3 Weeks Summer School Program on

11th July to 29nd July, 2022

Machine Learning for Wireless Networks and Computer Vision with Hands-on-Experience

Organized By
Department of Electronics and Communication Engineering
Delhi Technological University
(Formerly Delhi College of Engineering)
Bawana Road, Delhi-110042
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Assistant Professor, ECE
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Assistant Professor, ECE
DTU

Convenors

Course Content

Wireless Networks and Computer vision-based intelligence are two very essential elements of the Internet of Things (IoT) solutions. Today, Computer vision, coupled with Computer Networks, advanced data analytics, and artificial intelligence, are acting as catalysts for each other, giving rise to revolutionary leaps in the Internet of Things (IoT) innovations and applications. The summer school platform will provide a learning platform for budding researchers and young minds to explore a new dimension of intelligent IoT-based systems equipped with wireless connectivity and computer vision-based applications with hands-on experience sessions. The Summer School will also organize a "**Poster Presentation**" for the participants and **prize with certificat**e will be awarded to three winners.
The Summer School program features hands-on sessions and talks by invited experts from industry including National Instruments, Ettus Research, Mathworks, HFCL, etc. and from the academia including IITs, IIITs, DTU, etc.

About DTU

Delhi Technological University (DTU), formerly known as the Delhi College of Engineering (DCE), is a public engineering university located in New Delhi, India. It was established in 1941 as Delhi Polytechnic and was under the control of the Government of India. The college has been under the government of the National Capital Territory of Delhi since 1963 and was affiliated with the University of Delhi from 1952 to 2009. In 2009, the college was given the state university status, thus changing its name to Delhi Technological University. It offers courses for Bachelor of Technology (B.Tech), Master of Technology (M.Tech), Doctor of Philosophy (Ph.D.), and Master of Business Administration (M.B.A.) and contains fourteen academic departments with a strong emphasis on scientific and technological education and research.

Broad Areas of Focus

Applications of Machine Learning for different wireless applications
- Software Defined Radio,
- Cognitive Radio,
- Reconfigurable Intelligent Surfaces.
- Use of Simulink, Labview and GNU Rdio for wireless applications

Study of ML and DL architectures for Computer Vision Applications
- Fundamentals of Neural Networks
- Recurrent Neural Nets
- Convolutional Neural Nets
- Transformers

Intended Audience

The intended audience of the summer school is B. Tech., M. Tech., Ph.D. students and young professionals from both industry and academia.

Registration

- The number of seats are limited, to be filled on a first come first basis.
- **Registration Fees: Rs. 500/-**
- Registration amount will be refunded to each candidate after successful completion of the event (with at least 75% attendance).
- Registration with payment will be considered valid.
- Registration fee submissions by

Paytm / PhonePe (No - 9312722617)

- For Registration click on the link below:
https://forms.gle/7QQHwKj9GUb2BML47
- Last Date of Registration : **9th July, 2022**

For any Query
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3-Weeks Summer School
On
Machine Learning for Wireless Networks and Computer Vision
with Hands-on Experience
(11^{th} July- 29^{th} July 2022)

Tentative Schedule

Week 1

Date/Time	10:30AM-12:30PM	12:30 PM To 1:30 PM	1:30 PM – 3:30 PM	3:30PM-4:00 PM
Day 1 11.07.2022	Registration & Inaugural Session (10:30AM-11:30 AM)	**Lunch Break**	SDR and GNU Platform **(Session 1)**	**Tea time and Informal Discussion**
	Keynote Session (11:30 AM – 12:30 PM)			
Day 2 12.07.2022	SDR and GNU Platform **(Session 2)**		Hands-on practice on GNU Radio **(Session 1)**	
Day 3 13.07.2022	Hands-on practice on GNU Radio **(Session 2)**		Practical examples using USRP **(Session 1)**	
Day 4 14.07.2022	Practical examples using USRP **(Session 2)**		Real time applications using USRP	
Day 5 15.07.2022	Introduction to Software Defined Radio (SDR) **(Session 1)**		**Expert Talk 1**	

Week 2

Date/Time	10:30AM-12:30PM	12:30 PM To 1:30 PM	1:30 PM – 3:30 PM	3:30PM-4:00 PM
Day 1 18.07.2022	Reinforcement Learning (RL) for Cognitive Radio **(Session 1)**	**Lunch Break**	RL for Reconfigurable Intelligent Surfaces (RIS)	**Tea time and Informal Discussion**
Day 2 19.07.2022	Hands-on Experience on RL for CR Using GNU Radio		Hands-on Experience on RL for CR Using MATLAB	
Day 3 20.07.2022	Hands-on Experience on RL for CR Using MATLAB		**Expert Talk 2**	
Day 4 21.07.2022	Fundamentals of NN and CNN **(Session 1)**		**Hands on Practice:** CNN based classification using python **(Session 2)**	
Day 5 22.07.2022	Concept of Recurrent Neural Networks, GRUs **(Session 1)**		**Hands on Practice:** LSTM and Bi-LSTM based learning for sequential data using python **(Session 3)**	

Week 3

Date/Time	10:30AM-12:30PM	12:30 PM To 1:30 PM	1:30 PM – 3:30 PM	3:30PM-4:00 PM
Day 1 25.07.2022	Introduction to Transformers	**Lunch Break**	**Hands on Practice:** Transformers	**Tea time and Informal Discussion**
Day 2 26.07.2022	Scene Understanding in Aerial images		**Hands on Practice:** Aerial Image classification	
Day 3 27.07.2022	**Expert Talk 3**		**Hands on Practice:** CNN based for Corona virus detection system	
Day 4 28.07.2022	Video Summarisation		Poster Presentation Competition	
Day 5 29.07.2022	**Expert Talk 4**		Closing Ceremony, Prize and Certificate Distribution	