Department of Electronics & Communication Engineering
National Institute of Technology, Rourkela - 769008, Odisha, India
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Workshop on Practical implementation of Smart City Systems

(21st and 25th May 2018)

Overview:

New Internet of Things (IoT) applications that leverage ubiquitous connectivity, big data and analytics are enabling Smart City initiatives all over the world. These new applications introduce tremendous new capabilities such as the ability to remotely monitor, manage and control devices, and to create new insights and actionable information from massive streams of real-time data. As a result, IoT offerings are transforming cities by improving infrastructure, creating more efficient and cost effective municipal services, enhancing public transportation, reducing traffic congestion, and keeping citizens safe and more engaged in the community.

Smart Cities Mission is an urban renewal and retrofitting program by the Government of India with a mission to develop 100 cities all over the country making them citizen friendly and sustainable. Smart Cities Mission focuses on waste management, sewerage treatment plants, smart class rooms, Wi-Fi, smart LED streetlights, city surveillance, traffic signalization project, etc., Such initiative needs several Smart City professional, Engineers and developers to augment in designing and developing IoT based Smart cities.

This workshop introduces the fundamentals of Internet of Things (IoT) and how one can implement for Smart Cities. The course covers infrastructure related architecture, technologies and principles behind IoT for designing an ideal Smart City. The workshop will also discuss about

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building blocks for Smart City and share few of the use cases as well as Smart City framework presented during Global City Team Challenge hosted by National Institute of Standards and Technology (NIST), USA.

Broad Area of interest:

Major aspects of Internet of Things (IoT) using Hardware, Software and Networking for Smart Cities

Objectives:

The primary objectives of the course are as follows:

- Overview of IoT domain related to Hardware, Operating systems and Web IoT protocols.
- Learn building blocks and schematic of building Smart Cities such as Sensors, hardware and cloud components.
- Learn various cloud IoT platforms available for Smart Cities such as Arduino, NodeMCU, AWS IoT, IBM-Bluemix and Microsoft Azure.
- Get exposed to various Sensors (water quality, Air Quality, CTTV/IP Camera, speed sensor, health monitoring, accelerometer, vibration, temperature, fire, humidity, pollen etc.) interfacing with microcontroller in real time.
- How to design and develop Smart City applications.
- Each participant shall build at least one Smart City application utilizing off the shelf hardware, sensors and cloud components.
- Student shall have an opportunity to review the international IoT papers such as IEEE and Open IoT. One can apply these papers for their future research and job opportunities.

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Agenda:

Day	9:30-11:00 (Theory)		11:15-12:45 (Theory)		1:45-3:15 (Lab)		3:30-5:00 (Lab)
1	Introduction to Smart City	Break	Introduction to IoT and Building Blocks of IoT	Break	Overview, Specification and demonstration of Hardware platforms	Break	Overview, Specification and demonstration of Sensors
2	IoT Standards and Protocols		IoT Cloud Platform		Overview of Dew Mobility IoT hardware platform		Demonstration of Dew Mobility IoT hardware platform with AWS IoT
3	Database implementation (BiG Data and other database)		Data Analytics including Video Analytics		Overview of Raspberry Pi IoT hardware platform		Demonstration of Raspberry Pi IoT hardware platform with AWS IoT, Ubidots
4	Security and Privacy		Python, micro-programming and other microcontroller programming language		Overview of Cypress IoT hardware platform		Demonstration of Cypress IoT hardware platform with IBM Bluemix, AWS IoT
5	Mobile Application Development - Android/Tizen		IoT applications – Use cases		Demonstration of apps		Demonstration of apps

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Professional Experts:

Shivakumar Mathapathi

Co-Founder and CTO, Dew Mobility

Team Lead Global City team challenges hosted by National Institute of Standards & Technology, USA

Lecture – IoT course – MSIS - Santa Clara University, CA

Industry Advisor- Senior Design Project- Department of Electrical Engineering, Santa Clara University, CA

Capstone Industry Advisor- MSIS- Smart City project- Santa Clara University, CA, USA

Shivakumar Mathapathi is the Co-Founder and CTO of Dew Mobility. He is the Team Lead for Global City team challenge hosted by National Institute of Standards & Technology (NIST USA). Shivakumar has over 25 years of experience in product development, design and faculty. Mathapathi is a seasoned technologist, entrepreneur, instructor and practitioner on the Internet of Things (IoT) with extensive experience as lead faculty, lab-practice and mentorship in executing smart city, smart agriculture, assisted living and other IoT related projects. He has designed study programs and academic syllabus for The IoT course, a Masters curriculum (4 units) taught at Santa Clara University and California Polytechnic State University. He led capstone design project at Cal Poly (part of California State University) to design and develop IoT cloud platform needed for smart city.

Tharun Kumar

Engineering Manager, Xtrans Solutions Private Limited

Tharun Kumar has 13 years of experience in various domains and mainly focused on Internet of Things, Mobile and Web Applications. He has 6 years of experience in USA. He had worked with Ericsson, Motorola, etc.,