Charul

Website: pcharul.github.io
Email: charuli@iiitd.ac.in
LinkedIn: charul-paliwal-915860144
GitHub: github.com/pcharul
Twitter: charulp9

Education

Indraprastha Institute of Information Technology — New Delhi, India
Ph.D., GPA: 9.26/10 — 2017–current

- Research: "Spatio Temporal Signal Processing"
- Advisor: Dr. Pravesh Biyani

Indraprastha Institute of Information Technology — New Delhi, India
M.Tech. in Communication and signal processing, GPA: 9.26/10 — 2016–2018

Indira Gandhi Institute of Technology (Now IGDTU) — Delhi, India
B.E. in Electronics and Communication Engineering, Percentage: 86.49 — 2012–2016

Publications

[1] C. Paliwal and P. Biyani, "Selective drive by sensing", in *process*, 2021.

[2] C. Paliwal, P. Biyani, and K. Rajawat, "Variational bayesian filtering for spatio temporal matrix completion", in *IEEE ITS (Submitted)*, 2021.

[3] C. Paliwal, U. Bhatt, P. Biyani, and K. Rajawat, "Traffic estimation and prediction via online variational bayesian subspace filtering", *IEEE Transactions on Intelligent Transportation Systems*, 2021.

[4] Charul, U. Bhatt, P. Biyani, and K. Rajawat, "Online variational bayesian subspace filtering", in *ICASSP 2019 - 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2019, pp. 5057–5061.

[5] C. Paliwal and P. Biyani, "To each route its own eta: A generative modeling framework for eta prediction", in *2019 IEEE Intelligent Transportation Systems Conference (ITSC)*, IEEE, 2019, pp. 3076–3081.

Skills

- **Programming Languages:** Python, Matlab
- **Library:** Tensorflow, Pytorch, PyTorch Lightning, Sklearn, Numpy, apricot
- **Expertise Area:** Optimization, Variational Inference and Deep learning

Research Interests

- Machine Learning
- Deep Learning
- Statistical Signal processing
- Variational Inference
- Optimization
- Transportation

Projects

Selective Drive by Sensing Mar, 20 –Current

Guide: Dr. Pravesh Biyani

- The objective of this project is to select the buses to create a system of vehicle mounted sensors that performs accurate air quality sensing.

Air Quality Data Monitoring and Prediction using Moving Vehicles Sept, 19 –Current

Guide: Dr. Pravesh Biyani

- Given the measurements in time and few nodes in the city network due to moving sensors, we estimate the spatio temporal air pollution matrix.

Scalable ETA prediction Jan, 20 –current

Guide: Dr. Pravesh Biyani

- We are working on providing the ETA prediction for more than 1000 routes of DIMTS and DTC buses in Delhi. https://mybus.chartr.in/.

Deep learning based generative model for Bus ETA Prediction Jan, 19 –Jun, 19

Guide: Dr. Pravesh Biyani

- We propose a novel ETA prediction algorithm based on generative autoregressive deep learning model that integrates both traffic speed corresponding to the bus as well as the stopping time in one framework.

Speech synthesis based Hearing Aid Dec, 17 –Jan, 19

Guide: Dr. Pravesh Biyani

- We use a speech synthesis paradigm to construct clean speech from the mixture by exploiting the speaker characteristics and the correlation between subsequent formants to improve the intelligibility of the output speech. The system consists of multiple convolutional networks with an aim to first extract formant level features and then estimate subsequent phoneme level embedding from the Mel spectrogram. An autoregressive recurrent network then consumes these embeddings to generate clean speech of the target source.

Speech synthesis and Mimicking system Aug, 17 –Nov, 17

Guide: Dr. Saket Anand and Dr. Anubha Gupta

- This project aims in mapping the voice characteristic of one user to another user. GMM, neural network methods(RNNs i.e. LSTM, GRU) are used to develop a model to map the acoustic features of one user to the other.

Stimulation and design of Quadrifilar helix Antenna Sept, 16 –Nov, 16

Guide: Dr. Shobha Sundar Ram

- A circular polarized, narrowband ,5dBi quadrifillar helix antenna is stimulated in CST. Implemented design is also developed.

PC to PC communication using LiFi Jan, 16 –May, 16

Guide: Dr. Kanchan Sharma

- This project is based on visible light communication between two computers.

Scholarships and Awards

- DST Ph.D. scholarship 2019
- IEEE Intelligent Transportation Systems Society Travel Grant. 2019
- IEEE Signal Processing Society Travel Grant. 2019
- TA Excellence Award for your TAship for the course Principle of communication system. 2017

- AICTE Post graduate scholarship for Masters education 2016–2018
- Received Shail Bala Jain Motivational price for academics 2014–2015
- Event management in IGIT tech fest Impulse' 15 Impulse'14, Impulse'13, Taarangana'14, Taarangana'15 2013 –2015

Hobbies

- Travelling, Exploring New Places, Hiking
- Reading about Psychology and Mindfulness
- Dancing
- Squash