International Symposium on Smart Cities Challenges, Technologies and Trends SCCTT - 2022 4th November 2022

Organised By
Department of Computer Science & Engineering,
Maharaja Agrasen Institute of Technology, Delhi, India
in collaboration with
National Institute of Technology Delhi & IEEE ComSoc Delhi Chapter

Editorial Board

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SCCTT-2022 Symposium Souvenir
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निदेशक

Prof (Dr) Ajay K Sharma
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Prof (Dr) Ajay K Sharma
Director

Message

I am extremely happy to know that Department of Computer Science and Engineering, Maharaja Agrasen Institute of Technology, Delhi, India is organising an international Symposium on "Smart Cities Challenges, Technologies and Trends, SCCTT, 2022", on 4 th November 2022.

I hope this symposium will provide an opportunity to all the participants to interact with each other and update their knowledge on latest trends in smart cities challenges. The deliberation in this symposium will surely enable the Participants to do research in the field of Technology.

I also congratulate team of SCCTT, 2022 in bringing out the souvenir on this occasion.

I wish them all the success in life.

Prof (Dr) Ajay K Sharma
Director

Dr. Nand Kishore Garg
Chief Patron

MESSAGE

It is a pleasure to know that Department of Computer Science and Engineering, Maharaja Agrasen Institute of Technology, Delhi, India is organising an international Symposium on "Smart Cities Challenges, Technologies and Trends, SCCTT, 2022", on 4th November 2022.

I am sure that the symposium will witness enthusiastic participation from across the globe, resulting in productive partnership with the Institute to leverage the opportunities. It is sure to be a landmark event. Best wishes for the successful organization of the event.

I also congratulate Prof. Namita Gupta and her organising team of SCCTT, 2022 in bringing out the souvenir on this occasion.

I wish them all the success in life.

Dr. Nand Kishore Garg
Founder & Chief Advisor, MATES

Shri Vineet Kumar Gupta
Chief Patron

MESSAGE

I am indeed happy to know that Department of Computer Science and Engineering, Maharaja Agrasen Institute of Technology, Delhi, India is organising an international Symposium on "Smart Cities Challenges, Technologies and Trends, SCCTT, 2022", on 4th November 2022.

I am sure that the symposium will give new path and motivation to new researcher and outcome of the symposium will be beneficial to the society. I extend my best wishes on the occasion.

I also congratulate Prof. Namita Gupta and her organising team of SCCTT, 2022 in bringing out the souvenir on this occasion.

I wish them all the success in life.

Vineet Kumar Gupta
Chairman, MATES

Prof. M L Goyal
Patron

MESSAGE

It gives me immense pleasure to know that Department of Computer Science and Engineering, Maharaja Agrasen Institute of Technology, Delhi, India is organising an international Symposium on "Smart Cities Challenges, Technologies and Trends, SCCTT, 2022", on 4th November 2022.

I give my heart filled wishes to Prof. Namita Gupta and her team for the symposium. I am assured that we all will witness enthusiastic participation from across the globe. It is sure to be a landmark event. Best wishes for the successful organization of the event.

Prof. M.L. Goyal
Vice-Chairman(Academics), MATES

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(AFFILIATED TO GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, DELHI)

Ref. No.....

Date 31/10/22

Prof. (Dr.) Neelam Sharma
Patron

Message

I am extremely happy to know that Department of Computer Science and Engineering, Maharaja Agrasen Institute of Technology, Delhi, India is organising an international Symposium on "Smart Cities Challenges, Technologies and Trends, SCCTT, 2022", on 4th November 2022.

The Confluence of educationists, researchers, industry experts, students and technocrats from various institutes and organisation in our campus will definitely create the right kind of vibrations.

I wish to express my sincere appreciation to the authors, presenters, reviewers and committee members for their hard work, passion and commitment to organise an academic event of high quality. I congratulate all the authors who submitted papers and all the attendees. I wish the deliberations and the exchange of ideas will motivate all to excel in time to come.

I applaud Prof Namita Gupta and her organizing team for organising SCCTT, 2022. I wish them success.

Prof. (Dr.) Neelam Sharma
Director, MAIT

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Ref. No......

Date.31/10/22.....

Prof. (Dr.) S.S. Deswal
Dean (Academics), MAIT

Message

It is gratifying to know that Department of Computer Science and Engineering, Maharaja Agrasen Institute of Technology, Delhi, India is organising an international Symposium on "Smart Cities Challenges, Technologies and Trends, SCCTT, 2022", on 4th November 2022.

Organizing such an event at this point of time reinforces our objective of developing an environment for the exchange of ideas towards technological development. I wish the Symposium would be able to deliberate on current smart cities challenges.

I extend my grateful wishes to Prof. Namita Gupta and her organising team of SCCTT, 2022 for making the Symposium a great success.

Prof. (Dr.) S.S. Deswal
Dean (Academics), MAIT

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Ref. No..... *Date.....*

Prof. Namita Gupta
General Chair

The members of the organizing committee and myself are very proud to present the ``International Symposium`` under the theme of **"Smart Cities Challenges, Technologies and Trends"** and welcome all participants to Maharaja Agrasen Institute of Technology, Delhi on 4th November 2022. The Symposium is organized by the Department of Computer Science and Engineering, MAIT in association with National Institute of Technology Delhi and IEEE ComSoc Delhi Chapter.

The Symposium aimed to bring a deeper understanding of the latest trends and challenges in Smart Cities technology and how to work together to build cost-effective solutions to problems faced by people in cities and metros. The Symposium shall see contributions in the fields like Smart Cities Cyber-Physical Infrastructures, energy-efficient Communications in Smart Cities, Smart Homes, Smart Hospitals, Smart Campuses, IoT and Smart Applications, Cyber Attacks, Smart light System etc.
We are extremely happy to host distinguished personalities from academics and industry as keynote speakers and invited expert talks. These talks along with the presentations of selected papers are expected to be feast for the academics and research community.

The hard work and dedication of all the members of various organizing committees during the preparation for this Symposium is highly appreciated. Without them the event would not have been possible. Thanks, and acknowledgement are due to the Management of Maharaja Agrasen Technical Education Society for giving us the opportunity to organize the Symposium. Special thanks to Dr Nand Kishore Garg Sir, Prof Neelam Sharma Mam, Prof S S Deswal Sir, all Hods and CSE Department faculties, staff and students for their support that makes it a success case.

On behalf of the organizing committee, I thank Frontiers Journal, EDGE by Pearl Academy and IEEE ComSoc Delhi Chapter for sponsoring the Symposium and being our Financial Partners. I thank Ministry of Housing and Urban Affairs (Government of India), Ministry of Electronics and Information Technology (Government of India) and Indian Society for Technical Education (ISTE) for being our Technical Partners. I thank National Institute of Technology Delhi for being our Academic Partner.
Hope that the Symposium leaves positive memories for you to cherish.
My personal respect goes out to all of you.

Prof. Namita Gupta
HOD, CSE, MAIT

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Dr. Anurag Singh

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It gives me immense pleasure to know that Department of Computer Science and Engineering, Maharaja Agrasen Institute of Technology, Delhi, India is organising an international Symposium on "Smart Cities Challenges, Technologies and Trends, SCCTT, 2022", on 4th November 2022.

The topics to be covered to be covered in this symposium are comprehensive and will be leveraged for developing and understanding about new developments and emerging trends in this most relevant field of Information Technology. I hope the goal of the Symposium is well achieved by updating the knowledge of academicians, researchers, research scholars and students.

I congratulate Prof. Namita Gupta and her Organizing team for taking this excellent initiative and extend my best wishes for the successful conduct of the event.

(Dr. Anurag Singh)

Profiles

Chief Patron(s)

Dr. N.K. Garg, Founder Chairman, Maharaja Agrasen Technical Education Society and Chancellor, Maharaja Agrasen University. Dr. N.K. Garg is a notable social worker and has many noble deeds attached to his name was and MLA of Delhi from Trinagar constituency. He is a National Executive of Bhartiya Janta Party. He held prominent positions in renowned organisations.

Shri. Vineet Kumar Gupta, Chairman, Maharaja Agrasen Technical Education Society. He is a renowned businessman and industrialist. Being a businessman par excellence, his faith in engaging with the latest technical know-how from around the world has lead to the success of all his industrial set ups. Apart from being a renowned businessman and industrialist, philanthropy is very close to his heart and he has devoted his life in trying to make lives of the less fortunate better in all possible ways.

Patron(s)

Prof. (Dr.) M.L.Goyal, Vice Chairman Academics, MAIT. Dr. M.L.Goyal was given several appreciation and special contribution awards during his 31 years of service at CMC Limited. He was elected as the President of the Computer Society of India for two terms during 1994-96. He is a Fellow of Computer Society of India, Institution of Engineers (India) and Institution of Electronics & Telecommunication Engineers.

Prof. (Dr.) Neelam Sharma, Director, MAIT. Ph. D, M. Tech., B. Tech. She is awarded Ph. D. in Development of Fast VLSI RBSD Pipelined Arithmetic Logic Unit from UPTU Lucknow, 2006. Her Research Specialization is VLSI Technology, Digital Logic Design, Microprocessor & Microcontroller.

Patron(s)

Prof.(Dr.) S S Deswal is currently working as Dean (Academic) in Maharaja Agrasen Institute of Technology. He is awarded Ph.D from NIT, Kurukshetra with Title, Studies on Ride through Capabilities for Adjustable Speed Drives. He is active member of International Association of Engineers, International Association of Computer Science and Information Technology, Associate Member of Institution of Engineers and IEEE.

Prof. (Dr) Ajay K. Sharma has assumed the charge as Director of National Institute of Technology, Delhi on 21st September, 2021. Prof. Sharma is a former Vice Chancellor, IKGPTU, Jalandhar (Punjab) and former Director, NIT Delhi, NIT Hamirpur & IIIT Una. Prof. Sharma is a Senior Professor (currently on lien) in the Department of Computer Science & Engineering at Dr. B.R. Ambedkar NIT, Jalandhar. He carries over more than three decades of experience in teaching, research and various leadership roles in Central Government/State Government. Prof. Sharma obtained his Ph.D. in Electronics Communication and Computer Engineering from NIT, Kurukshetra (Erstwhile Regional Engineering College) in 1999.

General Chair(s)

Prof. Namita Gupta, is the Head of Computer Science and Engineering Department (an NBA accredited) at Maharaja Agrasen Institute of Technology, GGSIP University, Delhi, India. She is having more than 20 years of teaching experience and has played active role in research and project development. She has coordinated numerous National and International events and hackathons in the campus like Aakash Project, Smart India Hackathon (2017-2020), e-yantra. She is also President of MAIT IIC (Institute Innovation Cell). She has been awarded “Best Performance Award” in 2007 and “Long service Award” in 2017 by MAIT for her remarkable contribution. Her current areas of interest and research includes Data Mining, Databases and Machine Learning.

Dr. Anurag Singh, is working as an Associate Professor in Computer Science and Engineering Department, NIT, Delhi. He is having more than 20 years of teaching experience and has played active role in research. He did his PhD from IIT Kanpur in 2014. His areas of research include complex networks, graph spectra, attacks on complex networks, efficient routing in transportation networks, and federated learning.

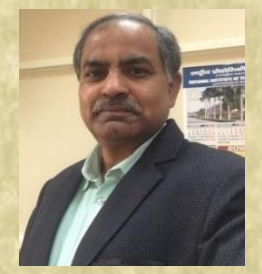
Sabrina Tiziana Gaito received a degree in Physics in 1996, a Master Degree in Material Science in 1998 and a Ph.D. in Applied Mathematics in 2002 from the University of Milan, Italy. She is currently full professor at the Computer Science Department of the University of Milan, at the position of the Director of the CONNETS Lab. Her papers have received 1900+ citations, and my H-index is 27, according to Google Scholar.

Honorary Chair

Prof. Aboul Ella Hassanien, is the Founder and Head of the Egyptian Scientific Research Group (SRGE) and a Professor of Information Technology at the Faculty of Computer and Information, Cairo University, Egypt. On September 1998, he received his doctoral degree from the Department of Computer Science, Graduate School of Science & Engineering, Tokyo Institute of Technology, Japan. Professor Hassanien has more than 600 scientific research papers published in prestigious international journals and over 30 books covering such diverse topics as data mining, medical images, intelligent systems, social networks and smart environment.

Keynote Speaker

Prof. Rachana Garg, She is IEEE (Senior Member) and ISTE (Life Member). She is Presently Executive Vice Chair IEEE Delhi Section, Past Chair Women in Engineering, Delhi Section, Past Chair PES-IAS Delhi Chapter and student activity chair, Delhi Section. She is also Faculty advisor IEEE PES-IAS student Chapter, DTU and Nrityangana. Her key area of interests are Power system operation and control, renewable energy systems, artificial intelligent techniques, smart grid.



Prof. Brahmjit Singh, is working as a Professor in the department of Electronics and Communication Engineering, NIT, Kurukshetra. He has more than 32 years of teaching experience. His areas of interest include Machine Learning in Wireless Communication and Low Complexity Security Solutions for IoT. He is senior member of IEEE and also holds the position of Vice Chair IEEE ComSoc Delhi Chapter. He has published more than 172 papers in journals of repute.

Speakers

Dr. S. K. Agrawal, his expertise is in "Intelligent Innovation for Research and Monetization", currently he is heading Sony India AI team for digital products innovations using AI for Asian and Global market. Dr. Agrawal is **Ph.D. in Artificial Intelligence** from Delhi Technological University (DTU), formerly known as Delhi College of Engineering (DCE) Delhi, Indian Institute of technology (IIT) Delhi. He also holds a Master's degree in Signal processing from Netaji Subhas Institute of Technology (Formerly: Delhi Institute of Technology), University of Delhi, India.

Ms. Diana Nicuţari, Journal Specialist at Frontiers in Artificial Intelligence & Frontiers in Big Data at Frontiers.
As a Journal Specialist in the Publishing Development Department, she support the strategic development of the Frontiers in Artificial Intelligence & Frontiers in Big Data journals.

Mr. C.B. Arun has been working in the Animation and Visual Effects industry for over 30 years. He started, when he got his first BBC Microcomputer and used it for creating graphics for India's first Science Fiction TV Series – Space City Sigma. He also worked on the very first Indian 2D animation series for Doordarshan called Ghayab Aaya! He graduated from the Mass Communications Research Institute in Delhi.

Dr. Anmol Ratna Saxena is working as an Associate Professor and Head, Start-up Centre for Innovation and Entrepreneurship, Department of Electrical Engineering, NIT, Delhi. Earlier, he has worked as an Assistant Professor at MITS, Gwalior, India. He obtained his Ph.D from IIT, Delhi India in 2014. His research interests include design of power electronic converters, dc-dc converters fo EV, Low voltage DC Grids, Multi Port Converters, digital control, modelling and robust control design of dc-dc Converters. He is a senior member of IEEE and Executive Committee member of IEEE PELS Society of Delhi Chapter.

Dr. Deepak Kumar Sharma is working as an Associate Professor in the Department of Information Technology, IGDTUW, Delhi. Earlier, he has worked as an Assistant Professor at NSUT, Delhi. He obtained his Ph.D in Computer Engineering from University of Delhi, India in 2016. His research interests include opportunistic networks, wireless ad hoc and sensor networks, software Defined Networks and IOT Networks. He has over 17 years of experience in Academics. He has published various research papers in reputed international journals like ETT Wiley, IEEE Systems Journal etc.

Symposium Organizing Committee Members

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Dr. Nand Kishore Garg
Founder and Chief Advisor, MATES
Chancellor, MAU, Baddi, HP

Shri Vineet Kumar Lohia
Chairman, MATES

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Ms. Mini Agarwal
Assistant Professor (CSE)
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Sessions Chair and Co-chair

Sessions	
Track 1 (Offline)	
04-11-2022	**Smart Cities Challenges, Technologies and Trends**
	Session Chair: Dr. Anmol Ratna Saxena, NIT Delhi
	Session co-chair : Dr. Ashish Khanna, CSE Dept., MAIT
Track 2 (Online)	
04-11-2022	**Smart Cities Challenges, Technologies and Trends**
	Session Chair: Dr. Deepak Kr Sharma, IGDTUW, Delhi
	Session co-chair : Mr. Anupam Kumar, CSE Dept., MAIT

Symposium Schedule

(Friday, 4th November, 2022)

Time	Program	
9:30 am – 10:00 am	**Registration** *Venue: Audi Lobby*	
10:00 am – 11:15am	**Inauguration** 10:00am - 10:05am: **Sarasvati Vandana** 10:05am - 10:08am: **Brief Symposium Introduction** 10:08am - 10:13am: **Welcome Address by Symposium General Chair** 10:13am - 10:23am: **Address by IEEE ComSoc Delhi Chapter** 10:23am - 10:30am: **Address by Chief Guest** 10:30am - 10:50am: **Keynote Address** 10:50am - 11:05am: **Address by Chief Advisor, MATES** 11:05am - 11:15am: **Vote of Thanks** *Venue: Auditorium*	
11:15 am-12:00 pm	**Expert Talk** **on "Building Digital Twins and Metaverse with Unreal Engine"** (Mr. C. B. Arun Kumar, Academic Director, EDGE Metaversity) **Venue: Auditorium**	
12:00 pm-12:15 pm	**Invited Talk** **on "Metaverse SmartCities with AI"** (Dr. S. K. Agarwal, Head of AI, Sony India) *Venue: Auditorium*	
12:15 pm-12:20 pm	**Vote of Thanks** *Venue: Auditorium*	
12:20 pm –1:30 pm	**Lunch and Networking** *Venue: Audi Lobby*	
1:30 pm –3:30 pm	**Session – 1 (offline)** **Session Chair:** Dr. Anmol Ratna Saxena (NIT Delhi) **Session Co-chair:** Dr Ashish Khanna (MAIT Delhi) *Venue – Room No. 131/132*	**Session – 2 (Online)** **Session Chair:** Dr. Deepak Kr Sharma (IGDTUW Delhi) **Session Co-chair:** Mr Anupam Kr (MAIT Delhi) *Platform – ZOOM*
3:30 pm –3:50 pm	**TEA Break**	
3:50pm – 4:40 pm	**Valedictory Session** 3:50 pm – 4:10 pm: **Address by Frontier Publishing professional** (Ms. Diana Nicutari, Journal Specialist, Frontiers in Artificial Intelligence and Big Data) 4:10 pm onwards: **Certificate Distribution Ceremony** *Venue – Room No. 131/132*	

Accepted Papers
(Abstracts)

[Paper ID 7]	Small object detection application in recognizing text from multi aspect image dataset using artificial intelligence
Author 1:	**Author 2:**
Ravi Prakash Chaturvedi	Udayan Ghose
rpchaturvedi51@gmail.com	udayan@ipu.ac.in

Abstract: In earlier years in smart cities object detection system has been improved by several folds due to many novel deep learning models. Deep learning has outperformed the existing traditional computer vision techniques. In recent many automated segmentation models uses the concept of feature extraction, the model proposes various features extraction on the images. The models generally use a texture classification model and color detection models, to predict the label of neighbouring pixels, and the classification used to validate the features. The parameter tuning of these models are generally based on the signal processing schemes, many researchers have used an optimized parameter sets which is obtained for a specific dataset, due to which the accuracy increases drastically but the model are not scalable on any other data set . We propose a new hybrid technique by using wavelet and watershed transform for small object detection for text extraction. Our hybrid model is scalable over variety of images, the model is used on different images and the result shows improvement in accuracy in presence of different noise.

Keywords - Object detection, Masking DWT, watershed, small object, Morphological.

[Paper ID 13]	Hybridized Bio-Inspired Intrusion Detection system for Internet of Things
Author 1:	**Author 2:**
Richa Singh	R L. Ujjwal
richa.singh081991@gmail.com	ujjwal@ipu.ac.in

Abstract: Internet of things(IoT) consist of several smart devices which are implanted with computing, sensing, and network capabilities. These capabilities enable them to collect and exchange heterogeneous data wirelessly. With the increasing usage of IoT devices in the world, security needs for the IoT system also increases. The IoT devices can be easily targeted by the intruders to perform malicious activities and the underlying network is also corrupted. Hence, in this paper, a bio-inspired based IDS is proposed to identify intrusive traffic in the IoT framework. The hybridized sine-cosine algorithm(SCA) and salp swarm algorithm (SSA) determines important features from the IoT network traffic. Extracted features are used to detect, and classify intrusive traffic efficiently. The IoT network intrusion dataset determines the performance of the proposed system in python environment. Proposed hybrid system achieves maximum accuracy with minimal features, and takes minimum time in detecting intrusion for the IoT network. Proposed system effectiveness is shown by comparing it with other similar approaches for performing multiclass classification.

Keywords - Internet of Things 1, IDS 2, SSA 3, SCA 4, Feature Selection 5

[Paper ID 17]	Dependable Modulation Classifier Explainer (DMCE) with Measurable Explainability	
Author 1:	**Author 2:**	**Author 3:**
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Abstract: Internet of Things(IoT) plays a significant role in building Smart Cities worldwide hoon Kim et al. (2017). Smart cities use IoT devices to collect and analyze the data to provide better services and solutions. These IoT devices are heavily dependent on the network for communication. These new age networks have Artificial Intelligence(AI) playing a crucial role in reducing network roll-out and operation costs, improving entire system performance, enhancing customer services, and generating possibilities to embed a wide range of telecom services and applications Balmer et al. (2020). For IoT devices, it is essential to have a robust and trustable network for reliable communication among devices and service points. The signals sent between the devices or service points use modulation to send a signal over a bandpass frequency range. Our work focuses on modulation classification done using deep learning method(s), Adaptive Modulation Classification(AMC), which now has become an integral part of a communication system Zhou et al. (2019). We propose a Dependable Modulation Classifier Explainer(DMCE) that focuses on the explain ability of modulation classification. Our work demonstrates how we can visualize and understand a particular prediction made by seeing highlighted data points crucial for modulation class prediction. We have also demonstrated a numeric Explain ability Measurable Metric(EMM) to interpret the prediction. In the end, we have presented a comparative analysis with existing state-of-the-art methods.
Keywords - Visualisation, Constellation Diagram, Modulation Classification, Explain ability

[Paper ID 35]	VAiBT : Vulnerability Assessment in BlockChain Technology		
Author 1:	**Author 2:**	**Author 3:**	**Et al.**
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Abstract: A BlockChain is constructed as a series of blocks of data. Each block is cryptographically linked to the one before it, so once a block is added, it can't be modified. Many security experts believe that the BlockChain system's inherent cryptographic capabilities are sufficient to fend off ongoing hacking attempts and security threats. The security and privacy of blockchain technology have, however, been the subject of studies, and it has emerged that numerous applications have been the target of successful cyberattacks. In this paper, sincere effort has been made to perform 'VAiBT : Vulnerability Assessment in BlockChain Technology ' where in, enumerable vulnerabilities in the Blockchain technology have been explored and a comparative result has been presented by performing the simulation in Java programming language on a set of three(03) credit cards. The results have been positive and encouraging.
Keywords - Network Security, Blockchain, Cryptography, Vulnerability, Attacks

[Paper ID 24]	Blockchain Enabled Access Control to Prevent Cyber Attacks in IoT: Systematic Literature Review	
Author 1:	**Author 2:**	**Author 3:**
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Abstract: Internet of Things (IoT) enables communication among objects in order to collect information and draw decisions to improve quality of life. There are several unresolved security and privacy concerns in IoT due to multiple resource constraint devices which leads to various cyber-attacks. The conventional access control techniques depend on a central authority, which further poses privacy and scalability issues in IoT. Various problems with access control in IoT can be resolved to prevent various cyber-attacks by using the decentralization and immutability properties of the blockchain. This paper explores the current research trends about blockchain-enabled secure access control mechanisms and also identifies its applicability in creating reliable access control solutions for IoT. Basic properties of blockchain, like decentralization, auditability, transparency, and immutability are the propulsion that provides integrity and security disregarding the participation of an external entity. At first, the application of blockchain was only for cryptocurrencies but with the introduction of Ethereum, which allows to write and execute smart contracts, applications other than cryptocurrencies are being created. This article intends to find and examine the primary research that uses blockchain for secure access control in IoT, as well as come up with a systematic review of various findings. The study discusses the obstacles in building decentralized access control solutions for IoT systems, as well as future research areas. For new researchers, this publication is a nice place to start and a strong reference point.
Keywords-Cyber Attacks, Internet of Things, Security, Privacy, Blockchain, Access Control, Smart Contract

[Paper ID 63]	A framework for data collection using sensors aided Internet of Things in Mushroom Cultivation	
Author 1:	**Author 2:**	**Author 3:**
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Abstract: Mushroom is a rich source of protein and is becoming very popular these days. Still in India, the consumption of mushroom per capita is nearly 40 g which is very low as compared to a country like China(220g). Mushroom cultivation is extremely season dependent. As temperature, humidity, and carbon dioxide exceeds a certain limit, the crop yield decreases drastically. The temporary structure of traditional huts used for mushroom growing has provisions neither for measure for the important environmental parameters like temperature, humidity, and carbon dioxide nor for the controlling of these in specific limits. In the present article, IoT enabled mechanism is proposed for the mushroom huts which is a combination of sensor nodes and software used for taking suitable corrective decisions based on the collected data so that the seasoned conditions for mushroom cultivation can be maintained in extreme weather conditions as well. The resulted outcome will establish the environmental standards for better mushroom cultivation which will result in increased income of the needy farmers of the country.
Keywords -IoT, Raspberry Pi, Smart Mushroom Cultivation, Wireless Sensor Network

[Paper ID 26]	A Novel allocation scheme for evaluating an optical-wireless Heterogeneous Network Architecture		
Author 1:	**Author 2:**	**Author 3:**	**Et al.**
Abhishek Gaur	Dr. Priestly Shan	Dr. Sibaram Khara	
abhishek1011332805@gmail.com			

Abstract: For the next generation of communication networks, WIMAX and EPON (Ethernet Based Passive Optical Networks) are two potential broadband access technologies. The EPON function allows the backhaul of WiMax Networks to achieve increased bandwidth and enhanced spectral efficiency. Some access architectures for the combination of EPON and WiMAX technologies have been proposed in this chapter. The architectures arising from this can benefit dually from the increased bandwidth of fibre optics and wireless communication's mobility. This concept was based on the proposal of an integrated architecture that reduces the design and operating expenses for the new access networks.
Keywords - PON (Passive Optical Networks), EPON (Ethernet based Passive Optical Networks), BS (Base Station), ONU (Optical Network Unit), WIMAX (Worldwide Interoperability for Microwave Access), QoS (Quality of Services)

[Paper ID 38]	Blockchain based Certificate Validation	
Author 1:	**Author 2:**	**Author 3:**
Rachna Jain	Kashika Jain	Panav Jain
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Abstract: By exploiting advancements in developing technology, the smart city in the digital age can develop into an intelligent community. Specifically, a new digital smart city ecosystem has emerged as a result of the increasing use of blockchain technology. Numerous blockchain applications promise to address the issues in a variety of industries, from crypto currencies and risk management to the Internet of Things (IoT) and public and social services. Additionally, the fusion of blockchain with artificial intelligence (AI) is transforming the network architecture of smart cities to create sustainable ecosystems. However, when it comes to accomplishing the objectives of developing sustainable smart cities, these technological breakthroughs present both opportunities and obstacles. In this work we have devised block chain based solution for preventing malfunctioning in certificate validation which is an important step for any university. Each certificate is uploaded in its hash format and is stored using block chain. The hashes are stored in unique transactions in nodes, which are deployed on a private network. Using SHA-256 hashing algorithm, the certificates are uploaded in the system, and can be viewed by anyone with the right credentials. Due to the usage of block chain technology, the certificates are stored in a decentralized manner, which ensure there is no central point of failure. This paper also improvises that when certificate uploading is required new nodes are added, instead of modifying the past blocks.
Keywords - Block-chain, Smart City, Intelligent Systems, Certificate validation, Hashing.

[Paper ID 27]	Nonstationary Time Series Forecasting Using Optimized-EVDHM-ARIMA for COVID-19		
Author 1:	**Author 2:**	**Author 3:**	**Et al.**
Suraj Singh Nagvanshi	Inderjeet Kaur	Charu Agarwal	
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Abstract: The Coronavirus (COVID-19) outbreak swept the world, infected millions of people, and caused many deaths. Multiple COVID-19 variations have been discovered since the initial case in December 2019, indicating that COVID-19 is highly mutable. COVID-19 variation 'XE' is the most current of all COVID-19 variants found in January 2022. It is vital to detect the virus transmission rate and forecast instances of infection to be prepared for all scenarios, prepare healthcare services, and avoid deaths. Time-series forecasting helps predict future infected cases and determine the virus transmission rate to make timely decisions. A forecasting model for nonstationary time series has been created in this paper. The model comprises an optimized EigenValue Decomposition of Hankel Matrix (EVDHM) and an optimized AutoRegressive Integrated Moving Average (ARIMA). The Phillips Perron Test (PPT) has been used to determine whether a time series is nonstationary. A time series has been decomposed into components using EVDHM, and each component has been forecasted using ARIMA. The final forecasts have been formed by combining the predicted values of each component. A Genetic Algorithm (GA) to select ARIMA parameters resulting in the lowest Akaike Information Criterion (AIC) values has been used to discover the best ARIMA parameters. Another genetic algorithm has been used to optimize the decomposition results of EVDHM that ensures the minimum non stationarity and maximal utilization of eigenvalues for each decomposed component.

Keywords - Time-series$_1$, Forecasting$_2$, COVID-19$_3$, Optimized-ARIMA$_4$, Optimized-EVDHM$_5$, PPT$_6$.

[Paper ID 49]	An Extended Approach to Appraise Electricity Distribution and Carbon Footprint of Bitcoin in a Smart City	
Author 1:	**Author 2:**	**Author 3:**
Ayushi Sharma	Pratham Sharma	Harsh Bamotra
ayushisharma.andc.du@gmail.com	prrrathm@gmail.com	harshbamotra.andc.du @gmail.com

Abstract. A smart city may not exist without an efficient and clean energy system. Clean and green energy is the future of power system in smart city perspective. Thus, there is drive to integrate as much renewable energy as possible

which may fulfill the need of a smart city to make it sustainable. A smart city not only fulfils their own energy requirement rather they are expected to pro-vide energy to utility also. Renewable energy sources (RES) may not sustain without a backup due to their intermittent nature. Thus, battery energy storage system (BESS) has seen to have a paramount role in large scale penetration of RES into grid. They help in better match between the demand and supply during standalone mode and during grid connected mode, they may play a dominant role in supplying energy during the intermittency period of RES to fulfil the deficit power promised by the operator. In this paper, a new approach is proposed for improving the availability of the energy by using BESS during the period of intermittency. Thus, in case an operator bids certain amount of energy to utility, then the BESS may support the grid during intermittency by an amount of power, which has been promised by the operator. Thus, whatever the operator bids that will be supplied to grid either using renewable energy generation or if not available, then BESS will support. The example system has solar generation, BESS and local load connected to utility. The simulation work is done in MATLAB.

Keywords: Battery Energy Storage System (BESS), Photo-Voltaic (PV), Solar Energy, Voltage Source Converter (VSC).

[Paper ID 14]	Clean Energy System with Large Scale Integration of Renewable Energy Sources using BESS
Author 1:	**Author 2:**
Ruchika	D.K. Jain
Mittalruchika46@gmail.com	

Abstract: A smart city may not exist without an efficient and clean energy system. Clean and green energy is the future of power system in smart city perspective. Thus, there is drive to integrate as much renewable energy as possible which may fulfill the need of a smart city to make it sustainable. A smart city not only fulfils their own energy requirement rather they are expected to pro-vide energy to utility also. Renewable energy sources (RES) may not sustain without a backup due to their intermittent nature. Thus, battery energy storage system (BESS) has seen to have a paramount role in large scale penetration of RES into grid. They help in better match between the demand and supply during standalone mode and during grid connected mode, they may play a dominant role in supplying energy during the intermittency period of RES to fulfil the deficit power promised by the operator. In this paper, a new approach is proposed for improving the availability of the energy by using BESS during the period of intermittency. Thus, in case an operator bids certain amount of energy to utility, then the BESS may support the grid during intermittency by an amount of power, which has been promised by the operator. Thus, whatever the operator bids that will be supplied to grid either using renewable energy generation or if not available, then BESS will support. The example system has solar generation, BESS and local load connected to utility. The simulation work is done in MATLAB.

Keywords - Battery Energy Storage System (BESS), Photo-Voltaic (PV), Solar Energy, Voltage Source Converter (VSC).

[Paper ID 20]	Remote Photoplethysmography: Digital Disruption in Health Vital Acquisition		
Author 1:	**Author 2:**	**Author 3:**	**Et al.**
Monika	Harish Kumar	Sakshi Kaushal	
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Abstract: In recent years, Remote Photoplethysmography(rPPG) is emerging as an affordable, contactless, and hassle-free technology to measure heart rate and other health vitals anywhere and anytime just with the use of a simple webcam or a smartphone camera. It has various applications of artificial intelligence(AI) in the health monitoring of patients/individuals which can serve as a basis for indication of several disease detection and monitoring. Although a lot of rPPG algorithms have been developed to measure health vitals such as heart rate, oxygen saturation level, respiration rate, etc., all of these algorithms suffer from one issue or another such as the effect of uneven illumination, body motion, quality of the webcam, the distance between the webcam and the subject, periodic noise, etc. This paper presents the study of various issues in the existing rPPG algorithms and the work done in the research field to handle those issues. It also presents the evaluation of the heart rate and other health vitals measuring tools present in the commercial market and compares the performance of these tools against a standard health monitoring device. Two commercially available applications Wellfie and Covitor are evaluated to check the significance of these kinds of rPPG applications.

Keywords: Camera, remote photoplethysmography, video processing, ICA, BSS.

[Paper ID 23]	A Systematic Review on Big Data Applications and Scope for Industrial Processing and Healthcare Sectors.
Author 1:	**Author 2:**
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Abstract: Nowadays, big data is an emerging area of computer science. Data are generated through different sources such as social media, e-commerce, blogs, banking, healthcare, transactions, apps, websites, opinion platforms, etc. It is processed for effective utilization in different industries, including healthcare. These enormous generated data are essential for data analysis and processing for industrial needs. This paper reviews the work of various authors who have contributed to data collection, analyzing, processing, and viewing to explore the importance and possibilities of big data in industrial processing applications and healthcare sectors. It identifies different opportunities and challenges (data cleaning, missing values, and outlier analysis) along with applications and features of big data. This systematic review further proposed dirty data detection and cleaning and outlier detection models that can be usedfor many applications. The data cleaning and outlier detection models use the optimizations concept to solve the optimal centroid selection problem and suspected data.

Keywords—Big data, Data cleaning, Outliers, Industrial processing, Healthcare

[Paper ID 34]	Revamping Healthcare with Web 3.0		
Author 1:	**Author 2:**	**Author 3:**	**Et al.**
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Abstract-There are many patients who are in need of such vital organs which may improve their living condition but finding the right person with matching organ for donation is a cumbersome job to do. There were many instances which involves frauds and organ trafficking.in this paper we are proposing an application for organ donation and transplant matching system using Ethereum blockchain, to provide functionalities like donor-recipient automated transplant matching for organ donation, easy access of medical records, and holistic platform for the whole system; in a highly secure, traceable and automated way, aiming to enhance the whole system and process of organ distribution as well as transplant matching, saving lives and curb illegal activities like trafficking, etc. The main idea of this application is to reduce the time limit and avoid time spending in search of the matched donor and the accessibility of required organ.

Keywords: Healthcare, Blockchain, IoT, Web 3.0

[Paper ID 52]	A Survey on the Aspects of Smart Cities Using Blockchain Technology		
Author 1:	**Author 2:**	**Author 3:**	**Et al.**
Prof.Namita Gupta	Yogesh Sharma	Dr. Farzil Kidwai	
namita@mait.ac.in	yogeshsharma@mait.ac.in	farzilkidwai@mait.ac.in	

Abstract: With the increase of rapid urbanization, new challenges and issues are created. In this situation a need for smart cities provides opportunities to counter these challenges and issues, thus solving the problems associated with urbanization and provide its citizen better facilities to live in. Many governments are infusing the technology into almost every facet of the city's operation, be it transportation, education, light system, homes, hospitals and many more. There are many technologies available to achieve this purpose be it IoT, Cloud Computing or Blockchain Technology. IoT and Cloud Computing technologies are very useful when it comes to collection of data but blockchain technology offer uncountable valued services to its end users. In this paper we will discuss all the aspects of a smart city operations combined with blockchain technology and in the end, we will also present some research challenges associated with smart cities and blockchain.

Keywords: Blockchain, Smart Cities, IOT

[Paper ID 53]	Methodology for the transmission of biomedical signals in times of pandemic, through the use of wearable devices, EMG demonstration case		
Author 1:	**Author 2:**	**Author 3:**	**Et al.**
Wilver Aucchauasi	Sandra Mezar	Karin Rojas	
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Abstract: Currently, many solutions are being presented for the recording of biomedical signals, based on the 19 use of different devices which increase the use and applications, as an aid mechanism for medical 20 diagnosis. In times of pandemic, the possibilities of attending medical appointments for medical 21 consultations and for the realization of different tests decrease; the pandemic produced by covid-19, 22 allowed the implementation and growth of online appointments, as an alternative mechanism for 23 patient care, in this paper we present a method to scale the appointments and medical care that are 24 performed online, towards the use of wearable devices based on IoT technology that allow evaluating 25 the patient, performing the registration and sending of biomedical signals. We present a case study 26 based on the recording of electromyography signals to identify the muscular work of the arm, using a 27 wearable device, which allows the registration in the patient who is isolated, and can be sent by 28 various wireless means, with the intention that the doctor who is performing the medical evaluation, 29 can evaluate the signals making the diagnosis online. As results we present an acquisition protocol 30 where the recording of the arm muscle signals is performed, where we process the signals, separating 31 them into signals that correspond to a particular muscle, the proposed method can be scaled and 32 applied in the analysis of different types of signals from the human body

Keywords - Devices, IOT, EMG, signal, configuration, device

[Paper ID 55]	BoF-SVM Inspired Machine Learning Model for Detecting Dementia		
Author 1:	**Author 2:**	**Author 3:**	**Et al.**
Deepika Bansal	Kavita Khanna	Rita Chhikara	
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Abstract: Dementia is a brain disorder which causes loss in cognitive abilities of the patients. Mild cognitive impairment is a mediator phase of healthy controls and dementia patients. The motivation of this study is the prediction of the presence of dementia using magnetic resonance imaging data, which is significant for the diagnosis of normal control and dementia patients. The proposed model leverages the benefits of powerful techniques like Discrete Wavelet Transform, Bag of Features, and SVM. The results of the proposed data intelligence model are promising in terms of the accuracy of the model which is 92.32% which is better than the recently proposed models in the literature. Also, the proposed method is compared with the models which may use curvelet transforms and with the methods which have gone without using DWT transforms. The comparisons have also been made with the models that have used other prevalent techniques like Principal Component Analysis, Fisher Discriminant Ratio, Gray Level Co-occurrence Matrix. The results justify the use of each of the methods in the proposed model.

Keywords: Data Intelligence, Dementia, Magnetic resonance imaging, Discrete wavelet transform, Bag of features, Support vector machine.

[Paper ID 56]	Smart Automated Medical Diagnosis of Dementia Through Fine-Tuned Efficient Net		
Author 1:	**Author 2:**	**Author 3:**	**Et al.**
Deepika Bansal	Kavita Khanna	Rita Chhikara	
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Abstract: Smart automated models using deep learning are more extensively used in smart healthcare. The present study contributes to the diagnosis of dementia using Magnetic Resonance Imaging. Dementia is a syndrome that deteriorates the cognitive function of the brain. The disease has no cure, till now, except for the prior diagnosis of the disease. The present study aims for classifying the MRI scans of two datasets OASIS and ADNI into 2 categories: binary classification (normal control, and dementia disease) and multi-classification (normal control, mild cognitive impairment, and dementia disease). To achieve the objective, a smart automated model using EfficientNetB0 architecture of deep learning is fine-tuned by adding three dense layers on the top of the network. The swish activation function is used in the inner dense layers added. The dropout and batch normalization layers are also added for dealing with the problem of overfitting. This smart architecture offers high accuracy and high efficiency compared to other pre-trained networks. The smart automated model is assessed on various performance measures and outperformed the state of art techniques. The proposed model can be utilized for developing a smart automated framework to help medical services to improve decision-making in smart cities.

Keywords - Smart healthcare, Dementia, Magnetic resonance imaging, Pre-trained networks, Transfer learning, EfficientNet.

[Paper ID 61]	Method for monitoring patterns in the behavior of brain activity prior to an episode of epilepsy, applied to young people in times of the covid19 pandemic, using low-cost BCI devices: Demonstration case		
Author 1:	**Author 2:**	**Author 3:**	**Et al.**
Wilver Auccahuasi	Sandra Meza	Karin Rojas	
wilver.auccahuasi@upn.edu.pe	smeza@esan.edu.pe	krojas@utp.edu.pe	

Abstract: Epilepsy is one of the characteristic diseases of brain activity. People with this disease live with the 20 symptoms and try to control the events to mitigate the effects that they may cause, such as a fall, 21 blow, or any other consequence. In these times of pandemic caused by COVID-19, many of the 22 people who have this disease present many events in a row, which can be caused by many factors, 23 such as being at home most of the day, without being able to go out to get distracted. In this research 24 work, a practical method is presented to monitor and predict an epilepsy event, based on the 25 measurement of stress and meditation levels by using low-cost devices. For the evaluation of the 26 method, measurements were made on a patient who constantly presents epilepsy events. The 27 evaluation was carried out when she took her classes online, where the students present greater 28 pressure. The method uses smartwatches to evaluate the stress level and BCI devices to measure the 29 level of meditation. The results found in the data analysis present grouped values for the positive and 30 negative cases of happening of epilepsy events. In the evaluation, possible threshold values that can 31 be used to classify epilepsy events were determined. The determined threshold value can be used Running Title 2 32 independently if only one device can be counted on. The reference threshold value is determined 33 between values of 41 and 79, on a scale of 1 to 100. It is concluded that the device that can be 34 counted on in the market at a low cost is the smartwatch that measures the stress level, compared to 35 the best-known brain signal analysis device. As for the BCI device, the presented method is easy to 36 implement; it can be easily used by the patients themselves or their relatives.

Keywords - BCI, patterns, meditation, attention, analysis, epilepsy.

[Paper ID 62]	Methodology for the extraction of characteristics in medical images using RADIOMICS		
Author 1:	**Author 2:**	**Author 3:**	**Et al.**
Wilver Auccahuasi	Sandra Meza	Karin Roja	
wilver.auccahuasi@upn.edu.pe	smeza@esan.edu.pe	krojas@utp.edu.pe	

Abstract: In the studies of medical images, being able to classify the objects present in the images is of vital 22 importance; these objects can be some structure of the human body, some malformation, and tumors, 23 among others. One of the fundamental tasks is to be able to find the characteristics that help to 24 classify the desired object; these characteristics can be found manually using mainly shape and color 25 descriptors. In the present work we describe a methodology of how to use the RADIOMICS tool, to 26 carry out the search for the characteristics automatically, we indicate the necessary steps and the 27 procedures to be carried out. To demonstrate the methodology, we use the mammography modality 28 in the detection and classification of micro calcifications, where the problem is related to being able 29 to find them in a high-density image, taking as a starting point that their representation in the image 30 is very small. We start the methodology with the analysis of the original image in DICOM format, 31 then we carry out the location and marking of the images and finally as a result we present the Running Title 2 32 description of the characteristics found as well as the recommendation to be used with the different 33 classification algorithms. The methodology presented is scalable and can be used in different imaging 34 modalities.

Keywords - Features; Medical imaging, DICOM; Image Processing; Analysis, Classification.

[Paper ID 64]	A Novel Approach for Automatic Avalanche Detection System for SMART CITIES		
Author 1:	**Author 2:**	**Author 3:**	**Et al.**
Ashish Sharma	Dr. Farzil Kidwai	Yogesh Sharma	
ashish@mait.ac.in	farzilkidwai@mait.ac.in	Yogeshsharma @mait.ac.in	

Abstract: Cities all over the world are reaching operational excellence and growing smarter with the introduction of innovative technologies. These technologies, if utilized in an efficient manner can become assets of tomorrow. Many weather-related natural disasters have increased in frequency and severity in recent times. These natural disasters can devastate the environment, the economy, and life as we know it. Technology, if used as an instrumental asset can enhance our preparedness for emergencies. Utilizing vision-based strategies to prevent natural disasters like avalanches has been one of the major advancements. A valuable tool for avalanche forecasting and evaluating the efficacy of avalanche prevention measures in low visibility conditions is automated snow avalanche prediction. Automation offers an easy escape from the hassle of continuous human monitoring of avalanche activity and also increases the speed and accuracy of detection. Our solution offers an economic and precise alternative to traditional prediction systems. It takes into account different climatological factors related to snow stability in order to make a prediction about avalanche danger. The system analyzes past and present activity to predict if avalanches can be developed. It consists of a thermal imaging camera that collects infrared images of cracked snow. These images are then subsequently examined with the help of a deep-learning image processing model to investigate the likelihood of an avalanche occurring in the crack. The prediction, if positive the authorities can be alerted and further necessary actions can be taken.

Keywords: Avalanche, Climatological, Thermal Imaging, Deep Learning, Image Processing

[Paper ID 1]	Managing Learning Objects and Associated Information in Augmented Reality Enabled Tools
Author 1:	**Author 2:**
Pushpendra Kumar	Bharti Chugh
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Abstract: In the recent times, several technologies are introduced for didactic purposes upon the basis of target audience. The demand for such teaching tools is increasing exponentially. These tools would be powered by technologies like VR/AR/MR to help students to interact with the concepts and processes they are learning in virtual scenarios. This article proposes a method to manage learning objects and enhance their capability with augmented reality constructs. This method extends its functionality by introducing a way to manage the information associated with learning objects in memory in form of simple queues.

Keywords - Didactic, Learning Objects, Augmented Reality

About MAIT

Maharaja Agrasen Institute of Technology, Delhi is affiliated to Guru Gobind Singh Indraprastha University, Delhi, India (NBA Accredited, ISO 9000:2015 Certified, Graded as 'A' by the National Assessment and Accreditation Council, Bangalore). It was established in the year 1999 and since then it has taken long strides in providing quality Engineering and Technical education to students. The institute offers Bachelor's Degree in 5 disciplines of Engineering - Computer Science and Engineering (240 students' intake), Electronics and Communication Engineering, Electrical and Electronics Engineering, Information Technology, Mechanical and Automation Engineering (180 students' intake each) and Mechanical Engineering (60 students' intake) and Postgraduate degree in Master of Business Administration (180 students' intake). The Institute is approved by All India Council for Technical Education and affiliated to Guru Gobind Singh Indraprastha University, Delhi. Keeping in view the values ushered in by Maharaja Agrasen and the objectives envisioned by the Maharaja Agrasen Technical Education Society, the Institute aims to provide well qualified manpower to this nation.

About CSE Department

Department was formed in 1999 to provide an outstanding research environment complemented by excellence in teaching. It offers B.Tech degree affiliated to Guru Gobind Singh Indraprastha University, Delhi. Department of Computer Science & Engineering commits to work towards developing Engineers with a rich blend of competent, technical, managerial and social skills and contribute to nation building. It places emphasis on all the important aspects of computers such as Computer Networks, Mobile Communication, Algorithm Design, Operating System, Advance Database Systems, Theory of Computation , Computer Graphics and many more.

Department takes the initiative to improve the soft skills, analytical capabilities and verbal communication of the students so that they can face the competition in the corporate world confidently. To meet the objectives, department pays special emphasis on teaching and hands on practical work. Students exhibit their innovative ideas, skills and potentials as final year projects and have won many awards at University level.

The excellent infrastructure, experienced team of faculty dedicates to strengthen effective teaching learning process ensuring quality education.

We believe that this approach to teaching-learning, coupled with practical experience gained during Industrial Training in reputed organizations, equips our students to handle the challenges posed by the IT industry. Students of Computer Science and Engineering are placed with top IT companies.

We as a team resolve to take the Department to heights of success and glory and prepare for the forthcoming challenges.

Publication Partners

Frontiers was founded in 2007 by Henry Markram and Kamila Markram, two neuroscientists from the Swiss Federal Institute of Technology (EPFL) in Lausanne, Switzerland**.** Frontiers want to enable society to generate knowledge faster and more efficiently and ultimately accelerate innovation, health, and prosperity for all. The fundamental measure of success will be the full transition to open access as the default method of publishing quality-controlled research findings. Frontier's research journals are community-driven and peer-reviewed by editorial boards of over 202,000 top researchers. Featuring pioneering technology, artificial intelligence, and rigorous quality standards, their research articles have been viewed more than 1.9 billion times, reflecting the power of open research. Initially starting in the field of neuroscience, Frontiers now spans hundreds of academic disciplines and is one of the most cited and largest research publishers in the world. The journal is ESCI indexed.

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NIT Delhi has started its academic session in 2010 with three undergraduate B.Tech degree programmes in Computer Science and Engineering, Electronics and Communication Engineering and Electrical and Electronics Engineering. The academic activities of NIT Delhi were initiated at NIT Warangal in year 2010 which later moved to a temporary campus at Dwarka, New Delhi in June 2012 and now currently running at IAMR Campus, Narela (February 2014**).**

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