HMR INSTITUTE OF TECHNOLOGY AND MANAGEMNET
(An ISO-2008 Certified Institute, Approved by AICTE & Affiliated to Guru Gobind Singh Indraprastha University)
Fostering Technical Excellence Through Education

SKILL-ERA

2018-2019

Technical Magazine

Department Of Electronic And Communication Engineering

SKILL-ERA CONTENTS

SKILL-ERA CONTENTS

Editor's Desk……

Fall is one of the most exciting periods at a college because it is the start of something new for so many students. It is a matter of great pride and privilege for me being a part of technical magazine **"Skill Era "**provides a platform for every student to grow their literary skills. The main thrust of the college is to provide virtuous learning environment to cultivate entrepreneurship capabilities in numerous areas of electronics and communication engineering with improved efficiency, productivity and technological empowerment of human resources.

Our budding talents have expressed their thoughts, ideas, aspirations and convictions in a creative way. In fact, this is how they broaden their mental, psychological and intellectual horizons. Thus, the magazine reflects how the college has been able to live up to its aim, providing quality education to the students. As you scan through the pages it will enlighten you with the significant milestones that ECE department of HMRITM has achieved this year.

I would like to thank all my editorial team members for helping me pull this through. I express my considerable appreciation to all the authors of the articles in this magazine. These contributions have required a generous amount of time and effort. It is this willingness to share knowledge, concerns and special insights with fellow beings that has made this magazine possible.

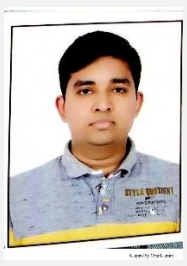
Thank you all!!

Ms Shweta Bhatia
Magazine Coordinator
Assistant Professor (ECE)

Magazine Editorial Team

Abhishek Dadhwal (Student Coordinator, ECE 3A)

Saksham Singh (Student Coordinator, ECE 3A)



Nishank Vadhera (Student Coordinator, ECE 3A)

Volume 1, Issue 1

(August 2018- July2019)

ABOUT HMRITM


Late Sh. Hiralal


Late Smt. Mohan Devi


Late Smt. Rita Gupta

HMR Institute of Technology & Management was established in the year 2002. It has spread over a sprawling lush green campus 5 acres of land.

HMRITM meant for nurturing Technical Spirit - conceived in 2002, to provide exceptional facilities for students of Engineering and Technology, the HMR Institute of Technology and Management boasts of being among the reputed institutes even in its early stages. The Institute recognizes the need for bringing up a new age cerebral workforce in today's highly competitive environment. The name HMR stands after the founders of this institution Late Sh. **H**iralal, Late Smt. **M**ohan Devi and Late Smt. **R**ita Gupta. The Institute provides an atmosphere that ensures academic excellence and industry exposure that helps equip the students with the technical skills and emotional intelligence to successfully grapple with the complexities of a dynamic technology-driven environment. This endeavour is greatly aided by the location of the institute in Delhi that is home to several corporate houses and industries.

The institute stands for quality embedded higher education at par with global standard and an excellent learning environment backed by innovative state-of-the-art infrastructure. Further, it aims to add greater value to the world of crucial engineering developments and technological breakthroughs through an active focus on research and development activities. With a bird's eye-view of all-encompassing development, it strives to achieve faster progress for students, for itself

Vision of the college

Vision: To provide technical education of highest standards in various fields of engineering, information technology & management and to be a global centre of academic excellence.

Mission of the college

Mission: Enabling students to become highly competent and ingenious technocrats, in the field of engineering and technology thereby setting new trends globally.

About the Department

The Department of **ECE** was started in the year 2003 with an intake of 120 students. The intake was increased to 180 students from 2012. A Separate block is provided to develop the department as a centre of excellence. ECE Department has faculties with good experience of teaching and research background, through which they are guiding students to the path of excellence. Most of the faculty members in ECE department are either Ph.D. or pursuing Ph.D.

Faculties of the department are untiringly committed towards student betterment and growth of the department. Collaboration with faculty members from other disciplines, both within and outside the institute, is encouraged.

Department organizes various value addition program (VAP) for student, in various areas such Embedded System (ARM, Arduino, PIC etc.), IoT (Internet of things), MATLAB etc., to get them ready for the competitive industry and employability. Different projects bases on Project Based Learning was made by students and presented Tech Expo organized at college as well as university level.

The Alumnae of all the past years are well-placed in reputed organizations like INFOSYS, HCL Technologies, HP, Citrix etc. Some of them are pursuing M.Tech, MBA and MS courses in India & abroad. The Department has established well equipped laboratories with modern and latest software and hardware tools and kits.

Vision of the Department

Vision: To create professionally competent, research oriented, disciplined, socially & environmentally sensitized Electronics & Communication Engineers.

Mission of the Department

M1: To make the students entrepreneur & employable by imparting quality education & training in Science, Electronics & Communication Engineering fields.

M2: To create an environment for overall personal development of the students including creative & innovative thinking, team work, professional ethics & improved communication skills.

M3: To pursue research & new technologies in Electronics & Communication Engineering & related disciplines in order to serve the need of society, industry, government & scientific community.

Program Educational Objectives (PEO's)

After successful completion of the educational program in engineering, the graduates will be

PEO1: Able to apply concepts of mathematics, scientific computing to Electronics and Communication Engineering to develop seamless knowledge for providing solution to any industrial problem.

PEO2: Able to prepares them for professional careers / higher studies and

aid in pursuing a diverse range of career roles as engineers, consultants, researchers, technologists and entrepreneurs.

PEO3: Able to learn and innovate in ever-changing global economic and technological environment maintaining professional discipline and high ethical as well as moral standard.

PEO4: Able to inculcate effective communication skills, teamwork, ethics and leadership in preparation for a successful career in industry and R&D organizations and involve in designing and developing interdisciplinary and innovative systems.

Programme Specific Outcomes (PSO)

Electronics and Communication Engineering (ECE) graduates will be able to:

PSO1: ***Engineering knowledge and Problem Analysis:*** Analyse and provide solutions to specific engineering problems relevant to Electronics & Communication Engineering by applying the knowledge of basic sciences, engineering mathematics and engineering fundamentals.

PSO2: ***Design & Development:*** Design of electronics and communication systems containing electronic devices, software, and hardware using the significant analytical knowledge in Electronics & Communication Engineering with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PSO3: ***Environment, Sustainability & Ethics:*** Apply the contextual knowledge of Electronics and Communication Engineering to assess societal, environmental, health, safety, legal and cultural issues with professional ethics and function adequately as an individual or a leader in a team to manage different projects in multidisciplinary environments as the process of life-long learning.

PSO 4: ***Research & Investigations:*** Conduct investigations and use research-based knowledge and research methods to solve complex problems

Branch Toppers

S.NO.	BATCH	RANK	ROLL NO.	NAME	PASSING%
1.	**2015-2019**	1st	00513302815	**APAAR GUPTA**	90.8
		2nd	41496502815	**MANAN AGGARWAL**	86.2
		3rd	04613302815	**SHRUTI**	85.76
2.	**2016-2020**	1st	35596502816	**SHUBHAM GUPTA**	88.79
		2nd	20213302816	**DHAARNA**	86.99
		3rd	48413302816	**JAIDEEP PURI**	85.84
3.	**2017-2021**	1st	00913302817	**RASHMI SHARMA**	86.46
		2nd	47013302817	**ATUL KUMAR PATHAK**	86.32
		3rd	40413302817	**SHRIYA PRAKASH**	85.61
4.	**2018-2022**	1st	01113302818	**SAKSHAM SINGH**	85.33
		2nd	42113302818	**MAYANK GAUR**	78.71
		3rd	50113302818	**HIMANSHI CHAWLA**	78.41

Director's Message – HMRITM

I am happy that Department of Electronics and Communication, HMRITM, Delhi, is bringing out an Institute Technical Magazine "**SKILL-ERA**". The **SKILL-ERA** will definitely help to show-case the activities that are happening in Department and the Campus. It also helps in building up teamwork which is very much needed today in the world of competition. It provides a platform for exposing the merits and academic achievements of the faculty and students. This enhances the documentation culture of the institute. This would definitely create an impact in the minds of readers, by way of providing larger visibility and dimension to the campus. I hope that this culture of releasing Technical Magazine continue forever and become a quoted example for all other colleges to follow.

Dr V .C Pandey
Professor, Director – HMRITM

Deputy Director's Message - HMRITM

It is a matter of pleasure the Department of Electronics and Communication is bringing out the Department Magazine "**SKILL-ERA**" for the year 2018-19. **SKILL-ERA** will be a medium for recording events and exhibits the literary skills of students. I am sure that this magazine will be informative and resourceful. In addition to the numerous achievements of the institute this is yet another mile stone in their curricular and co-curricular activities. I hope the magazine will bring creative talents of the students of the institutes. I congratulate the editorial team for their determined efforts and wish them all success.
Happy Reading!

Dr. Shalini Gupta
Professor & Deputy Director - HMRITM

HOD's Message – ECE (HMRITM)

I am pleased to know that our Electronics and Communication Engineering Department is going to publish the annual issue of Departmental Technical Magazine "**SKILL-ERA**". It provides a great opportunity to the students and faculty of the department to share their Knowledge, Literature, Talents, Achievements, Motivations and News related to technology etc. unfolds our imaginations, and gives life to our thoughts and aspirations. I would like to congratulate the entire editorial team and contributors for their hard work and dedication in making this dream come true.

Dr A. K Sharma
HOD (ECE)
HMR Institute of Technology & Management

Student's Articles

Virtual Reality

Virtual reality is an artificial environment which is created by software and hardware than presented to user I such a way that the user stops believing and accepts it as a real environment. On a computer virtual reality is experienced by two ways of senses i.e. sight and sound.

The simplest form of virtual reality is a 3-D image that can be explored interactively at a personal computer, usually by manipulating keys or the mouse so that the content of the image moves in some direction or zooms in or out. More sophisticated efforts involve such approaches as wrap-around display screens, actual rooms augmented with wearable computers, and hap tics devices let you feel the display images.

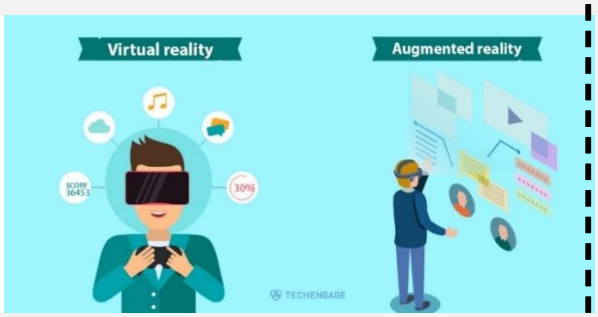
Virtual reality can be divided into:

- The simulation of a real environment for training and education.
- The development of an imagined environment for a game or interactive story.

Methods by which virtual reality can be realized:

- Head-mounted display (HMD): a display device, worn on head or as part of helmet.

- Augmented reality (AR): an interactive experience of a real world where objects are generated by computer perceptual information.



- Mixed reality (MR): mixer of real and virtual world to produce visualizations.

- Simulated reality (SR): such as an extended hallucination or an elaborated program.

Abhishek Dadhwal
ECE 3A

COSMIC RADITATIONS

Cosmic Radiations: The cosmic radiations are the radiations consisting of the cosmic Rays. Whereas the cosmic rays are the high energy protons and Atom nuclei which move through space at nearly the speed of light. These radiations are mostly extragalactic or are mostly emitted outside the solar system or sometimes within the solar system.

High energy radiations from outside our galaxy:

The Pierre Auger observatory in Argentina finally has solid evidence that most of the energetic particles in nature come from the sources outside the Milky Way galaxy. Scientists have suspected this for decades but were not able to confirm it until now.

“For the first time, we have proof that the highest-energy cosmic rays are of extragalactic origin,” says Alan Watson, a UK astronomer and Co-founder of the observatory. The result comes as a relief to the researchers, after previous claims regarding their origin made ten year ago by the Pierre Auger collaborations subsequently turned out to be premature.

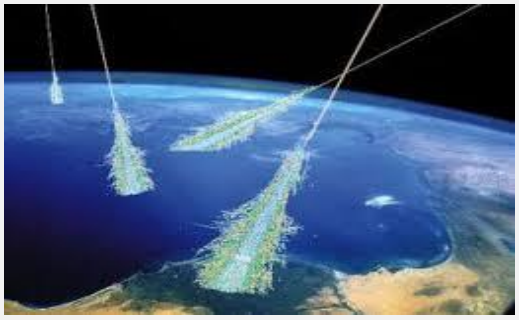
The study does not pinpoint individual sources of the cosmic rays, or explain how they reach their highest energy states, but the researcher’s belief it is the first step towards understanding origin.

The invisible shower

Most cosmic rays are the protons or other cahrged particles, including atoms and nuclei as heavy as iron. When such a particle rains onto the earth’s upper atmosphere and collides with an atomic nucleus in the air, it produces a sharpenal burst of subatomic particles. These hit other nuclei and produce more particles, generating an invisbke shower that is often spread over a many square kilometers by the time it hits the grounds.

To dtect these showers the pierre Auger observatory has 1,600 car sized water tankers placed at 1.5 kilometer intervals, to cover 3,000 square kilometers of grassy plains in Argentina’s Mendoza Province.

The researchers observed at 32,187 particles that had energies above 8 x 1018 ev, detected by the observatory from the beginning in 2004 until 2016. The Galaxy’s magnetic field bends the path of the charged particles, which can randomize their direction by the time they hit earth. But these particles, which were still 6% more likely than avergae to come from a particular region of the sky, whch is outside the milky way’s disk.



Saksham Singh
ECE 3A

Generative Adversarial Network (GAN)

A Deep Neural Network (DNN) refers to the way of construction and development of training networks between input and output involving a series of layers in between which allows richer intermediate representations to be understood and built. Deep Learning is a class under machine learning algorithms which is capable of learning in unsupervised conditions to draw advanced features from the given raw input.

GAN, short for Generative Adversarial Network is studied under machine learning, was invented by Lan Good fellow and his colleagues in 2014.

The two main approaches in statistical classification are: Generative approach and Discriminative approach, where generative model is a statistical model of the joint probability and the discriminative model is a model of conditional probability. GANs have been proven useful for unsupervised, semi-supervised, fully supervised and reinforcement learning systems.

The GANs have found use in improving astronomical images as they were used to successfully model the distribution of dark matter in a direction in space which was useful for predicting gravitational lensing that would occur. Also, GANs have been trained to accurately approximate the faults in computationally expensive simulations of particle physics experiments. However, GAN generated unique and realistic human images (may be of people who do not exist) are raising concerns as they may be used for sinister purposes.

Shivi Saxena
ECE 3B

HOW GOOGLE CONTROLS THE LIFE OF AN AVERAGE PERSON

Google is taking over our lives.

It's not anything terribly surprising. But maybe it is. Once you think about all those gloriously nerdy "moon shots" from Google and how the tech is permeating every facet of our lives, well, it adds up.

You may be wondering and thinking: “How can this be?” The truth may strike you like lightning! Google knows each and everything about you. Google knows your address, the person you talk to the most, the places you visit often, the types of books you read, the types of brands you purchase, the types of sites you browse.

You must be wondering: “How?!”

Well, do you remember having filled in all the personal details while signing up for Google mail or any other application such as YouTube, Google Maps, Play store, Google Drive, Google Photos, etc. belonging to Google?

Google has all the personal information about you. Google knows each and everything about you. Hence, it controls you without being seen by you. All the advertisements that pop up when you are browsing, Google is behind them.

The sale promotional e-mails you receive; Google is behind them. Google always knows your exact presence location. Google knows when you do bank transactions. Google knows the phone bill payment schedule. Google knows how much traffic you will encounter while travelling to a place.

Chrome: If you use Google Chrome -- and, yes, many of us do -- then Google can track your every move online.

Gmail: Yep, Google looks at all your emails. Or, it can anyway. And you're creating contact lists as well as calendars of events and appointments. Google says: Thanks for sharing (everything).

Google Drive: You're uploading all your pictures and documents to Google's cloud. Five years ago, did you think you'd be doing that?

Here's a list of Google products that illustrate what I'm getting at.

Android: Google's open source operating system powers mobile devices worldwide. Even a lot of people who own Apple devices wind up using Android phones. This means Google can collect from wherever and deliver to you on your phone, wherever you go.

Google Play: This is Google's app marketplace. The World dances to Google's beat.

Google Now: With Google Now, you grant the company permission to read all the types of data you already willingly upload to it via its other products, then send you reminders based on your location, time of day, your habits, etc. Convenient? Sure. Kind of creepy? Definitely.

So, you see how Google controls an average man or woman's life!

Himanshi Chawla
ECE 3A

Arduino Controlled War Field Spy Robot

Arduino Controlled War Field Spy Robot using Night Vision Wireless Camera and Android Application

Abstract: The main objective behind developing this robot is for the surveillance of human activities in the war field or border regions in order to reduce infiltrations from the enemy side. The robot consists of night vision wireless camera which can transmit videos of the war field in order to prevent any damage and loss to human life. Military people have a huge risk on their lives while entering an unknown territory. The robot will serve as an appropriate machine for the defense sector to reduce the loss of human life and will also prevent illegal activities. It will help all the military people and armed forces to know the condition of the territory before entering it. Keywords — Robot, Night Vision, Bluetooth Module, Android.

EKANSH JOHAR
ECE 7B

Machine Learning Project: Predicting Beijing House Prices with Regression

Introduction

In this project, we will develop and evaluate the performance and the predictive power of a model trained and tested on data collected from houses in Beijing's suburbs. Once we get a good fit, we will use this model to predict the monetary value of a house located at the Beijing's area.

A model like this would be very valuable for a real estate agent who could make use of the information provided in a daily basis. Housing price of Beijing from 2011 to 2017.It includes URL, ID, Lng, Lat, Community ID, Trade Time, DOM (days on market), Followers, Total price, Price, Square, Living Room, number of Drawing room, Kitchen and Bathroom, Building Type, Construction time. Renovation condition, building structure, Ladder ratio (which is the proportion between number of residents on the same floor and number of elevators of ladder. It describes how many ladders a resident has on average), elevator, Property rights for five years （It's related to China restricted purchase of houses policy), Subway, District, Community average price.

Abhishek (ECE-7B)
Aditya Rai (ECE-7B)

The revolutionary role of 5G in the Internet of Things

The fifth generation of mobile networks promises to facilitate the implementation of Internet of Things (IoT) in companies. This technology will enhance the connection between objects without requiring the intervention of people on a massive scale. A revolution that has been talked about for a long time and to which a key date is associated: the year 2020. Based on the current infrastructure of 4G networks, the deployment of LTE-M technology is the first step in the arrival of 5G, providing greater speed, penetration, lower battery consumption and mobility and voice support, in addition to standardization, robustness, scalability and security in IoT. The future arrival of 5G will bring even more improvements and advances whose functionality and efficiency also evolves.

The new 5G mobile network will mean a qualitative and quantitative leap in terms of connectivity. It promises to multiply by one hundred the number of connected devices and reduce up to 90% of the network's energy consumption. It will be possible thanks to an improvement in broadband, with more network capacity, less latency and more speed, which will make M2M (machine-to-machine) communications on a larger scale possible.

"The 5G will allow an improvement in the massive connection of wearable's, cars and computers as well as contribute crucially to the development of smart cities, being the catalyst for the implementation of IoT devices," said José Cano, director of analysis and consulting of IDC.

The June 2018 edition of Ericsson's Mobility Report, revealed a report that analyses the trends that will drive the mobile industry over the next five years, noting that the first commercial launches of 5G networks and large-scale implementations are imminent IoT scale. In this study it is estimated that by 2023 there will be around 3.5 billion IoT connections and 1 billion 5G subscriptions.

2020, the year of 5G

For these forecasts to be fulfilled it is essential to ensure the correct spectrum for 5G in low, medium and high bands. With the countdown already underway, the different agencies involved in the definition of 5G work to arrive on time for deployment. The proposed 3GPP 5G solution is based on an evolution of the LTE and the first NR 5G specifications that were approved in December. Among the participants of the working groups is the multinational Huawei. " Only a unified global standard will allow us to focus on technological innovation, promote commercial use, expand the capacity of the industry and strengthen cooperation to build a solid 5G ecosystem," said company sources. The Action Plan for 5G of the European Union and the 5G National Plan approved by the previous government, plan to have the first 5G commercial networks by 2020. In the case of Spain, we have recently attended the bidding of the frequency bands for its development and deployment. This broadband offer is set at a limit of 120 MHz per operator, and it is expected that all companies can access a sufficient amount of spectrum to take advantage of all the potential of 5G technology.

Meanwhile, the 3rd Generation Partnership Project (3GPP) has recently included LTE-M as a standard for inter-machine communication, further confirming that the 5G Massive Machine Type Communication layer will be based on this technology and, consequently, both the radio layer NR-5G as the Core will support it. This fact implies a consolidation of the LTE-M standard in future 5G networks and allows companies to start their digital transformation processes with LTE-M, a technology already available with a guarantee of continuity in the coming years.

A boost for IoT

From the IDC analysis firm, they consider that when talking about the implementation of this fifth generation of mobile communications, we must talk about two speeds. On the one hand, what is a 5G infrastructure, which will allow the deployment of the networks and that is expected to not be widespread until 2020. And, on the other, it has to do with the development and manufacturing of terminals that can use their capabilities. In this sense, several manufacturers have already announced their first 5G phones for 2019.

But nobody takes deception. The true potential of the new frequencies is more related to the productive sector than to the end user. Super broadband, very low latency, reliability and an increase in the number of connected objects will be the keys to the digital development of sectors such as tourism, health or education. And, without a doubt, the industry and smart cities. From Ericsson they announce that the arrival of 5G will greatly multiply the number of devices that the network can handle and reduce energy requirements, stimulating the widespread growth of Internet of Things (IoT). Implementing large sensor networks, such as those on road vehicles, becomes more practical. Improvements will be available such as increased network capacity and longer battery life for connected devices, facilitating remote maintenance.

It is precisely in the sensor industry that IoT is being applied the most. Especially in products such as lighting or smart parking, cameras and drones. In addition, it is also present in other areas such as fault management, automatic adjustment of the demand for supplies efficiently and environmental control systems to prevent episodes of contamination. Precisely the case of autonomous vehicles - both collective and private - is a clear example of the application of 5G technology.

Future challenges for IoT

Over the next few months, challenges arise that will have to be faced in order to implement IoT effectively. From Huawei point out four challenges to overcome. The first of these, they emphasize, is the need for unified requirements in order to contribute to a balanced development of the Internet of Things, such as establishing unified 5G standards.

A dialogue that will undoubtedly lead to the third of the challenges that all participants face: formulate intersectional regulation policies in a coordinated manner. Finally, it is essential to "accommodate long-term challenges with short-term objectives. Throughout the development of 5G, all kinds of changes in the industry and demand will continue to present new requirements," they point out from the Chinese technology.

Ericsson, meanwhile, explains that 5G technology will provide an improvement in those innovation platforms that draw on emerging technologies such as the Internet of Things (IoT) to become integral parts of our economy and lifestyle.

E-BOMBS : PAYLOAD FOR PERFECT LIGHTS OUT

Abstract: Today the world is advancing exponentially every aspect of science whether it is discovering of new elements or doing search operations for the extra-terrestrials in outer space or using the nuclear energy to create the Energy or in Nuclear energy in war. But as we advance, we are getting closely attached to the electrical equipment's, machines or device they are everywhere, and their presence can be felt at every corner of your lives.

And with this there comes a picture of destroying all the circuits in just a blow of one shockwave. And that shockwave is known as Electromagnetic Pulse (EMP) shock wave that will fries all the circuits in just a matter of second and they won't be able to perform the single task they are designated to do. It's the same kind of result any country would face after the Nuclear Confrontation but there is a huge difference that this this will not cost any life not to a civilian or an armed officer in a field. The only thing that gets affected is the circuits of the machinery they use. Simply you'll have the same results as nuclear confrontation but without the loss of precious life not by your side and not by their side because there would not be harmful radioactive emission.

An EMP has the devastating tendency to destroy any electrical and electronic equipment in its range, causing damage to the circuits of electronic equipment. This makes the EMP one of the most fatal & Terrifying weapon in the world causing huge damage to any nation's security and their interest.

E-bomb devices allows their user to have a non-nuclear encounter to defeat an enemy without causing any disaster. The trespassing activities around the border and due to weak defence system of our military this causes the loss in several aspects to the nation's Security. But what if we disrupt any electrical equipment, vehicle or

communication system which are used automatically when they came in range of a certain EMP field. This can be achieved by the use of electromagnetic shock waves that destroy the electronic circuits and communication network of enemy forces. E-bombs are the payload bombs based on the emission of Electromagnetic Shock waves which will have great impact on the course of military defences and attacking strategy as the bomb can target the Enemy's mobile targets, air defence system, mobile or static radars, naval vessels with communication systems and even ill-shielded communication or electronic system at a military base and also have a great impact on the information sector of enemy unit.

This paper includes all the basses of Electro-Magnetic Pulse generation & possible causes & effects on the nearby electronic components within its specified range capability. Along with their consecutive role in Modern Warfare as Directed Energy Weapons (DEW's).

A Backup Server with Raspberry Pi

Overview: A backup server is a type of server that enables the backup of data, files, applications and/or databases on a specialized in-house or remote server. It combines hardware and software technologies that provide backup storage and retrieval services to connected computers, servers or related devices. It is widely used in an IT environment to store and easily retrieve sensitive and no sensitive client data.

About our Project: We are using a Raspberry Pi to set-up a backup server which can sync and store (provided there is a storage medium i.e. a SD Card, USB Drive, a HDD, a SSD). We intend to use open source, free software for our project, making sure the easy scalability and transparency in the complete backup process. The way we'll be using it, NextCloudPi is a standalone, self-contained OS that runs on our Raspberry Pi. It syncs and annually backs up files from practically any device (including our phones and cameras instantly), and serve files to those devices. One can even set up multiple users, for that purpose.

Scope of our Project: With tons of data being generated every hour in an IT environment (and partially even in our homes) we need an easy to setup and operate backup server with reliability and efficient storage. This project intends to close that gap and give the user an option of setting up an easy, efficient backup solution, compatible with majority of devices. Our project aims to be a feasible and efficient solution for small enterprises for backing up any kind of data, i.e., text files, media files on the given storage device.

Joydeep Sen Gupta (ECE-7B)
Vansh Tayal (ECE-7B)
Prakhar Sharma (ECE-7B)
Ishant Dutt (ECE-7B)

Fingerprint Enabled Electronic Voting Machine

Abstract: Electronic voting machines are getting popular day by day to conduct Election in densely populated countries. India has almost 1.3 billion voters and their biometric information. To make proper use of this information in Election for faster and transparent voting process, a Finger-print enabled EVM has become a necessity. Currently available Biometric integrated EVMs have some issue with their security, vulnerability and power backup. This article is about the design and construction of a Fingerprint enabled electronic voting machine (EVM) with greater security and power backup compared to the existing EVMs of this type. The machine is integrated with fingerprint and various steps of hardware security layers. The proposed design ensures accuracy, transparency, security and faster result processing in Election.

Nikhil Gupta
Romica Chawla
Ankit Jindal
Shivam Bansal

6G Technology

Wireless communications are the transferring of information between two or more points which are not physically connected. Wireless mobile communication is being used from many years, but day by day Need of facilities on mobile is increasing, so time to time next integrated Versions of network is introduced. Distances can be short, which is used for television remote control and even far distance which is used for deep-space radio communications. Latest version is 5G, but only some countries are using 5G wireless network. 6G wireless cell phone communication network shall meet world class standard covering the whole world under its communication just like Global covering system has been devised by some companies. The 6th generation (6G) wireless mobile communication networks shall integrate satellites to get global coverage. The global coverage systems have been developed by four courtiers. The global position system (GPS) is developed by USA. The COMPASS system is developed by China.

6G internets use a combination of the latest in radio and fibre optics technology. We deliver through line of sight. Which means we don't have to rely on the copper cable or base our speed on how to far your business is away from the exchange. The 6G mobile system for the global coverage will integrate 5G wireless mobile system and satellite network. These satellite networks consist of telecommunication satellite network, Earth imaging satellite network and navigation satellite network. The telecommunication satellite is used for voice, data, internet, and video broadcasting; the earth imaging satellite networks is for weather and environmental information collection; and the navigational satellite network is for global positional system (GPS). The four different countries which developed these satellite systems are; the GPS by USA, the COMPASS system developed by China. The Galileo system by EU, and the GLONASS system developed by Russia.

How does 6G compare with traditional broadband?

6G has the benefit of the blooding a brand a new network in compassing the latest state of the art technology .so we do not suffer the any of the legacy essay the other provide do 6G air fibre id deferent future reroof wireless solution id using technology pioneer by the military to communicate with unmanned Arial vehicle for critical matter during sever condition. Now refuse and available for bushiness 6g offer faster moor secure and cost effective and brood band.

WISDOM – Wireless innovative System for Dynamic Operating Mega communications concept, 6th generation (with very high data rates Quality of Service (Quos) and service applications) and 7th generation (with space roaming). This paper is focused on the specifications of future generations and latest technologies to be used in future wireless mobile communication networks. However, keeping in view the general poor masses of India, some of the future generation technologies will be embedded with 2and 2.5G so that general masses may get the advantage of internet, multimedia services and the operators may get proper revenues with little extra expenditure in the existing mobile communication networks.

6G will fulfil most of the demand of the present and next generation user. The 7G will be the most advance generation in mobile communication but there will be some research on demanding issues like the use of mobile phone during moving condition from one country to another country, because satellite is also moving in constant speed and in specific orbit, the standards and protocols for cellular to satellite system and for satellite to satellite communication system. The dream of 7G can only be true when all standards and protocols are defined. May be this is possible in next generation after 7G and can be named as 7.5G.

Faculty's Articles

Advanced antenna systems for 5G networks

Recent technology developments have made advanced antenna systems (AAS) a viable option for large scale deployments in existing 4G and future 5G mobile networks. AAS enables state-of-the-art beam forming and MIMO techniques that are powerful tools for improving end-user experience, capacity and coverage. As a result, AAS significantly enhances network performance in both uplink and downlink. Finding the most suitable AAS variants to achieve performance gains and cost efficiency in a specific network deployment requires an understanding of the characteristics of both AAS and of multi-antenna features. An advanced antenna system (AAS) is a combination of an AAS radio and a set of AAS features. An AAS radio consists of an antenna array closely integrated with the hardware and software required for transmission and reception of radio signals, and signal processing algorithms to support the execution of the AAS features. Compared to conventional systems, this solution provides much greater adaptively and steer ability, in terms of adapting the antenna radiation patterns to rapidly time-varying traffic and multi-path radio propagation conditions.

Multi-antenna techniques: Multi-antenna techniques, here referred to as AAS features, include beam forming and MIMO. Such features are already used with conventional systems in today's LTE networks. Applying AAS features to an AAS radio results in significant performance gains because of the higher degrees of freedom provided by the larger number of radio chains, also referred to as Massive MIMO.

Beamforming: When transmitting, beam forming is the ability to direct radio energy through the radio channel toward a specific receiver, as shown in the top left quadrant of Figure 1. By adjusting the phase and amplitude of the transmitted signals, constructive addition of the corresponding signals at the UE receiver can be achieved, which increases the received signal strength and thus the end-user throughput. Similarly, when receiving, beam forming is the ability to collect the signal energy from a specific transmitter. The beams formed by an AAS are constantly adapted to the surroundings to give high performance in both UL and DL.

MIMO (Multiple Input, Multiple Output) techniques: Spatial multiplexing, here referred to as MIMO, is the ability to transmit multiple data streams, using the same time and frequency resource, where each data stream can be beam formed. The purpose of MIMO is to increase throughput. MIMO builds on the basic principle that when the received signal quality is high, it is better to receive multiple streams of data with reduced power per stream, than one stream with full power. The potential is large when the received signal quality is high and the streams do not interfere with each other. The potential diminishes when the mutual interference between streams increases. MIMO works in both UL and DL, but for simplicity the description below will be based on the DL. Single-user MIMO (SU-MIMO) is the ability to transmit one or multiple data streams, called layers, from one transmitting array to a single user. SU-MIMO can thereby increase the throughput for that user and increase the capacity of the network. The number of layers that can be supported, called the rank, depends on the radio channel. The AAS simultaneously sends different layers in separate beams to different users using the same time and frequency resource, thereby increasing the network capacity. In order to use MU-MIMO, the system needs to find two or more users that need to transmit or receive data at the very same time. Also, for efficient MU-MIMO, the interference between the users should be kept low. This can be achieved by using generalized beam forming with null forming such that when a layer is sent to one user, nulls are formed in the directions of the other simultaneous users.

Mr.Sumer Singh
Assistant Professor (ECE)

INTRODUCTION TO WIRELESS SENSOR NETWORKS

WHAT IS WIRELESS SEMSOR NETWORK (WSN)?

The wireless sensor networks (WSN Wireless Sensor Network), are based on low-cost and consumer devices (nodes) that are able to obtain information from their environment, process it locally, and communicate it via wireless links to a central coordination node .The nodes act as elements of the communications infrastructure by forwarding messages transmitted by farther nodes to the coordination centre. The wireless sensor network consists of numerous spatially distributed devices, which use sensors to control various conditions at different points, including temperature, sound, vibration, pressure and movement or contaminants. The sensors can be fixed or mobile. The devices are autonomous units consisting of a microcontroller, a power source (almost always a battery), a radio transceiver (RF) and a sensor element. Due to the limitations of battery life, the nodes are built with energy conservation in mind, and generally spend a lot of time in 'sleep' mode with low power consumption. WSNs have the ability to auto-restore, that is, if a node fails, the network will find new ways to route data packets. In this way, the network will survive as a whole, even if there are individual nodes that lose power or are destroyed. The capabilities of self-diagnosis, self-configuration, self-organization, self-restoration and repair are properties that have been developed for this type of network to solve problems that were not possible with other technologies. Sensor networks are characterized by being unattended networks (without human intervention), with a high probability of failure (in the nodes, in the topology), usually built adhoc to solve a very specific problem (that is, to execute a single application).

MS. Seema Malik
Assistant Professor (ECE)

60 GHz Technology

The emergence of low cost microwave component fabrication technologies has recently made them a commercial reality for broad market applications beyond the military space. In particular, millimetre wave 60 GHz technologies are receiving increase attention from today's broad market due to the unique advantages of this frequency band located in the upper region of the microwave spectrum. This global license-free and largely uncongested band typically operate between 57 GHz to 66 GHz offers a wide bandwidth of up to 9 GHz, which permits high data rates, provides short wavelengths that allows for a compact system design, and that has a high ratio of attenuation, which results in a low interference level. These benefits made 60 GHz technologies attractive for such applications as multigigabit WI Gig networks (IEEE 802.11ad and the next-generation IEEE 802.11ay standards), wireless backhaul connectivity, and wireless transmission of high definition video (a proprietary Wireless/ Ultra Gig standard).

Why all the excitement about 60 GHz? First of all, the abundance of the bandwidth in the unlicensed 60 GHz band is unmatched in any of the lower frequency bands. The fact that this band is unlicensed and largely harmonized across most regulatory regions in the world is a big advantage, in contrast with the meagre spectrum available in the lower frequency bands for existing technologies such as Wi-Fi. For example, there is only 70 MHz available in the 2.4 GHz band and 500 MHz in the 5 GHz band for Wi-Fi, compared to the multiple GHz available in 60 GHz. The current allows channel bandwidth of 20 and 40 MHz While Multiple Input Multiple Output technology has given a huge boost in performance, there is a practical constraint in the number of antenna that can be packed onto the small form factor devices with reasonable cost. Theoretically, using four antennas in spatial multiplexing mode with 40

MHz channel bonding and short guard interval can reach 600 Mbps data rate. However, there is not yet a commercial product in the market that uses more than 3 antennas, and so increasing number of antennae is not a practical way to achieve gigabit data rate.

Dr Ajay Kumar
Assistant Professor (ECE)

Future Technology: Optical Wireless Communication

Optical wireless communication is the emerging technology used for next generation indoor and outdoor broadband wireless applications. OWC is used to handle high data rate and it has very large information handling capacity and introduced a huge potential to the future of the global telecommunication industry. Optical communication systems are classified according to their transmission medium: guided medium such as fibre communication and unguided medium like optical wireless communication (OWC) or free-space optical communication (FSOC). Early in the 20th century all the data transmitted in the rage of few kHz of bandwidth for communication. Because of emerging of internet, the demand of data increases day by day. To complete the demand of high-speed Internet, video-conferencing, live streaming etc., new transmission medium has been researched. Light wave communication in guided media such as fibre and in unguided medium such as optical wireless communication is the alternative communication system to this problem. Optical wireless communication systems also provide as alternative solution to the fibre optics technology which is capable of full duplex transmission of data, voice and video in certain applications. Optical wireless communication has proven their usefulness through a wide range of communication applications.

Mr.Nitin Garg
Assistant professor (ECE)

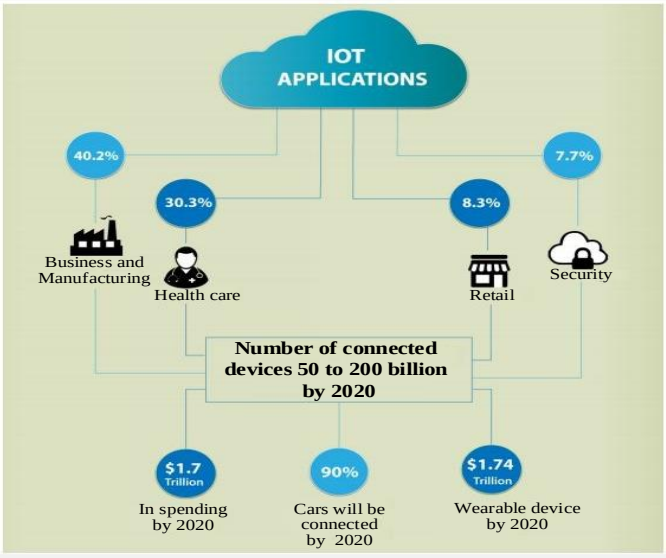
Low-Voltage Low-Power Analog Integrated Circuits

Low-voltage circuit techniques are applied in the area of battery-operated systems. For portability reasons, the size of the equipment must be small, which necessitates the maximum integration of the signal processing circuitry. However, as the size of batteries is now becoming the limiting factor, the reduction of the power dissipation has become an extra design constraint. As a consequence, the key point is to develop, simultaneously, both low-voltage (i.e. 1-1.5 V) and low-current (i.e. < 100/~A) operating integrated circuits in order to reduce the battery size. Another design criterion that must be fulfilled is transfer quality. This quality is influenced by two different kinds of errors: stochastic ones and systematic ones. By stochastic errors we mean inaccuracies in the input-output relation caused by noise or interference. Though impossible to eliminate, their influence can be minimized by a proper design strategy. Systematic errors arise from network imperfections, such as offset, non-linearity, inaccuracy of the device parameters, drift and temperature dependence. Probably the most effective method to reduce their influence, and thus to obtain an accurate transfer function, is by means of applying negative feedback, which allows us to exchange the large gain provided by the (highly nonlinear) active devices for quality provided by (usually linear) passive devices. Design strategies for the reduction of stochastic errors and systematic errors are normally not consistent with design strategies which take into account power dissipation, voltage range and current range. Therefore, it is the combination of transfer quality, low voltage and low power that

must be considered during the whole design process. For this reason, most of today's measurement instruments communicate by means of voltages, not currents.

Dr. Kuldeep Panwar
Assistant Professor (ECE)

Wireless technology for IOT applications



The Internet constitutes the largest heterogeneous network and infrastructure in existence. It is estimated that over 3 billion people had access to the Internet in 2014. Also, there are as many mobile subscriptions (6.8 billion) as there are people on earth. Global mobile data traffic was estimated at 2.5Exabyte per month in 2014. This figure is estimated to rise to 24.3 Exabyte per month at a compound annual growth rate of 57 percent in 2019. This can be attributed to a number of technological factors including the proliferation of touch screen devices (smartphones, tablets, and the like), and, significantly, the evolvement and technological advancement of wireless and mobile technologies. On the other hand, the Internet of Things (IoT) is a fast-growing heterogeneous network of connected sensors and actuators attached to a wide variety of everyday objects. Mobile and wireless technologies in their assortment of low, ultra-power, short- and long-range technologies continue to drive the progress of communications and connectivity in the IoT. The future will foresee smart and low-power networked devices connecting to each other and to the Internet using, mostly, reliable low-power wireless transmissions. Figure 1 shows the rapid growth of IoT by 2020. In this article describe some enabling wireless technologies for the IoT. It analyses the capabilities of IEEE 802.15.4 technologies, Bluetooth Low Energy, and Wi-Fi. Additionally, it explores the opportunities promised by the recent development in IEEE 802.11ah and LoRa technologies. Lora WAN and IEEE 802.11ah are the latest technologies in long-range and low-power WAN. They are targeted for low-power and low-cost devices. Lora WAN targets key requirements of the IoT such as secure bi-directional communications, mobility, and localization services. This standard will provide seamless interoperability among smart things without the need of complex local installations, and gives back the freedom to the users, developers, and businesses aiding the flourishment of the IoT. For instance, LoRa plays a significant role in the future of wireless and machine to machine (M2M) communications. On the other hand, 802.11ah is IEEE latest update to their legacy 802.11 technologies (popularly known as Wi-Fi). IEEE 802.11ah aims to cater for low-cost and low-power market. It is a competitor to Lora, ZigBee and other technologies in their class.

Ms.Manisha Sharma
Assistant Professor (ECE)

ULTRAWIDEBAND ANTENNA

With the rapid development of modern Wireless Communication Technology, micro strip antenna is in researchers' good graces because of its advantages, such as a low profile, light weight, high-gain and simple structure that ensure reliability, mobility and efficiency.

In addition, it is characterized by relative ease of construction, low cost, conformability to complex

mounting surfaces and compatibility with printed circuit boards. In fact, this antenna provides all the advantages of printed circuit technology.

Thus, this type of radiating element becomes day after day popular in many wireless systems such as satellite communications, radar, medical applications, etc. However, the main disadvantage of patch antenna radiator is its narrow bandwidth. Recently, many techniques have been developed to enhance the bandwidth. The most commonly used ones are adding slots to radiating element and partial ground plane. In addition, the micro strip antennas are known by their disability to operate at high power levels. Therefore, the challenge in micro strip antenna design is to increase the bandwidth and gain. Patch antenna arrays in the X-band have been widely reported in literature

Ultra wideband (UWB) technology, positioned as the cutting edge of research and development, paves the way to meet the emerging demands set by broadband wireless applications, such as high-speed data transmission, medical imaging, short-range radars, electromagnetic testing, etc.

This breath-taking resource builds upon the basics of UWB technology to provide a complete compilation of figures of merit along with a vital state-of-the-art of the different antenna alternatives that are to be employed according to the specific application. Without excessive recourse to mathematics, this volume emphasizes on the UWB antenna design and equips readers with practical prediction techniques based on simple formulas and models. The big picture of UWB antenna technology would not be complete without addressing its applications, and this will serve to provide consultants with key clues for market gap analysis.

The UWB antennas are proposed for applications of communication systems, various kinds of antenna test ranges, and high-resolution microwave imaging. The narrower instantaneous bandwidth of UWB antennas will degrade the performance of the above applications. By using different characteristic of geometries, structures and sizes, good impedance bandwidth and instantaneous bandwidth can be achieved for these UWB antennas.

The application of these antennas is used as the feed to replace the traditional narrowband feeds for the antenna test ranges (far field range, near field range, and compact range). Since FCC released the extremely wide spectrum with emission masks for commercial ultra-wideband (UWB) applications in 2002, much effort of research and development has been paid for the design of UWB antennas for a variety of applications from wireless or wired communications to non-communications such as imaging, location, and radar systems.

Several ultra wide band (UWB, 3.1-10.6 GHz) antennas are presented for either wireless communications or detection applications. An UWB antenna could be either a planer structure for portable devices or has a 3D configuration, which is suitable for an access point. Dielectric resonator is used to tremendously shrink an UWB antenna's size, which is important for a terminal device for wireless communication, antenna techniques to reject the interferences from WLAN bands are presented for printed UWB antennas. It systematically reviews progress of the field within 10 previous years until the latest reported in a thorough overview for the advantage of the field readership, especially critically highlighting the untouched existing gaps that showed the necessity for new endeavour in exploring novel answers. It concludes research insight for future research directive suggestions such as how loading can affect and improve the BW for wide-band and UWB antennas and how it can keep the antenna dimensions miniaturized while the antenna characteristics are not affecting a lot.

Ms Mukti Rawal
Assistant Professor (ECE)

WIRELESS COMMUNICATION

Wireless or wireless communication is one in which communication (emitter/receiver) is not bound by a means of physical propagation, but the modulation of electromagnetic waves through space is used. In this sense, the devices are not connected physicists are only present in the transmitters and receivers of the signal, among which we find: antennas, laptops, PDAs, mobile phones, etc.

Historical aspects and generalities: Wireless communication, which is done via radio frequency waves, facilitates operation in places where the computer is not in a fixed location (warehouses, multi-story offices, etc.) is currently used in a general and accessible to all audiences. It is also worth mentioning today that wired networks have an advantage in terms of data transmission over wireless ones. While wired provide speeds of up to 1 Gbit/s (Gigabit Network), wireless ones reach only 108 Mbit/s.

A "mix" between wireless and wired can be performed, so that they can work as follows: that the wired system is the main part and the wireless part is the one that gives the equipment and operator mobility to move easily in different fields (warehouse or office).An example of long-distance networks is public radio switching networks. These networks have no problems in signal loss, because their architecture is designed to support data packets instead of voice communications. Currently, wireless transmissions are an effective tool that allows the transfer of voice, data and video without the need for wiring. This transfer of information is achieved through the emission of radio waves having two advantages: mobility and flexibility of the system in general. Technological aspects in general, wireless technology uses low-power radio frequency waves and a specific band, free or private, to transmit between devices. These conditions of freedom of use without the need for a license, has led to the number of computers, especially computers, which use the waves to connect, through wireless networks to have grown significantly.

Fields of use: The tendency to mobility and ubiquity makes wireless systems more and more used, and the goal is to avoid cables in all kinds of communication, not only in the computer field but in television, telephony, security, home automation, etc. A social phenomenon that has become very important, all over the world, as a result of the use of wireless technology are the wireless communities that seek the dissemination of alternative to commercial networks. The biggest exponent of these initiatives in Spain is RedLibre.

Some problems associated with wireless technology: Microwave ovens use radiation in the 2.45 GHz spectrum. That is why wireless networks and phones that use the 2.4 GHz spectrum may be affected by the proximity of such furnaces, which can cause interference in communications. Other times, this type of interference comes from a non-accidental source. Using a disruptor or signal inhibitor can make communications over a certain frequency range difficult and even impossible.

Wireless equipment: Some of the access point equipment that normally comes with Omni 2 DB antenna, often detachable, in which links can be made above 500 meters and can also be interconnected with each other. There should be no obstacles for the signal to be excellent, as this interferes with the signal and there may be problems in the connection.

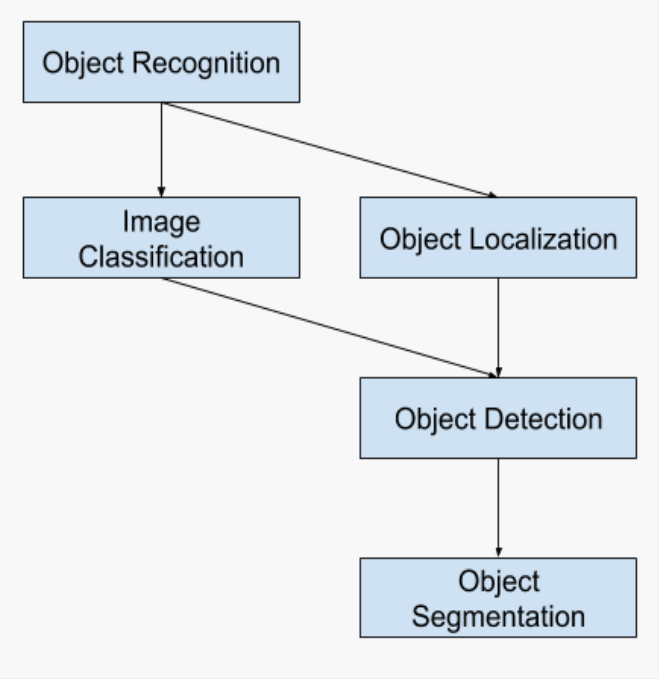
Ms.Sameena Chauhan
Assistant Professor (ECE)

A Gentle Introduction to Object Recognition with Deep Learning

It can be challenging for beginners to distinguish between different related computer vision tasks. For example, image classification is straight forward, but the differences between object localization and object detection can be confusing, especially when all three tasks may be just as equally referred to as object recognition. Image classification involves assigning a class label to an image, whereas object localization involves drawing a bounding box around one or more objects in an image. Object detection is more challenging and combines these two tasks and draws a bounding box around each object of interest in the image and assigns them a class label. Together, all of these problems are referred to as object recognition.

What is Object Recognition?

Object recognition is a general term to describe a collection of related computer vision tasks that involve identifying objects in digital photographs. *Image classification* involves predicting the class of one object in an image. *Object localization* refers to identifying the location of one or more objects in an image and drawing abounding box around their extent. *Object detection* combines these two tasks and localizes and classifies one or more objects in an image.



Overview of Object Recognition Computer Vision Tasks

Now that we are familiar with the problem of object localization and detection, let's take a look at some recent top-performing deep learning models. The R-CNN family of methods refers to the R-CNN, which may stand for "*Regions with CNN Features*" or "*Region-Based Convolutional Neural Network*," developed by Ross Girshick, et al. This includes the techniques R-CNN, Fast R-CNN, and Faster-RCNN designed and demonstrated for object localization and object recognition.

Dr. Ritu Jangra
Assistant Professor (ECE)

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Faculty Achievement

Faculty Publications

Implementation of ORB and Object Classification using KNN and SVM Classifiers

Abstract: Object identification and classification is quite a fascinating topic in computer vision due to its numerous applications in various domains. This paper proposes an orientation and rotation invariant feature descriptor named as ORB (Oriented FAST and Rotated BRIEF). This feature vector computes scale, rotation and translation invariant features for the test and trainee images. For matching the computed feature sets we used supervised classification method i.e. K-Nearest Neighbours Algorithm (K-NN) and Support Vector Machine (SVM) for the classification of various object categories in the dataset. Comparative experimental results based on analysis of the SVM and KNN classifiers on the basis of recognition accuracy and execution time is given. SVM shows better matching score whereas KNN is time efficient in comparison to SVM.

Dr. Ritu Jangra

Impact of reduction in descriptor size on object detection and classification

Abstract: Extraction of distinctive and robust features in image/video analysis and processing has attracted the attention of researchers in the recent years. Elimination of irrelevant and less important features reduces the computational complexity to a great extent at the cost of a very marginal reduction in accuracy. This paper presents a framework for dimensionality reduction of the binary features to obtain a low dimension feature vector for object detection. The process of identification and selection of the most relevant feature is performed in three steps: extraction of features using binary descriptors; Selection of best feature subset using Sequential Forward Selection (SFS) and Principal Component Analysis; classification using SVM classifier. The experimental results show that BRISK and LATCH descriptors perform better even when the dimensionality is reduced from 256, 128, and 64 to 32 bits with an acceptable classification accuracy and significant reduction in run time. However, there is slight decrease in the classification accuracy of LBP, FREAK, BRIEF, and ORB. A classification rate of 84.93% is obtained with LATCH descriptor for a descriptor size of 32 bits.

Dr. Ritu Jangra

Unsupervised Deep Learning Method based Binary Descriptor for Object detection

Abstract: The wide applications of the object detection techniques in the domains like video surveillance, security, military, automated industry tasks, biometrics has attracted the interest of the researchers. Deep learning has proved to be a most effective and efficient techniques for the object detection nowadays and has brought quite a revolution in this field. This paper proposes CNN architecture for the extraction of compact binary descriptors using stacked convolutional auto encoders without labeled data. The experiments are conducted on the PASCAL and CALTECH standard object

datasets. The results are presented in terms of recall and precision performance matrices. The results show that the proposed architecture using CNN outperforms the rest of the state-of the art descriptor of its class. The recall and precision for the CALTECH dataset for the proposed CNN architecture is 0.98 and 0.93 respectively.

Dr.Ritu Jangra

CDDITA-Based Voltage-Mode First Order All Pass Filter Configuration

Abstract: This realization of a voltage-mode first order voltage-mode all pass filter (VM-APF) employing single current differencing differential input trans conductance amplifier (CDDITA) as active component is presented. The proposed configuration employs one CDDITA along with two resistors and one grounded capacitor. The pole frequency and phase shift of proposed VM-APF are electronically tuneable by trans conductance of CDDITA. The proposed circuit is verified by SPICE simulations.

Dr. Kuldeep Panwar

Novel single resistance-controlled oscillator employing MCDDITA

Abstract: This article presents a novel single resistance-controlled oscillator (SRCO) using one modified current differencing differential input trans conductance amplifier (MCDDITA), two resistors, two capacitors and one buffer. The proposed oscillator offers following beneficial features: (i) use of grounded/virtually grounded passive elements (ii) independent control of both condition of oscillation (CO) and frequency of oscillation (FO) (iii) independent tuning of FO and CO under non-ideal conditions (iv) no requirement of any component matching constraints (v) the CO is very simple and easily adjustable and (viii) low active and passive sensitivities. The grounded capacitors require lesser chip area and parasitic capacitances can be absorb by them, this is the major benefit of using grounded capacitances. The workability of the presented configuration has been tested by SPICE simulations with TSMC 0.5µm process parameters.

Dr. Kuldeep Panwar

New Current Mode Lossy Integrator Employing CDDITA

Abstract: This work presents a novel current-mode (CM) lossless integrator that uses one current differencing differential input trans conductance amplifier (CDDITA) and one grounded capacitor. The configuration based on single active element has several advantages from the aspect of monolithic integration, few are: reduced power consumption, chip miniaturization. Employment of grounded capacitor is also beneficial for monolithic integration. Specifying some of the key features of integrator proposed are: 1) purely resistorless,2) electronically tunable, 3) current output available at the port having high impedance, and 4) excellent performance under non-ideal conditions. So, a resister-less current mode lossy integrator with electronic control employing single CDDITA has been proposed in this paper. The verification of workability of the proposed current mode integrator is well explained by the help of SPICE simulations using TSMC CMOS 0.18 µm technology node.

Dr. Kuldeep Panwar

Grounded Series R-L impedance Simulator using CDDITA

Abstract: The research work proposes a new grounded series R-L impedance simulator employing Current differencing differential input trans conductance amplifiers (CDDITAs). The presented circuit consists of two CDDITAs along

with single grounded capacitor and single grounded resistor. Some major advantages of proposed design are; (i) all the passive elements used in circuit are grounded. So, circuit is a suitable candidate for on-chip implementation, (ii) The inductive part of the realized impedance is electronically tunable through bias currents, (iii) both Inductive as well as Resistive part are independently tunable (iv) no active and/or passive element matching is required and (v)admirable performance under non-ideal environment. To show the workability and usefulness of the presented configuration a current mode low pass filter (CMLPF) is constructed. All theoretical results are verified by performing simulations under PSPICE environment.

Dr. Kuldeep Panwar

Grounded Parallel R-L impedance Simulator using CDDITA

Abstract: The purposed work describes a new grounded lossy inductance (grounded parallel RL network) simulator configuration employing two Current differencing differential input trans-conductance amplifiers (CDDITAs), one resistance (grounded) and one capacitance (grounded). The presented circuit deals electronic tuning of both inductive as well as resistive part through the transconductances of employed CDDITAs. The proposed circuit is completely free from active/passive component matching conditions and its behaviour is studied considering non ideal current voltage transfer ratios. To validate the usefulness of presented parallel RL simulator some filter designs are developed using proposed configuration. All the designed circuits are simulated in PSPICE environment with TSMC 0.18µm process parameter model.

Dr.Kuldeep Panwar

A Miniaturized Quad-band Antenna with Slotted Patch for WiMAX/WLAN/GSM Applications

Abstract: A miniaturized quad-band patch antenna for WiMAX/WLAN/GSM applications is presented in this paper. The proposed antenna structure consists two L-slots and a slit in the patch. The longer between two slots, resonates at 1.74 GHz (1.8 GHz band), whereas the shorter at 2.58 GHz (2.4/2.5 GHz band). The third and fourth resonances at 3.6 GHz (3.5 GHz band) and 5.6 GHz (5.2/5.5/5.8 bands) are due to the slit and length of the patch, respectively. A detail parametric analysis is carried out by varying the length of the slots (i.e. L-slots and slit) to achieve the desired frequency bands. An equivalent circuit model of the antenna is developed and the various antenna performances are analysed. The antenna simulated results for return loss and 2D radiation patterns are experimentally verified.

Dr.Ajay Gangwar

Aadhaar Farming: Connecting with Government

Abstract: With days in and out, the technology is booming very much too limitless boundaries and with that the need of technology is essential in every phase or field of life. Whether it's Science Lab, Computer Science Lab, Research Institute, Farming Field, Transportation Field etc. but the technology is too somewhat limiting the power of human to use itself. Especially, under the real-world scenarios like transportation, farming, Marketing, Telecommunication etc. includes the use of technology and with that new identification

method so as to confirm the identity of any user or buyer or traveller.

In the similar way, Aadhaar Identification which is one of the world's largest biometric database that includes the unique identification of each and every Indian Citizen. Aadhaar as an identity document (ID) stands apart from any other unique ID since it contains each and every single aspect of human. Similarly, with the advent of time, many new changes occurred in the history of Aadhaar Technology and many more new uses were included to use with it.

With the same identity document, we here presenting our research study on the integration of Farming System or Agricultural System with the unique identification method i.e. Aadhaar. We proposed this study since the need of connecting government with directly to farmers to make the job of issuing fertilizers, pesticides and seeds more ease to reach to farmers. Here we are calling this new concept as ***"Aadhaar Farming".***

Dr.A.K Sharma

SECURE DATA AGGREGATION TECHNIQUES TO ENHANCE CAPABILITIES OF SENSOR NETWORK.

Abstract: Data Aggregation is a suitable technique to design an energy efficient Wireless Sensor Networks. The amount of data to be transmitted can be reduced by applying the Data aggregation algorithm. Moreover, it helps in reduction of the chance of data redundancy in design of Wireless Sensor computational Networks installed in hostile environment. In last decade, number of aggregation algorithms based on various techniques has been proposed. The most efficient data aggregation algorithms developed and published recently have been reviewed in this paper. The different categories of the data aggregation algorithms are structured, unstructured and hybrid. Since, the energy consumption of network is minimum with structured protocol, therefore, it can be used in static environments efficiently. Whereas, the Hybrid and Unstructured protocols can be used in dynamic approach. The paper also provides an introduction to in-network aggregation which help in reducing complexities of Wireless Sensor Networks.

Ms.Seema Dahiya

WIRELESS SENSOR NETWORK LIFETIME WITH MULTIPLE SINK POSITIONING.

Abstract: In the recent years, the fastest attention seeking field that is growing at a very rapid rate in WSN. An introduction of WSN node, ease of gathering information from those areas where our approach is practically impossible. WSN is the collection of similar type of n numbers of nodes that are arranged in a specific pattern, known as a cluster. But the main problem is that arises in this is that the lifetime of batteries that are used for running this node. So we use different techniques to overcome a little to this problem. The one of the technique is by making different clusters and one of the nodes as a base station that sent all the information to the main station. But this is not good as such. Another one is the positioning of the base station. In this, the base station is placed as such as that all the nodes are close the base station so that the energy dissipate is inferior. Another technique is the manoeuvrability of nodes. In this, the base station is elevated such as the node which has more energy become the base station and after a short time period, another node becomes base station so that the energy of node last very long.

Ms Seema Dahiya

Dual Band Circularly Polarized Antenna for Ka Band Applications

Abstract: In present scenario dual band high gain micro strip patch antennas are very much desirable in view of 5G mobile communication implementation in near future, So, this paper presents a new dual band Circularly Polarized (CP) patch antenna operating in 5G band. A rectangular slot at angle $45^0$is used for the design of this compact dual band CP patch antenna. The proposed antenna can operate at 28 GHz and 38 GHz having bandwidth 900 MHz and 1.3 GHz, respectively, which are useful in mobile 5G communication and multimedia wireless systems. Axial Ratio Band Width (ARBW) is 210 MHz at 28 GHz and 300 MHz at 38 GHz. The gain of the proposed antenna is 7.5 dBi and 7.7 dBi at 28 GHz and 38 GHz, respectively. The proposed dual band micro strip patch antenna has been simulated, optimized and miniaturized by using EM simulator software HFSS.

Mr.Sumer Singh Singhwal

Novel circularly polarized dielectric resonator antenna for microwave image sensing application

Abstract: In this article, a novel, simple, and compact structure of dielectric resonator antenna is proposed, which provides wide bandwidth across proposed mm wave band for microwave image sensing with considerable gain using a lossy FR-4 epoxy substrate and thick FR4 as DRA. A DR can be excited using four-line feed using a circular loop type feed network. These line feeds maintain phase difference of 90^0 to produce CP. This antenna provides approximate constant gain of 8.6 dB on 25-26 GHz band and 3 dB axial ratio bandwidth is almost 1 GHz from 25.2 to 26.2 GHz, Impedance bandwidth of the proposed antenna is 3 GHz (24-27 GHz). This antenna can be used in microwave image sensing and wearable sensors applications, due to its compactness (30 × 30 mm_2), in mm wave band.

Mr.Sumer Singh Singhwal

Circularly polarized V-shaped dielectric resonator antenna

Abstract: In this article, a probe fed V-shaped dielectric resonator antenna (DRA) loaded with circular patches, is proposed for X band applications. A prototype was fabricated to validate the results. Circular polarization is achieved by the geometry of DRA integrated with the circular patches on its surface, these circular patches behave as a monopole antenna. To achieve circular polarization two orthogonal fields have been excited in the DRA, which are in time phase quadrature. Due to the symmetry of design, it shows dual polarization, both Left Hand Circular Polarization (LHCP) and Right-Hand Circular Polarization (RHCP), in two orthogonal directions. The fabricated prototype exhibits wide impedance bandwidth of 7.85-10.1 GHz (25%) and circular polarization (CP) Bandwidth (BW) of 8.35-8.7 GHz (4%). Maximum measured gain of 4.8 dBi has been obtained in comparison with the simulated gain of 5.6 dBi. Applications of the proposed antenna include satellite communication, telemetry tracking and control, Synthetic aperture radar (SAR), weather radar, and military radar in X band. Directional CP performance is useful in designing a smart antenna and multiple input multiple output (MIMO) antenna.

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Departmental Activities

a) Seminar/ Invited talk

S. No.	Date	No. of Participants	Topic	Speaker
1.	August,2018	35	VLSI	Maven Silicon
2.	APRIL,2019(SEMINAR)	ECE 2ND Yr.	DATA SCIENCE	MAPPING SKILLS PVT. LTD.
3.	APRIL,2019(INVITED TALK)	ECE 2ND Yr.	MACHINE LEARNING	WEB TECH. PVT. LTD.

b) Workshops Organized

S. No.	Date	No. of Participants	Technology	Trainer
1.	APRIL,2019	ECE 2ND Yr.	IOT	CETPA PVT. LTD.

c) Short Term Courses/ Value Addition Program

S. No.	Date	No. of Participants	Technology	Trainer
1.	4 OCT. 2018-15 OCT. 2018	46	PYTHON	BRAIN MENTORS PVT. LTD.

d) Faculty development Program

S. No.	Date	No. of Participants	Topic	Trainer
1.	25-29 SEP. 2018	20	MOBILE APP DEVELOPMENT	ICT ACADEMY

e) Other Co-Curricular activities

S. No.	Date	Club	Activity
1.	26th Jan,2019	Anugoonj	Prelims
2.	14-15Th March,2019	Emblazon	Fest
3.	4th June, 2019	DSW, GGSIPU	FINAL YEAR MAJOR PROJECT COMPETITION – 2019 (ECE), GGSIPU
4.	16,20,21 AUG. 2018		INDUCTION PROG.

College Cultural Fest- EMBLAZON 2019

EMBLAZON is a two-day extravaganza; a celebration of sorts; a dense, fun-filled embodiment of the energy and conviviality which characterizes college life; a festival oozing with fun, vibrancy and entertainment. It is a product of dreams ambition and tireless hard work, a true testimony to the indomitable spirit, liveliness and sheer energy of the youth.

ECE department organised successfully EMBLAZON 2019, College cultural fest with full enthusiasm and students participated wholeheartedly.

Glimpse of Emblazon 2019

Volume 1, Issue 1

SUMMER TRAINING (17TH JUNE TO 12TH JULY 2019)

THE HMRITM is organising training (summer & winter) for the students, which is part of our curriculum activities.

The summer training in HMRITM was started from 17th June to 12th of July. This time the summer training was co-ordinated by Ms Seema Malik. There were 131 students from 2nd year, who participated in the summer training. There were two technologies in which students were trained i.e. Machine Learning (ML) and Internet of Things (IOT). The trainers of IOT and ML were coming from CETPA Company. We gain a lot of experience from this summer training. We learn about various new technologies /language like: - ARM, Arduino Uno, Node MCU etc. and Python language. We also implemented software programs on the hardware. We also made various projects during training like Robotic Car, Quad copter, and Automatic Temperature Controller etc. The trainers also resolve our queries which is related to technology and they also helped us in project making. They also suggested us many projects related to new technologies. They also provided us hardware (like: - Arduino Uno, Batteries, Connecting Wires, Motor, Led, Node MCU etc.) to make project during the summer training which enhance our skills and abilities to work on hardware. This summer training helped us to develop our skills which will help us in our future.

TECH EXPO 2019

15.04.2019

HMRITM organize project-Exhibition on half yearly basis. This time Project Exhibition was held on 15 April 2019.Project-based learning has been a key feature on which HMRITM has always focused. So, to help its students to excel for their profile, HMRITM came back with Tech Expo 2019 edition. Project Exhibition 2019 was organized by the EEE department of the college, the event proved to be a great platform for students to showcase the technical, innovative prowess. From ECE Dept. Ms Seema Malik and Ms Sameen Chauhan has co-ordinated the event and total 39 groups with 4 members in each group have participated in this exhibition. Prize winner teams' are-Shikhar Singh and Nitish Jha from 2nd year won the 1st prize with AMIGO project. Neha and Siddharth from 4th year won 2nd prize, the project is CROP PRIDICTION. Ashish Kumar, Divyanshu and Gaurav from 4th year has won 3rd prize with project MINI DRONE. The events were mainly based on promoting and appreciating innovative projects for real-world problems. The list of events included "Project Exhibition", "ResearchThon - Technical Paper Presentation", "Robotics - Robo-Racing, Robo-Soccer", "Coding Battle", "and Technical Quiz". Hundreds of students participated with the utmost enthusiasm.

Value Added Program (VAP)

Our learners participated in PYTHON TECHNOLOGY in 2018 under the guidance of BRAIN MENTORS Pvt. Ltd. Their commendable efforts comprised of projects - MARIO, CONTRA, TEKKEN, DATA ANALYTICS, and WEB DEVELOPMENT. The Value Addition Program was co-ordinated by MS Seema Malik. Among the ECE department total 46 students participated. First and Second year has taken part in this VAP. From first year total 17 students and from second year 29 students have participated. It was 12 days VAP from 14 Oct. to 15 Oct. 2018. The mentoring team ingeniously did their job. Python is a clear and concise language with an excellent built-in standard library. Its simple design yet flexible and powerful. In VAP, our students learned web development, software development, games developments and they taught them data science python libraries like NumPy, panda, SciPy, seaborn etc. by using python. It was very nice working experience with BRAIN MENTOR's.

Winter Training Program

HMR Institute of Technology and Management organized a two weeks winter industrial training

for the students of ECE, 6th semester. This was held in between 3rd January 2019 - 16th January 2019. This was done under the coordination of Ms Seema Dahiya at HMRITM, Hamidpur, and Delhi. WebTek Labs Private Limited Company offered two different trainings. They are Embedded ARM and Cloud Computing. Total 166 students participated in this training.

In Embedded ARM, they taught us about the different sensors like temperature sensor (LM35), IR sensor, humidity sensor, accelerometer, ultrasonic sensor etc. and LPC2148. Few more sensors like A/D converters, seven segment display, LED, UART, Timers and counters etc. They asked us to download micro vision software for C programming and ISIS for proteus designing. There were 77 students who participated in Embedded ARM.

In Cloud Computing, they taught the basic of cloud computing, evolution into the cloud computing, characteristics of cloud computing (on demand self-service, broad network access, resource pooling, rapid elasticity, measured service), cloud service models, cloud deployment models etc. There were 89 students who participated in cloud computing.

The team of WebTek Labs Private Limited was very helpful and enlightened us about the trainings in their best way. They helped us a lot even with the help of them we made small projects. With the help of them we got aware with new technologies used in industries. They were very friendly we asked our doubt without any hesitation and they tried to solve our queries with real life examples. Web Tek Labs Private Limited provided us a Training Completion Certificate which is very beneficial at the interview time. Certificate of Web Tek Private Limited is valid at Google Partner, National Skill Development Corporation (N.S.D.C.), Oracle Workforce Development Partner and IT-ITes SSC NASSCOM.

Glimpse of Departmental Activities

Rangoli Competition

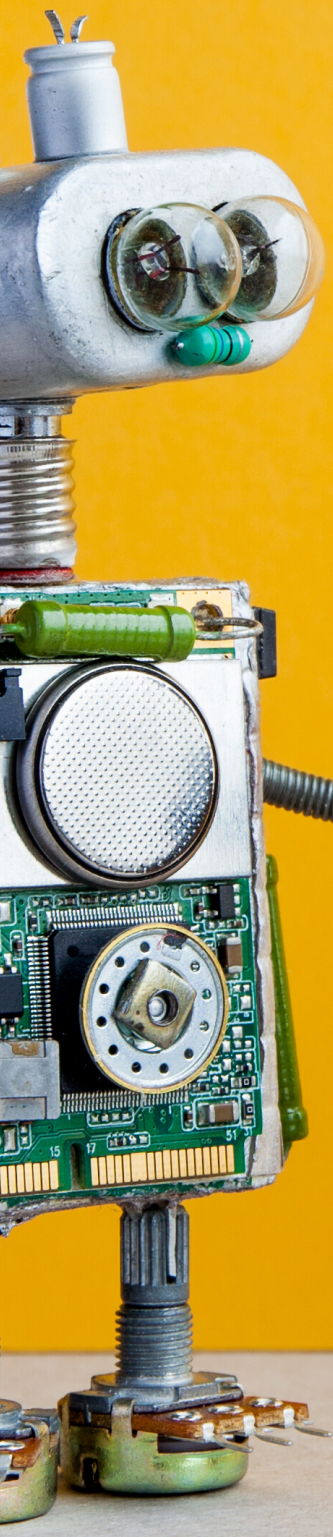
On 3rd September, 2019 a Rangoli competition was organised for the students to celebrate "**International Youth Day**" annually observed on 12 August, 2019 at HMR Institute of Technology and Management. The theme was "**Transforming Education",** show casing efforts to make education more inclusive and accessible for all youth, including efforts by youth themselves. The judge was **Ms Sujita** and she discussed various topic related to youth and motivate students towards a bright future, there was a cash prize of 2000₹, 1500₹, 1000₹, for first, second and third position respectively. This competition guided the students towards a responsible future.

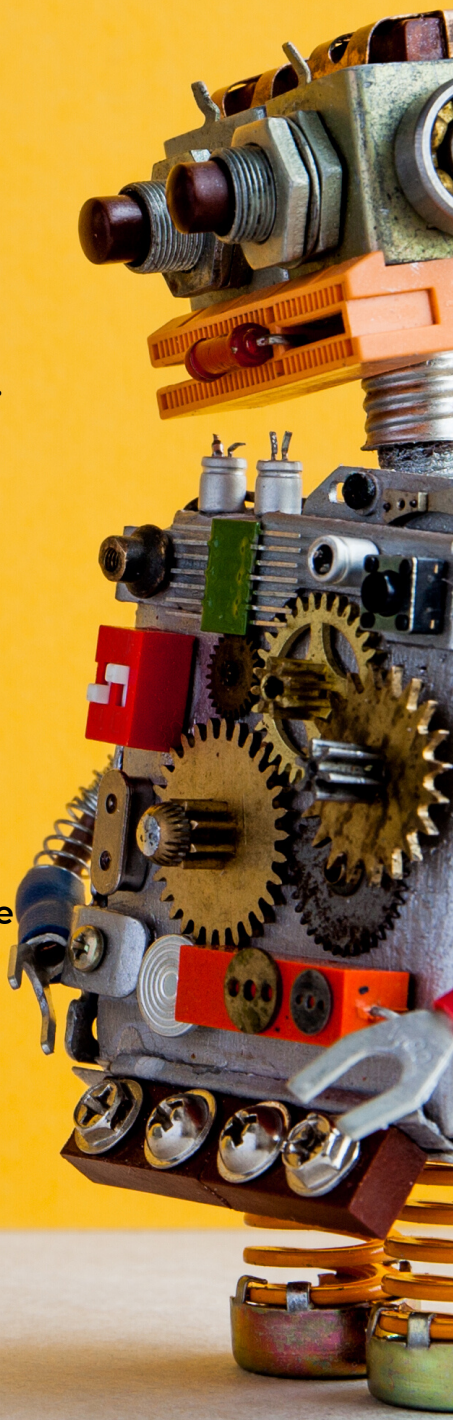
SKILL-ERA

2018-2019

A Technical Magazine

Department Of Electronics And Communication





S is for superb, a great attitude about life.

K is for keepsake, you treasure your memories.

I is for innovator, always improving

L is for lofty, your ambitions are high!

L is for little, the little things you do.

E is for being enthusiastic and vivacious in life.

R is for rock star, let it out!

A is for animated, let your energetic spirit shine

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