



Mohit Agarwala
Electrical Engineering
Indian Institute of Technology, Bombay
Specialization: Communications Engineering

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M.Tech.
Gender: Male
DOB: 04-11-1996

Examination	University	Institute	Year	CPI / %
Post Graduation	IIT Bombay	IIT Bombay	2022	null
Graduation	MAKAUT	Heritage Institute of Technology	2018	7.85
Graduation Specialization: Electronics and Communication Engineering				
Intermediate	CBSE	D.A.V Public School	2014	86.80%
Matriculation	ICSE	Splendour High School	2012	89.28%

AREAS OF INTEREST

- Wireless Communication
- Machine Learning
- Deep Learning in Image & Speech Processing

SCHOLASTIC ACHIEVEMENTS

- Secured **98.86** percentile in **GATE**(Graduate Aptitude Test in Engineering) among 104782 candidates. (2019)
- **AA** grade in Seminar on **Low Latency High Throughput Wireless Networks** at IIT Bombay. (2020)

PUBLICATIONS

IEEE | ONLINE PARTIAL SERVICE HOSTING AT THE EDGE *ICCCN 2021, Greece*
V S Ch Lakshmi Narayana, Mohit Agarwala, Nikhil Karamchandani, Sharayu Moharir

- **Objective:** Problem of service hosting where an application provider can dynamically rent **edge computing** resources and serve user requests from the edge to deliver a **better quality of service**.
- **Proposed a Dynamic policy α -Retro Renting** and provided its performance guarantees at the **edge server**.
- **Conducted extensive Monte-Carlo & trace driven simulations** to demonstrate the performance of **α -RR**.
- **Found several parameter regimes where α -RR's ability to store partially greatly improves cost-efficiency.**

MAJOR PROJECTS AND SEMINARS

- **Quality of Service for heavy multimedia in a complete wireless environment**
Guide: Prof. Nikhil Karamchandani, EE Dept., IIT Bombay | M.Tech Project (March 2021 - Present)
 - **Objective:** To develop algorithm for remote control and rendering of graphics for high bandwidth application.
 - Built a **reliable UDP** Protocol for Multi-media applications in c++/Python from scratch.
 - Studied Operator/Tele-Operator based **Haptics** application to perform remote based pottery making.
 - Measured **one way packet-wise** latency in a congested environment using **time synchronization** via **Marzullo's Intersection Algorithm**.
 - Studied the cause of packet drop in low reliable UDP protocols with **Wireshark**.
 - Implemented **packet marking** for **priority access** to a certain type of traffic for **ultra fast transmission**.
- **High Throughput, Ultra-low latency Multimedia over wifi**
Guide: Prof. Nikhil Karamchandani, EE Dept., IIT Bombay | M.Tech Seminar (July 2020 - Dec 2020)
 - Studied the effect of **prioritizing traffic** in latest **IEEE 802.11ax** wifi, while maintaining **fairness** and **QoS**.
 - Studied practical design choices including the **optimal configuration** of the scanning process during handoffs and the codec parameters for **delay optimization**.
 - Explored the use of Wi-Fi (IEEE 802.11n/r) network for remote control of a vehicle using **video transmission** on the uplink and **control signals** for the actuator on the downlink.
- **Geolife Trajectory Data Analysis**
Guide: Prof. Nikhil Karamchandani, EE Dept., IIT Bombay | Research Project (May 2020 - Dec 2020)
 - **Objective:** Streamline and create **Python-SQL** based UI for efficient analysis and error correction of Zero Based Time Table (ZBTT) simulator output.
 - Developed tools for map simulation from **Taxi GPS data** of **Beijing City**.
 - Used **Dijkstra's Algorithm** for shortest path calculation and **Fractional Knapsack** for finding path with maximum benefit.

KEY ACADEMIC PROJECTS

- **Speech to Sign-Language(with emotions) for the Hearing-Impaired**

Guide: Prof. Preeti Jyothi, CSE Dept., IIT Bombay | Automatic Speech Recognition (Jan 2021 - Jun 2021)

- **Objective:** To classify the text data into either a positive or a negative sentiment.
- Trained various neural networks LSTM, GRU, Bi-LSTM and Bi-GRU on IMDB Dataset, and studied the evolution of their performance on changing the number of units and layers.
- Studied the effects of using different learning-rate schedulers like Cosine Annealing scheduler, Exponential rate scheduler, Step scheduler and Reduce Learning Rate on Plateau scheduler.
- Achieved an accuracy of **87%** using BiGRU model and around **86%** accuracy using LSTM model with Reduce Learning Rate on Plateau Scheduler.

- **Flash No-Flash Photography**

Guide: Prof. Suyash P. Awate, CS Dept., IIT Bombay | Digital Image Processing (Aug 2020 - Dec 2020)

- Implemented denoising and detail transfer to merge the ambient qualities of the no-flash image with the high-frequency flash detail, using cross-bilateral filtering.
- Performed white-balancing to change the color tone of ambient images, continuous flash to interactively adjust flash intensity, and red-eye removal to repair artifacts in the flash image.

- **Facial Emotion Recognition using Deep Learning**

Guide: Prof. Preeti Jyothi, CSE Dept., IIT Bombay | Automatic Speech Recognition (Aug 2020 - Dec 2020)

- Synthesized phonemes by implementing source filter model to replicate the human glottal source.
- Performed Linear Predictive Analysis of natural and synthetic speech which involved LP coefficient estimation, constructing LP magnitude spectrum and sound reconstruction.

SELF PROJECTS

- **Attrition Classification**

- **Objective:** To predict whether an employee will leave the company or not based on 33 information points
- Achieved accuracy of **88.47%** by training **SVM** (Support vector machine) classifier on **Kaggle dataset**.
- Extracted relevant and less correlated features and applied One-Hot Encoding for features with multi-classes.

- **Support Vector Machine**

- **Objective:** Implement the modified SVM algorithm in the paper titled **Pegasos: Primal Estimated sub-GrAdient Solver** for SVM using NumPy.
- Use SVM classifier on linear data and kernelized-SVM on non-linear data.

- **Routing Information Protocol (RIP) using C** | Communication Networks

(Jan 2020 - Apr 2020)

- **Objective:** To implement RIP using socket programming (in Linux).
- Implemented RIP (Distributed Bellman Ford Algorithm) using C socket programming that read a given network topology and generated the cost matrix for the shortest paths between the nodes.

TECHNICAL SKILLS

● **Programming Languages :** C, C++, Python, HTML | **Operating Systems:** Windows, Linux

● **Tools and Software :** MATLAB/GNU Octave, TensorFlow, PyTorch, Pandas, NumPy, GNU Radio.

POSITIONS OF RESPONSIBILITY

- **Institute Interview Coordinator** | Institute Placement Team, IIT Bombay

(Nov 2019 - Dec 2019)

- Coordinated with a team of 250+ members for interviews of **1600+ students**.
- Assisted in conducting Pre-Placement Talks, Placement Tests and Interviews for **15+ firms**.

- **Mess Councillor** | Hostel Affairs Team, IIT Bombay

(July 2019 - April 2020)

- **Supervised, coordinated & managed** the planning & execution of food needs for **600+** hostel students.
- Ensured **quality meals** at **minimum cost**, utmost hygiene with **zero-waste** management system.
- **Organized** & participated in various **cultural, technical** and **sport** events for Hostel-4 IIT Bombay.

RELEVANT COURSES

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|------------------------------------|-----------------------------------|--------------------------------|
| ● Statistical Signal Analysis | ● Digital Image Processing | ● Optimization & Real Analysis |
| ● Fundamentals of Machine Learning | ● Automatic Speech Recognition | ● DSP & its applications |
| ● Digital Message Transmission | ● Wireless & Mobile Communication | ● Communication Networks |

EXTRA CURRICULAR ACTIVITIES

- Received **Special Mention Award, Hostel-4 Organization 2020** for my work as a part of Hostel Affairs Team.
- **Won Gem of the General Championship** (MDGC-2019) for Hostel-4, IIT Bombay as part of Dramatics team.
- **Interests and Hobbies:** Cricket, Badminton, Table tennis, Listening to music.