Aditya Savio Paul

Junior Research Fellow – Tartu Observatory

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INTRODUCTORY TITLE

Research Interest

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Education

Masters of Science - Robotics and Space Technology (*cum laude*)
    University of Tartu, Estonia *2018-2020*

Bachelor of Technology - Mechatronics Engineering
    University of Petroleum and Energy Studies, India *2013-2017*

Work Experience

Engineer : ESTCube - Satellite Program
Communication Subsystem and Ranging Experiment for Cube Satellites *2018 - Ongoing*
Tartu Observatory, Estonia

- Developing a client-server based load generator for testing SDN and NFV based EPC implementations
- Will be capable of generating traffic conforming to various transport layer protocols
- Employing **multi-threaded** programming to simulate multiple users for load generation

Graduate Research : Master's Thesis
Autonomous motion planning for spacecrafts near small solar system bodies *2019 - 2020*
Supervisors : Michael W. Otte (University of Maryland), Viljo Allik (Tartu Observatory)

- Devised a mechanism to counter device heterogeneity for human activity recognition by mobile sensors
- Analyzed various time and frequency domain features on accelerometer and gyroscope readings
- Used **canonical-correlation analysis** to project the datasets onto a common subspace
- Identified device pairs that achieved an **improvement of 33%** in the F1-score of cross-validation

Robotics and Automation Engineer
Strategies for Autonomous Motion for unmanned ground vehicles *2017-2018*
Oxygen to Innovation, India

- Analyzed tradeline level data to manufacture custom customer features for modeling
- Modeled the data using big data **machine learning techniques** such as Gradient Boosting
- Achieved an overall **60% accuracy** with **72% recall** of targets

Team Leader | Payload Engineer
CanSat Program, United States of America *2015-2017*
- Analyzed tradeline level data to manufacture custom customer features for modeling
- Modeled the data using big data **machine learning techniques** such as Gradient Boosting
- Achieved an overall **60% accuracy** with **72% recall** of targets

Engineer (Intern)
Reliability Engineering for Tractor Components *2016*
Mahindra Swaraj, India

- Analyzed tradeline level data to manufacture custom customer features for modeling
- Modeled the data using big data **machine learning techniques** such as Gradient Boosting
- Achieved an overall **60% accuracy** with **72% recall** of targets

Scholastic Achievements

- Secured **All India Rank 5** in JEE Advanced 2013 among **150,000** candidates
- Secured **99.99** percentile in JEE Main 2013 among 1.3 million students

- Awarded **Bihar Gaurav 2013** by Bihar Government for exceptional performance in JEE 2013
- Awarded **AP grade** in Computer Programming and Utilization course for exceptional performance, given to **11 students out of 532**

Academic Projects

Coloring Grayscale Images using CNNs

Guide: Prof Sunita Sarawagi, CSE Dept, IIT Bombay   *Autumn 2016 (ongoing)*
- Employing convolutional neural networks to add color to grayscale images

Handwritten Devnagri Character Recognition

Guide: Prof Sunita Sarawagi, CSE Dept, IIT Bombay   *Autumn 2016*
- Designed and developed a convolutional neural network to recognize handwritten devnagri characters
- Achieved **85% accuracy** using Adam optimizer and L2-regularization

Efficient Heuristics for Ballooning in KVM
Guide: Prof Purushottam Kulkarni, CSE Dept, IIT Bombay   *Autumn 2016 (ongoing)*
- Designing smart memory usage based heuristics to determine parameters for ballooning service in KVM

Compiler for a C-like Language
Guide: Prof Amitabha Sanyal, CSE Dept, IIT Bombay   *Spring 2016*
- Developed a compiler for a subset of C using *Flexc++* and *Bisonc++*
- Supports all major C features like function calls, recursion, multidimensional arrays and function call nesting
- Incorporated syntactic and semantic checks and lazy evaluation

Markov Text Generator
Guide: Prof G Sivakumar, CSE Dept, IIT Bombay   *Autumn 2015*
- Developed a Python **Markov text generator** that employs n-gram model and smoothing techniques
- Learned document model from corpus and generated new meaningful sentences similar to corpus text

Project Management Tool
Guide: Prof N L Sarda, CSE Dept, IIT Bombay   *Autumn 2015*
- Developed a web portal as an enterprise solution for project management in a hierarchical setting
- Included features like user teams, file upload with a **JDBC, PostgreSQL** back-end and JSP based UI

Program Checking
Guide: Prof Nutan Limaye, CSE Dept, IIT Bombay   *Autumn 2015*
- Presented a seminar on efficient probabilistic program checker and characterization of conforming languages

Seat Allocation Portal
Guide: Prof Sharat Chandran, CSE Dept, IIT Bombay   *Autumn 2014*
- Implemented modified **Gale-Shapely algorithm** in Java for allocating college admissions
- Developed a **Django** based web portal that accepted preferences and allotted programmes

ToyDB extension
Guide: Prof N L Sarda, CSE Dept, IIT Bombay   *Autumn 2015*
- Implemented **external merge sort** and **hash join** operations on ToyDB

Statistical Inferences from Text
Guide: Prof Ganesh Ramakrishnan, CSE Dept, IIT Bombay   *Autumn 2014*
- Developed a Python program to make statistically useful conclusions from English sentences
- Decided confidence values of predictions using standard distributions

Text2Sound
Guide: Prof Bhaskaran Raman, CSE Dept, IIT Bombay   *Spring 2016*
- Developed an android app that encodes text to audio signals and vice-versa using frequency shift keying

Technical Strengths

- **Programming Languages:** C/C++, Python, Prolog, Bash, Java
- **Development:** Android, HTML, CSS, Django, PHP, Bootstrap, PostgreSQL, JavaScript
- **Others:** LaTeX, Matlab, MIPS-Assembly, SAS, Scilab, R, Wireshark

Positions of Responsibility

- **Teaching assistant** for courses like *Computer Programming* (**thrice**) and *Logic Design* (once)
- **Internship Coordinator** (*Placement Cell 2015-16, IIT Bombay*): Involved in the communication and scheduling of companies and universities and assisting them in recruiting students for internships
- **DAVP Volunteer**: Prepared questions and conducted weekly *Data Structures and Algorithms* tutorials for sophomores

Additional Courses Undertaken

Foundations of Machine Learning, Advanced Machine Learning, Virtualization & Cloud Computing, Network Security & Cryptography, Wireless Networks, Computational Complexity