

Workshop on Machine Learning, Deep Learning and Computational Intelligence for Wireless Communication (MDCWC 2023)

(Hybrid mode)

(FIRST COME FIRST SERVED BASIS)

23rd June and 24th June 2023



REGISTRATIONS OPEN FOR THE WORKSHOP-1 AND WORKSHOP-2

Workshop – 1: Mathematical Foundation for Machine Learning and Wireless Communication (Date: June 23rd 2023 Time: 1.45 P.M. to 3.45 P.M.)

Session 1: Bayes Technique for Machine Learning



Most of the Machine learning algorithms like Regression, Classification, Clustering, etc. are formulated using Bayes technique. The workshop focusses on sample problem formulation and the methodology to solve using Bayes technique. This will be useful for the beginner researcher those who are doing research in Machine learning applications. Talk will be based on the book authored by the speaker “Pattern recognition and Computational intelligence using Matlab”, Springer publications, which is recognized as one of the Best New pattern recognition books by the Book authority (leading site for book recommendations)

Speaker: [Dr. E.S. Gopi](#), Associate professor, Department of ECE, NIT, Tiruchirappalli



Session 2: Introduction to Orthogonal Frequency Time Space (OTFS)

One of the recently developed promising modulation techniques based on Delay-Doppler representation of data is OTFS. The talk gives the mathematical introduction of the OTFS model with demonstration using Matlab. This will be helpful for the beginner research scholars those who are doing research in wireless domain. The talk will be based on the recent publication by the speaker on the recently published article “On the Performance of Generalized Spatial-Index Modulation Based Orthogonal Time Frequency Space System”, published as the proceedings of National Conference on Communications 2023.

Speaker: [Dr. P. Maheswaran](#), Assistant professor, Department of ECE, NIT, Tiruchirappalli

Workshop – 2: Deep Learning based RF Signal Classification-Hands-on (Date: June 24th 2023 Time: 1.45 P.M. to 3.45 P.M.)

Abstract: Radio Frequency (RF) signal classification is a key technique of Dynamic Spectrum Access (DSA) to utilize the unused spectrum in Cognitive Radio (CR) to meet the ever-increasing traffic demands for the next generation 5G and beyond cellular networks. In recent years, the RF signal classification for CR-based applications using Deep Learning (DL) architectures has received considerable attention. This tutorial focuses on a DL-based framework with Convolution Neural Network (CNN) architecture for classifying various modulation schemes such as BPSK, QPSK and GMSK. The real-time GSM signals captured from the nearby base stations will be used to analyse the performance of the developed CNN architecture. (For further details scan QR code given below)



Tutorial speakers:

1. Dr. Prabhu Chandhar, Director, Chandhar Research Labs, Chennai, India.
2. Mrs. K.Tamizhelakkiya, Wireless Researcher, Chandhar Research Labs, Chennai, India.

Highlights:

1. Certificate and materials will be provided for all the participants.
2. Lucid presentation of the complex topics with illustration.
3. Given the chance to submit the chapter to the book “Machine Learning for Wireless Communication with simulation illustration” published by springer (every submitted papers will be subjected to regular review process).

*WebEx link will be shared to registered online participants

Tutorial Schedule:

- 01:45 PM - 02:00 PM: Fundamentals of Deep Learning and CNN architecture
- 02:00 PM - 02:30 PM: Live Demo: Dataset generation using Deep Radio® , GNU platform and Wi-Guy®
- 02:30 PM - 03:15 PM: Hands-on: CNN model training
- 03:15 PM - 03:45 PM: Hands-on: Testing and Real-Time modulation prediction

Tutorial Outline Learning Objectives: By the end of the tutorial, the participants shall be able,

- ✓ To use Kaggle platform for handling big RF datasets for DL-based wireless projects .
- ✓ To learn Python programming tools for signal processing and DL .
- ✓ To prepare, train, test and predict real-time wireless signal.



Organized by

Pattern recognition and Computational intelligence group
Department of Electronics and Communication Engineering
National Institute of Technology Tiruchirappalli



Registration Details:

Registration fee:

- Workshop 1: Rs.1000
- Workshop 2: Rs. 1000
- Both workshop 1 & 2: Rs. 1500
- Group participation (max. : 2) for individual workshop: Rs. 1500

Mode of payment:

SBI collect

1. For payment <https://www.onlinesbi.sbi/sbicollect/icollecthome.htm> > Educational Institutions > CONFERENCE AND WORKSHOP NIT TRICHY > ECE MDCWC 2023
2. Workshop registration: <https://forms.gle/HpZWQw6uN3aaI4QWA>



For future details contact:

esgopi@nitt.edu,
mahes@nitt.edu,
mdcwc2023@nitt.edu