Sai Shashank GP | Indian Institute of Technology Madras

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Education

Program	Institution	%/CGPA	Duration
B.Tech, Electrical Engineering	Indian Institute of Technology Madras, Chennai	8.2/10.0	Nov '20 - May '24
Class XII, TSBIE	FIITJEE Junior College, Hyderabad	95.5%	Jun '18 - May '20
Class X, BSEAP	Dr. K.K.R's Gowtham School, Tirupati	10.0/10.0	May '17 - May '18

Publications

- Active Foundational Models for Fault Diagnosis of Electrical Motors

*(Sriram Anbalagan, **Sai Shashank GP**, Deepesh Agarwal, Balasubramanian Natarajan, Babji Srinivasan)*

  - Submitted to "Engineering Applications for Artificial Intelligence" Journal(Under Review)

Skills

- **Modelling & Analysis:** Autodesk Fusion 360, Autodesk EAGLE, MATLAB
- **Programming languages & Tools:** C, C++, Python, MySQL, HTML, LaTeX, Arduino IDE
- **Machine Learning:** Pytorch, Tensorflow, OpenAI-Gym, Scikit-Learn, Keras, OpenCV
- **Data analysis:** Pandas, Numpy, Matplotlib, Seaborn, Scipy

Professional Experience

- Engineering Trainee - HIXAA Technologies Pvt. Ltd. Dec'21 - Jan'22

(Guide: Atul Ghumade, Co-Founder of HIXAA Technologies Pvt. Ltd.)

  - Developed a guidance system for truck drivers to perfectly to align the trucks to silos' opening for easier unloading.
  - Enabled real-time positioning of container's opening using ArUco markers & blob detection in OpenCV.
  - Designed a UI which shows real-time positioning of the truck using Tkinter & assisted on paid user identification.

Research Experience

- Young Research Fellowship Program - YRF, IIT Madras Aug'22 - Aug'23

(Guide: Dr. Babji Srinivasan, Department of Applied Mechanics, IIT Madras)

  - Worked on developing a deep learning framework to diagnose mechanical faults in Electric Motors.
  - Programmed the entire prediction framework using TensorFlow and ran experiments with real-world datasets.
  - Designed a novel method of active sampling which uses Shannon Entropy and KL-Divergence metrics.
  - Achieved an accuracy of **greater than 95%** across various datasets by using just 25% of labelled data.

- Option Indexing in Continual Learning using Successor Representations Jun'23 - Present

(Guide: Dr. Balaraman Ravindran, Department of Computer Science, IIT Madras)

  - Extending the work done on Option Indexing(OI-HRL) by Kushal Chauhan *et.al.*
  - Modified the given algorithm in the paper using Successor Representations.
  - Running experiments with the newly modified framework on AI2THOR 3D environments.

- Extending Target Optimism to Contextual Bandits with Fairness Guarantees Sep'23 - Present

(Guide: Dr. Balaraman Ravindran, Department of Computer Science, IIT Madras)

  - Innovating a new algorithm for contextual bandit setting which uses Target Optimism term introduced by *Andrei et.al.*
  - Formulating the new algorithm such that it satisfies the group fairness criteria formulated by *Huang et.al.* (Link).
  - Aiming to experiment the algorithm on real-world Hiring Processes to test its fairness.

Teaching Experience

- Teaching Assistant for EE2703: Applied Programming Lab Jul'23 - Nov'23

(Course Instructor: Dr. Nitin Chandrachoodan, Department of Electrical Engineering, IIT Madras)

  - Mentored a class of 180+ students on the concepts of Python Programming and it's applications.

Course Projects & Paper Presentations

- Solving Taxi-v3 Environment using Hierarchical Reinforcement Learning(HRL) Apr'23

(Course Instructor: Dr. Balaraman Ravindran, Department of Computer Science, IIT Madras)

  - Utilized Semi-MDP Q-Learning and Intra-Option Q-Learning frameworks of HRL to solve the environment.
  - Programmed the entire framework from scratch using Numpy and compared the different approaches.

- **Thompson Sampling in Cascaded Bandits - Paper Presentation** Nov'23

(Course Instructor: Dr. Kota Srinivasa Reddy, Department of Electrical Engineering, IIT Madras)

  - Reviewed the paper "A Thompson Sampling Algorithm for Cascading Bandits" by *Cheung et.al.* (Link)
  - Explained the mathematical proof and recreated the results mentioned in the paper.
- **Gaussian Process Optimization in Bandit Setting - Paper Presentation** Apr'23

(Course Instructor: Dr. Andrew Thangaraj, Department of Electrical Engineering, IIT Madras)

  - Reviewed the paper "Information-Theoretic Regret Bounds for Gaussian Process Optimization in the Bandit Setting" by *Niranjan et.al.* (Link)
  - Explained the mathematical proof using the concepts taught in the course "Information Theory".
- **Electric Circuit Solver using Python** Feb'22

(Course Instructor: Dr. Harishankar Ramachandran, Department of Electrical Engineering, IIT Madras)

  - Programmed an API to solve for all the unknowns in a basic analog circuit with both DC & AC components.
  - Created the API using classes & Numpy's matrix functionalities.

Personal Projects

- **Hogwarts Chessboard** Jul'21 - Nov'22

(Part of Electronics Club, IIT Madras)

  - Transformed generic chessboard with movement automation & remote connectivity for enhanced game experience.
  - Devised cloud-based communication system via RPi4 to exchange players' responses & move pieces in reality.
  - Implemented stepper motor system to realise 2D plotter mechanism for movement of magnet embedded chess pieces.

Relevant Courses

- Reinforcement Learning
- Multi-Armed Bandits
- Pattern Recognition & Machine Learning
- Information Theory
- Control Engineering
- Linear Algebra for Engineers
- Probability for Electrical Engineers
- Series & Matrices
- Applied Programming Lab
- Numerical Methods

Achievements and Awards

- Achieved a **percentile of 99.91** in the IIT-JEE Main 2020 among 1.4 million applicants
- Achieved a **percentile of 99.6** in the IIT-JEE Advanced 2020 among 200 thousand candidates
- Received Kishore Vaigyanik Protshahan Yojana Fellowship 2019 from the Government of India
- Received Young Research Fellowship 2022 from Indian Institute of Technology Madras
- Attended a fully sponsored AI Alignment Workshop conducted by MIRI, UC Berkeley

Positions of Responsibility

- **Events Head - Shaastra, IIT Madras** Jun'22 - Feb'23
  - Spearheaded a **team of 15 members** in organising 5 tech competitions in Shaastra 2023.
  - Played an integral role in negotiating with companies like Bajaj Auto to sponsor our circuit design competition.
- **Events Coordinator - Shaastra, IIT Madras** Aug'21 - Mar'22
  - Ideated and organised events based on PCB Designing & all-round electronics for Shaastra 2022
  - Managed a footfall of **500+ participants** hailing from all over the country.

Co-Curricular and Extra-Curricular Activities

- **Workshop Trainer - Sampark, IIT Madras**
  - Conducted a hands-on introduction to machine learning workshop
  - Marketed our Shaastra workshop to an audience of 75+ students
- **Workshop Trainer - Shaastra, IIT Madras**
  - Taught building supervised learning models to an audience of 100+
  - Generated a revenue of 50k INR from the workshop
- **Student Mentor - Shiksha Prayas NGO**
  - Coached two 9^{th} standard students for their all round development
  - Helped them improve their academic score than they initially expected