



**Department of Computer Science and Engineering**



# **MAGAZINE**

**Volume-11**

**December 2020**

**Meerut Institute of Engineering and Technology  
N.H. 58, Delhi-Roorkee Highway, Baghat Bypass  
Road Crossing, Meerut, Uttar Pradesh 250005**



### **Vision of Department**

“To be an excellent department that imparts value based quality education and uplifts innovative research in the ever-changing field of technology.”

### **Mission of Department**

1. To fulfill the requirement of skilled human resources with focus on quality education.
2. To create globally competent and socially responsible technocrats by providing value and need based training.
3. To improve Industry-Institution Interaction and encourage the innovative research activities.

### **Program Education Objective**

**After five years of graduation students will:**

**PEO 1:** Students will have the successful careers in the field of computer science and allied sectors as an innovative engineer.

**PEO 2:** Students will continue to learn and advance their careers through participation in professional activities, attainment of professional certification and seeking advance studies.

**PEO 3:** Students will be able to demonstrate a commitment to life-long learning.

**PEO 4:** Students will be ready to serve society in any manner and become a responsible and aware citizen.

**PEO 5:** Establishing students in a leadership role in any field.



## Program Outcomes

Engineering Graduates will be able to:

- 1. Engineering Knowledge :** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



## Faculty Development Program

Increasing internationalization in teaching is strongly supported by the Indian education sector and is considered vital for Indian institutions in developing India's capacity in research and innovation, driving up India's institutional ranking and increasing the quality of teaching and learning. Thus, enhancing the academic and intellectual environment in the institutions by providing faculty members with ample opportunities to pursue research and also to participate in seminars / conferences / workshops has become vital for developing nations like India. Participation in such programs would enable faculty members to update their research and pedagogical skills. Higher education institutions are starting to adapt and respond to professionals already in employment, mature learners and the demand from students enrolled for skills for employability programs. With the aim of equipping faculty members with required skills and knowledge, MIET Meerut pursues the Faculty Development Program as its primary objective.

### 1. CLOUD TECHNOLOGY

Cloud Technology program was conducted on 2<sup>nd</sup> November to 6<sup>th</sup> November 2020 by Government Engineering College Gandhinagar, Gujarat. Our department faculty members Mr. Abhishek Kumar was trainee of the program. Cloud Technology program was conducted on 16<sup>th</sup> November to 20<sup>th</sup> November 2020 by AICTE Training And Learning (ATAL) Academy. Our department faculty members Mrs. Pragya Gaur was trainee of the program.



### 2. CYBER SECURITY

The program was organized on 24<sup>th</sup> August to 28<sup>th</sup> August 2020 by AICTE Training And Learning (ATAL) Academy. Objective of this program to aware the faculties members about cyber security. Our department faculty Mr. Sanjay Sonkar participated in program.

### 3. DATA SCIENCES

The program was organized on 1<sup>st</sup> December to 5<sup>th</sup> December 2020 by Meerut Institute of Engineering & Technology, Meerut. Objective of this program to aware the faculties members about data science future scope. Our two faculties Dr. Aanjay Mani Tripathi and Mr. Rohit Aggrawal participated in program.

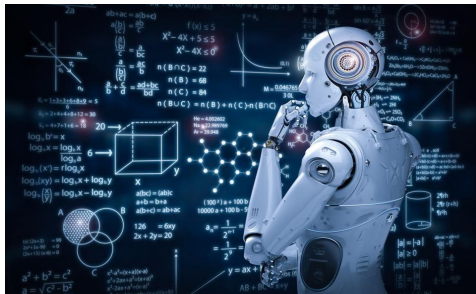




## Faculty Development Program

### 4. NATIONAL EDUCATION POLICY FOR HOLISTIC EDUCATION AND INSTITUTIONAL RANKING

The program was organized on 10<sup>th</sup> December to 12<sup>th</sup> December 2020 by Deptt. Of Civil Engineering, Meerut Institute of Engineering & Technology, Meerut in association with the Internal Quality Assurance Cell (IQAC), MIET, Meerut. Our faculty Mr. MD Iqbal and Ms. Vaishali Malik participated in program to enhance the knowledge about this



### 5. MACHINE LEARNING AND APPLICATION

The program was organized on 29<sup>th</sup> June to 3<sup>rd</sup> July 2020 by AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD. Objective of this program to enhance the knowledge of faculties members about machine learning and application of Machine Learning. Our faculty Ms. Vani Rastogi enhance the knowledge by participated in this program.

### 6. Design, Simulation & Measurement of Different types of Antenna for 5G Applications using HFSS

The program was organized on 2<sup>nd</sup> November to 4<sup>th</sup> November 2020 by Deptt. of Electronics & Communication Engineering, Meerut Institute of Engineering & Technology, Meerut in collaboration with Entuple Technologies, Bangalore. Our department faculty MD Iqbal enhance his knowledge.



### 7. Cybersecurity Infrastructure Configuration

The program was organized on 23<sup>rd</sup> November to 1<sup>st</sup> December 2020 by ICT Academy association With Paloalto Networks. Objective of this program to enhance the knowledge of faculty members about Cybersecurity Infrastructure Configuration.



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## UDYAT EVENTS



# Webinar on Higher Studies



(Organize By Department of CSE)

### What you get:-

1. Importance of Higher Studies
2. How to prepare for Higher Studies



Date :- December 13, 2020  
Time :- 03:00 PM  
Virtual Meetup

Webinar link :- <https://zoom.us/j/91086241313>

**Harshit Sachdeva**

(Application Developer at IBM)

#### Innovation Ambassadors:- | Student Coordinator:-

Dr. Vimal Kumar(Adviser) | Samarth Anand (Udyat Secretary)

Dr. Mukesh Rawat (Mentor) | Gehna Malik (Udyat Vice Secretary)

#### For Details Contact:-

Samarth Anand (7060226350)



# SALESFORCE WORKSHOP



## Online Webinar on Google Meet

### Highlights:-

- How to get Certified and Placed in Salesforce Ecosystem.



**Shubhangi Gupta**  
(Salesforce Campus Ambassador)

**Date: 8<sup>th</sup> November 2020**

**Day: Sunday**

**Time: 01:00pm to 02:00pm**

**For Details Contact: Shubhangi Gupta(Udyat Member) "8755952693"**





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GROUP OF INSTITUTIONS

UDYAT EVENTS



# Webinar on Deep Learning

(Organize By Department of CSE)

What you get:-

1. Motivation from Alumni
2. How they start their Career

Date :- November 25, 2020

Time :- 12:00 Noon

Virtual Meetup



**Vishal Yadav**

(Technology Analyst at Barclays  
Investment Bank, Glasgow, UK)

Webinar link :- <https://meet.google.com/qpf-fnhr-y mo>

Innovation Ambassadors:- | Student Coordinator:-

Dr. Mukesh Rawat (Mentor) | Samarth Anand (Udyat Secretary)

Dr. Vimal Kumar (Adviser) | Samarpan Jain (Udyat Member)



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## UDYAT EVENTS



# WEBCRAFTY CREW



It's time to be innovative...



### Instructions:-

- \* Individual entry.
- \* Open book event & topics will be provided on the spot.
- \* Participation certificates.
- \* Non-MIETians can also participate.
- \* WordPress & Bootstrap is not allowed.
- \* Date :- 18 October 2020
- \* Timing :- 11 A.M to 2 P.M

Entry Fee :-  
Rs. 40

"Rs. 5000+"  
CASH PRIZE  
+  
Internship to  
the top 3

Scan QR to register -



\* Pay on 7983721001 through  
PAYTM only.



\* Contact Details :-

- Samarpan Jain(8941837344)
- Arnav Jain (7983721001)





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UDYAT EVENTS



# Webinar On BlockChain & Its use cases



Discussions :-

1. Overview of BlockChain
2. Its Practical Approach



Speaker :-

Dr. Vinay Singhal  
Mr. Vijay Sharma  
Mr. Syed Naushad Imam

For Details Contact:-  
Samarth Anand | Dr. Mukesh Rawat  
Gehna Malik | Udyat Mentor

Joining Link :-

<https://zoom.us/j/97770183287>

Date :- November 5,2020  
Timing :- 2:45 to 4:45 PM



# Get Ready for Innovative Talks

(Organize By Department of CSE/IT/MCA)



What you get:-

1. Motivation from Alumni
2. How they start their Career

Date :- October 19,2020  
Time :- 10:30 AM  
Virtual Meetup

Webinar link :- <https://zoom.us/j/96370198529>  
Dr. Shashwat Pathak(Head Innovation Cell)



**Nishant Sharma**  
CTO and  
Cofounder of Opdemy



**Vidit Bhatia**  
Data Scientist  
At Adobe



**Vikas Upadhaya**  
Security Analyst  
At Confidential



**Mudit Bansal**  
Member at  
OWASP Meerut and  
CScodershub

Innovation Ambassadors:-

Dr. Mukesh Rawat  
Dr. Vimal Kumar



Student Coordinator:-

Samarth Anand  
Gehna Malik



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## UDYAT EVENTS



### Awareness Session on Intellectual Property Rights and its Relevance for Science and Technology Students

Organized By:  
Atal Community Innovation Center MIET Meerut  
Foundation

MIET Innovation Cell  
MIET Incubation Forum

WENN  
IEC-MIET  
UDYAT

Date: 28<sup>th</sup> Dec.2020 Time: 13:30 PM -14:30 PM  
Over Google Meet Platform

### Distinguished Speakers



**Mr. Sandeep Singhai**  
Principal Scientist & IPR  
Coordinator, CSIR-CSIO



**Ms. Akanksha Singh**  
Project Associate  
CSIR-CSIO



**Guest of Honor**  
**Dr. Muthu Singaram**  
CEO, HTIC-IIT Madras

[Register Now](#)



## Webinar On The Ease and Power of Python



### Discussions :-

1. Generic Session on Python
2. Scope of Python
3. Career Opportunities in Python



### Speaker :-



**Shagun Prakash**  
( Data Analyst in a  
Fortune 50 IT MNC )

For Details Contact:-  
Samarth Anand | Dr. Mukesh Rawat  
(7060226350) | Udyat Mentor

Date :- 26 July 2020  
Timing :- 1:00 PM



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### Students Achievement



**Elite**

## NPTEL Online Certification

(Funded by the Ministry of HRD, Govt. of India)



This certificate is awarded to

**HARSH GUPTA**

for successfully completing the course



### Enhancing Soft Skills and Personality

with a consolidated score of **93** %

Online Assignments	24.25/25	Proctored Exam	68.25/75
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Total number of candidates certified in this course: **2108**

**Prof. Rajesh M. Hegde**  
Chairman, Centre for Continuing Education  
IIT Kanpur

**Feb-Apr 2020**  
(8 week course)

**Prof. Satyaki Roy**  
NPTEL Coordinator  
IIT Kanpur



Indian Institute of Technology Kanpur



Roll No: NPTEL20HS10S10981816

To validate and check scores: <https://nptel.ac.in/noc>



## NPTEL Online Certification

(Funded by the Ministry of HRD, Govt. of India)



This certificate is awarded to

**HARSH GUPTA**

for passing the course

### Introduction to Industry 4.0 and Industrial Internet of Things

with Score\* **90** %



**Prof. Adrijit Goswami**  
Dean, Continuing Education & NPTEL Coordinator  
IIT Kharagpur

**Jan-Apr 2020**  
(12 week course)



Indian Institute of Technology Kharagpur



\*Continuous online assessment score

To validate and check scores: <https://nptel.ac.in/noc>



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## Students Achievement



**Elite**

# NPTEL Online Certification

(Funded by the Ministry of HRD, Govt. of India)



This certificate is awarded to

**AYUSH KUMAR**

for successfully completing the course



## Developing Soft Skills and Personality

with a consolidated score of **75** %

Online Assignments	23.71/25	Proctored Exam	50.82/75
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Total number of candidates certified in this course: **8393**

**Prof. Rajesh M. Hegde**  
Chairman, Centre for Continuing Education  
IIT Kanpur

Sep-Nov 2020  
(8 week course)

**Prof. Satyaki Roy**  
NPTEL Coordinator  
IIT Kanpur



Indian Institute of Technology Kanpur



Roll No: NPTEL20HS43S71950064

To validate and check scores: <https://nptel.ac.in/noc>



**Elite**

# NPTEL Online Certification

(Funded by the Ministry of HRD, Govt. of India)



This certificate is awarded to

**DIVYANSH SHARMA**

for successfully completing the course



## Developing Soft Skills and Personality

with a consolidated score of **76** %

Online Assignments	23.63/25	Proctored Exam	52.43/75
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Total number of candidates certified in this course: **8393**

**Prof. Rajesh M. Hegde**  
Chairman, Centre for Continuing Education  
IIT Kanpur

Sep-Nov 2020  
(8 week course)

**Prof. Satyaki Roy**  
NPTEL Coordinator  
IIT Kanpur



Indian Institute of Technology Kanpur



Roll No: NPTEL20HS43S71950072

To validate and check scores: <https://nptel.ac.in/noc>



## Faculty Certificates



05/29/2020

**Swati Jain**

has successfully completed

**Programming for Everybody (Getting Started with Python)**

an online non-credit course authorized by University of Michigan and offered through Coursera

Charles Severance  
Clinical Professor, School of Information  
University of Michigan

COURSE  
CERTIFICATE



Verify at [coursera.org/verify/J8TPJKKQLgHT](https://coursera.org/verify/J8TPJKKQLgHT)  
Coursera has confirmed the identity of this individual and  
their participation in the course.



## Faculty Certificates



**UNIVERSITY  
OF LONDON**

Aug 24, 2020

**ANURADHA TALUJA**

has successfully completed

**Probability and Statistics: To p or not to p?**

an online non-credit course authorized by University of London and offered through  
Coursera

*J. S. Abdey*

Dr James Abdey  
Assistant Professorial Lecturer, LSE  
University of London

**COURSE  
CERTIFICATE**



Verify at [coursera.org/verify/EDZ9N7RGJCS](https://coursera.org/verify/EDZ9N7RGJCS)

Coursera has confirmed the identity of this individual and their  
participation in the course.



## Faculty Certificates



University of Colorado

Boulder | Colorado Springs | Denver | Anschutz Medical Campus

Sep 20, 2020

# Vinod Kumar

has successfully completed

## Requirements Gathering for Secure Software Development

an online non-credit course authorized by University of Colorado System and offered through Coursera

Kristen Walcott-Justice  
Assistant Professor  
Department of Computer Science

COURSE  
CERTIFICATE



Verify at [coursera.org/verify/S6GE7NQLLQVR](https://coursera.org/verify/S6GE7NQLLQVR)

Coursera has confirmed the identity of this individual and their participation in the course.



Faculty Article

Editorial

TRANSPARENT NEWS 4

# The demand for IoT in Today's Digital World

In today's world, the most important thing is DATA and every business is depended on that data. And here comes the largest source of data and that is IoT. IoT generates huge bulk of data every second and that data is stored and operations are applied to it. Terabytes of data are being generated by IoT every second. The Internet of Things (IoT) refers to a vast number of "things" that are connected to the internet so they can share data with other things – IoT applications, connected devices, industrial machines, and more. Internet-connected devices use built-in sensors to collect data and, in some cases, act on it. IoT connected devices and machines can improve how we work and live. Real-world Internet of Things examples range from a

smart home that automatically adjusts heating and lighting to a smart factory that monitors industrial machines to look for problems, then automatically adjusts to avoid failures. IoT unites data, analytics, and marketing processes across locations. Retailers capture IoT data from in-store and digital channels and apply analytics (including artificial intelligence, or AI) for real-time, contextual listening, and to understand behavior patterns and preferences. They often use IoT connected devices like RFID inventory tracking chips, cellular and Wi-Fi systems, beacons, and smart shelves in their Internet of Things strategy. IoT connects all phases of the Industrial Internet of Things (IIoT) process – from



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Assistant Professor  
Computer Science &  
Engineering  
MIET, Meerut, U.P

supply chain to delivery – for a cohesive view of production, process and product data. Advanced IoT sensors in factory machines or warehouse shelves, along with big data analytics and predictive modeling, can prevent defects and downtime, maximize equipment performance, cut warranty costs, boost production yield and enhance the customer experience. IoT the

technology captures data streaming in real-time from the Internet of Medical Things (IoMT) – such as wearable's and other medical connected devices that monitor exercise, sleep, and other health habits. This IoT data enables precise diagnoses and treatment plans improve patient safety and outcomes, and streamlines care delivery. IoT with geo fence-enabled location intelligence and AI, deployed across the value chain, can deliver greater efficiency and reliability for transportation and logistics companies. This technology can improve service quality, reduce downtime, and boost customer satisfaction. It can also enhance safety and reduce costs by managing, tracking, and monitoring

connected vehicles, freight, and other mobile assets in real-time. IoT applications are used to address many real-world issues – traffic congestion, city services, economic development, citizen engagement, and public safety and security. Smart cities often embed IoT sensors into the physical infrastructure, such as streetlights, water meters, and traffic signals. The Internet of Things helps providers deliver reliable, fair-priced services and products. IoT connected devices and machines predict problems before they occur. Distributed grid resources like solar and wind are integrated through IoT. And behavior data – such as that collected from smart homes improve convenience and security and informs the development of customized services.





Faculty Article

Editorial

TRANSPARENT NEWS 4

Robots are contemplated as they will take away our jobs and us humans will not have any work to do. This belief is partially true because robots will take our places but there will be someone who will develop these robots, so humans will develop these robots. Robots do the work as they are programmed, they do not add their own creativity to complete any task. This power of creativity is only possessed by human beings so relax these bots will not overtake your jobs. As I mentioned these bots are developed by humans. Now here a question arises how these bots are developed?

## Building Bot using RPA (Robotic Process Automation)

Robots are contemplated as they will take away our jobs and us humans will not have any work to do. This belief is partially true because robots will take our places but there will be someone who will develop these robots, so humans will develop these robots. Robots do the work as they are programmed, they do not add their own creativity to complete any task. This power of creativity is only possessed by human beings so relax these bots will not overtake your jobs. As I mentioned these bots are developed by humans. Now here a question arises how these bots are developed?

is the combination of several technologies, brought together under one toolkit for different automation purposes. Though the term 'RPA' emerged in the early 2000s, the initial development was started after the 1990s. Machine Learning (ML) is one of those technologies that helped towards innovation, which eventually lead to the creation of RPA. In 1959, 'Arthur Samuel' developed Machine Learning. Machine Learning allowed computers to perform several critical tasks, such as translation and text summarization, etc. However, there were limits on how computers could process language. It led to the development of 'Natural Language Processing (NLP)', which helped computers to understand and process human language more accurately. In 1960, NLP combined 'AI (Artificial Intelligence)' for establishing the interactions between computers and human languages. Then, the technology progressed further towards the establishment of RPA, and there were few more developments in the 1990s. Because of the continuous developments, there was an emergence of technology that most



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Computer Science &  
Engineering  
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closely resembled RPA. The history of RPA tells that there were few key predecessors of Robotic Process Automation that are Screen Scraping, Image Recognition, Speech Recognition, Natural Language Generation, and Sentiment Analysis. Now you will think that how this technology added value in your work? The answer is simple to imagine you have to do a work in which you have to add people's details from the excel sheet you have the number of people is 10 then you will just copy-paste those details from excel to website one by one but if there are details of 1000 people? You have to burn the midnight oil to complete this task this task will take a full day or two. What if, you develop your bot and your task is completed in just a minute. So, isn't this a blessing? And not only 1000 people data you can work with lakh of

people details. The only skill you need is the skill to develop your own bot. Developing these bots is fun only you need is interest to develop these bots. RPA provides organizations with the ability to reduce staffing costs and human error. These bots are typically low-cost and easy to implement, requiring no custom software or deep system integration. Enterprises can also supercharge their automation efforts by injecting RPA with cognitive technologies such as Machine Learning, Natural Language Processing, and Speech Recognition, automating higher-order tasks that in the past required the perceptual and judgment capabilities of human. Many international companies like Tata Consultancy Services, Cognizant, Accenture, Capgemini, IBM, Tech Mahindra, Vodafone, HCL Technologies, Hewlett Packard Enterprise, Walmart and American Express Global Business Travel are among the many enterprises adopting RPA. According to the report, "TCS embraces automation throughout its own organization and across its customer base." It added, "TCS has deep technical

finesse and structured, mature approaches to assessing processes, identifying opportunities, developing CoEs (which it calls "automation factories") to industrialize RPA, and developing 'garages' to experiment with emerging RPA-adjacent technologies." The report goes on to say: "Firms looking for a partner with an integrated offering to support automation at scale should choose TCS." So, at last, it is concluded that this technology is emerging and RPA will generate large employment in the future where the responsibility will be Process Designer, Automation Architect, and Production Manager. Also, RPA has provided an excellent solution for organizations to replace repetitive, mundane, rule-based processes with software bots. It is now helping organizations who were looking to increase their workflow accuracy and efficiency. First, RPA was widely adopted in the IT sector. It amazed many big organizations as well as small and medium enterprises with outstanding results. Later, it was adopted in other sectors like Finance, Accounting, Banking, etc.



Faculty Article

# जिंदगी को बनायेगी आसान आर्टिफिशियल इंटेलिजेंस

हमारी दुनिया में कृत्रिम बौद्धिकता यानी आर्टिफिशियल इंटेलिजेंस (एआई) का दखल लगातार बढ़ता जा रहा है। आने वाले समय में कुछ भी घटने से पहले हम यह जान लेने में सक्षम हो जायेंगे कि आगे क्या होनेवाला है। आप बस सोचेंगे और आपका रोबोट रूपी मित्र आपकी जरूरतों को पूरा कर देगा। आर्टिफिशियल इंटेलिजेंस की तकनीक और इसके विभिन्न आयामों की जानकारी प्रस्तुत है आज के इन्फो-टेक में...

## बुलन्द वाणी/संवाददाता

**मेरठ।** हालिया वर्षों में आर्टिफिशियल इंटेलिजेंस (कृत्रिम बौद्धिकता) की तकनीक चर्चा में रही है। आर्टिफिशियल इंटेलिजेंस का काम बौद्धिक मशीनों बनाना है। आसान शब्दों में कहें, तो आर्टिफिशियल इंटेलिजेंस का अर्थ है एक मशीन में सोचने, समझने और निर्णय लेने की क्षमता विकसित करना। यह कंप्यूटर साइंस का सबसे उन्नत रूप है।

भारतीय संदर्भ में अगर बात करें, तो नीति आयोग और गुगल के बीच इसे लेकर सहमति बनी है कि हमारे देश में आर्टिफिशियल इंटेलिजेंस और मशीन लर्निंग के पारिस्थितिकी तंत्र को बढ़ावा दिया जायेगा। नीति आयोग को आर्टिफिशियल इंटेलिजेंस जैसी तकनीकें विकसित करने और अनुसंधान के लिए राष्ट्रीय कार्यक्रम तैयार करने की जिम्मेदारी सौंपी गयी है। यह तकनीक आज कई रूपों में हमारे सामने है। पूर्णतः प्रतिक्रियात्मक, सीमित स्मृति, मरिक्ताक सिद्धांत और आत्मचेतना इनमें प्रमुख हैं। इसके अतिरिक्त, प्रसारण के क्षेत्र में आर्टिफिशियल इंटेलिजेंस एक बहुत बड़े बदलाव की बयार लेकर आया है।

## क्या है एआई तकनीक

आर्टिफिशियल इंटेलिजेंस की शुरुआत साल 1950 में हुई थी। इसकी खोज करनेवाले जॉन मैकार्थी बौद्धिक मशीनों को बौद्धिक कंप्यूटर प्रोग्राम बनाने का विज्ञान और तकनीक मानते थे। उनके अनुसार, यह मशीनों द्वारा दिखायी गयी इंटेलिजेंस है।

इसके जरिये, कंप्यूटर सिस्टम या रोबोटिक

सिस्टम तैयार किया जाता है। जिस आधार पर मानव मरिक्ताक काम करता है, उसी तर्कों के आधार पर इन्हें चलाने का प्रयास किया जाता है। दरअसल, आर्टिफिशियल इंटेलिजेंस कंप्यूटर से निर्गमित रोबोट और मनुष्य की तरह सोचनेवाले सॉफ्टवेयर बनाने की तकनीक है। जापान ने सबसे पहले इस तकनीक पर काम करना शुरू किया था और 1981 में फिमथ जेनरेशन नामक योजना शुरू की थी। इसके अंतर्गत, सुपर-कंप्यूटर के विकास के लिये 10-वर्षीय कार्यक्रम की रूपरेखा प्रस्तुत की गयी थी।

जापान के बाद, इंग्लैंड ने आर्टिफिशियल इंटेलिजेंस की दिशा में कदम बढ़ाया था और 'एल्बो' नाम का प्रोजेक्ट तैयार किया था। इसी तरह, यूरोपीय संघ के देशों ने भी 'एम्सिट' कार्यक्रम की शुरुआत की थी। साल 1983 में कुछ निजी संस्थाओं ने मिलकर आर्टिफिशियल इंटेलिजेंस की उन्नत तकनीकों और सर्किट का विकास करने के लिए 'माइक्रो-इलेक्ट्रॉनिक्स एंड कंप्यूटर टेक्नोलॉजी' संघ की स्थापना की थी।

## प्रसारण और कृत्रिम बौद्धिकता

आर्टिफिशियल इंटेलिजेंस (एआई) का दखल प्रसारण के क्षेत्र में अब व्यापक हो चला है तथा भविष्य में इसके और ज्यादा व्यापक होने की उम्मीद है। इस तकनीक पर आर्टिफिशियल इंटेलिजेंस, स्टार वार, आई रोबोट, टर्मिनेटर, ब्लेड रनर जैसी फिल्मों भी बन चुकी हैं। इन फिल्मों के जरिये आप कृत्रिम बौद्धिकता और उसके महत्व को समझ सकते हैं।

रजनीकान्त की फिल्म 'रोबोट' में एआई



असिस्टेंट प्रोफेसर आयुष सिंघल  
कंप्यूटर साइंस विभाग  
मेरठ इंस्टीट्यूट ऑफ टेक्नोलॉजी, मेरठ

तकनीक का उपयोग किया गया था। इतना ही नहीं, एआई वाले कंप्यूटर सिस्टम ने साल 1997 में शतरंज के सर्वश्रेष्ठ खिलाड़ी रहे रूस के गैरी कास्परोव को हरा दिया था। आज टीवी प्रोडक्शन से लेकर विषयवस्तु निर्माण तक में, एआई तकनीक का उपयोग शुरू हो चुका है। पहले यह सिनेमा के साइंस फिक्शन कैटेगरी तक ही सीमित था, लेकिन आज पाप गीतों, न्यूज मीडिया, रियलिटी शो बनाने से लेकर हॉलीवुड की बड़ी फिल्मों के निर्माण में भी इसकी भूमिका बढ़ रही है। फिल्म 'अवतार' के लिए न्यूजीलैंड के वेटा डिजिटल ने इसी तकनीक का इसका इस्तेमाल किया था।

'द प्लेनेट ऑफ द एप्स' फिल्म में लिए

वैक्यूम स्थित जीवा डायनामिक्स ने इस तकनीक को मदद से कंप्यूटर द्वारा ऐसे प्रभाव उत्पन्न किये, जिसने विजुअल इफेक्ट से फिल्म के चरित्र पैदा कर दिये। प्रसारण के क्षेत्र में इसके प्रभाव का अंदाजा इसी से लगाया जा सकता है कि जब 2017 में उत्तर कोरिया के लीडर किम जोंग-उन के सैतले भाई का मलेशिया में कल्ल कर दिया गया था, तब जापान की न्यूज एजेंसी जेएक्स प्रेस कॉर्प ने चाकियों की तुलना में आधे घंटे पहले ही यह खबर प्रसारित कर दी थी।

फिलहाल, एआई के ज्यादातर प्रयोग कंप्यूटर गैम्स बनाने, प्राकृतिक भाषा प्रसंस्करण, एक्सपर्ट प्रणाली, दृष्टि प्रणाली, वाक पहचान, बौद्धिक रोबोट निर्माण के क्षेत्र में हो रहे हैं। इनके अतिरिक्त, जटिल सिस्टम प्रणाली चलाने, नयी दवा तैयार करने, नये केमिकल तलाशने, खनन उद्योग, अंतरिक्ष से जुड़ी तकनीकों, शेयर बाजार से लेकर बीमा आदि क्षेत्र ऐसे हैं, जिसमें एआई तकनीक का इस्तेमाल हो रहा है। हवाई जहाज भी कंप्यूटर द्वारा संचालित होने लगे हैं। इनके एयर ट्रैफिक कंट्रोल के लिए एआई का इस्तेमाल किया जा रहा है।

## भारत में कृत्रिम बौद्धिकता

भारत में भी रोबोटिक्स, वचुअल रियलिटी, क्लाउड टेक्नोलॉजी, बिग डेटा, आर्टिफिशियल इंटेलिजेंस तथा मशीन लर्निंग सहित तमाम तकनीकी क्षेत्रों में आर्टिफिशियल इंटेलिजेंस की तकनीक का बोलबोला लगातार बढ़ रहा है। नीति आयोग आर्टिफिशियल इंटेलिजेंस द्वारा देश में व्यवसाय करने के तरीके को बदलने जा रही है। विशेष रूप से जन कल्याण के क्षेत्रों में इसका उपयोग किया जायेगा। स्वास्थ्य व शिक्षा

के क्षेत्र को बेहतर बनाने, नागरिकों के लिये बेहतर शासन प्रणाली लाने और आर्थिक उत्पादकता में बढ़ोतरी हेतु आर्टिफिशियल इंटेलिजेंस जैसी भविष्य की ओर ले जाने वाली तकनीकों का उपयोग अब अपने देश में भी किया जायेगा।

## कुछ बातों का रखना होगा खयाल

इसमें कोई दो राय नहीं कि आर्टिफिशियल इंटेलिजेंस हमारे रहने और कार्य करने के तरीकों में बड़ा परिवर्तन लाने जा रहा है। रोबोटिक्स और वचुअल रियलिटी जैसी तकनीकों द्वारा अब उत्पादन और निर्माण के क्षेत्रों में बड़ा बदलाव देखने को मिलेगा। लेकिन इसके नकारात्मक प्रभाव से भी इंकार नहीं किया जा सकता। एक अध्ययन के अनुसार, आर्टिफिशियल इंटेलिजेंस तकनीक के कारण भारत में साल 2022 तक 10 लाख से ज्यादा नौकरियां समाप्त हो जायेंगी। ऑक्सफोर्ड विश्वविद्यालय की रिपोर्ट के मुताबिक, अकेले अमेरिका में अगले दो दशकों में डेढ़ लाख से ज्यादा रोजगार खत्म हो जायेंगे।

आर्टिफिशियल इंटेलिजेंस की दुनिया में रोजगार से उत्पन्न चुनौतियों से हम लड़ सकते हैं, लेकिन इसकी वजह से भविष्य में जो बड़े खतरे सामने आयेंगे उनसे निपटना मुश्किल होगा। विशेषज्ञों की मानें तो रोबोट अथवा बौद्धिक क्षमता रखने लगे और किसी कारणवश मनुष्य को अपना दुश्मन मान बैठेंगे तो मानसता के लिये वह कहीं बड़ी मुश्किलें पैदा करने वाली स्थिति होगी। हॉलीवुड फिल्म टर्मिनेटर और भारत की रोबोट जैसी फिल्मों से इसका अंदाजा लगाया जा सकता है।



Faculty Article

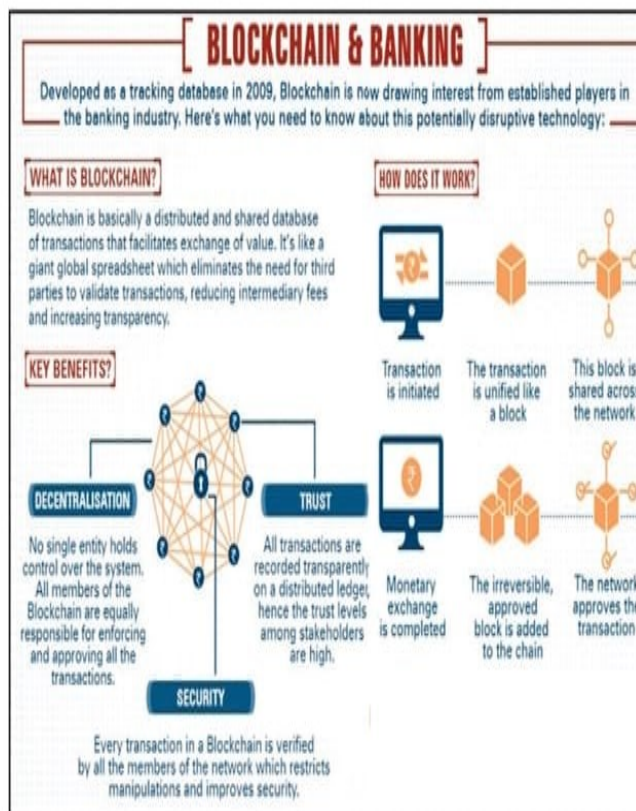
# Blockchain Technology - coin the way the world demands



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The Blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value. Blockchain technology can be used to create a permanent, public,

transparent ledger system for compiling data on sales, tracking digital use, and payments to content creators. It provides the ultimate security for various transaction processes, as being the decentralized model. Blockchain technology continues to redefine not only how the exchange sector operates, but the global financial economy as a whole. The concept of Blockchain has energized the financial services industry globally. The concept has already brought a disruption in the financial industry. The code is deployed in the Ethereum Remix IDE



in the solidity file format. The transaction is encrypted and added to a distributed ledger by generating a hash code. Multiple parties with access to the shared ledger verify the details of the transaction in the form of nodes, without compromising the identity of those involved. Verified nodes of the transaction are added as a permanent, irrevocable part of the shared ledger. The transaction is completed. Ethereum Remix IDE is a browser-based platform that consists of a solidity compiler, transaction executor,

and Hash-code generator. This collaborative nature is used to easily build Ethereum contracts. Remix IDE is a user-friendly environment that makes the solidity code for the smart contract. Truffle compiler is a user-friendly compiler that is used to deploy code on the local host provided by the Ganache IDE. Ganache Ide consists of a free balance of ether that is used to run the transaction. Thus the application is economically friendly i.e. with a far lower error rate, lower capital requirements, etc.



## Student Article

### ITwin Limitless Pendrive Technology

iTwin is a 'limitless' secure USB device that enables users to access, edit and share all their files media between any two online computers anywhere in the world.



Figure 1

A USB flash drive is a data storage device that consists of flash memory with an integrated Universal Serial Bus (USB) interface. A Cloud Storage is also a similar case where in the data is stored remotely and is accessed whenever needed.

But a drawback of this USB flash drive is that it is of small size because of which it can easily be misplaced or lost. This is a particular problem if the data it contains is sensitive and confidential.

In Cloud Storages, the data can be stolen or misused if the username and password of an account to access the storage is hacked by someone. There are many more drawbacks like limited storage, no security, back up, temporary files, no remote disables etc.

The only limit is the size of your computer's hard drive. iTwin is an innovative solution that allows remote file access without the security and privacy risks of the cloud and USB flash drives. It is very easy to access as a USB device and no special installation is required.

iTwin uses thoroughly analyzed crypto protocols and algorithms(AES 256 bit encryption). It has features like bi-directional file access, no temp files, remote disable, smart key generation, password support and twintrust authentication.

Monika Garg  
CSE III SEM



**Student Article**

## NETWORK ATTACHED STORAGE (NAS)

Network-attached storage (NAS) is dedicated file storage that enables multiple users and heterogeneous client devices to retrieve data from centralized disk capacity. Users on a local area network (LAN) access the shared storage via a standard Ethernet connection. NAS devices typically do not have a keyboard or display and are configured and managed with a browser-based utility. Each NAS resides on the LAN as an independent network node, defined by its own unique Internet Protocol (IP) address.

NAS and storage area networks (SANs) are the two main types of networked storage. NAS handles unstructured data, such as audio, video, websites, text files and Microsoft Office documents.

### What NETWORK STORAGE IS USED FOR?

NAS enables users to collaborate and share data more effectively, particularly work teams that are remotely located or in different time zones. A NAS connects to a wireless router, making it easy for distributed work environments to access files and folders from any device connected to the network. Organizations commonly deploy a NAS environment as the foundation for a personal or private cloud.

NAS systems can be purchased fully populated with disk, or customers may purchase a

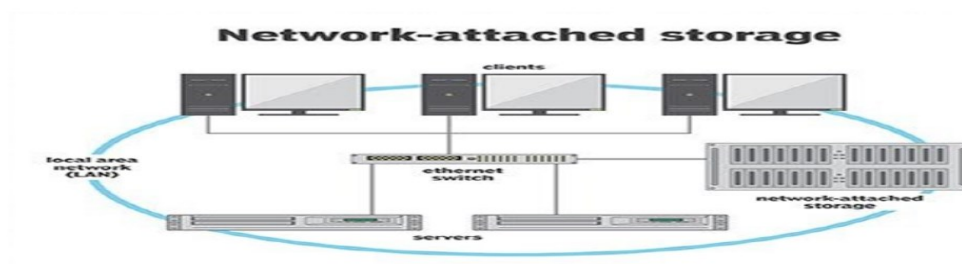


Figure 1: NAS

diskless chassis and add HDDs from their preferred vendor. Drive makers Seagate, Western Digital and others routinely collaborate with NAS vendors to develop and qualify network-attached storage media.

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CSE V SEM



**Student Article**

## Common Request Object Broker Architecture (COBRA)

Common Object Request Broker Architecture (CORBA) could be a specification of a regular design for middleware. It is a client-server software development model.

Using a CORBA implementation, a shopper will transparently invoke a way on a server object, which may air a similar machine or across a network.

The middleware takes the decision, associated is to blame for finding an object which will implement the request, passing it the parameters, invoking its methodology, and returning the results of the invocation. The shopper doesn't need to remember of wherever the item is found, its programming language, its software package or the other aspects that don't seem to be a part of the associated object's interface.

CORBA Reference Model:

The CORBA reference model known as Object Management design (OMA) is shown below figure. The OMA is itself a specification (actually, a group of connected specifications) that defines a broad vary of services for building distributed client-server applications. several services one may expect to search out in a very middleware product like CORBA (e.g., naming, dealings, and asynchronous event management services) are literally fixed as services within the OMA.

Different parts communicate victimization ORB. ORB is additionally referred to as the item

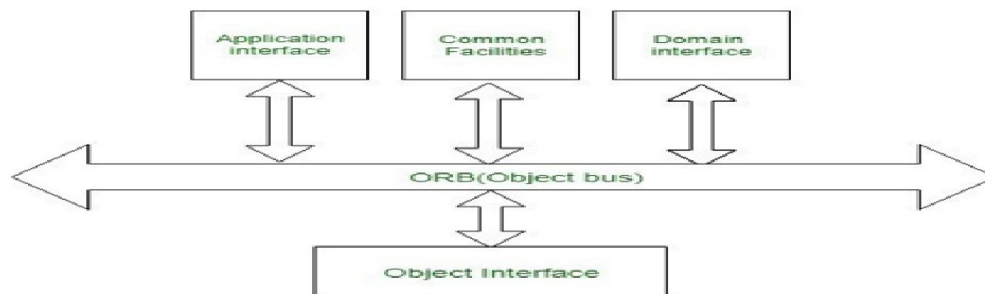


Figure 1: Object Management Architecture (OMA)

bus. An associate example of the application interface is a distributed document facility.



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In a very domain interface, it will have domain dependent services, for instance, producing domain.

Object interface has some domain freelance services:

- 1.Naming Service:Naming service is additionally known as a white page service. victimization naming service server-name will be searched and it's location or address pointed out.
- 2.Trading Service: Commercialism service is additionally known as a yellow page service. victimization commercialism service a selected service will be searched. this is often corresponding to looking out a service like an automobile store in a very yellow page directory.

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## Student Article

### Advanced Encryption Standard

Cyber Security has become a rising issue in recent years where encryption is one of the solutions and plays an important role in data protection. Encryption algorithms that are widely used in information security are asymmetric and symmetric. Advanced Encryption Standard (AES) is one of symmetric encryption that is most used often and the most secure encryption today.

The Advanced Standard Encryption also known by its original name Rijndael, is a specification for the encryption of electronic data established by the U.S. AES is able to handle three key sizes such as 128, 192, 256 bits.



Figure 1: AES

The features of AES are as follows

- Symmetric key symmetric block cipher
- 128-bit data, 128/192/256-bit keys
- Stronger and faster than Triple-DES
- Provide full specification and design details
- Software implementable in C and Java

Methods in Advanced Encryption Standard: Each round comprises of four subprocesses. Let us discuss each process in detail:

#### 1. Substitute Bytes

- Each byte is replaced by byte indexed by row (left 4-bits) column (right 4-bits) of a 16x16 table





## Student Article

- 1st row is unchanged
- 2nd row does 1 byte circular shift to left
- 3rd row does 2 byte circular shift to left
- 4th row does 3 byte circular shift to left

### 3. Mix Columns

- each column is processed separately
- each byte is replaced by a value dependent on all 4 bytes in the column
- effectively a matrix multiplication with results in the range 0-255

### 4. Add Round Key

- XOR state with 128-bits of the round key again
- processed by column (though effectively a series of byte operations)
- inverse for decryption is identical since XOR is own inverse, just with correct round key
- designed to be as simple as possible

### Future of AES:

AES will be able to replace DES in the future. The algorithm that is designed for AES satisfies a number of criteria's i.e. it has strong security , simple to design and performs good. Everyday more unique ways are developed for cyber-attacks. To battle this, security specialists have to stay busy to stop the attacks. Some expert analyst say a new method called "Honey Encryption" could stop hackers from serving fake data for any key code mis-understanding.

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CSE VII SEM



Student Article

## POWERLINE COMMUNICATION

To transmit electric power from a small number of sources (the generators) to a large number of sinks (consumers) in the frequency range of 50-60 Hz power lines were design. Electrical power lines are usually classified into the high ( $>100\text{kV}$ ), medium (1-100kV) and low ( $<1\text{kV}$ ) voltage network. Power line communication which is also known as Power line carrier, power line digital subscriber line (PDSL), mains communication, power-line telecommunications, or power line networking (PLN) uses the existing electrical network for communication. So the cost of installation is lower than other communication system and availability of communication service can be everywhere outlets exist. Power line communication is an emerging home network technology that allows consumers to use their already existing wiring system to connect home appliances to each other and to the Internet.

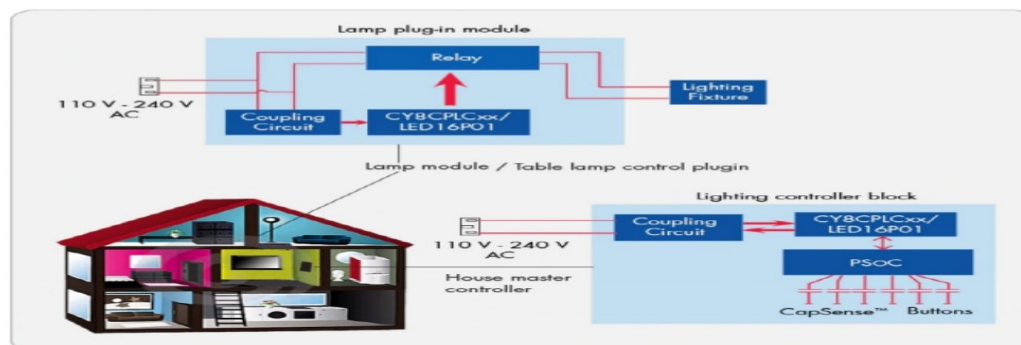


Figure 1: Powerline Communication

For communication purpose electrical power supply network is used in power line communication. Reduction in operational costs and expenditures for communication is the main thing in power line communication. For internal communication of electrical utilities, remote measuring and control task high, medium and low voltage supply have been used. PLC is also used in internal electrical installation within buildings and homes called in home PLC for various communication application. PLC modems are used to make communication in power supply networks. Data signal from conventional communication devices, (computer, telephone) is converted by PLC modem in a form that is suitable for transmission over



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power lines. Although, power supply network is not designed for data communication. The PLC transmission channel has some negative properties as frequency-dependent attenuation, changing impedance, fading and unfavorable noise condition. However, to provide higher data rates PLC network has to operate in a frequency spectrum of up to 30 MHz . PLC network produces electromagnetic radiation and disturb other services operating in the same frequency range. PLC is divided into two groups: narrowband PLC allowing data rates up to 100 kbps and broadband PLC allowing data rates beyond 2 Mbps . With the inevitable arrival of broadband access, the demand for digital voice, video, internet data within the home increases continuously. PLC technology allows the uses of existing and widespread power distribution infrastructure to provide highspeed networking capabilities along with many other benefits.

### APPLICATIONS

In 1838, Englishman Edward Davy proposed a solution for remote measurements system between London and Liverpool. In 1897, first patent was submitted by him for the remote measurement of electrical network meters communicating over electrical wiring . Some special applications out of many are: Automatic meter reading: In this technology, data from energy meter is automatically collected and transfer to the central database for bill and analysis. The main aim for the automation of meter reading is not to reduce labor cost but to obtain data rate that is difficult to obtain. In most of the places, users have demanded that their monthly bill be based on actual reading, instead of the bill which is based on prediction. This is the technology which saves periodic trip and billing is based on the real consumption not estimated. Since, the installation of first ac transmission line in 1886. To measure the energy that consumers pay for was very important. Mr. Paraskevakos created first AMR system in 1974 by using technology developed by Theodore George . PLC presents an interesting and economical solution for AMR.

### ADVANTAGES AND DISADVANTAGES

As a coin has two sides, every technology has some advantages and disadvantages. Similarly power line communication has advantages and disadvantages which are given as

#### A. Advantages

Most private dwellings do not have dedicated neither low norhigh-speed network cabling installed, and the labor costs required to install such wiring is often quite high. Power line communication uses the existing electrical network for communication. So the cost of instal-



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lation is lower than other communication system and availability of communication service can be everywhere outlets exist. For internal communication of electrical utilities, remote measuring and control task high, medium and low voltage supply have been used. PLC is also used in internal electrical installation within buildings and homes called in home PLC for various communication application. If there is the availability of multiple power outlets in every room, the home power line infrastructure represents an excellent network to share data among intelligent devices, also with high data transfer rate, up to a few hundreds of Mbps.

### B. Disadvantages

Minimum-security levels: power lines do not necessarily provide a secure media Data attenuation: due to the presence of numerous elements on a power line network, data attenuation is likely to be an issue High costs of residential appliances: the cost of a power line network modem is not always competitive with the cost of a standard modem used to connect to a phone line network. Noise: the greater amount of electrical noise on the line limits practical transmission speed (vacuum cleaners, light dimmers, kitchen appliances and drills are examples of noise sources that affect the performance of a power line-based home network

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**Student Article**

## Nymble: Blocking Misbehaving Users in Anonymizing Networks

Anonymizing networks such as Tor route traffic through independent nodes in separate administrative domains to hide a client's IP address. Unfortunately, some users have misused such networks under the cover of anonymity, users have repeatedly defaced popular websites such as Wikipedia. Since website administrators cannot blacklist individual malicious users' IP addresses, they blacklist the entire anonymizing network. Such measures eliminate malicious activity through anonymizing networks at the cost of denying anonymous access to behaving users. In other words, a few "bad apples" can spoil the fun for all. This has happened repeatedly with Tor.

### Our Solution

We present a secure system called Nymble, which provides all the following properties: anonymous authentication, backward unlinkability, subjective blacklisting, fast authentication speeds, rate-limited anonymous connections, revocation auditability (where users can verify whether they have been blacklisted), and also addresses the Sybil attack to make its deployment practical.

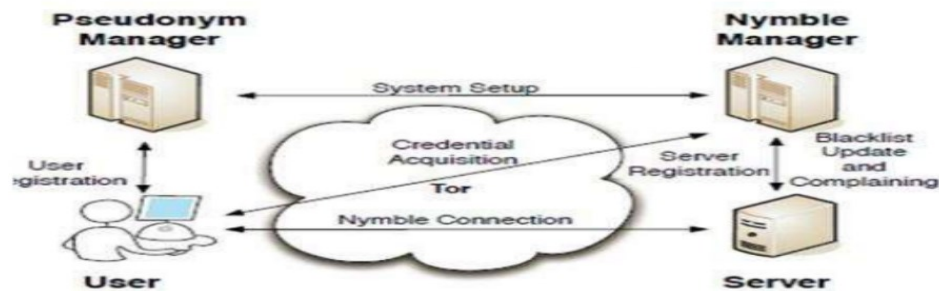


Figure 1: The Nymble system architecture showing the various modes of interaction. Note that users interact with the NM and servers through the anonymizing network.

### AN OVERVIEW TO NYMBLE

We now present a high-level overview of the Nymble system, and defer the entire protocol



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description and security analysis to subsequent sections.

### Resource-based blocking

To limit the number of identities a user can obtain (called the Sybil attack, the Nymble system binds nymbles to resources that are sufficiently difficult to obtain in great numbers. The Pseudonym Manager

The user must first contact the Pseudonym Manager (PM) and demonstrate control over a resource; for IP-address blocking, the user must connect to the PM directly (i.e., not through a known anonymizing network), as shown in Figure. We assume the PM has knowledge about Tor routers, for example, and can ensure that users are communicating with it directly.

### The Nymble Manager

After obtaining a pseudonym from the PM, the user connects to the Nymble Manager (NM) through the anonymizing network, and requests nymbles for access to a particular server (such as Wikipedia). A user's requests to the NM are therefore pseudonymous, and nymbles are generated using the user's pseudonym and the server's identity

### Time

Nymble tickets are bound to specific time periods. As illustrated in Figure 2, time is divided into linkability windows of duration  $W$ , each of which is split into  $L$  time periods of duration  $T$  (i.e.,  $W = LT$ ). We will refer to time periods and linkability windows chronologically as  $t_1, t_2, \dots, t_L$  and  $w_1, w_2, \dots$  respectively.

### Blacklisting a user

If a user misbehaves, the server may link any future connection from this user within the current linkability window (e.g., the same day). A user connects and misbehaves at a server during time period  $t$  within linkability window  $w$ . The server later detects this misbehavior and complains to the NM in time period  $t_c$  ( $t \leq t_c \leq t_L$ ) of the same linkability window  $w$ . As part of the complaint, the server presents the nymble ticket of the misbehaving user and obtains the corresponding seed from the NM.

### Notifying the user of blacklist status

Users who make use of anonymizing networks expect their connections to be anonymous. If a server obtains a seed for that user, however, it can link that user's subsequent connections. It is of utmost importance, then, that users be notified of their blacklist status before they present a nymble ticket to a server.



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Summary of updates to the Nymble protocol

We highlight the changes to Nymble since our conference paper [24]. Previously, we had proved only the privacy properties associated with nymbles as part of a two-tiered hash chain. Here we prove security at the protocol level. This process gave us insights into possible (subtle) attacks against privacy, leading us to redesign our protocols and refine our definitions of privacy.

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**Student Article**

## **BORDER SECURITY USING WIRELESS INTEGRATED NETWORK SENSORS (WINS)**

### **1. INTRODUCTION**

Wireless Integrated Network Sensors (WINS) combine sensing, signal processing, decision capability, and wireless networking capability in a compact, low power system. Compact geometry and low cost allows WINS to be embedded and distributed at a small fraction of the cost of conventional wireline sensor and actuator systems. On a local, wide-area scale, battlefield situational awareness will provide personnel health monitoring and enhance security and efficiency. Also, on a metropolitan scale, new traffic, security, emergency, and disaster recovery services will be enabled by WINS. On a local, enterprise scale, WINS will create a manufacturing information service for cost and quality control. The opportunities for WINS depend on the development of scalable, low cost, sensor network architecture. Distributed signal processing and decision making enable events to be identified at the remote sensor. Thus, information in the form of decisions is conveyed in short message packets. Future applications of distributed embedded processors and sensors will require massive numbers of devices. In this article we have concentrated in the most important application, Border Security.

### **2. WINS SYSTEM ARCHITECTURE**

Conventional wireless networks are supported by complex protocols that are developed for voice and data transmission for handhelds and mobile terminals. These networks are also developed to support communication over long range (up to 1km or more) with link bit rate over 100kbps. In contrast to conventional wireless networks, the WINS network must support large numbers of sensors in a local area with short range and low average bit rate communication (less than 1kbps). The network design must consider the requirement to service dense sensor distributions with an emphasis on recovering environment information. Multihop communication yields large power and scalability advantages for WINS networks. Multihop communication, therefore, provides an immediate advance in capability for the WINS narrow Bandwidth devices. However, WINS Multihop Communication networks permit large power reduction and the implementation of dense operations.

### **3. WINS NODE ARCHITECTURE**

The WINS node architecture (Figure 1) is developed to enable continuous sensing, event detection, and event identification at low power. Since the event detection process must





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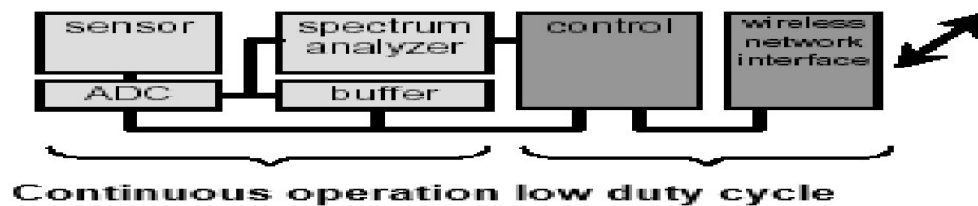


Figure 1

occur continuously, the sensor, data converter, data buffer, and spectrum analyzer must all operate at micro power levels. The WINS node then supplies an attribute of the identified event, for example, the address of the event in an event look-up-table stored in all network nodes. Total average system supply currents must be less than 30 A. Low power, reliable, and efficient network operation is obtained with intelligent sensor nodes that include sensor signal processing, control, and a wireless network interface. Distributed network sensor devices must continuously monitor multiple sensor systems, process sensor signals, and adapt to changing environments and user requirements, while completing decisions on measured signals.



Figure 2

#### 4. WINS MICRO SENSORS

Source signals (seismic, infrared, acoustic and others) all decay in amplitude rapidly with radial distance from the source. To maximize detection range, sensor sensitivity must be optimized. In addition, due to the fundamental limits of background noise, a maximum



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detection range exists for any sensor. Thus, it is critical to obtain the greatest sensitivity and to develop compact sensors that may be widely distributed. Clearly, microelectromechanical systems (MEMS) technology provides an ideal path for implementation of these highly distributed systems. The sensor-substrate “Sensorstrate” is then a platform for support of interface, signal processing, and communication circuits. Examples of WINS Micro Seismometer and infrared detector devices are shown in Figure 3. The detector shown is the thermal detector. It just captures the harmonic signals produced by the foot-steps of the stranger entering the border. These signals are then converted into their PSD values and are then compared with the reference values set by the user.

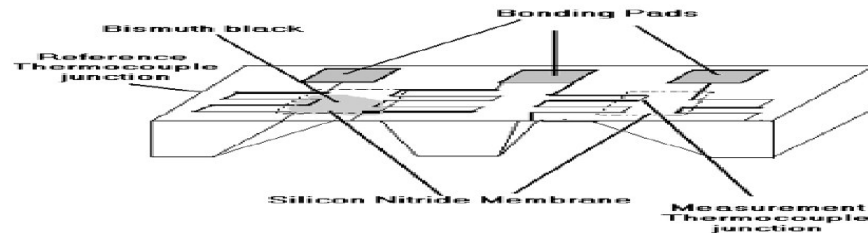


Figure 3

### 5. CONCLUSION

A series of interface, signal processing, and communication systems have been implemented in micropower CMOS circuits. A micropower spectrum analyzer has been developed to enable low power operation of the entire WINS system. Thus WINS require a Microwatt of power. But it is very cheaper when compared to other security systems such as RADAR under use. It is even used for short distance communication less than 1 Km. It produces a less amount of delay. Hence it is reasonably faster. On a global scale, WINS will permit monitoring of land, water, and air resources for environmental monitoring. On a national scale, transportation systems, and borders will be monitored for efficiency, safety, and security.

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## Student Article

### Electronic Paper display

It is also called e-paper, Electronic ink or e-ink, is a display technology using organic electronics designed to mimic the appearance of regular ink on paper. Unlike a conventional flat panel display, which uses a backlight to illuminate its pixels, electronic paper reflects light like ordinary paper and is capable of holding text and images indefinitely without drawing electricity or using processor power, while allowing the paper to be changed. One important feature needed is that the pixels be bistable so that the state of each pixel can be maintained without a constant supply of power.

Electronic paper was first developed in the 1970s by Nick Sheridan at Xerox's Palo Alto



Figure 1

Research Center. The first electronic paper, called Gyricon, consisted of tiny, statically charged balls that were black on one side and white on the other. The "text" of the paper was altered by the presence of an electric field, which turned the balls up or down.

In the 1990s another type of electronic paper was invented by Joseph Jacobson, who later co-founded the corporation E Ink which formed a partnership with Philips Components two years later to develop and market the technology.

#### TECHNOLOGIES USED :

The basic material used in the electronic paper display is ELECTRONIC INK. Electronic ink is a proprietary material that is processed into a film for integration into electronic displays. Although revolutionary in concept, electronic ink is a straightforward fusion of chemistry, physics and electronics to create this new material.



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Block Diagram:

The principal components of electronic ink are millions of tiny microcapsules, about the

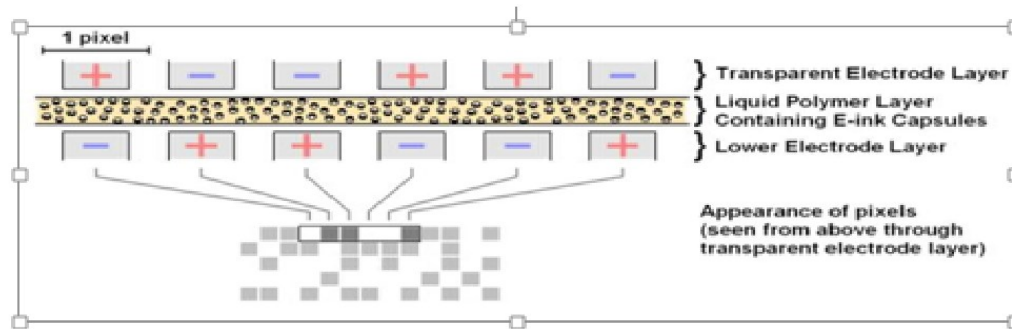


Figure 2

diameter of a human hair. In one incarnation, each microcapsule contains positively charged white particles and negatively charged black particles suspended in a clear fluid. When a negative electric field is applied, the white particles move to the top of the microcapsule where they become visible to the user. This makes the surface appear white at that spot.

At the same time, an opposite electric field pulls the black particles to the bottom of the microcapsules where they are hidden. By reversing this process, the black particles appear at the top of the capsule, which now makes the surface appear dark at that spot. To form an E Ink electronic display, the ink is printed onto a sheet of plastic film that is laminated to a layer of circuitry.

The circuitry forms a pattern of pixels that can then be controlled by a display driver. These microcapsules are suspended in a liquid "carrier medium" allowing them to be printed using existing screen printing processes onto virtually any surface, including glass, plastic, fabric and even paper. Ultimately electronic ink will permit most any surface to become a display, bringing information out of the confines of traditional devices and into the world around us.

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## Student Article

### DNSSEC Security Extensions

#### HISTORY :

Engineers in the Internet Engineering Task Force (IETF), the organization responsible for the DNS protocol standards, long realized the lack of stronger authentication in DNS was a problem. Work on a solution began in the 1990s and the result was the DNSSEC Security Extensions (DNSSEC).

1. In 1980 ,When the DNS was designed, security was not a focus. Attackers could compromise your DNS messages and redirect your messages to another location on the Internet instead of to the one you requested.
2. In 1990 ,The DNS technical community created the definitive solution to this problem – DNSSEC. DNSSEC strengthens authentication in the DNS using digital signatures based on public key cryptography.

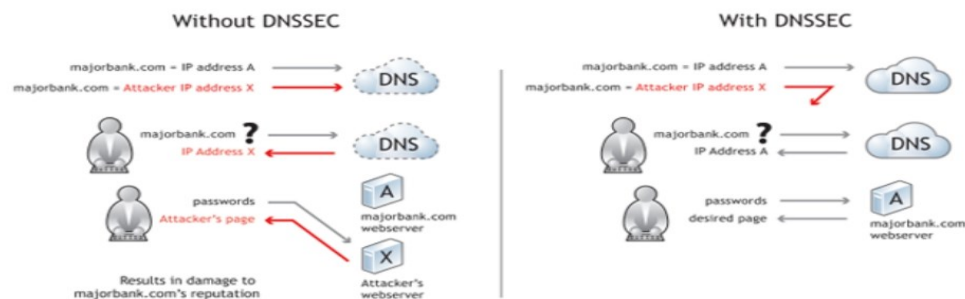


Figure 1

#### DEFINITION :

The Domain Name System Security Extensions (DNSSEC) is a feature of the Domain Name System (DNS) that authenticates responses to domain name lookups. It does not provide privacy protections for those lookups, but prevents attackers from manipulating or poisoning the responses to DNS requests.

DNSSEC strengthens authentication in DNS using digital signatures based on public key cryptography. With DNSSEC, it's not DNS queries and responses themselves that are cryp-



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tographically signed, but rather DNS data itself is signed by the owner of the data.

### HOW DOES DNSSEC WORK?

Domain Name System Security Extensions (DNSSEC) allow registrants to digitally sign information they put into the Domain Name System (DNS). This protects consumers by ensuring DNS data that has been corrupted, either accidentally or maliciously, doesn't reach them.

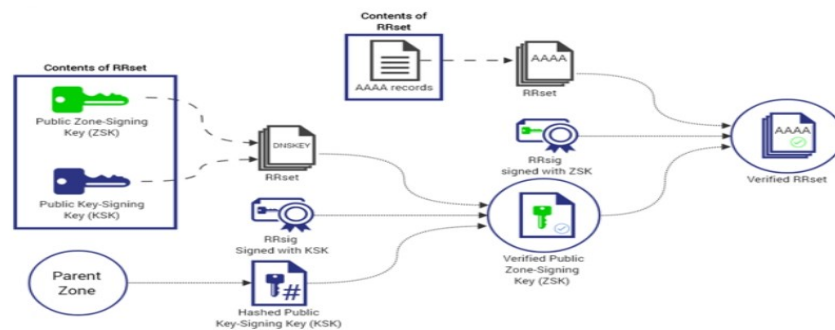


Figure 2

DNSSEC helps ensure you're reaching the site you intended to visit by using public keys and digital signatures to verify data. It does so by adding new records to the DNS settings such as the following:

1. RRSIG: holds cryptographic signatures
2. DNSKEY: holds public signing keys
3. DS: holds hashes of DNSKEY records
4. NSEC and NSEC3: provides denials-of-existence of DNS records
5. CDNSKEY and CDS: facilitates DS update requests between child and parent Zones

These records can be accessed in the same way as a regular DNS record such as a CNAME or A record however they are used to digitally sign a domain. DNSSEC also involves two main types of keys:

1. Zone-signing keys, or ZSKs: contain both a public and private key portion and validate specific record sets within a Zone.
2. Key-signing keys, or KSKs: sign DNSKEY records Each signed nameserver possesses one



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public key and one private key. When a client makes a request, the data they transmit is signed with a private key, which the recipient then opens with a public key. If a third party attempts to intervene without the public key, the recipient knows that the data is fraudulent. Because DNSSEC doesn't come with any encryption algorithms, it can't provide data confidentiality; it just helps the DNS server verify the authenticity of data requests.

Two sides of DNSSEC must be enabled for it to work :

1. Registrants, who are responsible for publishing DNS information, must ensure their DNS data is DNSSEC-signed.
2. Network operators need to enable DNSSEC validation on their resolvers that handle DNS lookups for users.

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## Student Article

### **EPIC-Electromechanical Human Machine Interaction**

Electro physiologically interactive computer systems (EPIC'S) combine Physiological sensing technologies with interactive computer applications. These systems support wide range of monitoring and training applications including system design and evaluation, medical diagnostics and rehabilitation, hazardous awareness monitoring, physiological conditioning affecting computing and so own. EPIC also forms the back bone of brain-computer interfaces and other hand free control technologies.

#### MONITORING EPICS

They are open-loop systems which detect physiological information from a subject and relay it to a computer or an expert with advanced processing capabilities for analysis. That is in the active observation of subjects physiological state of the monitored subject in order to carry out real-time analysis, on-line assessment of human physiological state, these systems incorporate learning algorithm or neural networks which attempt to extract state related features from detected physiological data stream that is, here data analysis is a form of signal preprocessing carried out within the EPICS system. Some applications of monitoring EPICS are,

1. Affective computing
2. System operator safety
3. Hazardous system monitoring

#### ELECTROMACHANICAL HUMAN MACHINE INTERACTION

People are interacting with computers in new and exciting ways, from augmented reality to autonomous vehicles. Purdue researchers are working hard to perfect these technologies, so that people from every background can utilize the newest technology in the most productive way. Machines also impact human comfort and perception. Understanding how humans and machines interact makes for better machines and better people!

New interactive computing applications are continually being developed in a bid to support people's changing work and recreational activities. As research focuses on one particular class of interactive systems, high level models of interaction are formulated and requirements emerge that reflect shared features or common functionality among those systems. Within this seminar a new class of interactive system is identified, based on shared requirements for detection, processing and presentation of human physiological information. We have named these systems electro physiologically interactive computer systems (EPICS) and describe in this report both the physiological and technological details behind their operation. The technology behind this system is really a combination of physiological sensing





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techniques with interactive computer applications. A review is presented of existing research and development into this exciting new area of human-computer interaction. It is envisaged that the work presented in this seminar will serve as a jumping off point for others interested in exploring the potential of incorporating physiological information into the human-machine relationship. In the modern era research is going on to develop techniques to improve human computer interaction. The interactive system research is beginning to breach the barrier between human and machine. Direct brain computer communication is an emerging reality.

### PHYSIOLOGICAL SIGNAL SENSING SYSTEMS

The human body is a biological system that is chemical, electrical, mechanical, thermal and magnetic in nature. The body receives information about objects in its environment via sensory apparatus tuned to receive data of each type.

### ELECTRONIC SENSING DEVICES

The role of an electrophysiological sensing device is to detect small electrical signals generated by human organs and skeletal muscles. The small electrical signals detected through skin-mounted electrodes have to be processed in such a way as to make them suitable for presentation (usually via a computer display).

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## Student Article

### IRIS SCANNING

Iris recognition is an automated method of biometric identification that uses mathematical pattern recognition techniques on video images of one or both of the irises of an individual's eyes, whose complex patterns are unique, stable, and can be seen from some distance.

It is the process of using visible and near-infrared light to take a high-contrast photograph of a person's iris. It is a form of biometric technology in the same category as face recognition and fingerprinting.

How does Iris Scanner work

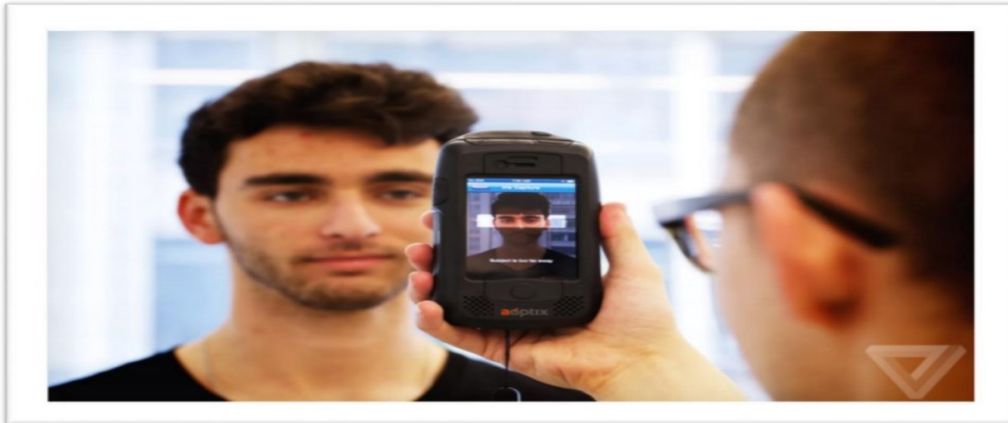


Figure 1

Biometric iris recognition scanners work by illuminating the iris with near infrared light to pick up unique patterns that are not visible to the naked eye. Iris scanners detect and exclude eyelashes, eyelids, and specular reflections that typically block parts of the iris. The process of iris recognition involves the use of a specialised digital camera. The camera will use both visible and near- infrared light to take a clear, high contrast picture of a person's iris. With Iris Recognition, the camera focusses in on your eye and locates the centre of the pupil, edge of the pupil, edge of the iris and your eyelids and eyelashes. This information is then fed through iris recognition software where the unique pattern of the iris is analysed and translated to an iris template. Iris Recognition is compatible with contact lenses and even eyeglasses and can be used by blind people, as long as they have an iris. This makes



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it an extremely versatile technology when it comes to securely identification. Benefits of Iris Recognition The characteristics of an iris are unique for each individual and even between eyes- your right and left eye both have unique iris patterns. Being a highly accurate way of identifying people, there are many

Advantages of the technology:

- Accuracy Iris Recognition is one of the most accurate forms of biometric authentication .
- Contactless Whilst proximity to the iris scanner is necessary, Iris Recognition provides a contactless solution which makes it hygienic to use and less intrusive to the end user.
- Flexible and Scalable Iris Recognition is extremely flexible. The use of an infrared camera means scanners can be used at night or in the dark. Because of its flexibility, Iris Recognition is also highly scalable and has been deployed by government and other agencies worldwide.
- Liveness Detection The technology in the iris scanner detects movement of the iris which identifies the liveness of the individual, reducing the risk of forged access through high quality stalic images.
- Fast Matching If an individual is already enrolled in the biometric system, Iris Recognition is one of the fastest forms of biometric identification.

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## Student Article

### Image Processing

Image processing is a process to convert an image into digital form and perform some operations on it, in order to get an enhanced image or to extract some useful information from it.

Image processing is a type of signal released in which input is image, as video frame or photograph and output may be image or characteristics associated with that image.

Image processing system includes treating images as two dimensional signals while applying already set signal processing methods to them.

Types of Image processing

Analog Image processing

Analog or visual techniques of image processing can be used for the hard copies like print-outs and photographs. Image analysts use various fundamentals of interpretation while using these visual techniques. The image processing is not just confined to area that has to be studied but on knowledge of analyst.

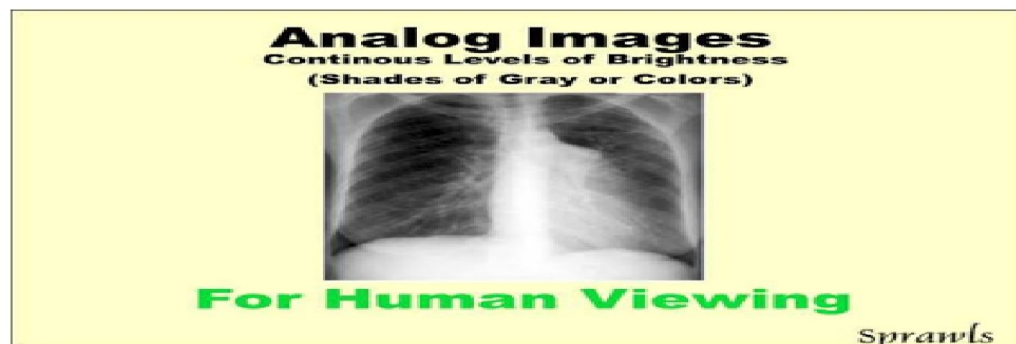


Figure 1: Analog Image processing

Digital Image processing

Digital image processing is the use of a digital computer to process digital images through an algorithm. It allows a much wider range of algorithms to be applied to the input data and can avoid problems such as the build-up of noise and distortion during processing. Since images are defined over two dimensions digital image processing may be modeled in the form of multidimensional systems.



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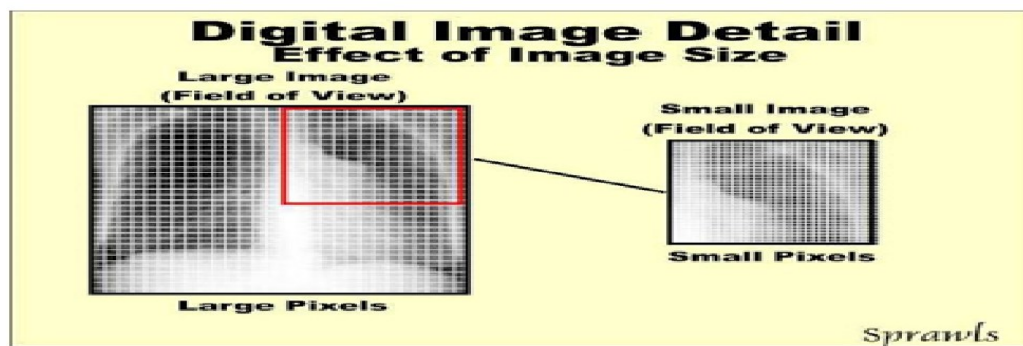


Figure 2: Digital Image processing

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## Student Article

### M-commerce

M-commerce (mobile commerce) is the buying and selling of goods and services through wireless handheld devices such as smartphones and tablets. As a form of e-commerce, m-commerce enables users to access online shopping platforms without needing to use a desktop computer. Examples of m-commerce include in app purchasing, mobile banking, virtual marketplace apps like the Amazon mobile app or a digital wallet such as Apple Pay, Android Pay and Samsung Pay.

#### Types of m-commerce

M-commerce can be categorized by function as either mobile shopping, mobile banking or mobile payments. Mobile shopping allows for a customer to purchase a product from a mobile device, using an application such as Amazon, or over a web app. A subcategory of mobile shopping is app commerce, which is a transaction that takes place over a native app. Mobile banking includes any handheld technology that enables customers to conduct financial transactions. This is typically done through a secure, dedicated app provided by the banking institution. Mobile payments enable users to buy products in-person using a mobile device. Digital wallets, such as Apple Pay, allow a customer to buy a product without needing to swipe a card or pay with physical cash.

#### How mobile commerce works

With most m-commerce enabled platforms, the mobile device is connected to a wireless network that can be used to conduct online product purchases. For those in charge of developing an m-commerce application, important KPIs to monitor include the total mobile traffic, total amount of traffic on the application, average order value and the value of orders over time. Similarly, tracking the mobile add to cart rate will help developers see if users are becoming customers. M-commerce developers may also be interested in logging average page loading times, mobile cart conversion rates and SMS subscriptions. In terms of mobile payment products specifically, they operate through a form of peer-to-peer (P2P) sharing. Once a mobile device is paired with a bank card's information, the phone can be waved over a payment terminal to pay for a product. This contactless payment using a mobile device is possible due to the use of Near Field Communication (NFC)

#### Advantages and disadvantages of mobile commerce

The advantages of m-commerce include:

- Added customer retention by being more easily accessible.



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- More convenience for customers in comparing prices, reading reviews and making purchases without the need of a desktop computer.

- Wider variety of products and services.

Disadvantages of m-commerce include:

- A poorly executed mobile experience can deter customers from making purchases.

- Mobile payment options are not available in every geographic location and may not support every type of digital wallet.

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## Student Article

### Object Recognition

Object recognition is a computer vision technique for identifying objects in images or videos. Object recognition is a key output of deep learning and machine learning algorithms. When humans look at a photograph or watch a video, objects, scenes, and visual details. The goal is to teach a computer to do what comes naturally to humans: to gain a level of understanding of what an image contains.

Object recognition is a key technology behind driverless cars, enabling them to recognize a stop sign or to distinguish a pedestrian from a lamppost. It is also useful in a variety of applications such as disease identification in bioimaging, industrial inspection, and robotic vision.

#### Object Recognition Techniques

##### Object Recognition Using Deep Learning

- Training a model from scratch: To train a deep network from scratch, you gather a very large labeled dataset and design a network architecture that will learn the features and build the model.
- Using a pretrained deep learning model: Most deep learning applications use the transfer learning approach, a process that involves fine-tuning a pretrained model. Deep learning offers a high level of accuracy but requires a large amount of data to make accurate predictions.

##### Object Recognition Using Machine Learning

Machine learning techniques are also popular for object recognition and offer different approaches than deep learning. Common examples of machine learning techniques are:

- HOG feature extraction with an SVM machine learning model
- Bag-of-words models with features such as SURF and MSER

Using machine learning for object recognition offers the flexibility to choose the best combination of features and classifiers for learning.

##### Other Object Recognition Methods

Other more basic approaches to object recognition may be sufficient depending on the application.

- Template matching – which uses a small image, or template, to find matching regions in a larger image.
- Image segmentation and blob analysis – which uses simple object properties, such as size,





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color, or shape. Typically, if an object can be recognized using a simple approach like image segmentation, it's best to start by using the simpler approach. This can provide a robust solution that does not require hundreds or thousands of training images or an overly complicated solution.

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## Student Article

### Ovonic Memory

Till now the semiconductor devices formed the basis for memory. Ranging from a small device like the calculator to huge devices like computer semiconductor devices was used for data storage. The data stored in these devices was in binary format. Since the semiconductor devices have reached their limit thus the new memory devices like Phase-change memory (PCM), also called Ovonic Unified Memory (OUM) was developed. Along with OUM, there were various other memory devices like FRAM, MRAM, and Polymer Memory which were also developed. In any case, among all these OUM was discovered to be the most encouraging one and hence is being utilized in certain devices. Conventionally the data storage was in the charge form which is now in the charge form in the new memory technologies.

#### INTRODUCTION

For the temporary or permanent storage of data in the computer or in other electronic devices a physical device called 'memory' is used to store the programs or data. The term 'memory' is often related to semiconductor devices consisting of transistors along with other electronic devices to store the data. In semiconductor memory, a bit of data is stored in a tiny circuit called a cell. These cells are formed by a group of electronic components consisting mainly of the transistor and capacitor. Thus in order to store a large amount of data large number of cells required gave rise to many other problems. For example, Intel's 10-core Xeon Westmere-EX has 10 million transistors. Transistor count is the most common technique to measure the complexity of an integrated circuit. According to Moore's law, the transistor count of the integrated circuit doubles every two years. Doubling the number of transistors and reducing the cell size increases the speed of the memory or processors.

#### OVONIC UNIFIED MEMORY

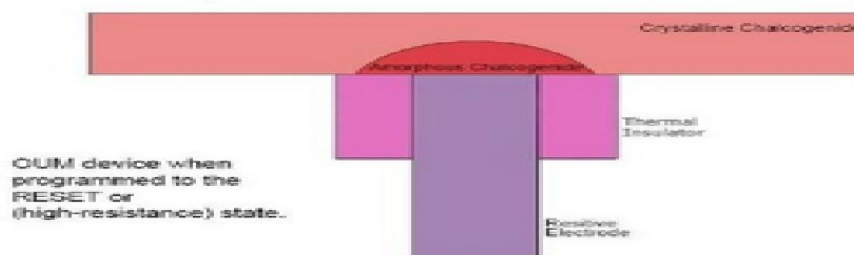
In the year 1960, Stanford. R. Ovshinsky, of Energy Conservation Devices, investigated the properties of the chalcogenide alloy. Thus, the name OVONIC was derived from OV from Ovshinsky and NIC from the latter part of ELCTRONIC.

OUM generally uses the thin film called chalcogenide alloy to store the data. The melting point of chalcogenide alloy is about 6000 °C and the crystallization temperature is about 100- 1500C. The architecture of OUM is as shown in fig 1.

Increasing the number of transistors in cells, and by reducing the chip size gave rise to various problems like heat dissipation, cell size, design complexity, and many more. Semiconductor memory has the advantage of random storage and access, this data could be



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*Fig1. OUM Architecture*

Figure 1

efficiently stored and can be accessed easily in random order.

Among the various new memory technologies, OUM is found to be the most promising one. OUM is a non-volatile random-access memory. OUM uses the change in the resistance of a material to store the data. This the technique is also used in the CD, DVD, etc. to store the data. The material used is chalcogenide alloy. The alloy consists of the Group VI elements of the periodic table. Change in the resistance of a material is done by heating the material to maintain it either in the amorphous or crystalline state.

The cell of OUM consists of a resistive heater electrode, alloy, and an insulator encompassed by the alloy as shown to prevent data loss due to heat. The lower part of the cell is connected with a diode or CMOS. Unlike ordinary memory advancements the information stockpiling (data storage) in the emerging technologies is not in the form of charges and the reading of data is done by measuring the resistance of the alloy. The amorphous state having high resistance ( $\approx 100k$ ) indicate binary 1 while the crystalline state having low resistance ( $\approx 1k$ ) indicates the binary 0.

#### CONCLUSION

In contrast to conventional flash memory, OUM can be randomly addressed OUM requires fewer IC manufacturing steps and thus resulting in fewer imperfections, reduced cycle time, and greater manufacturing flexibility. It has direct application in gadgets utilizing solid-state memory e.g. computer, cell phone, PDA, and so on.

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Computer Science And Engineering

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GROUP OF INSTITUTIONS

**MAGAZINE**  
**DECEMBER 2020**  
**VOLUME 11**

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