalisawai@gmail.com , +91-9921000870
	52nd Annual Convention - Organized by CSI Kolkata Chapter - Theme: Social Transformation - Digital Way, Venue: Science City E-mail: csical@gmail.com , chairoccsi2017@gmail.com , csi2017kolkata@gmail.com Website: www.csi2017.in



CSI Invites Project Proposals from Faculty Members and Students under the Scheme of R&D Funding for the year 2017-2018

As India's largest and one of the world's earliest IT professional organizations, the Computer Society of India has always aimed at promoting education and research activities, especially in the advanced technological domains and emerging research fields. It is also committed to take the benefits of technological progress to the masses across India in particular to unrepresented territories. In order to promote research and innovation meeting the grass-root level ICT needs and emphasize the importance of joint research by faculty-students, the CSI has been providing R&D funding for last several years.

The CSI Student Branches and member institutions are requested to motivate the young faculty members and students (including undergraduate and postgraduate) to benefit from this scheme. The proposals should have the following: aim/objectives, expected outcome, indicative thrust areas for research funding may be submitted to: **Computer Society of India, Education Directorate, CIT Campus, IV Cross Road, Taramani, Chennai 600113**. Last date for Receipt of Proposals: 31st January 2018.

Aims and Objectives

- To provide financial support for research by faculty members, especially for developing innovative techniques and systems to improve teaching-learning and institutional management processes.
- To provide financial support to students for developing new systems catering to the needs of socially relevant sectors and/or involving proof of concepts related to emerging technologies.
- To facilitate interaction / collaboration among academicians, practitioners and students.
- To develop confidence and core competence among faculty/students' through research projects.
- To foster an ambience of '**Learning by Doing**' and explore opportunities of industry funding and mentoring for inculcating professionalism and best practices among students and faculty.
- To recognize innovation and present excellence awards for path-breaking projects through CSI YITP awards and industry associations, Govt. Agencies and professional societies.

Expected Outcome

- Identification of thrust areas, capability assessment, gap analysis, recommendations and future education and research directions.
- Integration of research methodologies into the university

teaching-learning process and evolving a quality control mechanism for academic programmes and curricula.

- Strengthening of industry-institutes interaction through commercialization of technologies and products developed by students and faculty.
- Publication of research studies (ICT penetration, technological innovation, diffusion & adaptation), state-of-the-art reports and case studies of education/ research initiatives.
- Identification of potential new and innovative projects of young faculty, researchers and students for possible business incubation

Indicative Thrust Areas for Research funding

The financial assistance up to ₹ 10,000/- for hardware/software projects would be provided to cover items like equipment, books/journals, field work, questionnaire, computation work and report writing. The indicative thrust areas for funding include (but not limited): Technology-OS, Programming Languages, DBMS, Computer & Communication Networks, Software Engineering, Multimedia & Internet Technologies, Hardware & Embedded Systems Process & Tools- Requirements Engineering, Estimation & Project Planning, Prototyping, Architecture & Design, Development, Testing & Debugging, Verification & Validation, Maintenance & Enhancement, Change Management, Configuration Management, Project Management, Software Quality Assurance & Process Improvement, Vertical Applications- Scientific Applications, Enterprise Systems, Governance, Judiciary & Law Enforcement, Manufacturing, Healthcare, Education, Infrastructure, Transport, Energy, Defence, Aerospace, Automotive, Telecom, Agriculture & Forest Management, Inter-disciplinary Applications- CAD/CAM/CAE, ERP/SCM, EDA, Geo-informatics, Bioinformatics, Industrial Automation, CTI and Convergence.

Only one proposal is accepted from the Institution.

Last date for Receipt of Proposals: 31st January 2018

For further details and application form can be downloaded from CSI portal www.csi-india.org under scrolling news items as "CSI R&D Projects Application"

Computer Society of India

Education Directorate,
CIT Campus, IV Cross Road
Taramani, Chennai-600113
Email: researchproposals@csi-india.org