

K.L.N COLLEGE OF INFORMATION TECHNOLOGY

POTTAPALAYAM – 630612. SIVAGANGAI DISTRICT

APPROVED BY AICTE, NEW DELHI & AFFILIATED TO ANNA UNIVERSITY, CHENNAI
ACCREDITED BY NBA-AICTE FOR B.E – CSE, ECE & B.TECH – IT BRANCHES



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

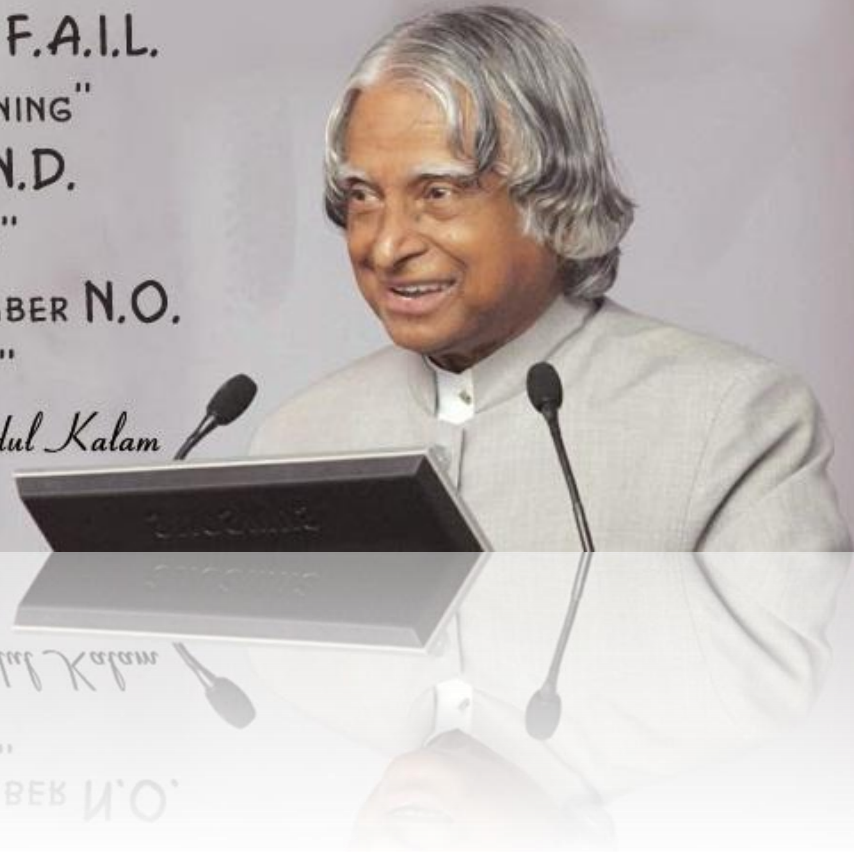


NEWS LETTER

(FOR THE ACADEMIC YEAR 2016 – 2017, RELEASE: JANUARY – JUNE 2016)

IF YOU FAIL, NEVER GIVE UP BECAUSE F.A.I.L.
MEANS "FIRST ATTEMPT IN LEARNING"
END IS NOT THE END, IF FACT E.N.D.
MEANS "EFFORT NEVER DIES"
IF YOU GET NO AS AN ANSWER, REMEMBER N.O.
MEANS "NEXT OPPORTUNITY"

Dr. Abdul Kalam



Dr. Abdul Kalam

MEANS "NEXT OPPORTUNITY"

IF YOU GET NO AS AN ANSWER, REMEMBER N.O.

Computers themselves and
software yet to be developed will
revolutionize the way to learn
— Steve Jobs



Think Different



About the Department

The Department of Computer Science and Engineering was established in the year 2001 with the aim of imparting quality education to the students. The Department has been accredited by National Board of Accreditation (NBA) and also permanently affiliated by Anna University for UG Programme.

The Department offers two courses: B.E. (Computer science and Engineering) with an intake of 120 seats and M.E (Computer Science and Engineering) with an intake of 24 seats.

The Department has very good infrastructure with four well equipped air-conditioned Laboratories, Seminar Hall, Department Library and Class Rooms with LCD projectors.

The Department has well qualified faculty members

continuously upgrading their knowledge by presenting papers in conferences, attending faculty development training programs to optimize the cutting edge technology prevailing in the field of Information Technology.

Most of the faculty members are the members of Professionals bodies like ISTE, CSI. The Department has sanctioned with the grant-in-aid of Rs.7,20,000/- for the financial year 2010-11 & Rs.6,00,000/- for the financial year 2011-12 under Entrepreneurship Development Cell (EDC) Scheme by AICTE.

The Department has signed MoU with leading organizations like IBM, Microsoft, ICTACT, Winways etc

Technical Events Organized

Conferences/FDP/Workshop/
Symposium/Student Development
Programmes/ Guest
Lectures/Alumni
Interaction/Alumni Meet MoU/
Professional activities organized

Vision of the Department

The Vision of the Department of Computer Science and Engineering is to become a center of excellence for quality education and research by providing the best opportunity to the students for attaining technical excellence in emerging technologies and to develop a comprehensive and integrated personality.

Mission of the Department

The Mission of the Department of Computer Science and Engineering is to prepare students for productive careers in industry, academic and government

- By providing an outstanding environment for teaching, learning and research in the theory and applications of Computer Science and Engineering.
- By inculcating the values of ethics and social responsibilities.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO 1: To produce graduates who can demonstrate competence for their successful employment in industries, academic institutions, government organizations, or to pursue higher studies.

PEO 2: To promote design, research, and implementation of products and services in the field of Computer Science & Engineering through strong communication, leadership, and entrepreneurial skills.

PEO 3: To inculcate students with adequate training and opportunities to work as teams on multidisciplinary projects and with an ability to relate computer science engineering issues with social awareness.

PEO 4: To promote student awareness on continuous learning and to practice professional ethics and morale in their career.

PROGRAM SPECIFIC OUTCOMES (PSOs)

Ability to solve complex problems and design systems using algorithm analysis and principles of Software Engineering, to face the challenges in corporate and industries.

Ability to communicate and function effectively as an individual and as a member or leader in multi-disciplinary teams to understand the impact of revolution in modern computerization in global, economic and societal context.

Ability to understand the need for sustainable development in software industries and to follow the professional ethics with a good understanding of their responsibilities and roles in society.

GALLERY



One day Technical Camp Microsoft Dreamspark "TECHNOVANZA'16"

Organized by Microsoft Visual Campus Club of
"Department of Computer Science and Engineering"



**Two Days Student Development Programme on
"Web Technologies"**
29th & 30th July 2016



Inaugural Function of Student's Association, CSE Department
ORDINATEUR'16
Date : 29.07.2016

GUEST LECTURES AND WORKSHOPS

Guest lecture on "**Pointers in C Programming**" was conducted on 3rd March 2016

Organized by:

Dr M.Arunachalam, HOD/CSE
Mr.J.Jeyaganesan AP/CSE

Resource Persons

Mr.D.Poorna Kumar , Branch Head, NIIT Anna Nagar Madurai

Mr.Ganesh Kumar, Assistant Faculty, NIIT Anna Nagar Madurai

Guest lecture on "**Introduction to PHP Programming**" conducted on 15 th February 2016

Organized by:

Dr. R.Aghila Professor/CSE
Mrs P.Suganthi AP/CSE

Resource Person :

Mr S.Bala Murugan, Director, Winyays Informatics PVT. LTD

R.Chella Pandi, Centre Head, Winyays Informatics PVT. LTD

Two –day workshop on "**Android Development**" was conducted on 26th February 2016

Organized by:

Dr. R.Aghila Professor/CSE
Mrs P.Suganthi AP/CSE

Resource Person :

Dr V.Subburaj, Managing Director, Sree Trainz Division Research Development & Taskdetecta IT Solution



GUEST LECTURES GIVEN BY STAFF & CHAIRING THE SEMINAR

- 
- Anna University approved seven days **Faculty Development Training Programme** was conducted from 6th to 12th of June 2016 organized by Dr.M.Arunachalam, Professor & Head and Dr.R.Aghila, Professor.
 - Dr.M.Arunachalam, Professor & Head , Dr.R.Aghila Professor, Ms.S.J.Subhashini- Associate Professor, delivered a lecture on **Theory of Computation** at KLNCIT.
 - Mrs S.K.Radhika, ASP, delivered a lecture on **Computer Organization** on 11 th of March 2016 for II and III year students at KLNCIT.
 - Mr G.Balakrishnan - Associate Professor delivered a lecture on **Backtracking Algorithm and Applications** on 18th of february 2016 for III year students at KLNCIT.

Dr.M.Arunachalam, Prof. & HOD/CSE chaired the Journal “**Elsevier International Journal of Communication system**”

Publications by Faculties in Journal / Conferences



Mr.G.Ganesan ASP	National Conference on Recent trends in SMAC'16	Real Time service on Data Integrity and channel Access delay in WSN
Dr.M.Parvathy Professor	International Conference on science ,Engineering and comp Tech 2016	Safe guarding video contents in a virtual storage via code matching
Ms.K.Nagalakshmi AP Ms.S.J.Subhashini ASP	National conference on Recent trends in SMAC	Privacy preserving policy to detect the packet audited by using HLA in WSN
Dr.R.Aghila Professor	National Conference on Recent trends in SMAC'16	A Survey On Mobile Phone Networks
Mr.G.Balakrishnan ASP	National Conference on Recent trends in SMAC'16	Effective Hypertension Treatment using Regression analysis
Dr.M.Arunachalam, Professor & HOD	International Journal Advanced Engg. Technology	Improving Network Performance through Novel RWA approach in optical Networks.
Mr.E.S.Vinoth Kumar, ASP	International journal of scientific Engineering and Applied science	Prediction of students outcome using Data mining Techniques

Ms.K.Nagalakshmi, AP	International journal of scientific Engineering and Applied science	Privacy preserving policy to detect the packet audited by using HLA in WSN
Ms.K.Nagalakshmi, AP Ms.S.J.Subhashini ASP	International journal of scientific Engineering and Applied science	Efficient Mobile data gathering in WSN based on Hora Algorithm
Dr.R.Aghila, Professor	International Journal of Advanced Research Trends in Engineering and Technology IJARTET Volume-03 Special Issue-22 ,April 2016	Diffusion Of Information In Mobile Phone Networks For Viral Marketing
Dr.M.Arunachalam Professor & Head	ICTACT Bridge 2016 series of conference(24.2.16)	ICTACT Bridge 2016 Trade Center Chennai.
Dr.R.Aghila, Professor Mrs.P.Suganthi, AP/CSE	Indian Journal of Science and Technology (IJST)	Information Retrieval using edge Quad tree in soil Database
Dr.R.Aghila, Professor Mrs.P.Suganthi, AP	Indian Journal of Science and Technology (IJST).	A Knowledge representation technique for intelligent storage and efficient retrieval using KBML,

"To a Human Brain, All Knowledge never it teaches deepest be it rooted Uprooting beyond our reaches." Dr.Pramod Ambadasrao Pawar, Editor in Chief, Epitoe Journals.



TECHNICAL EVENTS ORGANIZED – FDP & SDP

Name of the Program	Title	Name of the Staff	Date/ Duration	Venue
Faculty Development Workshop	Intellectual Property Rights and Innovations	Mrs.SJ.Subhashini	13.02.16	Kamaraj College of Engineering and Technology
Faculty Development Workshop	Intellectual Property Rights and Innovations	Mr G.Balakrishnan	13.02.16	Kamaraj College of Engineering and Technology
Faculty Development Workshop	Intellectual property rights and Innovations	Dr.M.Parvathy	04.03.16	KLNCE
Faculty Development Workshop	Intellectual property rights and Innovations	Mrs.S.K.Radhika	04.03.16	KLNCE
National Level Workshop	Data Science Analytics Using R Tool(DSAR'16)	Mrs R.Aghila	3.3.16 & 4.3.16	Sri Vidya College of Engg &Tech
National Level Workshop	Data Science Analytics Using R Tool(DSAR'16)	Mrs P.Suganthi	3.3.16 & 4.3.16	Sri Vidya College of Engg &Tech
Faculty Development Program	Grid and Cloud Computing	Mrs.PL.Prabha,AP/CSE	11.05.16 To 13.05.16	IBM Seminar Hall,KLNCIT
Faculty Development Program	Grid and Cloud Computing	Ms.B.Tamil selvi,AP/CSE	11.05.16 To 13.05.16	IBM Seminar Hall,KLNCIT
Faculty Development Program	Grid and Cloud Computing	Mr.P.Ajeeth,AP/CSE	11.05.16 To 13.05.16	IBM Seminar Hall,KLNCIT
Faculty Development Program	DST Sponsored 10-day Training Programme on Big data Analytics	Mrs.B.Annapoorani,ASP/CSE	18.05.16 to 27.05.16	PSNA College of Engineering & Technology

Faculty Development Program	DST Sponsored 10-day Training Programme on Big data Analytics	Ms.D.S.Gokula Radhika AP/CSE	18.05.16 to 27.05.16	PSNA College of Engineering & Technology
Faculty Development Program	DST Sponsored 10-day Training Programme on Big data Analytics	Mr.G.Dinesh,AP/CSE	18.05.16 to 27.05.16	PSNA College of Engineering & Technology
Faculty Development Program	Anna university approved seven days Faculty Development Training Programme	Mrs.C.H.Sumalakshmi,AP/CSE	06.06.16 to 12.06.2016	KLNCIT
Faculty Development Program	Anna university approved seven days Faculty Development Training Programme	Mrs.PL.Prabha,AP/CSE	06.06.16 to 12.06.2016	KLNCIT
Faculty Development Program	Anna university approved seven days Faculty Development Training Programme	Mr.Shiva Shankar S,AP/CSE	06.06.16 to 12.06.2016	KLNCIT
Faculty Development Program	Anna university approved seven days Faculty Development Training Programme	Mr.R.Arun Kumar,AP/CSE	06.06.16 to 12.06.2016	KLNCIT
Faculty Development Program	Anna university Sponsored FDTP on Computer Graphics	Ms.S.J.Subhashini,AP/CSE	10.06.16 to 16.06.2016	University College of Engineering
Faculty Development Program	Anna university Sponsored FDTP on Computer Graphics	Ms.K.Nagalakshmi,AP/CSE	10.06.16 to 16.06.2016	University College of Engineering
Faculty Development Program	DST Sponsored 10-day Training Programme on Big data Analytics	Dr.M.Arunachalam,Prof,HOD	23.06.16 to 01.07.16	KLNCIT
Faculty Development Program	DST Sponsored 10-day Training Programme on Big data Analytics	Dr.M.Parvathy,Professor/CSE	23.06.16 to 01.07.16	KLNCIT
Faculty Development Program	DST Sponsored 10-day Training Programme on Big data Analytics	Ms.P.Suganthi,AP/CSE	23.06.16 to 01.07.16	KLNCIT

Faculty Development Program	DST Sponsored 10-day Training Programme on Big data Analytics	Ms.T.T Mathangi,AP/CSE	23.06.16 to 01.07.16	KLNCIT
Faculty Development Program	DST Sponsored 10-day Training Programme on Big data Analytics	Ms.C.H.Sumalakshmi,AP/CSE	23.06.16 to 01.07.16	KLNCIT
Faculty Development Program	DST Sponsored 10-day Training Programme on Big data Analytics	Mr.Shiva Shankar S,AP/CSE	23.06.16 to 01.07.16	KLNCIT
Faculty Development Program	DST Sponsored 10-day Training Programme on Big data Analytics	Ms. Prabha P.L,AP/CSE	23.06.16 to 01.07.16	KLNCIT
Faculty Development Program	DST Sponsored 10-day Training Programme on Big data Analytics	Ms. Tamil Selvi B,AP/CSE	23.06.16 to 01.07.16	KLNCIT
Faculty Development Program	DST Sponsored 10-day Training Programme on Big data Analytics	Ms.S.Dhivya,AP/CSE	23.06.16 to 01.07.16	KLNCIT
Student Development Program	Two –day workshop on Android Development	Resource Person : Dr V.Subburaj Managing Director	26.02.16	KLNCIT



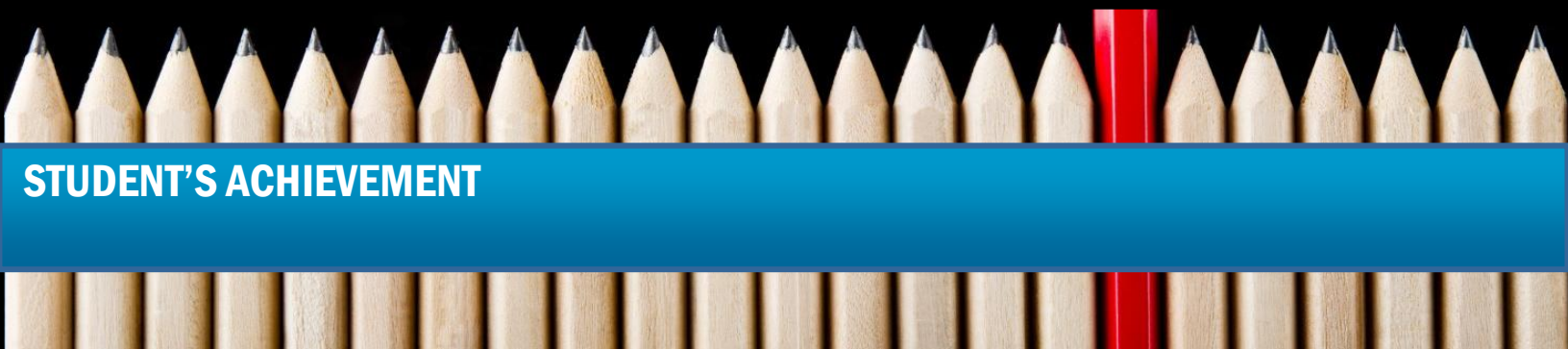
STAFF ACHIEVEMENT



Name & Designation of the Staff	Subject/Subject code	Class	Result
Mr.J.Jeyaganesan, AP/CSE	CP7022 Software Design	I M.E	100%
Mr. P.Ajeeth, AP/CSE	CP7029 Information Storage Management	I M.E	100%
Ms.S.Divya AP/CSE	CP7301 Software Process & Project Management	I M.E	100%
Mr.P.Vignesh AP/CSE	CP7026 Software Quality Assurance	I M.E	100%

“The road to success is not easy to navigate, but with hardwork, drive and passion its possible to achieve the dream”....

- **T.S.Divya** (II Year) won II Prizr in Paper Presentation and code Debugging at Fatima Michael Engineering College
- **J.V Elizabeth Seemathy** won II Prizr in Paper Presentation at Fatima Michael Engineering College
- **R.Geetha** and **M.Oviya** won II Prize in Kryptoyox at Kamaraj College of Engineering and Technology
- **R.Manikandan** (II year A) won II Prize in CM Tropy(JUDO) at MGR Race Course Stadium
- **Natanmai Deepak Sundararajan** (II year A) got II Prize in Open House Project at KLN College of Information Technology
- **R.Yuvaraj** (II year B) won I Prize in Gyan Mitra'16Idea Presentation and Paper Presentation, II Prize in Gyan Mitra'16 Project at Mepco Schlenk Engineering College
- **R.Yuvaraj** won I Prize in IGNITE'16 Paper Presentation at National Engineering College
- **R.Yuvaraj** won III Prize in Paper Presentation & Project Expo at Madras Institute of Technology
- **A.Anish Halima** & **S.Divya Bharathi** (III Year A)- II Prize in Web designing at Velammal College of Engineering
- **S.Sukkiratha** (III Year B) – III PrizeDebugging at VCET
- **T.S.Sushmitha** (III Year B) - I Prize in Engima VCET
- **P.J.Pooja** (III Year B) - I Prize in Engima at VCET
- **Saravana Kumar** (III Year B) - I Prize in Paper Presentation at VCET
- **T.K Surya Narayanan** (III Year B) – II Prize in Paper Presentation at Alagappa Chettiyar College of Engg & Tech
- **S.Srividhya** (III Year B) - I Prize in Paper Presentation at Alagappa Chettiyar College of Engg & Tech
- **Sabarish** (III Year B) – I Prize in Paper Presentation at Alagappa Chettiyar College of Engg & Tech
- **B.Vinod Kumar** (III Year B) – II Prize in Paper Presentation at Alagappa Chettiyar College of Engg & Tech





ALUMNI INTERACTION

Alumni Interaction was conducted on 19th of March 2016. **Mr. David Leonard.J - Solartis Technology Services**, Alumni of 2011 - 2015 Batch delivered an effective speech at KLN College of Information Technology. Eighty two students participated in the session

Mr.S.Karthikeyan - Cognizent Technology Solutions. Alumni of 2011 - 2015 Batch delivered an useful speech on IT Trends at KLN College of Information Technology which was conducted on 19th of March 2016 with participation of Eighty two Students.

Mr .C.C Rajkumar Sri Venkateswara College Delhi University. Alumni 2011 - 2015 batch conveyed useful information to 82 Participants on the Alumni meet at KLN College of Information Technology conducted on 19th of March 2016 with Eighty two Participants

PLACED STUDENT'S



S.No	NAME OF THE STUDENT	NAME OF THE COMPANY
1	I.Aaron Gladson	M/s. Vee technology Pvt Ltd
2	M.B.Dhivya Dharshini	M/s.Sutherland Pvt Ltd
3	M.Monika	
4	L.S.Preethi	
5	R.Ramya	
6	N.Subhashini	
7	A.Venkatasuburamanian	
8	B.G.Narayane	M/s. CTS Pvt., Ltd
9	P.Vinodhini	
10	V.Naveenraj	M/s.Mind Tree Pvt., Ltd
11	S.Sindhiya	
12	S.Nivitha	M/s.Sevenhills Cloud Pvt Ltd
13	R.Ramya	
14	R.S.Nooburashri	M/s.Info View Pvt Ltd
15	S.K.Shyamala devi	
16	S.R.Rajkumar	M/s.Abiba System Pvt Ltd.,
17	P.Vinodhini	M/s.Alsetech pvt ltd
18	M.G.Priyanka	M/s.Ethnus Pvt Ltd
19	G.Rohini	
20	V.Pradeepa	M/s.Sevenhills Cloud Pvt Ltd
21	A.Afrin Babu	
22	Josephine Anitha	M/s.E Care India, Tirunelveli
23	T.B.Shruthi	M/s.CSS Corp,Chennai
24	R.Dhivya	M/s.Vernalis, Madurai
25	T.B.Shruthi	M/s. SP Global Ventures(India) Pvt. Ltd, Chennai
26	S.K.Shyamaladevi	

STUDENT'S ARTICLE



CYBER PEARL HARBOR

“EXAMINATION OF PARALLELS BETWEEN THE “Day of infamy” and a major cyberattack reveals lesson for organizationa about vulnerability and tents of protection that help boost resilience against hackers and other cyberthreats”

When drawing attention to Cyber Vulnerabilities, there are many reasons to refer to a Cyber Pearl Hrbor. It is a remainder of risk of feeling vulnerable and of being unprepared for ven complacent toward or doubtful of an attack of this scale and nature. Pearl Harbor also represents the vulnerability of systems defense, particularly when faced with paradigramshift. It’s a clear symbol of unimaginable attack executed by distant foes though in capable of destruction.

Collacation enables Multiplicative Damage:

This has relevance today because of shared configuration in computing, a single platform, the same OS, one middleware approach, one compiler or database vendor and administration password or a root account to open them all.

“ Possible the most imporatatn transformation from kinetic war to Cyber war: position in space is logic in CyberSpace.”

The attack spread to dozens of engineering machines through mail servers, then interrupted hospital operations through a hundred similarly configured Solaris Network File System(NFS) work station. On fast forward of 20yrs later, and collateral damage in two orders of magnitude larger: the Iranian Cyber attack on Saudi Aramco brought down 30,000 computers because of a singel vulnerable in the master boot record system in computers.

- **Srividhva – IV CSE B**

5G Technology

The next generation of mobile network has a long way to go before it's a reality, but tests and plans are underway to set the terms for such an upgrade. In fact, they've been going on for years. Here's the current lowdown on 5G.

What is 5G?

5G is a term used to describe the forthcoming fifth generation of mobile network technology. The main quality of 5G networks compared to 4G will be speed. It's going to be many times quicker than what we have now, and by quite a way.

How fast is 5G?

We've actually seen claimed speeds of 7.5Gbps from Samsung and 10Gbps from Nokia (these days quite the network infrastructure specialist), while this time last year the University of Surrey managed to obtain a staggering 1Tbps - the same capacity as fibre optics.

Back in October we reported on just such tests conducted by China's Huawei and Japan's NTT Docomo network. They had managed to hit peak data speeds of 3.6Gbps using a sub-6GHz band. Compare that to the 300Mbit/s currently offered by EE's LTE-A network, and you'll see that we're talking about a 12-fold speed increase over 4G here.

A realistic, nicely rounded final figure for 5G speeds, then, could be in the region of 10Gbps.

Features of 5G Technology

- 5G technology offer high resolution for crazy cell phone user and bi-directional large bandwidth shaping.
- The advanced billing interfaces of 5G technology makes it more attractive and effective.
- 5G technology also providing subscriber supervision tools for fast action.

- The high quality services of 5G technology based on Policy to avoid error.
- 5G technology is providing large broadcasting of data in Gigabit which supporting almost 65,000 connections.
- 5G technology offer transporter class gateway with unparalleled consistency.
- The traffic statistics by 5G technology makes it more accurate.
- Through remote management offered by 5G technology a user can get better and fast solution.
- The remote diagnostics also a great feature of 5G technology.
- The 5G technology is providing up to 25 Mbps connectivity speed.
- The 5G technology network offering enhanced and available connectivity just about the world

A new revolution of 5G technology is about to begin because 5G technology going to give tough completion to normal computer and laptops whose marketplace value will be effected. There are lots of improvements from 1G, 2G, 3G, and 4G to 5G in the world of telecommunications. The new coming 5G technology is available in the market in affordable rates, high peak future and much reliability than its preceding technologies.

- *Asrumathi – IV CSE A*

Gi Fi

INTRODUCTION

Wi-Fi (ieee-802.11b) and WiMax (ieee-802.16e) have captured our attention. As there is no recent developments which transfer data at faster rate..as video information transfer taking lot of time.

Gi-Fi which is developed on a integrated wireless trnsceiver chip. In which a small antennae used and both transmitter- receiver integrated on a single chip. which is fabricated using the complementary metal oxide semiconductor (CMOS) process. Because of Gi-Fi transfer of large videos, files will be with in seconds.

WHAT IS GI-FI?

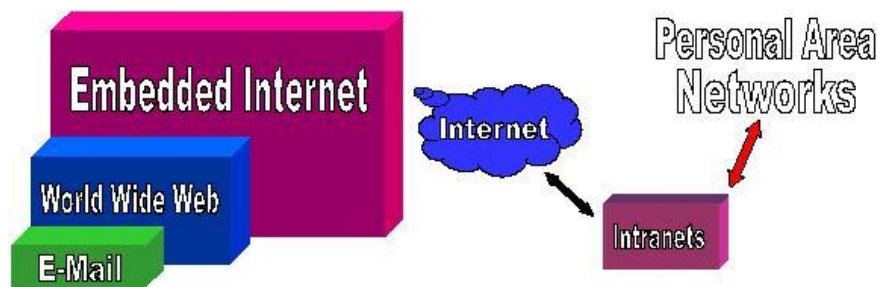
Gi-Fi or gigabit wireless is the world's first transceiver integrated on a single chip that operates at 60GHz on the CMOS .proces. It will allow wireless transfer of audio and video data at up to 5 gigabits per second, ten times the current maximum wireless transfer rate, at one-tenth the cost.NICTA researchers have chosen to develop this technology in the 57-64GHz unlicensed frequency band as the millimetre-wave range of the spectrum makes possible high component on-chip integration as well as allowing for the integration of very small high gain arrays. The available 7GHz of spectrum results in very high data rates, up to 5 gigabits per second to userswithin an indoor environment, usually within a range of 10 metres.It satisfies the standards of IEEE 802.15.3C.

FEATURES OF GI-FI:

The Gi-Fi standard has been developed with many objectives in mind. These are summarized below:

- High speed of data transfer
- Low Power Consumption
- High Security
- Cost-effective

FUTURE



- Keerthika – IV CSE A

Foldable Droid Could Mend Stomachs

The new robot can unfold from an ingestible capsule and operate inside the stomach.

There likely aren't many occasions when you'd want to swallow a tiny robot. But what if such an ingestible bot could be put to work inside your body, targeting a foreign object or patching up an internal wound, before decomposing without a trace?

A team of researchers from the Massachusetts Institute of Technology has proposed a new, minimally invasive way of using biocompatible and biodegradable miniature robots to carry out tasks inside the human body. The design of the bots is inspired by origami, the Japanese art of paper folding.

Made primarily from dried pig intestines (commonly used for sausage casings), the tiny robots look like a cross between a caterpillar and an accordion. A tiny magnet allows them to be maneuvered by a tuneable external magnetic field, the researchers said.

The researchers have already demonstrated origami-inspired robots capable of swimming, climbing and carrying a load twice their weight, but creating an ingestible device that can operate inside a stomach presented a whole new set of challenges, said Shuhei Miyashita, who was part of the MIT team that developed the robot but is now a lecturer of intelligent robotics at the University of York in the United Kingdom.

"The toughest problem we had to solve was that of getting the robot to work in such an unpredictable environment," Miyashita told Live Science. "The robot design was re-created so that it can still walk when flipped upside down and can correspond to the change of the stomach anatomy."

How it works?

In a paper that was presented at the IEEE International Conference on Robotics and Automation, held May 16-21 in Stockholm, Sweden, the team from MIT's Computer Science and Artificial Intelligence Laboratory described how they created a synthetic stomach to test the device and devised a two-step process for hypothetically removing a watch battery that had been swallowed. The scientists also demonstrated how the robot can patch the wound the battery leaves behind.

A 3D-printed open cross-section of the stomach and esophagus was lined with a silicone rubber mold, which matched both the shape and physical properties of a real-life stomach. The synthetic organ was then filled with a liquid that simulated the properties of gastric fluid.

In the study, one of the robots was rolled up and encased in a pill-size capsule of ice. Once the device reached the stomach, an external array of metal coils created a magnetic field that interacted with the robot's magnet and could be tuned to make the capsule roll toward the ingested watch battery.

The magnet causes the capsule to attach itself to the battery and when the robot rolls away again, it dislodges the battery from the stomach lining. Both the robot and the battery are then naturally passed out of the digestive system, the researchers said.

A second robot is then ingested in the same way, but this time the ice is left to melt and the robot unfolds. The same magnetic array is used to guide the robot to the wound site, which the robot covers before it eventually dissolves. The robot's structure also includes a dissolvable layer impregnated with drugs designed to aid healing, the scientists said. Larry Howell, a professor of mechanical engineering at Brigham Young University in Utah, who works on origami-inspired mechanisms and medical devices, said the new research marks a valuable step forward in creating robots that can carry out medical procedures inside the body.

"The idea of ingesting the robot in an ice capsule for initial delivery, and having it be biodegradable so that it decomposes afterwards, has the potential of having reduced long-term impact compared to some surgical alternatives," Howell told Live Science.

- *Divya – IV CSE A*



Thank you !