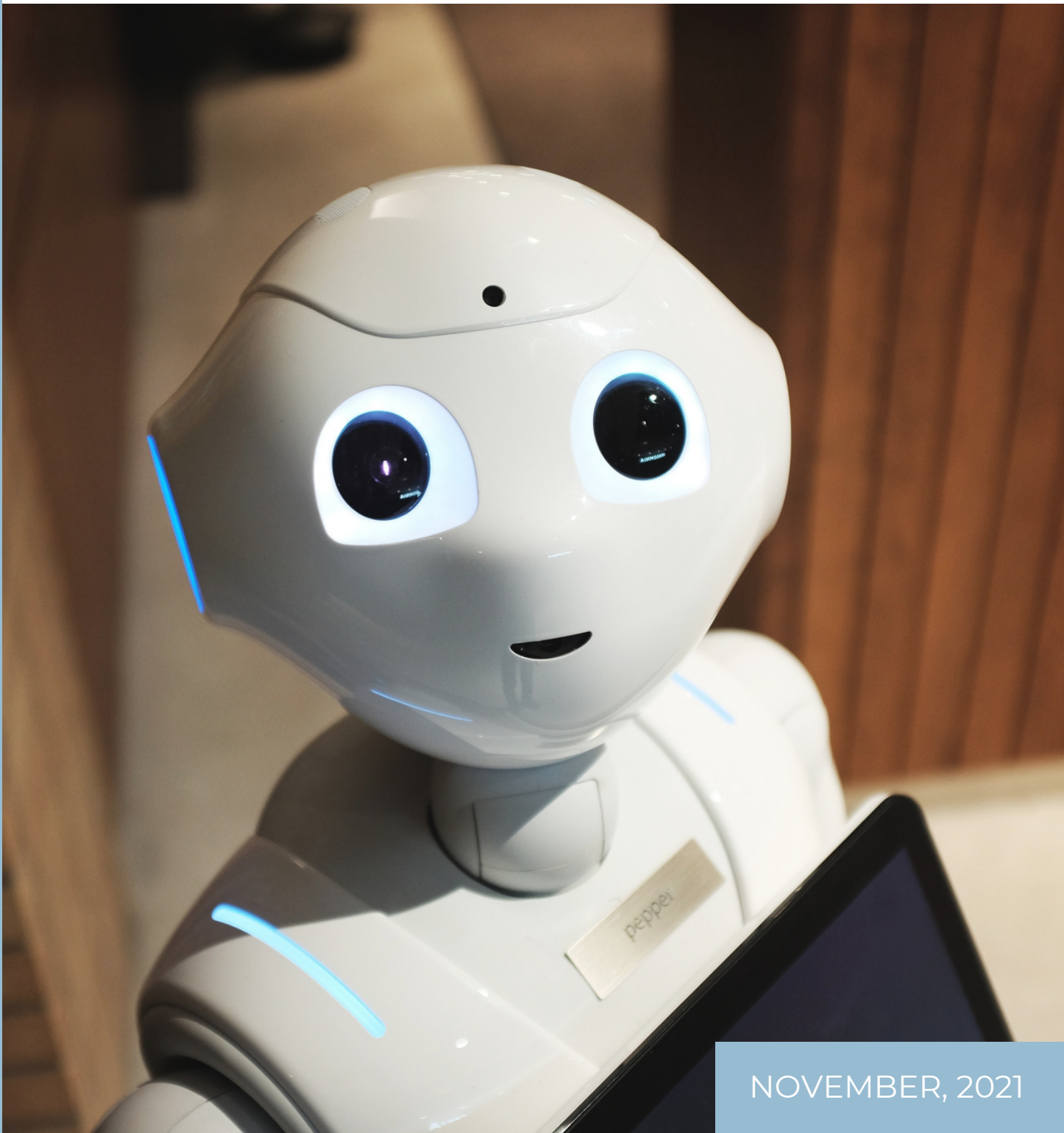**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

DIGIFLASH PROUDLY PRESENTS

DIGITIMES

2021 - 2022 ISSUE 1

NOVEMBER, 2021

VISION OF THE DEPARTMENT

To develop engineers with global employability, entrepreneurship capability, research focus and social responsibility.

MISSION OF THE DEPARTMENT

- To develop internationally competent engineers in dynamic IT field by providing state-of-art academic environment and industry driven curriculum.
- To motivate and guide students to take up higher studies and establish entrepreneurial ventures.
- To enrich the department through committed and technically sound faculty team with research focus in thrust areas.
- To undertake societal problems and provide solutions through technical innovations and projects in association with the industry, society and professional bodies.

Programme Educational Objectives (PEOs)

PEO 1: Domain Expertise - Possess expertise and emerge as key players in IT integrated domains.

PEO 2: Computing Skills and Ethics - Employ computing skills to solve societal and environmental issues in an ethical manner.

PEO 3: Lifelong Learning and Research - Involve in lifelong learning and research to meet the demands of global technology.

Programme Outcomes (POs)

PO1. Engineering Knowledge : Apply the knowledge of mathematics, science, engineering fundamentals and concepts of Computer Science to solve complex engineering problems.

PO2. Problem Analysis : Identify, review literature, formulate and analyse complex engineering problems using first principles of mathematics and engineering sciences.

PO3. Design and Development of Solutions : Design and develop computing solutions for complex engineering problems with societal and environmental awareness.

PO4. Complex problem Investigation : Investigate complex problems by employing research methods to arrive at valid conclusions.

PO5. Modern Tool Usage : Evaluate and use appropriate tools and techniques in engineering activities .

PO6. Societal contribution : Follow professional engineering practice by applying contextual knowledge to assess societal and legal issues.

PO7. Environment and Sustainability : Understand and provide professional engineering solutions taking into consideration environmental and economic sustainability.

PO8. Ethics : Follow ethical principles and norms in engineering practice.

PO9. Individual and Team work : Function effectively as an individual, team member or leader in diversified environments.

PO10. Communication : Communicate effectively through various modes for all engineering activities.

PO11. Project Management and Finance : Apply Engineering knowledge and management principles for effective project management in multi-disciplinary environments.

PO12. Life-long Learning : Engage in independent life-long learning and skill development for professional and social well being.

Programme Specific Outcomes (PSOs)

PSO1. Systems Engineering: Employ software engineering principles in the design and development of efficient systems.

PSO2. Knowledge Engineering: Apply data analytics techniques for solving real world problems.

Table of Contents

DEMYSTIFYING QUANTUM COMPUTING

Yuvaraaj K
20BCS086

Quantum Computing is a relatively booming field of computer science and a field that is proven to be significantly faster in solving NP-complete problems. Even big name corporations like Microsoft, Google, IBM are investing millions into this technology gold rush, also in the recent budget session our financial minister Mrs.Nirmala Sitharaman announced $1.12 Billion towards the area of quantum technologies in India. The emergence of the Technology in 2010's has quite a lot of importance, Moore's Law is plateauing and this is seen very evidently as the size of transistors has already reduced to 7nm. Any further reduction in size would cause the electron to experience a phenomenon of Quantum Tunneling, i.e. the transistor fails to work normally because the known laws of physics don't apply for an electron of size 4nm to 6nm, and quantum physics starts to take over. Thus, we can say that nature is inevitably forcing us to shift towards quantum. Coming to the mathematical/computational aspect of the technology.

It needs to be viewed as an entirely unique paradigm of computing, unlike traditional turing machines this one is not a deterministic computation, rather a probabilistic one. In simple terms, when an operation is performed on a bit of a normal computer it changes from one state to another, and the output is very much predictable using truth tables, but when dealing with a quantum computer and Quantum bits (qubits) the output is in probabilities of zero and one, this is also known as superposition of a qubit.

A very popular myth regarding quantum computers is that they will replace conventional computers that we use today. But the reality is far different, Quantum Processing units when they come into existence they would work together with the conventional CPU just as the way the GPU works today.

The GPUs have a particular job to perform, which the CPU fails to achieve when compared to the performance of GPU. Likely, the QPU will have a unique job that the CPU cannot perform. Hence, the CPUs will not be replaced totally. Another point of interest is that quantum computers can solve complicated problems like protein folding that can find a cure to cancer, and crack the RSA cryptosystems, etc. But in reality this would take around two to three decades to have a QPU that has such potential. In terms of programming a quantum computer uses a completely different style of code, or it is safe to say that there would not be a code like the higher level programming languages of today, rather a circuit constructed using quantum(reversible) logic gates on a quantum wire would be employed. The circuit and the gates that it constitutes are not physical but rather abstract, technically speaking they would be vibrations on a quantum field. For starters, there are a few quantum programming languages like the q# (pronounced 'q sharp') from Microsoft and QISKIT (Quantum Information Systems Kit) from IBM, and google's cirq. In most of these quantum specific programming languages, we don't write code to be converted into binary or something like assembly language that will later be read by a computer bit by bit like the humans read a book word by word. But rather the circuit written in code for quantum computers would be like music where each gate acts as a musical note
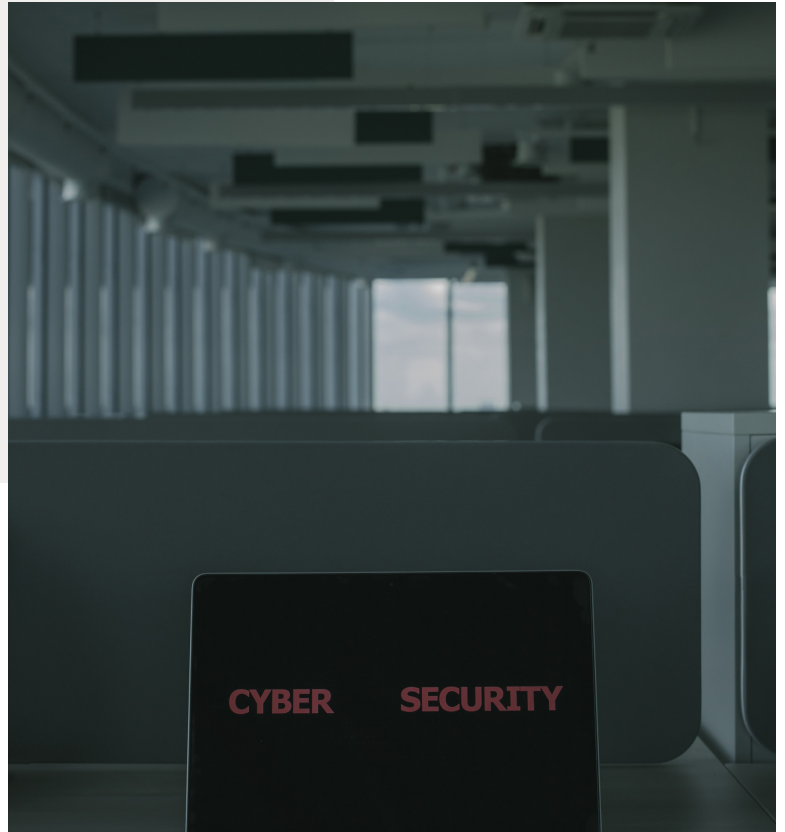
Do You Know...?

The possibility of quantum computing was first proposed by physicist Richard Feynman in 1982.

IMPORTANCE OF AI AND CYBER SECURITY

Logesh Krishna R
20BCS063

AI or Artificial intelligence has been around for quite some time. It has been around since 1970's as a fantasy in the form of science fiction in movies. This has become the most common and most underrated topic nowadays. Cyber security is another underrated topic that most people don't know about or do know but don't care.

AI and cyber security are the most important and emerging topics in the new generation. Now lets talk about the importance of these topics and why one must have a knowledge about them. As most of you know Tik Toks parent company is Byte dance which is an AI based company. Now lets talk about the question why Tik Tok is one of the popular apps why not other apps. If we think about it all comes to one thing data. Having large amount of data is one thing but using the data in order to develop an algorithm that predicts what you would like to watch is another level altogether which is the capability of AI.

AI is used in many ways, even Facebook has developed a TransCoder AI that has the capability to convert the program that is written in one programming language to another which is most useful as till now most of the old websites use 30/40 years old code it will be helpful for them to convert the code directly instead of starting from scratch which is costly. This helps those websites which are run on those languages to convert into new languages which are highly secure.

AI can be used to improve the cyber security as it can analyze different attacks done on websites and can be able to provide a sophisticated solution to the problem. It can even provide high level security by disabling the servers immediately so that no data breach can occur and it will be able to learn and find the attackers fast and alert the officials immediately. There are infinite possibilities how we can use AI as there are two sides to a coin there are also many dangerous ways to use AI if it goes into the hands of wrong persons. AI can also reduce the human need thus decreasing the jobs further.

As we all know that the covid-19 pandemic has hit most of the industries, companies and governments badly. All are suffering in one way or another. During this time the start-ups are one of the worst hit sectors. According to a survey 17% have been closed due to pandemic and 70% are facing serious disruptions. Even investors are not willing to invest in start-ups now. Only the start-ups that are based on AI, Machine learning and cyber security are able to attract investors to invest in them. This shows the importance of AI and why everyone should have knowledge about it.

Do You Know...?

160,000 Facebook accounts are compromised per day – a type of user data theft

SMOOTH-TALKING AI ASSISTANTS

Sharmila K
20BCS050

New techniques that capture semantic relationships between words are making machines better at understanding natural language. We're used to AI assistants-Alexa playing music in the living room, Siri setting alarms on your phone but they haven't really lived up to their alleged smarts. They were supposed to have simplified our lives, but they've barely made a dent. They recognize only a narrow range of directives and are easily tripped up by deviations. But some recent advances are about to expand the digital assistants. In June 2018, researchers at OpenAI developed a technique that trains an AI on unlabeled text to avoid the expense and time of categorizing and tagging all the data manually. A few months later, a team at Google unveiled a system called BERT that learned how to predict missing words by studying millions of sentences. In a multiple - choice test, it did as well as humans at filling in gaps.

These improvements, coupled with better speech synthesis, are letting us move from giving AI assistants simple commands to having conversations with them. They'll be able to deal with daily minutiae like taking meeting notes, finding information, or shopping online.Some are already here. Google Duplex, the eerily human-like upgrade of Google Assistant can pick up your calls to screen for spammers and telemarketers. It can also make calls for you to schedule restaurant reservations or salon appointments. In China, consumers are getting used to Alibaba's Ali Me which coordinates package deliveries over the phone and haggles about the price of goods over chat. But while AI programs have gotten better at figuring out what you want, they still can't understand a sentence. Lines are scripted or generated statistically, reflecting how hard it is to imbue machines with true language understanding. Once we cross that hurdle, we'll see yet another evolution, perhaps from logistics coordinator to babysitter, teacher or even friend.

AUGMENTED REALITY AND VIRTUAL REALITY

Ashwin Karthik S 21BCS312

One of the biggest confusions in the world of augmented reality is the difference between augmented reality and virtual reality. Both are earning a lot of media attention and are promising tremendous growth. So, what is the difference between virtual reality vs. augmented reality?

Virtual reality (VR) is an artificial, computer generated simulation or recreation of a real-life environment or situation. It immerses the user by making them feel like they are experiencing the simulated reality first-hand, primarily by stimulating their vision and hearing. VR is typically achieved by wearing a headset like Facebook's Oculus equipped with the technology, and is used prominently in two different ways:

- To create and enhance an imaginary reality for gaming, entertainment, and play (Such as video and computer games, or 3D movies, head-mounted display).
- To enhance training for real-life environments by creating a simulation of reality where people can practice beforehand, such as flight simulators for pilots.

- To enhance training for real-life environments by creating a simulation of reality where people can practice beforehand, such as flight simulators for pilots.

Virtual reality is possible through a coding language known as VRML (Virtual Reality Modelling Language) which can be used to create a series of images, and specify what types of interactions are possible for them. Augmented reality (AR) is a technology that layers computer-generated enhancements atop an existing reality to make it more meaningful through the ability to interact with it. AR is developed into apps and used on mobile devices to blend digital components into the real world in such a way that they enhance one another, but can also be told apart easily. AR technology is quickly coming into the mainstream. It is used to display score overlays on telecasted sports games and pop out 3D emails, photos or text messages on mobile devices.

Leaders of the tech industry are also using AR to do amazing and revolutionary things with holograms and motion-activated commands. Augmented reality and virtual reality are inverse reflections of one another with what each technology seeks to accomplish and deliver for the user. Virtual reality offers a digital recreation of a real-life setting, while augmented reality delivers virtual elements as an overlay to the real world. Medical students use AR technology to practice surgery in a controlled environment. VR, on the other hand, opens up newer avenues for gaming and interactive marketing. AR/VR development is steadily getting easier and cheaper. 5G networks will facilitate super-fast downloads and streaming, energizing VR and AR devices.

Do You Know...?

171 million people use VR technology today

ROBOTIC PROCESS AUTOMATION

Kaviyasree K M
20BCS037

Automation embraces the idea of technology as a business function that works with humans, not in place of them, to enhance and improve their performance, efficiency, and innovation. A growing number of us are becoming more comfortable with automation in our daily lives. Here we can discuss about Robotic Process Automation (RPA). RPA is the term used for software tools that partially or fully automate human activities that are manual, rule based, and repetitive. They work by replicating the actions of an actual human interacting with one or more software applications to perform tasks such as data entry, process standard transactions, or respond to simple customer service queries

Robotic process automation tools are not replacements for the underlying business applications; rather, they simply automate the already manual tasks of human workers. They essentially look at the screens that workers today look at and fill in and update the same boxes and fields within the user interface by pulling the relevant data from the relevant location. This serves a couple of purposes:

- It frees humans from monotonous, low-value added tasks like data entry and makes them available for higher-value tasks that require human creativity, ingenuity, and decision making.
- It helps to ensure that outputs are complete, correct, and consistent between tasks and between human workers.
- It helps to ensure that tasks can be completed more quickly because the robotic process automation tool can find and retrieve any necessary data in the background One of the key benefits of robotic process automation is that the tools do not alter existing systems or infrastructure.

Many other process automation tools interact with systems using application programming interfaces (APIs), which means writing code and can lead to concerns about quality assurance, maintaining that code, and responding to changes in the underlying applications.

VR IN MILITARY TRAINING

Vasanth T S
19BCS024

Virtual reality training is a common use case for VR technologies. It often helps for training exercises that are too rare, too expensive, or too dangerous to be done in real life. Training simulation in the military field fosters the combat skills of small-scale units or single soldiers by simulating actual vehicles, soldiers and combat environment With a VR headset and controllers, trainees are completely immersed in virtual environments. For example, you can have a flight simulator overlaid with a virtual world rendering an actual battlefield for a complete pilot training. virtual training can help you simulate different events like vehicle collisions or hostile armed forces. But it can also help you check the ergonomics of the cockpit you are simulating, by seeing in a real situation (almost), if the instrument panel is comfortable to use, and if all the buttons and commands can be reached out.

Specialized training also applies to maintenance and assembly technicians. Experienced support personnel are only a few in this sector, and their knowledge must be transferred somehow.

The use of virtual and mixed-reality technologies is a solution for this challenge. As an example, in the marine corps, each boat can have specific engineering constraints, leading to a different maintenance scenario from a boat to another. To be immediately operational, technicians can view the CAD model in VR and get an army specialized training program "on the boat" before their operation. This use case can also concern training simulation. Traditional military exercises are expensive and last awfully long. Both aspects can be significantly reduced by using augmented and virtual technologies.

But VR also helps with decision-making and tactics in actual combat situation. By rendering actual battlefield in VR and giving a fully immersive experience to the users, the command staff can easily grasp the situation. By running simulation and testing it, the commander can understand a series of possible outcomes and set better battle plans.

VR IN HEALTHCARE AND SURGERY

VAISHNAV S
20BCS008

Virtual reality (VR) is the name given to the technology that allows a user to simulate a situation or experience of interest, using a VR headset, within an interactive but computer generated environment. The simulation is immersive and may require the use of special 3-D goggles with a screen, or gloves that provide sensory feedback, to help the user learn from experience in this virtual world.

Medical Training:

Any kind of medical situation can be simulated using VR, to allow the students to deal with it as in real life. This is followed by feedback and debriefing, to allow them to learn from their mistakes, if any. The cheapness of VR systems and the fact that faculty are not required to be present makes access more flexible and broad-based.

Pain Management:

Virtual reality is also found to be useful in the work of relieving pain and rehabilitation of patients with severe pain, such as those who are recovering after having received a skin graft, during the daily cleaning of burns wounds, or to make daily injections more bearable for children.

Child Birth:

Researchers at Monash University Department of Obstetrics and Gynaecology carried out a study of 50 pregnant women who used VR glasses during their procedure. The study found out that using VR turned out to be a very relaxing and soothing experience. According to Dr. Vinayak Smith of Monash University, VR helps in reducing pain by 25%. Doctors use VR to help the patient experience certain real-life situations that are very helpful in pregnancy. It is also found that VR regulates the blood pressure and heartbeat of a pregnant woman, which increases during labor.

Fitness:

Virtual reality has been used in numerous fitness apps to promote physical activity every day by making it more fun. They either gamify physical exercise, provide goals and rewards, give feedback on the movements, or just make it more enjoyable by immersing the user in a beautiful landscape.

Mental Care:

Mental health patients with phobias, for instance, also find VR very helpful, as do their therapists. For instance, to treat clients with agoraphobia, or acrophobia, a corresponding situation may be recreated in the therapist's own center, to help the client face it little by little. This is also the case with post-traumatic stress disorder (PTSD).

Robots:

Robots in surgery controlled by VR - VR is also crucial in surgical robotics, which depends on a robotic arm controlled by a human surgeon at a console. The surgeon depends on the camera positioned within the body to provide a view of the area being operated on.

Do You Know...?

Mental illness treatment in VR Exposure therapy is one of the most efficient methods for treating certain mental disorders.

STUDENT PROJECTS

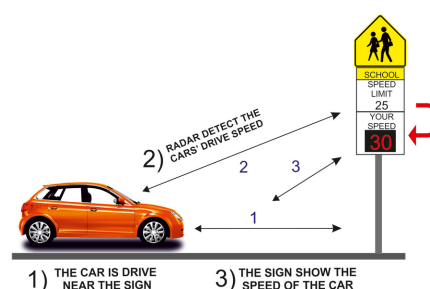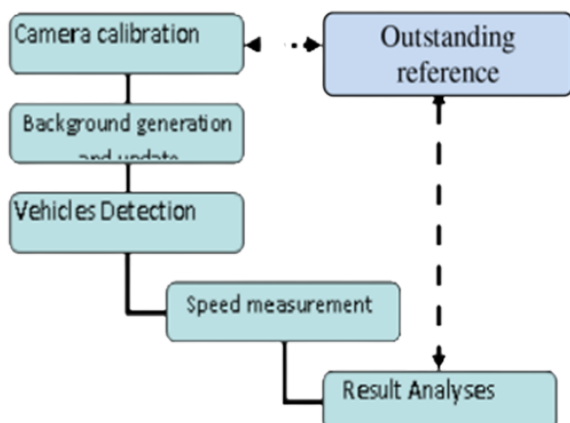# VEHICLE SPEED DETECTION

18BCS005 Manju Rekar M

Video and image processing has been used for traffic surveillance, analysis and monitoring of traffic conditions in many cities and urban areas. This project aims to present another approach to estimate the vehicle's velocity. In this study, the captured traffic movies are collected with a stationary camera which is mounted on a freeway. The camera was calibrated based on geometrical equations that were supported directly by using references. Camera calibration for exact measurements maybe possible while accurate speed estimation can still be quite difficult to achieve. The designed system has the ability to be extended to another related traffic application. The average error of the detected vehicle speed was ± 7 km/h and the experiment was operated at different resolutions and different video sequences.

A new algorithm that utilizes the video image processing and camera optics to detect vehicle speed in precise manner is presented. The algorithm requires only a video camera and a computer and can concurrently detect vehicle speeds in different lanes with less than 7% error. The camera location must be set up over the surface of the road with its optical axis inclined downward to the roadway to cover the road plane.

The software system is composed of 6 subsystems as shown in Figure, namely, the camera calibration unit, the background update and removal unit, the vehicle detection unite, the speed measurement unit the result analysis

unit and the outstanding reference. The result accuracy is compared with outstanding references which are the moving vehicles as we know the exact speeds of them that are driven by assistants during calibration. The image processing in this study is an important task and another complex component. This task requires processing data such as the background extraction and removal, moving vehicle detection and localization, vehicle shadow removal, applying filter for image correction and calculation of the vehicle's speed, etc.

The data captured through the video camera has a combination of consecutive image frames and each frame consists of numerical quantity of pixels which carry two types of data, background and foreground. The background contains the static objects such as parking vehicles, road surface and building or any other stationary objects and also climatic conditions and daylight/night time. The foreground represents moving objects such as pedestrians, moving vehicles or any other moving objects. In order to find out the speed of moving vehicles, the first step is to extract and remove the background. Therefore, the foreground which has the valuable data can be extracted and utilized for needed information such as speed, classification and number of the vehicles.


SYSTEM ARCHITECTURE OF VEHICLE SPEED DETECTION

SIGN LANGUAGE PREDICTION USING DEEP LEARNING

19BCS311 Nikila A

A real-time sign language translator is an important milestone in facilitating communication between the deaf community and the general public. This Project is the development and implementation of an American Sign Language (ASL) fingerspelling translator based on a convolutional neural network. We utilize a pre-trained GoogLeNet architecture trained on the ILSVRC2012 dataset, as well as the Surrey University and Massey University ASL datasets in order to apply transfer learning to this task. We produced a robust model that consistently classifies letters a-e correctly with first-time users and another that correctly classifies letters a-k in a majority of cases. Given the limitations of the datasets and the encouraging results achieved,

we are confident that with further research and more data, we can produce a fully generalizable translator for all ASL letters. We implemented and trained an American Sign Language translator on a android application based on a CNN classifier. We are able to produce a robust model for letters a-e, and a modest one for letters a-k (excluding j). Because of the lack of variation in our datasets, the validation accuracies we observed during training were not directly reproducible upon testing on the android application. We hypothesize that with additional data taken in different environmental conditions, the models would be able to generalize with considerably higher efficacy and would produce a robust model for all letters.
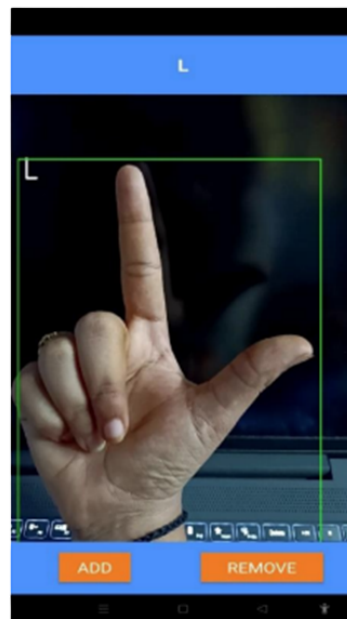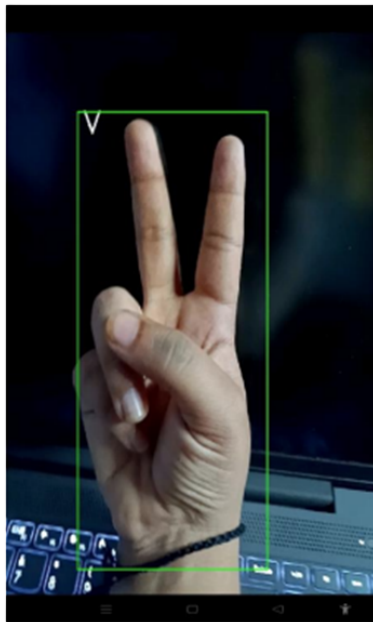
SIGN LANGUAGE PREDICTION

RIDDLES

1.Combine Eight Eights to form Thousand.

2.Name of the Flat riddle In a town, there are over 100 flats.
Flat-1 is named first flat.
Flat-2 is named second flat.
Flat-3 is named third flat.

A visitor 'Victor' decides to walk through all the flats, he finds all the flats except flat-62. Victor later finds that the locals of the town have given it another name. What is the name of the Flat?

3.Which is heavier: a ton of bricks or a ton of feathers?

4.Can you make a six-letter word using the letters N, A and B ?

5.computer terminology riddle I am an eight letter word and I am a computer terminology. The second, third and fourth letters make an animal. The fourth, fifth, sixth, seventh and eighth letters make a weapon. The first, second, third and fourth letters can be taken as an outcome of any exam. The fifth, sixth, seventh and eighth letter combine to form a high end typing software. Can you tell who am I ?

Answers

1.888+88+8+8+8=1000

2.One Minute flat flat 62 => Sixty second flat => One minute flat

3.Neither. They both weigh a ton

4.The word is BANANA

5.Password

https://visualise.com/virtual-reality/virtual-reality-healthcare

https://www.wareable.com/vr/how-vr-is-training-the-perfect-soldier-1757
 https://www.inspirisys.com/blogdetails/Demystifying_Quantum_Computing/27

https://arvr.google.com/

https://www.splunk.com/en_us/data-insider/what-are-augmented-reality-and virtual-reality.html

ABOUT DIGITIMES

DigiFlash is the student association of Computer Science and Engineering Department, MCET, Pollachi. The objective of our association is to innovate, create and sharpen the minds of the students to compete globally. It is a platform to improve the student's knowledge and also create opportunities to interact with leading industry persons. Digiflash is organizing number of Co-Curricular activities including special lectures by Experts, Workshops, Technical Seminars, Coding Events, Paper & Poster Presentations and Webinars. Digitimes is a part of Digiflash. A magazine that features the latest Technological advancements in the field of Computing.

EDITORIAL TEAM:

Sidharthan J	18BCS071
Veeraraghavan V	19BCS107
Ranjani A V	19BCS041
Ramesh A	19BCS007
Arul Praveena B	20BCS043
Logesh Krishna R	20BCS063
Abdul Basith S	20BCS042
Mohammed Rizwan A	21BCS302
Ashwin Karthik S	21BCS312
Mohamed Abith M	21BCS065

CHIEF EDITORS:

Dr.G.Anupriya, Professor/CSE

Mr.K.Prabhu, Assistant Professor/CSE

Send your articles for the forthcoming issue either by E-Mail to prabhu@drmcet.ac.in or Submit a hard copy to Mr.K.Prabhu, AP/CSE