Day-1 (14th Dec 2020)	Time (IST)
TUTORIAL-1	09.30 am - 11.00 am
Title: Machine learning for beyond 5G networks	11.30 am - 01.00 pm
Anubha Gupta (Professor, IIIT-Delhi)	
Vimal Bhatia (Professor, IIT-Indore)	
TUTORIAL-2	09.30 am - 11.00 am
Title: Blockchain-powered 5G-IoT Ecosystem vis-`a-vis COVID-19: Opportunities and Challenges	11.30 am - 01.00 pm
Anshuman Kalla (Postdoctoral Visiting Researcher, CWC, University of Oulu, Finland)	
Madhusanka Liyanage (Assistant Professor, University College Dublin, Ireland)	
TUTORIAL-3	2.00 pm - 03.30 pm
Title: Quantum Internet for Advanced Networks and Telecommunication Systems	04.00 pm - 05.30 pm
Anand M. (Senior Research Engineer, C-DOT, Bangalore)	
TUTORIAL-4	2.00 pm - 03.30 pm
Title: Intelligent Traffic Management leveraging 5G & Edge Computing	04.00 pm - 05.30 pm
Shailesh Prabhu (Senior Project Engineer, Wipro Limited)	
Ramneek Kalra (Project Engineer, Wipro Limited)	

Detailed Information

TUTORIAL-1 (Machine learning for beyond 5G networks)

Abstract: The tutorial will be covered in two parts and introduce attendees to the applications and solutions of Artificial Intelligence/Machine and Deep Learning for the next generation communication systems. In the first part, we will begin with a brief introduction of machine learning and the emergence of deep learning. There would be a brief recap of artificial neural networks and the problems associated with training of deeper neural network architectures. We will then, discuss deep belief networks, autoencoders, convolutional neural networks, and recurrent neural networks. In the second part, we will briefly look at the recent research literature and applicability of machine and deep learning for beyond 5G communication networks.

TUTORIAL-2 (Blockchain-powered 5G-IoT Ecosystem vis-`a-vis COVID-19: Opportunities and Challenges)

Abstract: The world is going through an unprecedented situation due to the spread of Coronavirus Disease 2019 (COVID-19). To contain the spread of the disease, some of the drastic measures that have been adopted are lockdown, social distancing, restriction on the social gathering, movement restriction, etc. These measures, coupled with the fear and anxiety of getting infected by the disease, have led to adverse effects on our personal as well as professional lifestyle. Despite these strict measures, we are still able to manage and move ahead; thanks to technologies that have provided means and support to fight against COVID-19. In this direction, we believe, powerful mix of technologies like Blockchain, 5G and IoT can play a cardinal role in handling the current (and post COVID-19) situation. Blockchain itself is a powerful mix of technologies that underlies it, whereas, 5G via mMTC has especial focus for IoT and its applications in numerous domains like MIoT, IIoT, smart cities, smart agriculture, etc. What would be interesting is to see how these technologies can fit-in together to mitigate the issues that have come-up during COVID-19 times. Thus, this tutorial will elaborate on the combined role of blockchain, 5G and IoT, the key aspects, numerous use cases in view of COVID-19, and the challenges that need attention by the research community. The tutorial also aims to provide a demonstration on blockchain enabled IoT application using both Ethereum and Hyperledger fabric. We hope this will provide attendees an opportunity to gain some practical exposure.

TUTORIAL-3 (Quantum Internet for Advanced Networks and Telecommunication Systems)

Abstract: We summarize how and where resilience is provided by commercial telecommunication carriers in today's optical networks. We first describe the typical partitioning of terrestrial networks into their segments and then describe the multi-layered structure within each of these segments. Within these constructs, we summarize where and how network resiliency is provided. To better understand how the resiliency techniques deployed in various layers and segments are engineered, we discuss how end-to-end services are pieced together to provide their needed quality of service and availability. Finally, to provide insight into the evolution of this methodology, we overview why key resiliency technologies and methodologies were deployed plus, possibly more importantly, why some were phased out. This talk is based on the lead chapter in Springer Handbook of Optical Networks, Part B.

TUTORIAL-4 (Intelligent Traffic Management leveraging 5G & Edge Computing)

Abstract: As a result of urbanization, the traffic density in the roads has drastically increased. Lack of self-discipline in drivers/pedestrians leads to various problems like traffic violations, pedestrians not following lane discipline, traffic congestion, accident reporting, etc. As the traffic condition get worse considering the increase in the number of vehicles every day, there is a critical need for technology to enable an Intelligent Traffic Management (ITM) system to overcome the existing problems.
While there are existing technology solutions to manage the traffic, the current systems lack the mechanism of real-time traffic analysis due to the limited network connectivity. In our tutorial, we bring in the aspect of solving the current traffic problems leveraging Edge Computing. Edge, being natively supported in the 5G architecture, is a potential enabler of real-time traffic analysis close to the sensors, scalability in large deployments and life cycle management of traffic analytics applications. The tutorial also will highlight these abilities through various Edge analytics solutions to different traffic problems. We will also be showcasing prototype implementation results related to real-time traffic violation detection and reporting. Finally, we will give a gist of the current research work in this field and propose resource efficient algorithms to enable real-time traffic analytics.