Aadarsh Ramachandiran

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EDUCATION

- **Indian Institute of Technology Madras**   Madras, India
  Bachelor of Technology in Electrical Engineering; CGPA: 9.53/10   *July 2023 – present*
- **Maharishi International Residential School**   Sriperumbudur, India
  Intermediate, CBSE; Grade: 96.8%   *April 2022 – March 2023*
- **Maharishi International Residential School**   Sriperumbudur, India
  Matriculation, CBSE; Grade: 95.0%   *April 2020 – March 2021*

SCHOLASTIC ACHIEVEMENTS

- Achieved **All India Rank 849** in the **Joint Entrance Examination - Advanced** out of over 150,000 candidates.   *2023*
- Secured **All India Rank 269** in the **Joint Entrance Examination - Mains** among more than 950,000 candidates.   *2023*
- Awarded the prestigious **KVPY Fellowship** with **All India Rank 304** in the **SA** stream.   *2022*
- Ranked in the **Top 1%** nationally out of 50,000 students at the **National Standard Examination in Physics**.   *2022*
- Attained **Top 1%** in the state at the **National Standard Examination in Astronomy**.   *2022*
- Selected for the **National Talent Search Examination Fellowship** by NCERT, Government of India.   *2020*

TECHNICAL SKILLS

- **Programming**: C/C++, Python, Verilog, Assembly

- **Tools**: Numpy, OpenCV, Matplotlib, Pandas, Pytorch, Tensorflow

KEY COURSES UNDERTAKEN

Applied Programming Lab	*IITM, present*
Microprocessors - Theory and Lab	*IITM, present*
Signals and Systems	*IITM, Nov 2023*
Supervised Machine Learning: Regression and Classification *	*July 2023*
Unsupervised Learning, Recommenders, Reinforcement Learning *	*July 2023*
Advanced Learning Algorithms *	*July 2023*
Structuring Machine Learning Projects *	*Jan 2024*
Convolutional Neural Networks *	*July 2024*
Deep Reinforcement Learning	*Hugging Face, present*
Sequence Models*	*present*

 * - Completed on Coursera.

POSITIONS OF RESPONSIBILITY

Ibot Robotics Club

Project Member - InnoGuide   *May 2024 - Present*

- Developing the **interface** for a **museum tour guide robot** to be deployed in **India's first Constitution Museum** at O.P. Jindal Global University (JGU).

- Developed a dynamic web application using **Flask** for backend development and **HTML**, **CSS**, and **JavaScript** for frontend, creating an engaging and responsive experience for museum visitors.

- Integrated the interface with the robot's navigation, speech, and display systems to facilitate autonomous guided tours, delivering real-time updates and contextual information related to the museum's exhibits.

- Implemented a **RAG chatbot** using **Langchain** to provide accurate and contextually relevant responses to the user about the Constitution and related exhibits.

- Utilized **Sarvam AI** for **Text-to-Speech (TTS)** and **Speech-to-Text (STT)** models that support **Indian English** and **Hindi**, enabling multi-lingual capabilities for seamless interaction between the robot and museum visitors.

- Collaborated with cross-functional teams to ensure effective deployment of the museum robot supporting the museum's mission to educate and engage visitors.

Agnirath

Race Strategist Engineer *April 2024 - present*

- Designed **race strategies** by analyzing weather conditions, terrain data, and energy consumption patterns to optimize **Solar Vehicle performance** for the **World Solar Challenge, 2025 in Australia.**
- Developed **predictive models** and **real-time models** to optimize velocity profile to ensure energy efficiency and maximize race outcomes.
- Collaborated with mechanical, electrical, and aerodynamics teams to align vehicle performance with strategy objectives, ensuring smooth **coordination** between strategy and vehicle capabilities.
- Utilized **heuristic optimization algorithms** to create adaptive strategies that respond to dynamic race conditions such as speed adjustments, energy management, and pit stop planning.
- Analyzed historical race data, including competitor performance and environmental factors, to refine decision-making and strategic planning for future events.
- Enhanced simulation tools and models to improve accuracy in predicting race outcomes and preparing for various race scenarios.

Sahaay Social Innovation Club   *Repository*

Deputy Coordinator *Nov 2023 - May 2024*

- Curated a dataset of over 5,000 images of waste items, classified into categories such as glass, metal, paper, wood, plastic, and mixed.
- Designed and trained a **Multi-Class Image Classification System** using **TensorFlow** to automate the sorting of waste items into the specified categories.
- Utilized **Transfer Learning** and **Fine-tuning** on a pre-trained **MobileNetV2 architecture** to enhance feature extraction and model accuracy.
- Achieved an impressive **accuracy of 98.8%** and an **F1 Score of 0.983** on the validation dataset and an **accuracy of 84%** and an **F1 Score of 0.83** on the test dataset.
- Converted the trained model to a **TensorFlow Lite (TFLite) model** and deployed it on a **NVIDIA Jetson Nano** for real-time waste sorting applications on campus.

AI Club

Deputy Coordinator *Nov 2023 - May 2024*

- Gained hands-on experience with fundamental machine learning concepts, including **Supervised**, **Unsupervised Learning**, and **Reinforcement Learning**.
- Developed and implemented the **Q-learning algorithm** for the **GridWorld** environment and **Deep Q-Learning (DQN)** for the **CartPole** environment using **PyTorch** and **OpenAI Gymnasium**.
- Enhanced DQN performance by employing **prioritized experience replay** and a separate target network, effectively reducing **experience correlation**, **overestimation bias**, and the **moving target problem**.

OTHER PROJECTS

- **Bluetooth-Low-Energy based Attendence System (present)**   *Repository*
  - Developing an **automated Attendance system** based on **Bluetooth Low-Energy** technology.
  - Engineered the system to be **cost-effective** by minimizing hardware requirements and reducing operational expenses, **time-efficient** by automating attendance recording, and **robust against proxies** through proximity based attendance recording.
  - Implemented features for real-time attendance tracking, automated data synchronization, and secure user authentication, ensuring high accuracy and ease of use.
  - Working on integration with existing attendance management system in my campus.

- **RouteOptimizer for Google Maps**   *Repository*
  - Developed a **Chrome Extension** to automatically reorder multiple stops in Google Maps to provide the most efficient route, addressing the burden on manual ordering for complex iteneraries.   Modelled the problem as an extension to the **Travelling Salesman Problem** and utilized **Google OR-Tools** to calculate most efficient route.
  - Integrated **FastAPI** for backend and used Open-source APIs, Nominatim and OSRM for geocoding and distance calculations.

EXTRACURRICULAR ACTIVITIES

- **Ranked 3rd place** in a 3-hour hackathon conducted by TechSoc on **multi-label classification of medical specializations based doctor transcripts.**

- **Secured 2nd place** among 20 teams in a **24-hour AI hackathon** conducted by the AI Club and TechSoc School at IIT madras on **multi-label classification into movie genres based on plot summaries.**

- **Finalist** in **Product Construct '24**, where I pitched an innovative solution to **Honda Pvt. Ltd.** aimed at enhancing **Digital Driving License Test Systems** in India. The proposal **addressed key challenges such as scalability and maintenance costs while ensuring optimal efficiency.**