Adi Shankara
INSTITUTE OF ENGINEERING AND TECHNOLOGY
Ph: 0484-2463825
Email: info@adishankara.ac.in
Website: www.adishankara.ac.in

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

EXPLORE, DREAM, DISCOVER

ISSUE 62 MONTHLY NEWSLETTER MAY 2023

GENESIS

IGNITING THOUGHTS

Contents

Vision

- To be recognized at the national and international level for excellence in education and research in Electronics and Communication Engineering.

Mission

- Inculcating leadership qualities, adaptability, and ethical values
- Imparting quality education in the field of electronics, communication, and related areas to meet the challenges in the industry, academia, and research
- Nurture the growth of each individual by providing a dynamic and conducive learning environment.

DEPARTMENTAL ACTIVITIES

ACCESS'23

ACCESS'23 (2023 3rd international conference on Advances in Computing, Communication, Embedded and Secure Systems), technically sponsored by IEEE, conducted online during 18 – 20 May 2023, is the third edition of ACCESS. ACCESS'23 is organized by department of ECE, ASIET, Kalady.

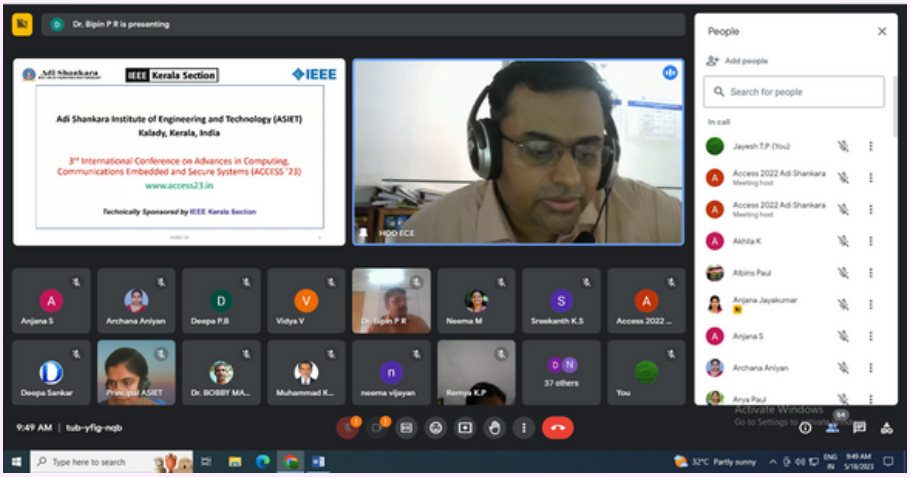
- Conference Convener: Dr. Ajay Kumar, H.O.D, ECE
- Conference Chair: Dr. Bipin P R, Associate Professor, ECE

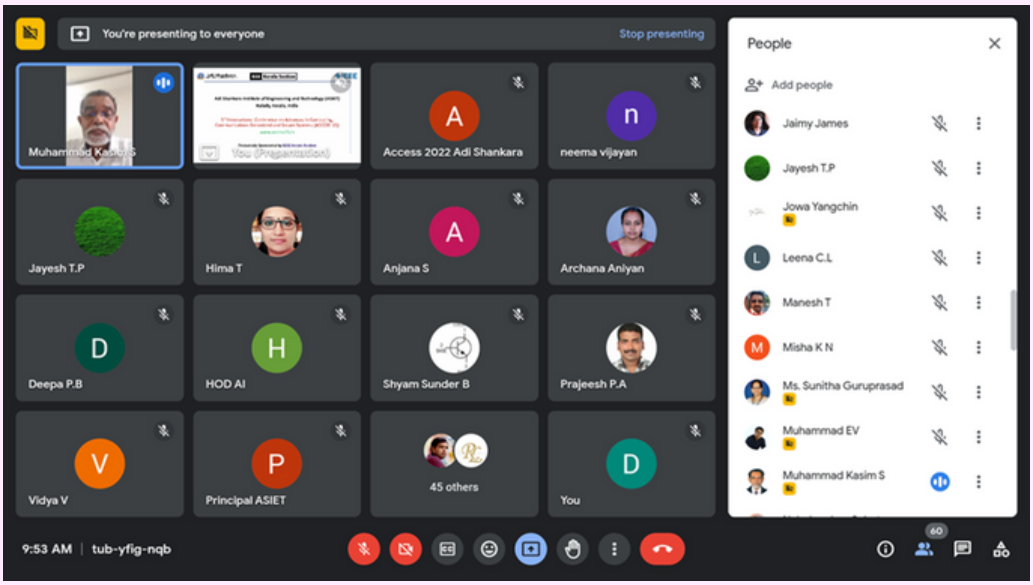
The conference kick started by an inaugural session on 18th May 2023. The Welcome speech was delivered by Head of the Department, Dr.Ajay Kumar. The program was inaugurated by Prof.Muhammed Kasim, Chair, IEEE Kerala Section. Dr. Bipin P R briefed about the conference and Prof. Muhammed Kasim delivered the inaugural address. He gave an insight into the relevance of putting dedicated effort for converting publications into patents and products. The Presidential address was delivered by our Principal Dr. Sreepriya S. She congratulated the department of ECE for organizing the international conference, ACCESS '23. Dr. Bobby Mathews C, Professor, ECE, delivered the vote of thanks.

The paper presentations were scheduled during the 3 days in 10 sessions, online. The Chairs of the conference from various reputed organizations evaluated each presentation. Each presentation was of duration 10 minutes followed by 5 minutes of questions and discussions. The paper presentations were organized under 5 tracks: Communication & Networking, Computational Intelligence, Computer vision and Signal processing, Robotics and Biomedical Engineering, and Security & Computing Technologies. Received a total of 220 papers, out of which 62 papers were selected. 2 international papers were there from USA and Iran. We received 38 papers from outside Kerala with a 28% acceptance ratio. All the accepted and presented papers will be published in IEEE Xplore.

Apart from paper presentations, we had 3 renowned speakers as keynote speakers. The first keynote address was delivered by Dr. Balaji Sreenivasan, Professor, IIT Madras, Chennai, India on 18th May 2023 on the topic Distributed Fiber Sensors - A Paradigm Shift in Cyber Physical
Systems. It was followed by session on Generative AI and Cyber Security by Dr. Hari M Koduvely, Senior Data Scientist, Open Text, Ontario, Canada on 19th May 2023. The third session was on 20 th May on the topic Interpretable Machine Learning by Dr. Abraham Varghese, University of Technology and Applied Sciences, Sultanate of Oman, Muscat, Oman.

The closing ceremony of ACCESS '23 was conducted on 20th May 2023, 3 Pm. The Welcome speech was delivered by Prof. Neema M, Organizing committee member, ACCESS '23. Dr. Bipin P R presented a report on ACCESS '23. The conference proceedings was released by Dr. Jaison Mathew, Convener, Conference activities, IEEE Kerala section.

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Jaimy James
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Leena C.L
Manesh T
Misha K N
Ms. Sunitha Guruprasad
Muhammad EV
Muhammad Kasim S
Access 2022 Adi Shankara
neema vijayan
Jayesh T.P
Hima T
Anjana S
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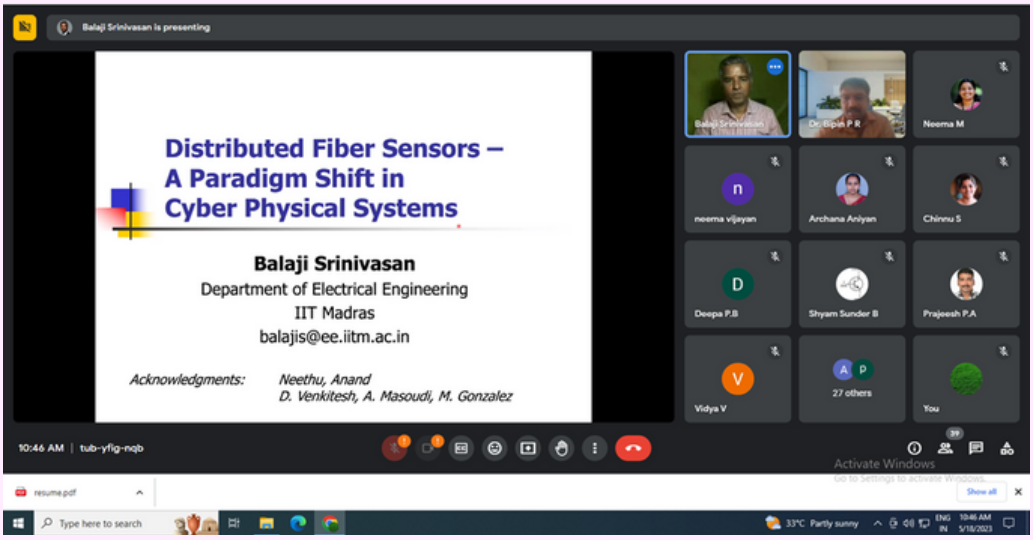
Balaji Srinivasan is presenting
Distributed Fiber Sensors – A Paradigm Shift in Cyber Physical Systems
Balaji Srinivasan
Department of Electrical Engineering
IIT Madras
balajis@ee.iitm.ac.in
Acknowledgments: Neethu, Anand
D. Venkitesh, A. Masoudi, M. Gonzalez
Neema M
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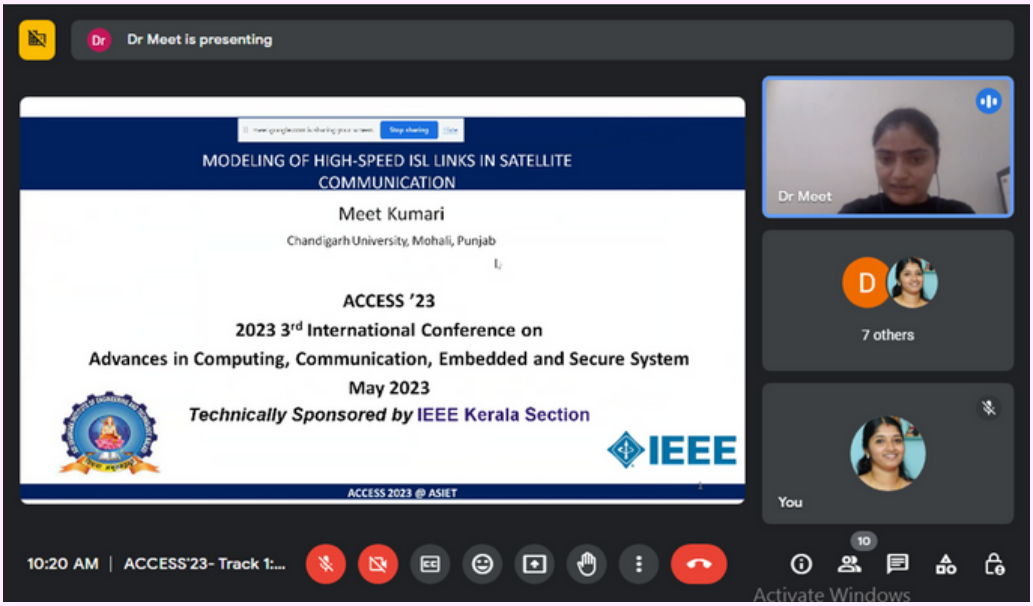
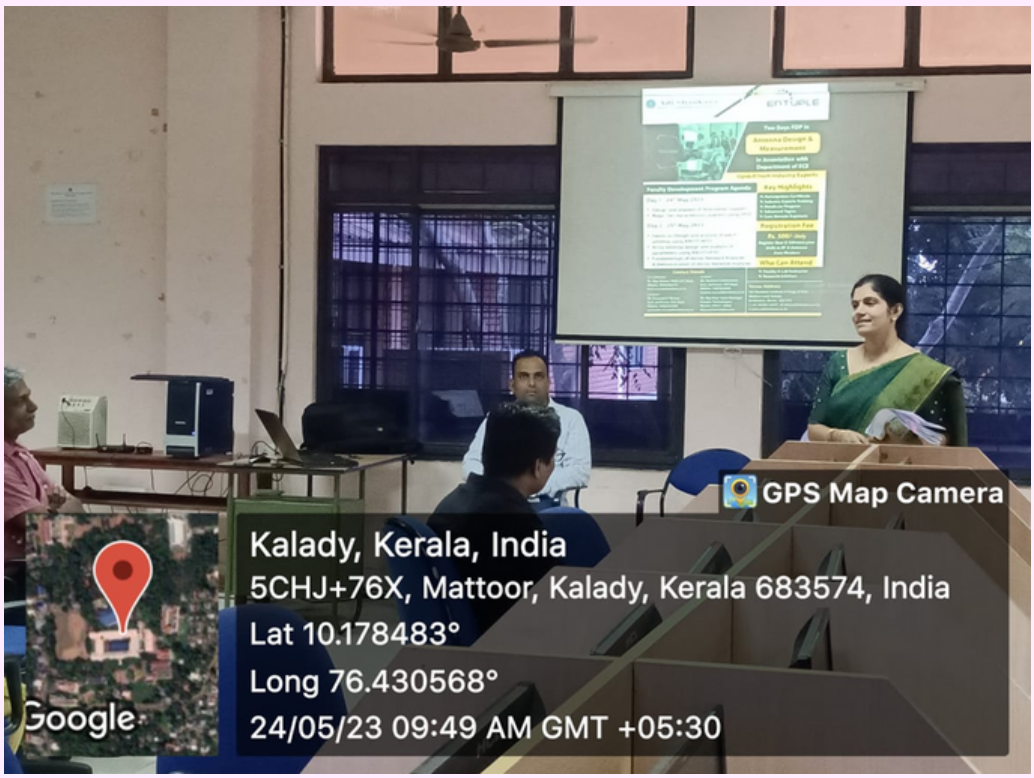

Dr Meet is presenting
MODELING OF HIGH-SPEED ISL LINKS IN SATELLITE COMMUNICATION
Meet Kumari
Chandigarh University, Mohali, Punjab
ACCESS '23
2023 3rd International Conference on
Advances in Computing, Communication, Embedded and Secure System
May 2023
Technically Sponsored by IEEE Kerala Section
IEEE
ACCESS 2023 @ ASIET
Dr Meet
7 others
You
10:20 AM | ACCESS'23- Track 1:...

Faculty Development Program -Antenna Design and Measurement

The Faculty Development Program on " Antenna Design and Measurement; was conducted by the Department of Electronics and Communication Engineering, Adi Shankara Institute of Engineering & Technology in association with Entuple Technologies from 24/05/2023 to 25/05/2023. The program aimed to enhance the knowledge and skills of faculty members in the field of antenna design and measurement, enabling them to deliver quality education to students and contribute to research and development in this domain. This FDP covered hands-on experience in Design and analysis using HFSS simulation software, fundamentals of Vector Network analyzer and its measurement techniques, etc. The program featured industry experts in the field of antenna design and measurement who conducted the sessions and workshops. The resource persons included:

- Mr. SHASHIKUMAR.R, Senior RF & Antenna Design Engineer, Entuple Technologies, Bangalore
- Mr. Babu Reddy, Entuple Technologies, Bangalore
- Mr. Lakshmi Narayan, Entuple Technologies, Bangalore



Talk on Patent Awareness

Adi Shankara Institute of Engineering and Technology, Kalady organized a seminar for the students from Electronics and Communication to provide Patent Awareness for layout-design of a semiconductor integrated circuit (SICLD) on 28th April 2023. The seminar was held at ECE Seminar Hall, ASIET,

The seminar began with a welcome address by Dr. Ajay Kumar, the Head of the Department of ECE, who greeted the students and introduced the speaker for the seminar.

The event was inaugurated by Dr. Sree Priya, the Principal of ASIET. She enlightened the students about the latest inventions of the present era and emphasized the importance of observing the world's problems and finding practical solutions to them. Her speech aimed to inspire the students to become innovative problem-solvers.

Following the inauguration, Dr. P. Jenopaul, the IPR (Intellectual Property Rights) cell coordinator at ASIET, conducted the seminar on IPR awareness for women. He shared his experiences and expertise in providing new solutions to various problems. Specifically, he focused on providing information on how to file patents for electronics circuits and integrated chips at the patent office. This session aimed to raise awareness about intellectual property protection and the process of patent filing.

A total of 37 students from the ECE department participated in the seminar, which provided them with valuable insights into the field of patent awareness and its importance in the electronics industry.

Overall, the seminar organized by ASIET aimed to educate the students about patent-related aspects of layout design for semiconductor integrated circuits and encourage them to explore innovative solutions in their future endeavors.

BRAHMA 2023

Brahma 2023 conducted on March 30, 31 and April 1 showcased a wide variety of both technical and cultural events .Students from across the nation participated in the festival with more than 50 events with a total of cash prize of 6 lakhs. Including thrilling competitions, exciting events, dynamic workshops, captivating live concerts and electrifying DJ night, Brahma'23 was indeed a spectacle.

The first day of Brahma commenced with thyagarajaradhana, tribute to the great maestro of Carnatic music .Thyagaraja and his contemporaries, Shyma Shastri and Muthuswami Dikshitar, were regarded as the trinity of Carnatic music. Followed by the performance, the events kick started with Voice of Brahma creating an ethereal atmosphere of music that left an invigorating mark on the listeners. Other highlights of the day were Rhythm which showcased beauty of percussion instruments, Stand up comedy, Spot light –Cinema workshop, Maven-best manager, Game of rooms, Fun zone, Air Assault-paintball, Go kart Museum, JAM, Spot photography and 3D printing workshop. The day ended with Shinkari melam followed by Theme show where creativity met style.

The second day began with Mudhra, where every movement told a story and every performance, a breathtaking display of skill and artistry. Followed by Band of Brahma , the ultimate battle of bands sparking a musical euphony. Doodle Art, Raagam a classical treat of vocational expression, Hisoka –Mime competition, RJ Hunt, Cryo laboratory, Warren-Maze game, Cluescape-The hunt, Soapy Soccer, Glow Ball, Fifa Versus, IoT Workshop and Arduino Workshop were the feature events of the day.

The day ended with Groove N Move – Choreo Night with electrifying dance performances.

The Final day included Rap Battle building every note to beat, Hip Hop Hustle, Street Show, Ditto –Step N Syncro, Renegade-DJ War, AALEKH –Mural painting work shop, Canine Inferino, Knives Out- Crime Scene ,Underarm Cricket , Strike 3- Basketball 3's,Brain Cycle ,Film Paradiso-ShortFilm contest ,Web Design and Development Workshop and CNC Workshop.

The jamboree came to a celebratory ending with Pro Shows lined including India's top leading band PRAGATHI featuring playback singer K.S Harishankar and Romeo Blanco with his thunderous DJ night.

BRAMHA'23 was an amalgamation of technology, art, and fun indeed invoking the creator within one. It's not just a fest, but an emotion and legacy of Adi Shankara. Completed with top-hole technical and non-technical workshops to strengthen our intellect, a platform of intriguing games and competitions to arouse adroitness and extremely dynamise Pro Shows to captivate ecstasy, BRAHMA'23 was exhilarating and indelible.

CONGRATULATIONS

NPTEL CERTIFICATIONS

JAIMY JAMES
Principles of signals and systems

NEETHA K
Evolution of air interface towards 5G

VYSAKH PRADEEP
Deep Learning

SEREEN SABU
Deep Learning

SREELAKSHMI PM
Principles of signals and systems

AMRUTHA V
Introduction to embedded system design

ANJANA RAVEENDRAN
Introduction to embedded system design

PLACEMENTS

D KEERTHANA PRASAD

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VISWESH PARAMESHWARAN

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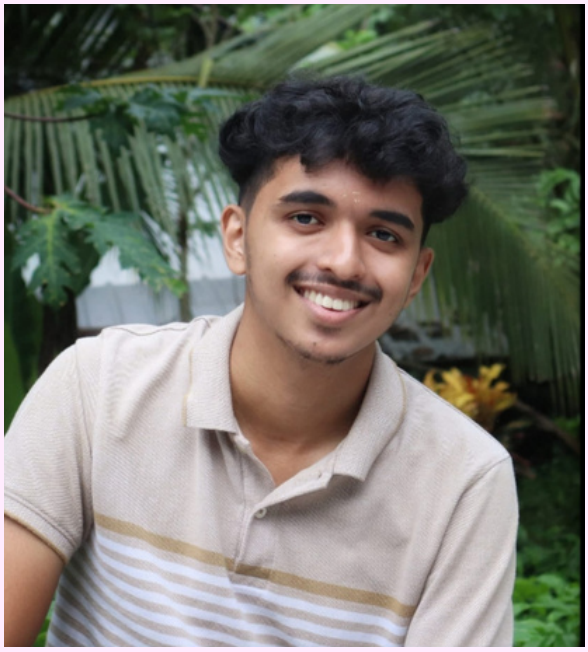


Abhijith surendran

Codelynks Software Solutions Pvt Ltd

BIDDING ADIEU

We would like to take a moment to acknowledge the departure of two esteemed members of our department, **Ms. Anjana S** and **Ms. Anjana J G**. We are grateful for the invaluable knowledge, guidance, and mentorship they have provided to our students. You have touched the lives of countless students, leaving a lasting impact that will be cherished for years to come. As you embark on a new chapter in your career, we want to extend our heartfelt congratulations and best wishes.

WARM WELCOME

We are thrilled to introduce and warmly welcome our newest additions to the teaching team at the Department of Electronics and Communications Engineering. These talented individuals bring a wealth of experience, passion, and dedication to our department, and we are excited to have them join our team.

Reshma Lakshmanan

Dr. Anagha E G

INDUSTRIAL VISITS

Embarking on exciting excursions, our students crafted unforgettable memories. From witnessing cutting-edge industries to exploring scenic destinations, each moment etched a lasting impression. Collaborative learning, laughter-filled conversations, and bonding experiences makes industrial visits truly a memorable experience.

BATCH 2020-24 : Rainbow - Led, Pipes, water tank : PVC industry in Manipal, Karnataka.

BATCH 2021-25 : Milma , MRCMPU ltd., Kalpetta, Wayanad

BATCH 2022-26 : Kannan Devan Tea Factory , Munnar

STAFF ZONE

QCA Technology

Anju George, Assistant Professor
ECE DEPT.

The growth of electronic industry is possible due to the invention and developments of CMOS technology. Due to its small size and compatibility, small sized circuits and devices are constructed. But when the electronic industry starts to grow, the number of transistors on a chip increases rapidly, thereby device density and operation frequency increases much faster, so power dissipation becomes a major concern. Also for the development of small sized devices the channel length of CMOS reduced, which introduces different short channel effects. Under these size considerations, there is a need to shift from CMOS technology. A number of alternatives such as carbon nanotubes, resonant tunneling devices, single electron devices and Quantum dot Cellular Automata (QCA). Among these Quantum dot Cellular Automata is one of the new emergent technology. QCA is a cellular type of design which consumes low power and low area.

Introduction

QCA is a cellular based design. It was developed by C.S lent [1] in 1993. The basic element in QCA technology is the QCA cell. A QCA cell consists of four potential wells and two electrons. These two electrons are localized in any two diagonally opposite potential wells. The electron tunnelling is possible due to the presence of tunnel junctions in a cell. Only the charges are shifted from one cell to the other, not the electrons. The shifting of charges is in accordance with the Columbic law of attraction.

QCA technology has more advantages than CMOS technology due to its attractive features like, fast speed, small area and low power consumption. Especially in situations where CMOS faces challenges to survive in submicron ranges. When the device sizes are scaled down to nanometer, the length of the channel of CMOS will be reduced. It diminishes oxide thickness and thereby arises various short channel effects. Comparing to all these effects, QCA has more advantages.

1. Basics of QCA

A. QCA Cell

The basic element in QCA is a QCA cell. It is a square nano structure, which consists of four quantum dots (quantum wells). The schematic diagram of a QCA cell is shown in Fig. 1

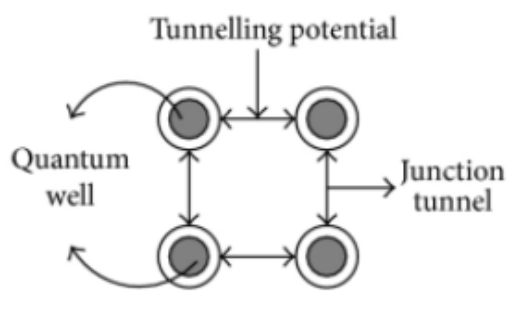


Fig .1. QCA cell

Exactly two electrons are located in a cell. According to Coulomb's law of interaction like charge repels and unlike charges attract each other. Due to this exactly two electrons are occupied in a cell. And these electrons always occupy the diagonal position (because electrons are negatively charged, so if they locate at adjacent positions they repel each other).

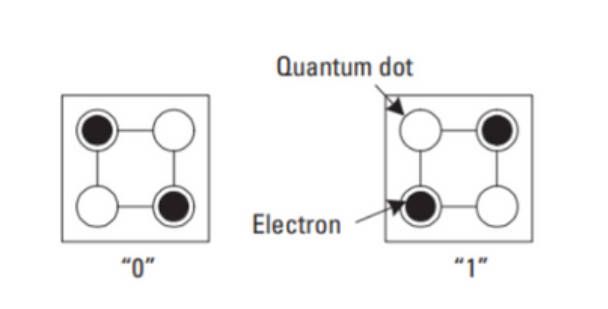


Fig.2. (a) P= +1 (b) P= -1

Depending on the locations of the electrons in the cell, the cell has two polarizations (P). One is P= +1 and the other is P= -1. The polarization of the cell is shown in Fig. 2 (a) and (b).

The polarization of the cell is determined by using the equation (1).

$$P = \frac{(P1 + P3) - (P2 + P4)}{P1 + P2 + P3 + P4}$$

For that the dots are numbered from dot on the top right corner and goes in clockwise direction. Top right dot i=1, bottom right dot i=2, bottom left dot i=3 and top left dot i=4. The numbering order of QCA cell is shown in Fig. 3.

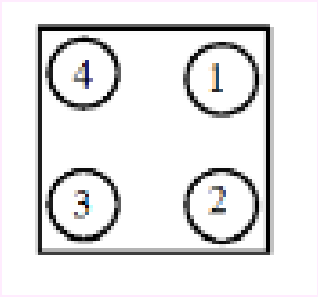


Fig. 3. Polarization numbering order

Cell polarization P= +1 represents a binary 1, while cell polarization P= -1 represents a binary 0.

B. QCA Wire

QCA wire is used for the propagation of logic '0' and logic '1' from input side to output side [2]. It is possible due to the Columbic interaction between cells. A QCA wire is shown in Fig. 4, which shows a 90-degree QCA wire.

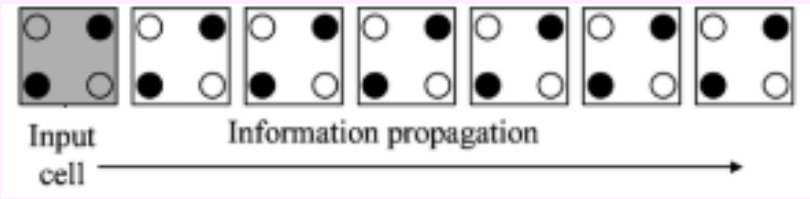


Fig. 4. Binary wire – 90 degree [3]

Initially the electron repulsion caused by Columbic interaction between cell 1 and cell 2 will cause cell 2 to change polarization. Then the electron repulsion between cell 2 and cell 3 will cause cell 3 to change polarization. This process will continue down the length of the wire.

Another type of QCA wire is 45-degre QCA wire. It is shown in Fig. 5.

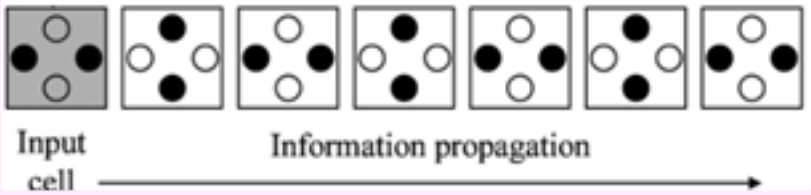


Fig.5. Binary wire- 45 degree [3]

C. QCA Clock

QCA circuits need clocks to operate correctly. Transitions in QCA occur under the influence of potential barriers between the quantum dots in QCA cell. QCA clocks help to lower and raise the tunnelling barriers. Clocking not only controls data flow, but also serves as power supply[4]. There are four clocks in QCA. Each of these clocks have 90 degree phase shift from each other. The four different clocks are shown in Fig. 6.The four different clock phases are switch, hold, release and relax.

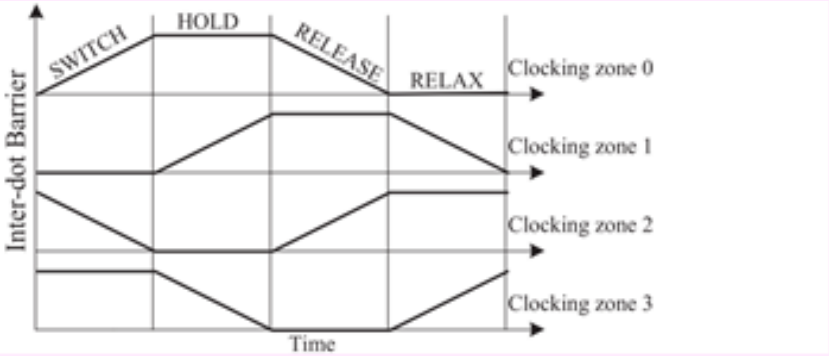


Fig.6. Clocking in QCA [4]

The first clock phase is known as switch phase. In this phase QCA cell begins to unpolarized and their interdot potential barriers are low. The barriers are then raised during this phase and the QCA cells become polarized according to the state of the input cell. At the end of this phase barrier are high enough to suppress any electron tunnelling, so cell states are fixed.
The second clock phase is known as hold phase. In which the barriers are also high, so the output from the first clock array is passed to the next phase. In the third clock phase, known as release phase, barriers are lowered and cells are allowed to relax to an unpolarized state. Finally, during the fourth clock phase, known as relax phase the cell barriers remain lowered and cells remain in an unpolarized state [4].

D. Logic Gates in QCA

Basic elements in QCA is an inverter and majority gates. Fig. 7 shows an inverter. In an inverter if the input is 1 then the output is zero and vice versa

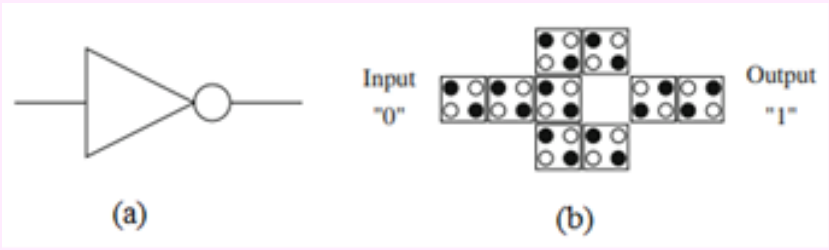


Fig.7. Inverter (a) Symbol (b) QCA inverter [2]

Majority gate gives the output from the majority of its inputs. For example if the input applied to the majority gate is '101' the output is '1', which is the majority number from the '101'.
A three input majority gate is shown in Fig. 8. It consists of 5 QCA cells, the central cell, known as decision cell, determines what would be the output by comparing all inputs. The equation for 3 input majority gate is given in equation (2).

M(A,B,C) = AB+ BC+ AC

The 3- input majority gate is given below.

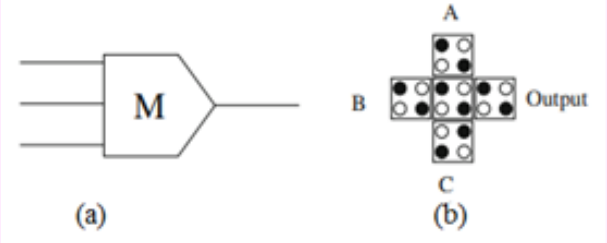


Fig.8. (a) Symbol
(b) QCA representation [2]

Truth table of the 3-input majority gate is given in table 1

Table 1: Truth table of 3-input majority gate

A	B	C	Output
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

Like 3-input majority gate there is also 5-input majority gate. It has 5 inputs and the output is the majority of these 5 inputs. A 5-input majority gate is shown in Fig. 9.

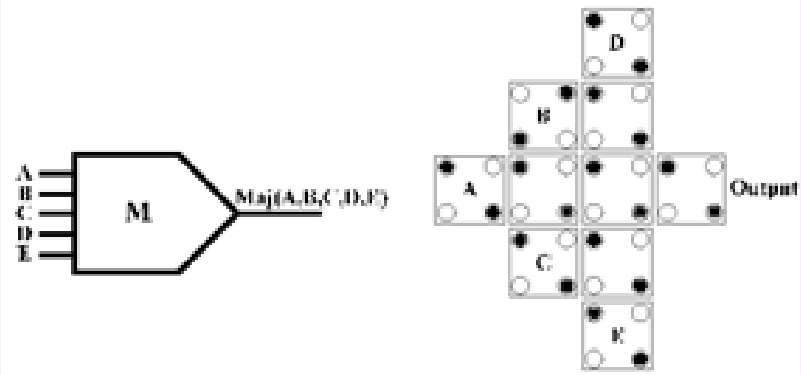


Fig.9. (a) Symbol (b) QCA representation [2]

Truth table for 5-input majority gate is given in table 2.

Table 2: Truth table for 5-input majority gate

SUM (A,B,C,D, E,F)	MAJ(A,B,C,D, E,F)
0	0
1	0
2	0
3	1
4	1
5	1

Equation for 5-input majority gate is given in equation (3)

M(A,B,C,D,E,F)=ABC+ABD+ABE+ACD+ACE+ADE+ BCD+BCE+BDE+CDE (3)

All other basic gates like AND gate, OR gate, NAND gate, NOR gate, etc. can be designed by giving small changes in the input of the 3-input majority gate.

(i)AND Gate:

AND gate can be designed by setting one of the inputs of 3-input majority gate to zero. It is shown in Fig. 10. Equation for AND gate is:

M (A, B, 0) = AB

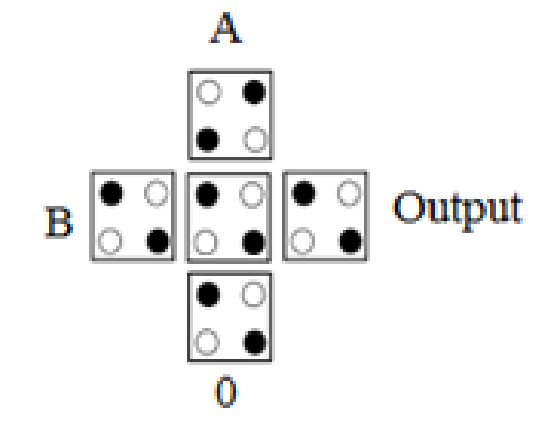


Fig.10. AND gate

(ii) OR Gate:

OR gate can be designed by setting one of the inputs of 3-input majority gate to one. It is shown in Fig. 11. Equation for OR gate is :

M (A, B, 1) = A+B

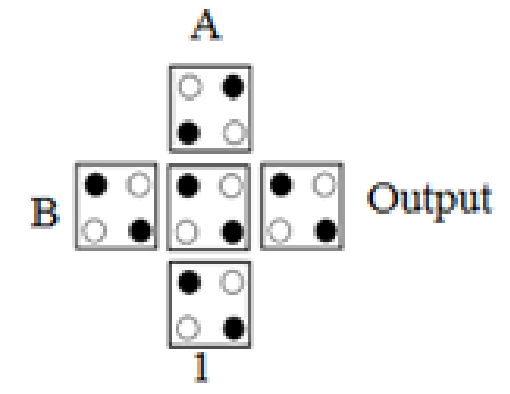


Fig.11. OR gate

(ii) OR Gate:

OR gate can be designed by setting one of the inputs of 3-input majority gate to one. It is shown in Fig. 11. Equation for OR gate is :

M (A, B, 1) = A+B

Similarly by giving inverter to the output of AND gate we get NAND gate and by giving inverter to the output of OR gate, we get NOR gate.

The research is expected to identify potential applications of QCA technology, including its use in high-speed computing, secure communication, and low-power electronics. The study will also identify the challenges that need to be addressed to make QCA technology commercially viable, such as manufacturing scalability, device integration, and cost-effectiveness. The study will provide insights into the potential of QCA technology and the areas where further research is needed to fully realize its potential.

The potential of QCA technology to revolutionize computing is immense, but further research is needed to fully understand its potential and to address the challenges that need to be overcome to make this technology commercially viable

STUDENT ZONE

Intelligent Transportation Systems: Integrating technology for efficient mobility.

Titya Ramchandran
S6 ECB

Intelligent Transportation Systems (ITS) have ushered in a new era of transportation, redefining how we navigate our increasingly complex and congested world. By leveraging advanced technologies, data analytics, and connectivity, ITS has the power to transform our roads, enhance safety, reduce congestion, and improve overall mobility. With more and more vehicles hitting the roads, adding more pollution and congestion, severely affecting the productivity of our society, it's the need of the hour to utilize technology in promoting smarter, cleaner and efficient mass mobility systems. We will explore the various technologies that underpin ITS and examine noteworthy examples from cities like Singapore, the United States, London to draw inspiration from.

Intelligent Transportation Systems refer to the application of technology, communication networks, and data analyticsto improve various aspects of transportation. It encompasses a wide range of technologies and solutions designed to enhance mobility, efficiency, and safety in transportation systems.

1.Sensing Technologies:
Sensing technologies play a crucial role in gathering real-time data and providing a comprehensive understanding of traffic conditions. These technologies include:

- Traffic Sensors: These sensors, such as inductive loops, microwave radar, and infrared detectors, monitor vehicle movement, volume, and speed, providing critical data for traffic management and optimization.

- Vehicle Detection Systems: Technologies like automated license plate recognition (ALPR) and video analytics enable the identification and tracking of vehicles, contributing to various applications, including toll collection, traffic enforcement, and congestion management.

2. Communication Technologies:
Communication infrastructure forms the backbone of ITS, facilitating the exchange of data between different components of the transportation system. Key communication technologies include:

- Dedicated Short-Range Communication (DSRC): DSRC enables vehicle to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication, allowing vehicles to exchange information about traffic conditions, accidents, and other vital data.

- Cellular Networks: Utilizing cellular networks, ITS can transmit real-time traffic information, traveler alerts, and navigation data to drivers and connected vehicles.

3.Data Analytics and Artificial Intelligence (AI):
Data analytics and AI are integral to extracting valuable insights from the vast amount of data collected by ITS. These technologies enable:

- Traffic Flow Analysis: By analyzing traffic patterns, historical data, and real-time information, AI algorithms can predict and optimize traffic flow, minimizing congestion and improving travel times.

- Incident Detection and Management: AI-powered systems can detect incidents such as accidents, road hazards, and breakdowns, facilitating rapid response and efficient incident management.

- Predictive Maintenance: By analyzing vehicle sensor data, AI algorithms can predict maintenance needs, optimizing vehicle performance, and reducing downtime.

Benefits of Intelligent Transportation Systems:
1. Improved Traffic Management and Congestion Reduction:
- Real-time traffic monitoring and prediction for efficient route planning.
- Dynamic traffic signal control to optimize signal timings and reduce congestion.
- Intelligent rerouting based on live traffic data to minimize travel time

2. Enhanced Safety and Security:

- Incident detection and management systems for quick response and emergency services.
- Integration of surveillance systems and advanced driver assistance for accident prevention.
- Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V21) communication to avoid collisions.

3. Efficient Public Transportation:

- Real-time transit information, including arrival times and service disruptions.
- Integrated fare payment systems for seamless multi-modal journeys.
- Optimization of public transportation routes to improve efficiency and reduce waiting times.

4. Environmental Sustainability:

- Traffic flow optimization to minimize fuel consumption and greenhouse gas emissions.
- Promoting eco-friendly transportation modes like electric vehicles and shared mobility services.
- Smart parking systems to reduce urban congestion and associated pollution.

Examples of Intelligent Transportation Systems

1. Singapore: The Smart Nation Approach

Singapore has long been at the forefront of implementing intelligent transportation solutions. The city-state's approach involves an integration of multiple ITS technologies, including:

- Electronic Road Pricing (ERP): Singapore's ERP system uses gantries and in-vehicle units to implement dynamic tolls based on real-time traffic conditions, reducing congestion and encouraging off-peak travel.

- Real-Time Traffic Management: The city's Traffic Management Centre uses data from sensors, surveillance cameras, and GPS devices to monitor traffic conditions and optimize signal timings, ensuring smooth traffic flow.

An electronic signboard displays estimated travel times to the key expressway exits based on real-time vehicle volume,
to help drivers make informed route choices

- Mass Rapid Transit (MRT) System: Singapore's MRT system serves as the backbone of its public transportation network. ITS solutions have been integrated into the MRT system to improve efficiency, safety, and passenger experience. Automated train control system sensure precise train movements, reducing delays and increasing capacity. Real-time information on train arrivals, service disruptions, and alternative routes are readily available to commuters. Singapore's bus stops are also equipped with digital displays that provide real-time information on bus arrival times.

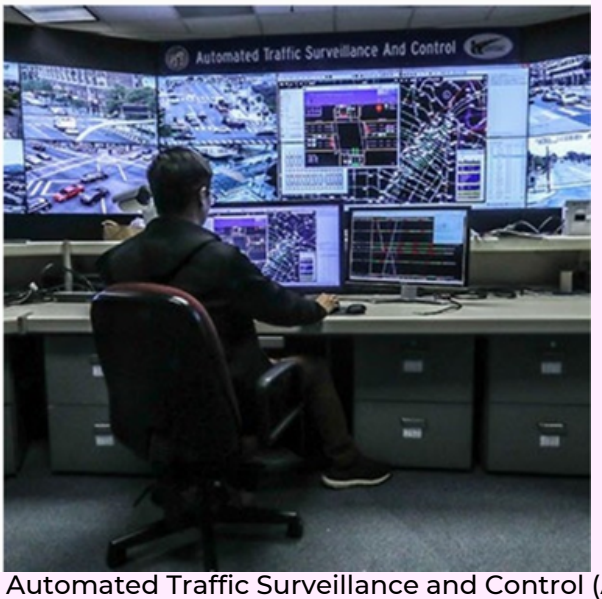
Additionally, Singapore's public transit system embraces contactless payment methods such as EZ-Link and NETS Flash Pay cards, enabling passengers to pay for their journeys across various modes, including buses, trains, and taxis, with a single card. These integrated mobility platforms provide convenience, efficiency, and a unified experience for commuters.

By tapping their EZ-Link cardsat Green Man+ traffic light posts, the elderly or pedestrians with disabilities get more time to cross roads

- Autonomous Vehicles: Singapore is piloting autonomous vehicles to provide first-mile/last-mile connectivity and enhance transportation accessibility. Trials and pilot projects are being conducted in various parts of the city, focusing on applications such as autonomous shuttles, last-mile deliveries, and mobility solutions for the elderly and disabled .Centre of Excellence for Testing and Research of AVs (CETRAN) has established test bed in Singapore to allow AVs to navigate complex urban environments, optimizing their performance and safety.

2. United States: Innovations in Traffic Management

- The United States has been actively adopting ITS to improve traffic management and safety. Noteworthy examples include:
- Dynamic Message Signs (DMS): These electronic signs provide real time information on traffic conditions, incidents, and alternative routes to guide drivers and reduce congestion. They are extensively used on highways across the country.
- Advanced Traffic Management Systems: Cities like Los Angeles and New York have implemented advanced traffic management systems that utilize real-time data and AI algorithms to optimize traffic signal timings, improving traffic flow and reducing delays.



Automated Traffic Surveillance and Control (ATSAC) system monitors real-time traffic conditions in Los Angele.

- Connected Vehicle Technology: The U.S. Department of Transportation has been conducting research and trials on connected vehicle technology, enabling vehicles to communicate with each other and with infrastructure, enhancing safety and efficiency.

3.London: Enhancing Public Transportation:

London, one of the world's largest and busiest cities, has embraced ITS solutions to tackle congestion and improve transportation services. The city's innovative Congestion Charge scheme aims to reduce traffic within the city center by charging vehicles entering the zone during peak hours. The system employs automatic number plate recognition (ANPR) cameras and online payment portals, efficiently managing traffic flow while encouraging the use of public transportation.

London's extensive public transportation system is also augmented by real-time information systems. The Transport for London (TfL) network provides live updates on bus, subway, and train services, enabling commuters to plan their journeys and avoid disruptions. Additionally, the city has introduced cycle hire schemes, such as Santander Cycles, providing an alternative mode of transportation and promoting eco friendly mobility.

4.Copenhagen: Cycling Paradise Enhanced by ITS

Copenhagen, renowned as a cycling paradise, has integrated ITS to further enhance its bike-friendly infrastructure. The city employs smart traffic signals that detect the presence of cyclists, prioritizing their movement and ensuring smoother cycling experiences. Furthermore, Copenhagen's bike-sharing system, Bycyklen, incorporates GPS technology and touchscreen interfaces on its bicycles, allowing users to navigate the city easily and access information on bike routes, points of interest, and local amenities.

The city also utilizes ITS for parking management. Sensors embedded in parking spaces provide real-time data on parking availability, enabling drivers to locate empty spots quickly. Moreover, dynamic messaging signs guide drivers to available parking facilities.

Intelligent Transportation Systems (ITS) have immense potential to transform Kerala's transportation landscape as well by improving efficiency, safety, and sustainability. By drawing valuable lessons from successful ITS implementations in areas with similar road and crowd dynamics as we saw above, Kerala can develop a roadmap that caters to its fast-paced mobility needs. The implementation of intelligent AI-based surveillance cameras across the state is already bringing in a new wave of efficient surveillance to ensure road safety, and we are gradually witnessing the integration of technology to enhance transportation. With numerous undertakings by Kochi Metro, including smart integrated modes of transportation such as metro, water metro, and feeder bus services running efficiently, the implementation of an intelligent transportation system across the state does not seem far-fetched. Through strategic planning, strong collaboration, and a user-centric approach, Kerala can embrace intelligent transportation systems to create a smarter, cleaner, and more efficient transportation network for its residents and visitors.

ACHIEVEMENTS

STAFF ACHIEVEMENTS

Divya V Chandran
Assistant Professor

- Reviewer and TPC member for the International Conference on Paradigms of Communication, Computing and Data Analytics (PCCDA-23) organized by Soft Computing Research Society

Aswathy N
Assistant Professor

- Attended Short Term Training Program (STTP) IEEE conference Organizers workshop on 25th March 2023 organized by IEEE Kerala Section

Neethu Suman
Assistant Professor

- Attended Faculty Development Program(FDP) Recent Advancements in Data Intelligence and it's Applications 24th to 28th April 2023 organized by Jyothy Institute of Technology and Visvesvaraya Technological University

NEETHA K
Assistant Professor

- Attended Faculty Development Program(FDP) Advances In Communication Engineering 6/03/2023-10/03/2023 organized by Viswajyothi College of Engineering and Technology
- Completed Online certification for NPTEL course on Evolution of Air Interface Towards 5G

Jaimy James Poovely

- Completed Online certification for NPTEL course on Principles of signals and systems

STUDENT ACHIEVEMENTS

Student Batch	Student Name	Title of Course attended	Conducted By	Date
2022-26	ANAMIKA SIBI	Arduino workshop	IEEE	3/31/2023
2022-26	ALWIN ELDHOSE	Arduino workshop	IEEE	3/31/2023
2022-26	GREESHMA RAJEEV	Arduino workshop	IEEE	3/31/2023
2022-26	ATHULYA SOMAN	Arduino workshop	IEEE	3/31/2023
2022-26	DEVANGANA G	IOT workshop		3/31/2023
2022-26	ADITHYA SREEJITH	Mobile development	John	5/16/2023
2020-24	VYSAKH PRADEEP	Deep Learning - IIT Ropar	NPTEL	5/16/2023
2020-24	SEREEN SABU	Deep Learning	NPTEL-IIT Ropar	5/16/2023
2020-24	SREEJITH P R	ELECTRIC VEHICLE FOUNDATION	Reynlab through Techmaghi	4/20/2023

Student Batch	Student Name	Title of Course attended	Conducted By	Date
2020-24	ANJANA RAVEENDRAN	Introduction to Embedded system Design	NPTEL	4/29/2023
2021-25	SREELAKSHMI P M	Principles of signals and systems	NPTEL	4/29/2023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