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### VISION

"To produce value based quality Engineers with the knowledge of latest trends and research technologies to meet the developing needs of industry and society."

### MISSION

- To impart quality education in line with quality teaching-learning process.
- To provide a better environment to encourage and support innovative research and development.
- To strengthen linkage between industry-academia for overall improvement of students.



The first step in the staircase of confidence and success are inventions and a gradual growth towards the success. The Shri Shankaracharya Institute of Professional Management and Technology once again stepped forward provisionally by being accredited by **National Board of Accreditation** for B.Tech Computer Science and Engineering. NBA accredited assures that student will receive education which is a balance between high academic quality and professional relevance well integrated into programmes, activities and processes. This will enhance employability of graduates and facilitates transnational recognition of degrees and mobility of graduates and professionals.

I appreciate the MOUNDS of work done by the faculties for this amendment. We have an unbelievable faculty. You all work tirelessly on behalf of students and serve incredibly important roles in the lives of so many. Your impact is profound, the lives you touch and the service you provide are unspeakable. Your unwavering focus on improving the experiences, outcomes, and opportunities for students is motivating and awe-inspiring.

At this predicament, I am delighted to congratulate all the stakeholders for their constant support and trust and I appreciate their diligent work whose contribution engrave the institute to the most beautiful form and also acknowledge for bringing best results in past years. My compliments to the graduating batch 2016-2020 and my best wishes to the students who would graduate in the subsequent years.

**Shri Nishant Tripathi**  
Chairman, SSIPMT



SSIPMT stands as a source of knowledge to its students and entrusts them with the responsibility to share what they have received with the society and the world at large. Thus it aims at creating a better society in all respects.

We are very grateful to know that CSE department has been accredited by National Board of Accreditation. NBA is one such autonomous accrediting body in India, which deals with the accreditation of engineering and various technical institutions on the basis of the quality of education provided there.

We are fortunate to be backed by a team of highly talented, dedicated and committed faculty members whose efforts made this possible. They are actively involved in their pursuit of creating knowledge through teaching, research and training. The corporate and industry interactions not only provide hands-on experience but also help in placement of our students.

Cordial Congratulations to the Department of Computer Science and Engineering and I appreciate everyone's efforts. Wishing you all the very best in all times to come.

**Dr. Alok Kumar Jain**  
Principal, SSIPMT



## THE MEMORANDUMS

### Mentor

Ms. Taniya Jain  
Asst. Prof. CSE Dept.

### Editorial Board

#### Editor In Chief

Abhishek Singh  
CSE 5<sup>th</sup> semester

#### Design and Layout

Shreyansh Tiwari  
Kartikey Pandey  
CSE 5<sup>th</sup> semester

#### Art Director

Istuti Singh  
CSE 5<sup>th</sup> semester

#### Writer and Editors

Istuti Singh  
Prachi Sharma

CSE 5<sup>th</sup> semester

#### Photography

Kaushal Gupta  
CSE 5<sup>th</sup> semester



I blissfully greet all the fresher students and ensure that we will do our best to equip you with the best teaching resources, practical performance and training methods so that you can accomplish your career and face a challenging world .We believe in inspirational minds, improve their intellectual abilities and build characters that our students will cherish for their lifetime.

We offer here 360 degrees learning; we know the value of this time. Hence, we create here an environment to give you a holistic learning. SSIPMT has an environment to bring to light and nourish the hidden talents of our students. Be the star performers, achieve excellence in whatever you do get amazing results in the forthcoming exams.

My Heartiest congratulations and best wishes to the outgoing batch of 2016-2020.It has been a wonderful four years with you, and now it is time for you to move on and enter a different world. Wishing them best of luck for their future! Whatever you do, do it with full heart, and achieve excellence.

**Dr. J.P. Patra**  
HoD, CSE Dept.



LoRa Technology has revolutionized IoT by enabling data communication over a long range while using very little power. When connected to a non-cellular LoRaWAN network, LoRa devices accommodate a vast range of IoT applications by transmitting packets with important information.

Thus, this will be very helpful in nurturing our students in the great education infrastructure of our institute and the deep rooted spirit of excellence will ensure you get an education that enables you to take on the biggest challenges facing humankind.

**Mr. Gurudutta Verma**  
Asst. Prof. CSE Dept.



It is an immense opportunity to launch CSE Department's 5th Newsletter on topic "LoraWAN" for academic year 2019-2020.

LoraWAN is Long Range Wide Area Network. It's a standard for wireless communication that allows IoT devices to communicate over large distance with minimal battery usage.

Technologies have been constantly developing, creating a demand for more engineers with technical skills geared toward IoT, Preferring LoRaWAN will let us better teach our students how to develop cutting-edge IoT applications using LoRa Technology and the LoraWAN open protocol.

**Mrs.Preeti Tuli**  
Asst. Prof. CSE Dept.





# LoRA AND LoRAWAN

## WHAT IS LoRAWAN ?

The LoRaWAN specification is a Low Power, Wide Area (LPWA) networking protocol designed to wirelessly connect battery operated 'things' to the internet in regional, national or global networks, and targets key Internet of Things (IoT) requirements such as bi-directional communication, end-to-end security, mobility and localization services. LoRa (Long Range) is a non-cellular long range and low power wireless technology. The underlying RF modulation technology was developed by French Cycleo which was acquired by US-based Semtech in 2012. The technology was incorporated into Semtech's future RF platforms in an effort to expand the potential market of industrial and home automation RF applications, needing extended range at lower cost and lower power.

By - Prachi Sharma (CSE 5<sup>th</sup> sem)

### How LoRAWAN BREAKS IoT LIMITATIONS ?

LoRaWAN® is a cutting-edge Low-Power Wide Area Network (LPWAN) technology protocol that has been designed to wirelessly connect "Things" in regional, national or global networks. LoRaWAN offers multi-kilometer connectivity at astonishingly low power consumption rates. This breaks the constraints imposed by traditional networking technologies and thereby opens up a whole new range of applications in the IoT world. LoRaWAN supports a wide range of frequency channels and data rates. Moreover, transmission with different specifications to the same gateway do not interfere with each other. Every transmission is encapsulated in a separate virtual channel which increases the capacity of the gateway significantly. Data rates range between 0.25 Kbps and 50 Kbps.

By - Prachi Sharma (CSE 5<sup>th</sup> sem)

<p><b>Long Range</b></p> <ul style="list-style-type: none"> <li>• Greater than cellular</li> <li>• Deep indoor coverage</li> <li>• Star topology</li> </ul>	<p><b>Max Lifetime</b></p> <ul style="list-style-type: none"> <li>• Low power optimized</li> <li>• 10-20yr lifetime</li> <li>• &gt;10x vs cellular M2M</li> </ul>
<p><b>Multi-Usage</b></p> <ul style="list-style-type: none"> <li>• High capacity</li> <li>• Multi-tenant</li> <li>• Public network</li> </ul>	<p><b>Low Cost</b></p> <ul style="list-style-type: none"> <li>• Minimal infrastructure</li> <li>• Low cost end node</li> <li>• Open SW</li> </ul>

By - Kartikey Pandey (CSE 5<sup>th</sup> sem)

### WHY LoRAWAN ?

#### Years of battery life

Maximizing battery life-time of IoT devices would be of utmost necessity. LoRaWAN does exactly this: Optimizes power consumption and thereby providing a battery life spanning over years!

#### Long Range

Provides multi-kilometer connectivity where communication range is much greater than traditional cellular networks. Typical LoRaWAN setups offer a coverage of 2-5 kms in urban areas, 15+ kms in semi-urban & rural areas. [LoRaWAN also offers deep indoor coverage.]

By - Istuti Singh (CSE 5<sup>th</sup> sem)

### LoRA TECHNOLOGY IS CONNECTING OUR SMART PLANET:

**Smart Agriculture:** From measuring environmental conditions that influence crop production to tracking livestock health indicators, Internet of Things (IoT) technology for agriculture enables efficiencies which reduce environmental impact, maximize yield and minimize expenses. Smart agriculture use cases based on Semtech's LoRa® devices and the LoRaWAN® protocol have demonstrated significant improvements.

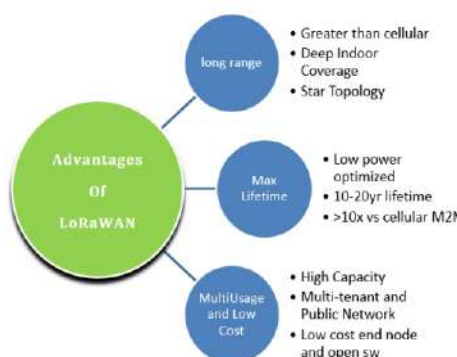
**Smart Cities:** Everyday municipal operations are made more efficient with LoRa Technology's long range, low power, secure, and GPS-free geolocation features. By connecting city services such as lighting, parking, waste removal, and more, cities can optimize the use of utilities and personnel to save time and money.

**Smart Environment:** By implementing a network of sensors and gateways embedded with LoRa Technology across a region, environmental indicators can be measured and reported for data analysis in real-time, detecting issues before they become crises. From air quality monitoring to radiation leak detection, LoRa®-based IoT solutions for the environment help protect citizens from environmental dangers.

**Smart Healthcare:** LoRa Technology's low power, low cost and reliable performance make it suitable for critical smart healthcare applications. IoT solutions comprised of LoRa®-based sensors and gateways can monitor high-risk patients or systems around the clock, ensuring health and medical safety are never overlooked.

**Smart Homes & Buildings:** LoRa Technology's low power qualities and ability to penetrate dense building materials make it an ideal platform for IoT-connected smart home and building devices. In addition, the long range capabilities make it possible for LoRa®-enabled sensors and the LoRaWAN® protocol to track assets that stray from home. Sensors in smart home and building applications can detect danger, optimize utility usage and more to improve the safety and convenience of everyday living.

By - Istuti Singh (CSE 5<sup>th</sup> sem)



### INDIA LoRAWAN MARKET LIKELY TO SEE A BOOM IN NEXT SIX YEARS:

According to industry research firm InForGrowth's (IFG's) 2019 Global LoRaWAN Market 2018-2026 report, the Asia-Pacific LoRaWAN market is expected to reach US \$4,729.2M by 2026, representing a compound annual growth rate (CAGR) of 51.4 percent.

India itself is expected to outpace this growth at 53.6 percent CAGR during the same period.

SenRa has successfully deployed its public LoRaWAN network in 50 cities of India and is targeting to cover 60 cities by the end of this year and 100 cities by the end of 2020.

"There is no question that India is a rapidly growing market for LoRaWAN technology," said Hosseini.

He added, "We're driving adoption of the standard with an aggressive rollout of LoRaWAN networks—having just announced our 50th city deployment in India—and are on track to deploy networks in 100 cities by the end of next year. With these networks, and our product and service solutions, SenRa and LoRaWAN will play a major role in the development of Smart Cities in India."

### LoRA FILLS A TECHNOLOGY GAP :

LoRa Fills a Technology Gap LoRa Technology has revolutionized IoT by enabling data communication over a long range while using very little power. When connected to a non-cellular LoRaWAN network, LoRa devices accommodate a vast range of IoT applications by transmitting packets with important information. LoRaWAN fills the technology gap of Cellular and Wi-Fi/BLE based networks that require either high bandwidth or high power, or have a limited range or inability to penetrate deep indoor environments. In effect, LoRa Technology is flexible for rural or indoor use cases in smart cities, smart homes and buildings, smart agriculture, smart metering, and smart supply chain and logistics.

A Semtech innovation, LoRa devices offer compelling features for IoT applications including long range, low power consumption and secure data transmission. The technology can be utilized by public, private or hybrid networks and provides greater range than Cellular networks. LoRa Technology can easily plug into existing infrastructure and enables low-cost battery-operated IoT applications. Semtech builds LoRa Technology into its chipsets which are incorporated into devices manufactured by a large ecosystem of IoT solution providers, and connected to LoRaWAN-based networks around the globe. Simply stated, LoRa connects devices (or all things) to the Cloud.

LoRaWAN was also designed with large service providers in mind. Just as with the cellphone network: a few operators that maintain and control the network and millions of users that exploit the network and do not need to care about the infrastructure. Nevertheless, since LoRa is operating in unlicensed spectrum, it's perfectly possible to set up your own gateway(s), have a coverage of a few kilometers and run your own network for a few hundred Euro or Dollar.

By - Kartikey Pandey (CSE 5<sup>th</sup> sem)

## Quiz

- Which big alliance of companies support LoRaWan?
- Who is contributing member of LoRaWan?
- How many LoRaWan network operator have been passed by LoRa alliance?
- What is lora gateway?
- Is Lora open source?



## Events Organized by CSE

Every time our department encourages and enabled extracurricular student activities to ensure that the students become well- rounded and also have expertise in a range of skills of their choosing. **State level Hackathon-Navonmesh 2019** was successfully organized on 17th and 18th October 2019 and the students of Computer Science and Engineering secured their first positions.

## Placements

- Shimeer Hablani (Teksystem)
- Ankita Shrivastava (Teksystem, Capgemini)
- Arpit Chandrakar (TCS Codevita)
- Shubham Patel (TCS Codevita, Capgemini)
- Diksha Dewangan (TCS Codevita)
- Nikhil Gautam(TCS Codevita)
- Ritesh Barik (TCS Codevita)
- Somnath Yadu(TCS Codevita)
- Rohit Mene (Global Logic, TCS)
- Chandrakant Sahu (Global Logic, TCS)
- Anugrah Mishra (Capgemini, Global Logic, TCS)
- Arpit Bagri (TCS, Capgemini)
- Meeta Singh Chauhan (Capgemini, TCS)
- Pallavi Patle (Capgemini, Cognizant)
- Asna Zenab Khan (Capgemini, TCS, Cognizant)
- Meenakshi Daga (Capgemini, TCS, Cognizant)
- Aashi Sharma (Capgemini)
- Prateek Agrawal (Capgemini, Cognizant)
- Ayush Pandey (Capgemini)
- Neelam Sanjana Naidu (Capgemini)
- Vaibhav Biturwar (Capgemini, TCS, Cognizant)
- Akshat Singh Parhihar (Capgemini, Cognizant)
- Priyanka Sahu (Capgemini)
- Deepika Sahu (Capgemini)
- Pallavi Pandey (Capgemini)
- Vaishali Pawar (Capgemini)
- Ayush Thakur (TCS, Capgemini)
- Shipra Kanth (TCS, Capgemini)
- Riya Soni (Capgemini)
- Manoj Dewangan (TRAY, Cognizant)
- Yukti Dewangan (TCS)
- Surbhi Bajaj (TCS)
- Mohit Patel (TCS, Cognizant)
- Abhishek Tandon (TCS)
- Ayushi Kesharwani (Technovert)
- Simarpreet Singh Chawla (Cognizant)
- Gaurav Kumbhare (Cognizant)
- Pritesh Tapkir (Cognizant)
- Nikhil Prasad Gupta (Cognizant)
- Megha Rakundala (Cognizant)
- Aakash Sinha (Cognizant)
- Sandhya Choudhari (Cognizant)

## Achievements

- "Girls on the prowl" led by Akanksha Pandey including Pragati Verma and Anjali Giri of CSE 5th Sem was presented with a consolation prize of Rs 5000/- in State Level Hackathon 2019.
- ToastMaster Kuldeep Singh Thakur secured 2nd place in area level humorous speech contest organized in Hyderabad.

## Our Academic Brilliants

- Ankit Pithalia 4th Sem (1st Rank)
- Riya Tamarakar 4th Sem (2nd Rank)
- Ravleen Bindra 4th Sem (3rd Rank)
- Meenakshi Daga 6th Sem (1st Rank)
- Anusha Lunia 6th Sem (2nd Rank)
- Devashish Verma 6th Sem (3rd Rank)

## Upcoming Events

- International Conference on Sustainable Research in Engineering Science and Management(ICSRESM-2020) 10th - 11th January, 2020
- Smart India Hackathon 2020

## What's Next

Upcoming cover theme for November 2019 issue is **Augmented Reality**. Students may submit their articles in categories such as: Technical Trends, Interesting Facts, Small Technical Game. Please send your article in MS-Word format to Editor in Chief, Abhishek Singh in the email id [cse.newsletter@ssipmt.com](mailto:cse.newsletter@ssipmt.com) with the details of the sender(name, semester, branch).

Issued on the behalf of Computer Science Department.

Shri Shankracharya Institute of Professional Management and Technology, Raipur

Pin Code: 492015, Raipur, Chhattishgarh

Phone: 0771-277289, 2120555, 2120666, Fax: 0771-2120555 E-mail: [cse.newsletter@ssipmt.com](mailto:cse.newsletter@ssipmt.com)