
# PRANAV PARAG MAHAJAN

Course :**B.E. (Hons.)**, Electronics and Communication Engineering, 2021
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CGPA :9.202


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|---|---|
| **Subjects / Electives** | Linear Algebra and Complex Analysis, Probability and Statistics, Computer Programming, Signals and Systems, Nonlinear Dynamics and Chaos, ODE, Electronic Devices, Multivariate Calculus, Digital Design, Environment Development Climate Change, Control Systems, Electromagnetic theory |
| **Technical Proficiency** | Python3, Shell Scripting, Verilog, MASM, Android Development, Git, C++, MATLAB, PyTorch, OpenCV, C Programming, Unity3D, Proteus |

## ACADEMIC DETAILS

| COURSE | SPECIALIZATION | INSTITUTE/COLLEGE | BOARD/UNIVERSITY | SCORE | YEAR |
|---|---|---|---|---|---|
| CLASS XII | Computer Science | P. JOG JR. COLLEGE | MAHARASHTRA STATE BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION | 554 MARKS | 2017 |
| CLASS X | | MILLENIUM NATIONAL SCHOOL | MAHARASHTRA STATE BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION | 473 MARKS | 2015 |

## SUMMER INTERNSHIP / WORK EXPERIENCE

**Summer Research Intern, CSIR - Central Electronics Engineering Research Instituite** — **May 2019 - Jul 2019**

Deep learning based Face Anti-spoofing using auxiliary supervision. Supervisor: Dr. Sanjay Singh.

- Preprocessed and created a pseudo ground truth for Replay Attack database.
- Trained a depth-estimator using 3D CNN autoencoder architecture.
- Working on cross database testing and rPPG based decoder to aid inference.

**Summer Intern, Mitera Tech.** — **May 2018 - Jun 2018**

- Designed and coded a general IOT framework for Home Automation linking Raspberry Pi, Arduino with a real-time database and developed an Android app which used Google Firebase – starter code open-sourced here.
- Implemented K-means clustering to make thermostat smarter by learning from less data and more specific to each user's actions.
- Preprocessed and augmented a dataset of HMI images to improve performance of an existing deep learning implementation.

## PROJECTS

**Generative latent chaotic timeseries - Nonlinear dynamics and Deep learning** — **Apr 2019 - Present**

Supervisor: Dr. Chandradew Sharma.

- Reproduced this paper, by implementing nonlinear models from scratch such as global polynomials, local polynomials, neural networks and semi-local methods including radial basis functions.
- Future work includes building and comparing a generative latent VAE-based chaotic timeseries model using LSTMs and Neural ODEs.
- I also wish to explore expressing timeseries in terms of wavelets and splines.

**x86 based Cash Register - Microprocessors and Interfacing** — **Mar 2019 - Apr 2019**

- Designed a memory for the microprocessor and I/O interfacing with LCD and buzzer as per requirements in Proteus.

**Reinforcement learning based strategy for Mobility-aware cognitive radio networks - Wireless Sensor Networks** — **Dec 2018 - Present**

Supervisor: Dr. Ramesha C.K. and Dr. Rajalekshmi Kishore.

- Studying the impact of mobility of Primary users and Secondary users in Cognitive Radio Ad-hoc Networks on various factors such as probability of detection, false detection, missed detection, correlated measurements.
- Using a simple energy detector, working towards building a robust co-operative sensing model using model free reinforcement learning methods such as Q-learning and SARSA. Exploring the possibility of Multi-agent RL and framing as markov games.

**Twitter based NLP Bot for Disaster Management - Information Retrieval, Deep learning** — **Oct 2018 - Nov 2018**

- Built and deployed to Azure in 4 weeks as a submission to Microsoft Codefundo++ Hackathon.
- Cleaned earthquake related tweets, and trained a neural net with 89% accuracy to classify them into 4 sets depending on the type of information the tweets offer
- Then summarizing (using ILP and encoder-decoder network) each of the 4 sets to maintain order in the end real-time summary. You can find the repo of this project here.

**Touchless 3D tracking interface using capacitive sensing - Electromagnetic theory** — **Aug 2018 - Sep 2018**

- Designed a simple distance tracker from aluminium foil, cardboard and Arduino.
- Measured change in charging time due to change in dielectric medium using MATLAB. [video]

**Game development - Android platform** — **Apr 2015 - May 2015**

- Developed and deployed 2 apps to Playstore: Drunk Ball Pong and Techno-Bounce using Unity game engine.

## POSITION OF RESPONSIBILITY

**Vice President - Center for Technical Education** — **May 2019 - Present**

CTE is a college organisation that provides non-academic skill training through courses conducted by seniors based on manual and practical learning. CTE is involved in various mentoring activities, hackathons and project fundings on campus.

**Finance Head - Centre for Technical Education** **Jan 2019 - Apr 2019**

**Schooling Head - Centre for Technical Education** **Aug 2018 - Apr 2019**

## CERTIFICATIONS

| NAME | CERTIFYING AUTHORITY |
|---|---|
| Certificate in Network Management | BITS PILANI and NETTECH |
| Reinforcement Learning - Merit Certificate | CTE, BITS Pilani, Goa campus |

## COMPETITIONS

**Elo merchant challenge - Kaggle competition** **Feb, 2019**
Rank : 387 / 4129 (Bronze Medal, Top 10%)

## EXTRA CURRICULAR ACTIVITIES

**Technical Writer @ Towards Data Science**

- Exploration and comparison of various **model-free RL** approaches for solving **Blackjack** environment. Corresponding medium article.
- Overview of **Neural Ordinary Differential equations** and how to use them. Corresponding articles in progress.
- **Ms Pacman AI** using Deep Q learning. Colab link.

**Peer Mentorship Program(PMP) Mentor**

PMP helps students reduce the confusion when transitioning to college, discovering new ways to balance class-work and student organisations and empowering interpersonal leadership experience. Mentored 8 first-year students, recognised by BITS.

## SCHOLARSHIPS

**Merit Scholarship** **Jan 2018**
Semester 1-1 Merit Scholarship

## LANGUAGES KNOWN

Hindi, English, Marathi, Sanskrit