Jay Joshi

jyjoshi | jyjoshi | jayjoshi1109@gmail.com | 951-556-9399

Education

Master of Science in Computer Science at **University of Southern California** **Aug 2022 - May 2024**
Relevant Coursework: Algorithms, Machine Learning, Web Technologies, Foundations of AI, Databases
Bachelor of Engineering in Computer Engineering at **University of Pune, India** **Jul 2018 - May 2022**

Skills

Expertise	Machine Learning, Algorithm Analysis, Statistics, Git, Github
Languages	Python, JavaScript, Java, C++, Object Oriented Programming, Android
Cloud & DB	Google Cloud Platform, Firebase, MySQL, MongoDB, Oracle DB
ML	PyTorch, Transformers, LLM, NLP, Hugging Face, CNN
OS & Web	Linux, MacOS, Windows, Angular, Nodejs, Flask, Bootstrap, HTML, CSS

Work Experience

ML Engineer, Graduate Research Assistant - ISI, USC **Nov 2022 - Jan 2023**

- Collaborated with a team of 5 researchers to develop an intelligent chatbot system for detecting and mediating hate speech in public forums, facilitating conflict resolution and prevention
- Trained and assessed performance of fine-tuned cross-lingual models (XLM) for Sequence Classification on 15+ datasets leveraging PyTorch and 3 Hugging Face libraries (transformers, datasets, evaluate)
- Devised an efficient ML pipeline utilizing Python scripts and Jupyter for benchmarking in-house models against state-of-the-art models, accelerating streamlined evaluations
- Delivered the NLP pipeline in less than 60 days, enhancing research team productivity, leading to 3x more in-house model experimentation and 2x faster training and testing

System Design and Software Engineer, Founder - Food Ready **Sep 2021 - May 2022**

- Conceived and delivered an efficient solution by building 2 full-fledged apps for students to pre-order canteen meals, saving customer time and maximizing revenue for business owners
- Conceptualized end-to-end system design and implemented the Android - Java app as a POC, leveraging Firebase's suite for the backend; coordinated with 7 members for overall software development
- Collaborated with a college canteen, a restaurant chain, and a local diner to deploy the solution, resulting in a 40% increase in revenues and a 1.5x boost in customer satisfaction while streamlining operations
- Initiated a research group of 4 for brainstorming and formulating a new scheduling algorithm to further optimize kitchen operations based on parameters such as ETA, preparation time, and meal-prep inventory

Projects

Micrograd - A tiny autograd engine [source] **Apr 2023 - May 2023**

- Implemented backpropagation (reverse-mode autodiff) over a dynamically built DAG (directed acyclic graph) and a small neural networks library on top of it with a PyTorch-like API
- The DAG operates over scalar values, i.e. we chop up each neuron into all of its individual tiny adds and multiplies, but this is powerful enough to build deep neural nets doing binary classification

Makemore - An auto-regressive character level language model [source] **Feb 2024 - Apr 2024**

- Utilized PyTorch to develop a probabilistic sequence model, emphasizing tensor operations and broadcasting to refine accuracy. Gained insights on mapping complex real-world problems into the deep-learning domain
- Optimized model performance and computational efficiency with advanced techniques including custom back-propagation, batch normalization, hyperparameter tuning, and in-depth loss function analysis.

Microservice orchestration using Kubernetes [source] **Apr 2024 - May 2024**

- Designed a microservice system for converting videos to MP3s using Docker, python, flask, MongoDB, and MySQL. Leveraged Kubernetes for container orchestration. Facilitated storage of large files using GridFS.
- Authenticated clients using JWTs. Utilized ingress to connect clients from the internet to the Kubernetes cluster. Implemented a notification service to update users using Google Mail's SMTP server.

Heterogeneous Link Prediction in Graphs using Attention [paper] **Jan 2024 - May 2024**
- Developed and implemented a novel link prediction model for heterogeneous graphs using Subgraph Sketching and Graph Attention Networks (GAT). Additionally utilized Ricci curvature for improved performance.
- Achieved 11th place on the ogbl-vessel leaderboard with a 0.6525 ROC-AUC score, and 6th place on the ogbl-biokg leaderboard with an 0.8414 MRR score while using significantly fewer parameters.

Triggered Adversarial Attacks in Neural Networks [paper] **Jan 2024 - May 2024**
- Developed adversarial attack strategies for vision and text-based neural networks, identifying vulnerabilities and evaluating current defense mechanisms in critical control systems.
- Demonstrated the potential of triggered adversarial examples to remain hidden and affect specific neural networks only under certain conditions, improving the stealth and precision of these attacks.

Geospatial Data Visualization and Analysis [source] **Oct 2023 - Nov 2023**
- Visualized and analysed geospatial data using various methods including spirographs, KNN (K-Nearest Neighbors), convex hull algorithms, and the use of SQL queries for data manipulation.
- It includes Python and HTML scripts for generating visualizations on website and KML files for map overlays.

EventFinder - An Event finding website [website] **Feb 2023 - Aug 2023**
- Developed a dynamic event-finder website leveraging Ticketmaster APIs, Angular, Node.js, and Bootstrap.
- Implemented local HTML5 storage for a personalized experience. Languages utilized Typescript, HTML, CSS

Propositional Inference Engine [source] **Feb 2023 - Mar 2023**
- Derived a program for propositional logic-based knowledge base (KB) with unit resolution for automated logical inference, enabling the system to ascertain if a provided statement can be logically deduced from the stored facts.
- Optimized the unit resolution implementation using efficient querying and retrieval mechanisms providing the ability to resolve large knowledge-bases within seconds.

Pente MiniMax Game Agent [source] **Jan 2023 - Feb 2023**
- Created a Pente game agent with the help of the Minimax algorithm and Alpha-Beta pruning. Utilized empirically derived heuristics to enhance the efficiency of Alpha-Beta pruning.
- Calculates the next move within 15 seconds, dynamically conducting a search upto depth of 3 across a search space ranging from 7x7 to 19x19 as the game progresses.

Imagine - A Visualisation Tool for Algorithms **Feb 2023 - Aug 2023**
- Formulating an algorithm visualization tool aiding quick comprehension for students and professionals
- The product provides a toolkit for flexible input manipulation and retractable execution built using Python and Github for rapid prototyping

Research Review on Dexterous Manipulation for Robots - Presentation **Apr 2021 - May 2021**
- Researched Robotic Hands, examining 2 current techniques of Reinforcement Learning and math models
- Identified and proposed enhancements by integrating Transfer and Imitation Learning, achieving an 60% training time reduction and 20% accuracy improvement

Indoor Navigation System - Team Lead, Smart India Hackathon **Nov 2019 - Jan 2020**
- Explored and utilized a range of technologies, including Bluetooth Low Energy (BLE) beacons, Wi-Max, GPS, and GIS, to develop an Indoor Navigation System app for mobile devices and track user position
- Facilitated seamless navigation in closed structures such as malls and airports with real-time(<1 s) guidance

Volunteer Experience

Volunteer Developer - Ivy **May 2023 - Aug 2023**
- Created backend APIs for Ivy, simplifying ML code conversion across six popular Python frameworks, volunteering to Ivy's mission of unifying AI technologies

Joint Secretary - Compsa **Jul 2019 - Aug 2021**

- Managed transition of club events from in-person to virtual during lockdown with the help of 50+ members
- Led workshops on Linux (5 day) and Github (2 day) helping students gain relevant exposure in lockdown