Aditya Mehta

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Discipline of Computer Science and Engineering
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Github | LeetCode | Portfolio

ACADEMIC DETAILS

Degree	Specialization	Institute	Year	CPI/%
B.Tech.	*Computer Science and Egineering*	IIT Gandhinagar	2022-Present	9.32/10
Class XII	*Physics, Chemistry, Maths*	St. Xavier's High School, Adipur	2021-2022	94.25
Class X		Archana St. Xavier's School, Mandvi	2019-2020	94.66

SELECTED PROJECTS

- **Text Generator based on next character prediction using MLP**
  [Advisor: Prof. Nipun Batra, IIT Gandhinagar] [Jan '24 - Apr '24]
  - Built a pipeline model for predicting the next character, using the context of preceding k characters.
  - Trained multiple models on diverse datasets such as Gulliver's Travels, English Wikipedia 8, Atomic Habits, Tolstoy's Essays, and Alice in Wonderland, adjusting the embedding size of the vocabulary.
  - Observed variations in outcomes depending on the selected embedding and neural network architecture. Conducted hyperparameter tuning to optimize performance.
- **Human Activity Recognizion (HAR)**
  [Advisor: Prof. Nipun Batra, IIT Gandhinagar] [Jan '24 - Apr '24]
  - Utilized the UCI-HAR dataset, which comprises time-series data capturing the activities of thirty subjects engaging in six different activities classified as walking, sitting, standing, running up, running straight and running down.
  - Employed the TSFEL library for feature extraction from the time-series data, followed by Principal Component Analysis (PCA) to reduce dimensionality. Developed and trained a Decision Tree model using the extracted features.
  - Utilized the Physics Toolbox Suite app to collect activity data for testing the trained model's performance.
- **Image Processing Toolbox deployed on FPGA Hardware**
  [Advisor: Prof. Joycee Mekie, IIT Gandhinagar] [Jan '24 - Apr '24]
  - Established UART communication between FPGA board and a machine to serially transmit and recieve Binary data on BRAMS. Used python IDE to send/recieve data and xilinx's Vivado for deployement of code on FPGA board.
  - Applied various convolution filter (smoothening/sharpening/gaussian) on the given image. Set up a smooth pipeline to finally get an enhanced image. Achieved optimal ratio for speed vs space trade-off.
- **Second Order System Analysis App on Matlab**
  [Advisor: Prof. Nithin V George, IIT Gandhinagar] [Jan '24 - Apr '24]
  - Developed a MATLAB Transfer Function Analysis App enabling real-time plotting of unit step responses, pole-zero diagrams, and Bode plots for second-order transfer functions.
  - Engineered an interactive interface with slider controls to dynamically adjust damping ratio, natural frequency, and gain parameters, facilitating intuitive exploration of system behavior and transfer function dynamics.
  - Utilized MATLAB's built-in functions to calculate transfer functions and generate plots, demonstrating proficiency in MATLAB programming and application development for control systems
- **Smart Game Engine using C/C++**
  [Advisor: Prof. Balagopal Komarath, IIT Gandhinagar] [Aug '23 - Nov '23]
  - Created a repository containing intelligent game implementations, wherein the computer utilizes optimal strategies to make moves for games like Connect4, UpitUp, Sudoko, TicTakToe. Mastered graph-based algorithms.
  - Designed a cubesolver capable of generating the most efficient solutions for solving any 2x2x2 Rubik's Cube.
- **Face Recognition and Object Classification, Dataset Analysis and Machine Learning Basics**
  [Advisor: Prof. Shanmughanathan Raman, IIT Gandhinagar] [Jan '23 - Apr '23]
  - Designed and implemented a **real-time face recognition** system using eigenfaces, exploring the nuances of facial recognition algorithms, and evaluated their efficacy on diverse datasets from the Sklearn library of python.
  - Worked on **dimentionality reduction** and **objects classification** with various Machine Learning Models of Sklearn.
  - Crafted a comprehensive Data Narrative, exploring scientific questions on given dataset and their hypotheses along with their scientific answers using Python libraries like Pandas, Seaborn, Numpy, Matplotlib and more.
- **Smart Bicycle Safety Monitoring System with Fuzzy Control Logic** [Aug '23 - Apr '24]
  [Prof. Nithin V George, IIT Gandhinagar]
  - Developed an Android application for a smart bicycle to enhance child safety through real-time monitoring.
  - Integrated **embedded hardware sensors**, including a gyroscope, accelerometer, GPS, microphone, and antenna, work in unison to detect occurrences such as over-speed, falls, and boundary crossings with precision and efficiency.
  - Implemented real-time alert mechanisms, audible alarms and GPS location displays, ensuring parental awareness.
  - Incorporated emergency response features, activating microphone and camera recording on the rider's device in the event of a fall and transmitting an SOS signal with recorded data to the parent's device.
- **Sensor-based Smart Terrain Mapping and Magnetic Field Detecting Rover** [Jan '23 - Apr '23]
  [Prof. Arup Lal Chakraborty, IIT Gandhinagar]
  - Developed an automobile that can judge and move on a flat terrain independently. It was equipped with the ability to detect any hindrance in front of it and has sufficient intelligence to detect the next iterable path.
  - Integrated Ultra sonic and Hall Sensors to detect any presence of Magnetic substances in a terrain of open range.

- **EPCOT: Evaporative Peltier Cooling Tent, for humidity and temperature regulation** [May '23 - July '23]
  [Prof. Udit Bhatiya, IIT Gandhinagar]
  - Engineered a smart sensor-based, collapsible temperature and humidity regulating device to assist individuals who are more susceptible to heat strokes or need a cool environment while working in extreme temperature conditions.
  - Successfully incorporated the **Peltier Module** for cooling along with the traditional **Evaporation based Cooling** method to achieve an optimal balance between efficiency as well as sustainability of the cooling model.
- **Mangalyaan Propellant Consumption Analysis Using Numerical Methods**
  [Advisor: Prof. Dilip Shrinivas Sundaram and Prof. Akshaa Vatwani, IIT Gandhinagar] [Aug '22 - Oct '22]
  - Implemented advanced numerical analysis techniques to precisely determine the mass of propellant consumed for **ISRO's Mangalyaan Mission** during the satellite's initial five maneuvers around the Earth's orbit.
  - Implemented numerical techniques, including Euler's method and Runge-Kutta method, to discretize energy and iteratively determine the mass of propellants. Also studied about Oberth's Maneuver effect for orbital transition.

TECHNICAL SKILLS

- **Programming Languages :** Python, C, C++, Verilog
- **Libraries :** NumPy, Pandas, Sklearn, Scipy, Matplotlib, Seaborn, Tensorflow
- **Other Tools :** Xilinx Vivado, Git, Autodesk Inventor, Adobe Creative suite, Arduino IDE, Linux, LaTeX

RELEVANT COURSES:

- **DSA:** Data Structures and Algorithms **(A or 10/10)** ; Data Centric Computing **(A- or 9/10)** ; Advanced DSA **(B or 8/10)**
- **ML/Data Science:** Machine Learning **(A or 10/10)** ; Probability, Statistics, and Data Visualization **(A- or 9/10)**
- **Signals and Systems:** Signals, Systems, and Random Processes **(A or 10/10)** ; Control Systems **(A or 10/10)**
- **Math:** Single Variable Calculus **(A or 10/10)** ; Linear Algebra **(A or 10/10)** ; Numerical Methods **(A- or 9/10)**
- **Others:** Basic Electrical Engineering **(A or 10/10)** ; Digital Electronics **(A- or 9/10)** ; Engineering Basics **(A or 10/10)**

POSITIONS OF RESPONSIBILITY

- **Core Committee Member,** *Blithchron, Annual Cultural Fest, IIT Gandhinagar* [May '23 - Apr '24]
  - Leading a team of **200+ undergraduate and postgraduate students**, managing expense, coordinating with vendors, and orchestrating the planning, execution, and delivery of Gujarat's largest student-run college cultural festival.
  - Learning and Implementing **Adobe Creative Suite** (including Illustrator, Photoshop, Premiere Pro and After Effects) for creative content creation and to manage and enhance the promotion of the cultural fest's Social Media handles.
- **Student Guide and Member,** *Student Support Service, IIT Gandhinagar* [July '23 - Apr '24]
  - Part of a dedicated faculty-driven team assisting students with diverse concerns and issues of college life.
- **Head Boy,** *Archana St. Xavier's High School, Mandvi* [July '18 - Mar '19]
  - Elected as the Head Boy of the school, by voting process among 500+ Higher Secondary School Students.

ACHIEVEMENTS

- Awarded **Dean's List for Academic Excellence** for all 4 eligible semesters at IIT Gandhinagar.
- Awarded **Prof. G. V. Rao National Scholarship** for excellent Academic Performance.
- Secured an All India Rank of **4059** in Joint Entrance Examination (JEE Adv.) conducted by National Testing Agency.
- Secured **AIR 468 in IAT** for research-based admission in Indian Institute of Science Education and Research (IISERs).
- Secured an overall **State Rank of 49** in ACPC (Admission Committee for Professional Courses) for Academic Year 2021-22.

EXTRA CURRICULAR ACTIVITIES:

- Member of Step-Up, the dance club of IIT Gandhinagar.
- Shortlisted for Lawn Tennis inter-iit trials for the college, showcasing physical fitness.
- Graphic Designing Enthusiast. Made attractive merchandise for the College's biggest cultural fest.
- Passionate about animation and video editing, making it a side-hobby for recreation.