**Dhruv Jain**                                              22M0828

**Computer Science & Engineering**                          **M.Tech.**

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| Examination | University | Institute | Year | CPI / % |
|---|---|---|---|---|
| Post Graduation | IIT Bombay | IIT Bombay | 2025 | 9 |
| Graduation | IIT Dharwad | IIT Dharwad | 2022 | 8.89 |
| Graduation Specialization: Electrical Engineering | | | | |
| Intermediate | HSC | Pace Junior Science College | 2018 | 83.69% |
| Matriculation | ICSE | HVB Global Academy | 2016 | 93.17% |

## UTILITY PATENT, RESEARCH PAPER AND ACADEMIC ACHIEVEMENTS

- **Information processing method, computer program, and information processing device**
  *(Co-Inventor of Japanese Patent (2023-166812), Rights Owned by: ExaWizards Inc.)*          *(November 22, 2023)*
  - Engineered a **multi-wavelength** image processing method to automate annotation tasks, **reducing manual efforts**
  - Created a customizable **GUI for ROI mask extraction**, image segmentation, & object **processing with excel data**
  - Proposed a novel method to **annotate images of a object** taken at **different wavelengths** with related information

- **Deep Learning-Based Track Prediction and Correction for a Radar Target**
  *(Published in IEEE Transactions on Radar Systems'23, Collaborator: Bharat Electronics Limited)*          *(March 17, 2023)*
  - Developed a **TCN-based system** that surpasses traditional **IMM-based Kalman filters** in predicting object track
  - Achieved **60% improvement in radar accuracy** for tracking highly maneuvering 3D targets in the **military vicinity**
  - Created a **MATLAB-based simulation** to generate **training data**, which was later processed by **Python AI models**

- **The Smart Authenticated Fast Exams (SAFE) IIT Bombay App: Best Initiative Award**
  *(Awarded by IIT Bombay Director during Orientation Day '23)*          *(August 3, 2023)*
  - Developer of **SAFE**, a platform used by numerous **professors** for conducting **attendance** and **quizzes** in lectures
  - Supported **100+ professors** and onboarded **1000+ students** for smooth usage both within & **outside IITB** premises
  - Invited by the **Application Software Centre (ASC)** to integrate SAFE into **IITB portal** for all UG and PG courses

## MAJOR PROJECTS AND SEMINAR

- **AI-Enhanced Grading System for Smart Authenticated Fast Exams (SAFE)** *(M.Tech Project)*          *(Jan'24-till date)*
  - Deployed an OCR model for **keyword highlighting** in answer scripts, achieving **87% accuracy** on our IITB dataset
  - Built a **Batch Grading Interface** using Vue.js for efficient evaluation of multiple answers on **Django-based** server
  - Crafted a feature for **grouping similar-looking answers** using **LLM APIs** for assisting professor in their evaluation

- **Survey on AI-Driven Handwritten Exam Assessment** *(M.Tech Seminar)*          *(Aug'23-Dec'23)*
  - Performed an in-depth **literature review** on existing **AI solutions** for automating grading of handwritten answers
  - Analyzed **Gradescope**, an American ed-tech competitor, to incorporate **similar functionalities** into our pipelines
  - Evaluated and compared existing solutions to optimize the **SAFE interface** and enhance its functionality using AI

- **Predictive Modeling for Radar Object Tracking and Corrections** *(B.Tech Project)*          *(Jan'21-Apr'21)*
  - Tasked with **detecting** an object, **predicting** its track, and **associating** it with a correct label for its future references
  - Applied TensorFlow for **tracking object** in radar, enhancing **trajectory prediction** & object association significantly
  - Integrated **synthetic data** from MATLAB to improve predictive accuracy and **probabilistic forecasting** in vicinity

## WORK EXPERIENCE AND INTERNSHIPS

- **A.I Engineer Intern | Exawizards India LLP, Hyderabad** *(Lead: Mr. Nishanth Koganti)*          *(Oct'21-Jun'23)*
  - Integrating **AI solutions** that enhance objection detections, demonstrating **practical applications** & improvements
  - Led **R&D** and **client projects**, providing solutions for clients like **NEDO**, covering both modelling & deployment
  - Developed an **Pose tracking** system with Tkinter for monitoring pets' activities, enhancing **caretaking experiences**
  - Created an **Split Autoencoder** for face detection, deploying encoder on **M5stack device** & decoder on Jetson Nano
  - Fine-tuned a **MaskRCNN model** for fruit detection utilizing Kaggle's open source **Fruits-360 dataset** using MMDet

- **Quantitative Analyst Intern | Dolat Capital Market PVT LTD, Mumbai** *(Lead: Mr. Jigar Shah)*          *(May'24-Jul'24)*
  - Engineered a **Cash & Carry with Calendar Spreads** strategy for index **arbitrage opportunities**, factoring slippages
  - Simulated strategy performance on **tick-by-tick Nifty data** over six months, analyzing **risk-to-rewards PnL** charts
  - Optimized code to C++ for **live deployment** for automated trades based-on pre-configured **entry & exit** conditions

- **Backend Developer Intern | Wealides Fintech PVT LTD, Bangalore** *(Lead: Mr. Priyesh Gandhi)*          *(Aug'23-Dec'23)*
  - Developed an **NLP model** to classify SMS transaction messages and **fetch exact amounts** with credit/debit status
  - Worked on a **Django template** to provide a real-time SIP investment calculator on the website using **REST APIs**
  - Integrated **Gupshup's API in backend** to enhance notifications features within the app for **WhatsApp automation**

- **CRM Data Analytics Specialist Intern | PMaps INC, Mumbai** *(Lead: Mr. Saurabh Rana)* *(Feb'24-Apr'24)*
  - Automated performance analysis using **machine learning** to identify key patterns of **good performing** employees
  - Reduced manual work by **70%** by developing **automated scripts**, leading to a significant increase in team efficiency
  - Presented insights through interactive **Streamlit dashboards**, enhancing decision-making with visual graphflows

## POSITIONS OF RESPONSIBILITIES

- **Head Web Coordinator at Institute Placement Team, IIT Bombay** *(Aug'23-Jul'24)*
  - Led the management of the placement **portal for 3K+** students, ensuring **seamless user experience** & functionality
  - Streamlined **company allocations** in PostgreSQL & managed our server, with **Node** backend & **Angular** frontend
  - Directed a team of **10+** developers, overseeing website **feature updates** & bug fixes to enhance platform reliability
- **Android Developer, Research Assistant at SAFE Team, IIT Bombay** *(Aug'22-till date)*
  - Administered the **GitHub repository** for the Android, handling bug fixes, **feature development**, and integrations
  - Enhanced the app to **support exam** functionalities for **Bharat Forge** 300+ employees, including **support for Marathi**
  - Executed Play Store **maintenance updates** and **provided assistance** to the team for resolving SAFE-related queries

## COURSE PROJECTS

- **Stamp Detection in Electoral Ballots and Vote Counting Website** *(EE769: Prof Amit Sethi)* *(Mar'24-Apr'24)*
  - **Objective**: Create a End2End system for **real-time vote counting** using ballot **image processing** in offline elections
  - Designed and implemented a **web-based system** using **Flask**, and developed an **Android app** for image capture
  - Reduced **manual efforts** prone to errors by automating vote counting, enhancing efficiency with **real-time updates**
- **Solidity-based Decentralized Fake News Detector App** *(CS765: Prof Vinay Ribeiro)* *(Mar'24-Apr'24)*
  - **Objective**: Create a **decentralized application** (DApp) for **fact-checking news** articles to combat misinformation
  - Designed **smart contracts** to enable users to vote on news truthfulness, and aggregate votes into a **fakeness score**
  - **Automated** the news verification process, **enhancing transparency** and **reliability** in detecting fake informations
- **Unified Content Discovery and Custom Playlist Sharing Platform** *(CS699: Prof Bhaskaran Raman)* *(Oct'22-Nov'22)*
  - **Objective**: To develop a webapp that allows users to **discover content** across platforms & create **public playlists**
  - Integrated **TMDb APIs** for searching movies and TV shows, allowing users to **create**, **manage**, and share playlists
  - Built the app using **Django**, enabled **playlist viewing**, **movie descriptions** and identification of streaming services
- **Part-of-Speech Tagging Using Word2Vec and Neural Network** *(CS772: Prof Pushpak Bhattacharya)* *(Mar'23-Apr'23)*
  - **Objective**: Aim to create an efficient DL model for **part-of-speech tagging** by leveraging **BERT** word embeddings
  - Implemented a **Feedforward Neural Network** (FFNN) model, utilizing backpropagation and fold **cross-validation**
  - Achieved **90% accuracy** in POS tagging by using a LSTM-based **encoder-decoder** model on the **Universal Tag Set**
- **Custom Virtual Machine Implementation from scratch** *(CS695: Prof Mythili Vutukuru)* *(Mar'23-Apr'23)*
  - **Objective**: Design and build a secure & efficient **virtual machine** environment to ensure robust protected isolation
  - Implemented the VM using **cgroups** and **namespaces**, integrating **QEMU-KVM hypercalls** for enhanced isolation
  - Achieved robust **system isolation** by improving security and resource management for **virtualized environments**
- **Understanding the Impact of Artificial Intelligence on White Collar Jobs** *(PS643: Prof Anupam Guha)* *(Oct'23-Nov'23)*
  - **Objective**: Investigated the effects of **AI on white-collar jobs** to understand the changes in employment patterns
  - Conducted a **comprehensive survey** and analysis, assessing **global** and **local** data on AI's impact on employment
  - AI will likely **handle repetitive manual tasks** soon, but tasks requiring cognitive thinking will be harder to replace
- **Development of MDP Solvers for Optimal Policy Computation** *(CS747: Prof Shivaram Krishnan)* *(Oct'23-Nov'23)*
  - **Objective**: Compute **optimal policies** for Markov Decision Processes (MDPs) using algorithms in bandit problems
  - Implemented **Value Iteration**, **Policy Iteration**, and **Linear Programming** for a football team scenario application
  - Enabled effective computation for decision-making and **improving strategic planning** in real practical problems

## TECHNICAL SKILLS

- **Programming/Scripting Languages**: Python, C/C++, Java, JavaScript, MATLAB, PHP, SQL, Git, Docker, LaTeX & Bash
- **Tools and Platforms**: Android Studios, PostgreSQL, AWS, Django, Linux, Keras, OpenCV, NodeJs, VueJs and VS Code

## MAJOR COURSES TAKEN

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|---|---|
| **EE769** Introduction to Machine Learning (ML) | **CS744** Design and Engineering of Computing Systems |
| **PS643** Introduction to AI, Data, and Policy (Institute) | **CS695** Topics in Virtualizations and Cloud Computing |
| **CS747** Foundations of Intelligent & Learning Agents | **CS772** Deep Learning for Natural Language Processing |
| **CS6003** Web Security and **CS675** Computer Graphics | **CS765** Blockchain, Cryptocurrencies & Smart Contracts |

## EXTRACURRICULAR ACTIVITIES

- Part-time trader and investor, **managing family portfolios**, IPO applications, and speculative investments in the market
- Completed **ISRO's Space Science & Technology training** *('23)* and participated in **Smart India Hackathon** (SIH) *('20)*
- Cleared **JEE Advanced**, qualifying for admission to IIT among over 2M+ students in competitive general category *('18)*
- Keenly interested in **space science**, quantum computing, cryptography, puzzles, sports, startups and **financial markets**