DHRUV JAIN

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Education

Indian Institute of Technology, Bombay (IITB) *2022 - Present*
Master of Technology in Computer Science and Engineering (MTech in CSE) CGPA: 8.88/10

Indian Institute of Technology, Dharwad (IITDH) *2018 - 2022*
Bachelor of Technology in Electrical Engineering (BTech in EE) CGPA: 8.89/10

CAREER OBJECTIVE

To secure a challenging position in the field of Computer Science, where I can apply and enhance my skills, contribute to organizational objectives, drive positive impact within the global tech community, and grow alongside an organization committed to the development of communities world-wide.

TECHNICAL STRENGTHS

Programming: C/C++, Java, Python, MATLAB, GIT, Bash, HTML, PHP, LaTeX, Visual Basics, Docker.
Modeling: Artificial Intelligence - Machine Learning, Deep Learning, Speech Processing, Computer Vision.
Cloud - Amazon Web Services, Shared-Hosting, Linux KVM, Droplets, DNS, Django, Flask, Jetson.

WORK EXPERIENCE

INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY (IITB) (July 2022 – Present)
Research Assistant under Guide: Prof. Bhaskaran Raman

- A.I Assisted Grading in SAFE App: We simplify the grading process for instructors by employing OCR techniques to identify specific keywords in written answers. By objectively analyzing factors such as accuracy and completeness, it provides consistent evaluations for assignments, or projects in educational settings, improving efficiency and fairness.

EXAWIZARDS INDIA LLP (August 2021 – June 2023)
AI Engineer Intern

- Behavioural Analysis of Pets: The task was to build an application that combines MMPose tracking model with Tkinter. The application offers guardians detailed reports on their pets' activities, including sleep schedules and toilet patterns, using a live feed from their cat house. It enables efficient monitoring and improves the caretaking experience overall.
- Anomaly Detection on UCR Time Series Dataset: The task was to encoded time series information into Gramian Angular Field (GAF) images and utilized the few-shot Patchcore algorithm to identified and flagged anomalies in system.
- Split Computing Investigation: The task was to develop an Under-complete Autoencoder model for face detection task. Installed the encoder on M5stack edge device and decoder on Jetson Nano server to make the pipeline efficient.
- Math Word Problem Solver: The task was to develop a Seq2Seq LSTM based Encoder-Decoder NLP model to solve simple linear math word problems from various datasets: MAWPS, ASDiv and SVAMP; for testing model feasibility.
- NIR Image generation: The task was to develop a Conditional GAN (cGAN) model for generating relevant NIR Images from their RGB correspondence to use vegetation indexes, in-order to build a better avocado fruit maturity classifier.
- Multispectral Image Segmentation: The task was to develop a neural network model for object detection using Near-Infrared (NIR) +RGB Images (NDVI Pipeline), with a focus on OPEN-MMLAB's mmsegmentation functionalities.
- Fruit Detection: Task to develop a MaskRCNN model for detecting various fruits, using Kaggle's Fruits-360 dataset.

PATENTS AND RESEARCH PAPERS

EXAWIZARDS JAPAN INC (Japanese Patent Number: P21062JP00)

- Mask Extraction GUI: We have developed an interactive GUI that facilitates the extraction of ROI masks from videos. Additionally, it utilizes these generated masks to perform image segmentation and object processing on those videos. The resulting outcomes, along with the corresponding timeframes, are efficiently compiled and organized into CSV files.

BHARAT ELECTRONICS LIMITED (BEL) and IITDH (Jan 2021 – Jan 2022) (Link to Paper).

- Online Multi-Target Tracking: We made significant progress in online multi-target tracking by leveraging Temporal convolutional networks (TCN) to outperform the SOTA Kalman-based Interacting Multiple Model (IMM) filter. Overall improving the probabilistic predictions, track association and trajectory smoothing for objects in Indian radar vicinity.

EXAWIZARDS and IITB (Jan 2023 – Apr 2023) (Link to Paper).

- Semi-supervised Image Annotation: The seminar task was to overcome the challenge of limited labeled data; we propose using deep learning and active learning. Pre-trained models and image processing techniques train an annotation model, while addition of selectively informative unlabeled samples improves performance of the overall annotate model.

PROJECTS

Analogy Finder -DLNLP, IITB (Link to Code).
We implemented the Skipgram and Cbow models from scratch on Gutenberg dataset to find word embeddings for analogy task.

Developed an Animated Bike Riding Graphic Game in OpenGL, IITB (Link to Code).
We build 3D models in Unity and imported them into OpenGL and animated the objects using joint render modelling.

Built a Load generator, Load testes and Load Balancer, IITB (Link to Code).
We balanced load by conducting a load test on our web server by using a load generator to measure its capacity.

Pos-Tagging Sentence -DLNLP, IITB (Link to Code).
We implemented a Seq2Seq (Enco-Deco) NLP model to pos-tag any given English sentences using glove embeddings.

Own custom Virtual Machine, IITB (Link to Code).
We created our own virtual machine using cgroups and namespaces on qemu-kvm supported hypercalls in Linux.

Title Generation -DLNLP, IITB (Link to Code).
We implemented a real-time end-to-end speech recognition system on hardware which uses TDNN deep learning model.

Campaign Continuity Recommender, GlobalShala and Saint Louis University
After data analysis, it was advisable to terminate one of the Facebook ad campaigns for the SuperHero U Event to save cost.

Real-Time Speech Recognition System, IITDH (Link to Code).
We implemented a real-time end-to-end speech recognition system on hardware which uses TDNN deep learning model.

Bosch Traffic Sign Recognition, IITG (Link to Code).
A step closer to L5 autonomy, we tried to help a vehicle by recognizing the traffic signals on road, using BOSCH's dataset.

Smart India Hackathon, Kerala (Link to Code).
We built an APM ML-based tool for GAIL to monitor & improve the performance of process plant motors equipments.

PHP Website, Milestone Business Ventures LLP (MBVL), Mumbai (Link to Code).
We created and hosted a showcase website build in HTML and PHP for the manufacturer company.

Machine Learning IPL 2020 Winner Predictor (Link to Code).
ML model to predict the winner of IPL 2020, using Kaggle data of 2009-2020 matches (80%+ Accuracy).

Chess Keywords Voice Detection (Link to Code).
Understand spoken chess commands and converts it to chess notation, to make a move in the Chess GUI.

Relevant Courses Completed

- Data structures and Algorithms (10/10)
- Programming Techniques (10/10)
- Pattern Recognition and Machine Learning (9/10)
- Neural Networks and Deep Learning (9/10)
- Speech Processing (10/10)
- Optimization Theory and Algorithms (10/10)
- Information Theory (10/10)
- Computer Architecture (9/10)
- Design and Engineering of Computing Systems (9/10)
- Deep Learning for Natural Language Processing (8/10)
- Data Analysis (8/10)
- Computer Programming (10/10)
- Introduction to High Performance Computing (10/10)
- Calculus and Linear Algebra (7/10)
- Introduction to Probability (10/10)
- Introduction to Communication Systems (10/10)
- Digital Signal Processing (10/10)
- Digital Systems (9/10)
- Computer Graphics (8/10)
- Topics in Virtualization and Cloud Computing (9/10)

ACADEMIC ADDONS

- I have completely managed a team for Ecommerce Development and Social Media Marketing (2023).
- Participated in IITB Tech Fest (2022) as a representative from SAFE team to showcase our app.
- Participated in 9th Inter IIT Tech Meet, IITG (2021) and Building Out Loud Hackathon, Devfolio (2021).
- Campus Ambassador of Smartknower Program (2021).
- Runners up in Machine learning Competition organized by Smart India Hackathon (2020).
- Won Coding Competition in Indian Institute of Information Technology, Dharwad (2019).
- Secured AIR 7514 in JEE Advanced among 2,000,000 students in open general category (2018).

PERSONAL TRAITS

- I can understand five languages: English, Hindi, Marwari, Gujrati, Marathi.
- Member of: Department Academic Mentorship Program Team, AI Club, Quiz Club, Tech Team, HPC Team.
- AI Technophile with passion for Coding and always keen to take up new and challenging tasks.
- Young CS Enthusiast that has the ability to work as an individual as well as in a group.
- Believes in Openness, Conscientiousness, Extraversion, and Agreeableness.
- Strong motivational, management, and leadership skills in any assigned task.
- Interested in Sports: Cricket, Football, Badminton, Basketball, Swimming, Athletics, Chess and many more.
- Taking various courses on Coursera and Udemy Platform regarding AI, Python, Web Development.
  - Introduction to HTML5
  - Building Web Applications in PHP
  - Introduction to Structured Query Language
  - Building Database Applications in PHP
  - JavaScript, jQuery, and JSON
  - Machine Learning A-Z™
  - Deep Learning A-Z™
  - Python for Data Science Bootcamp
  - Git Beginner
  - Python Django 2021.