Nikhil Bola Kamath

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Education

University of Southern California — Los Angeles, CA
Master of Science in Computer Science; ***GPA: 3.83/4.0*** — Aug 2022 - May 2024
Courses : Foundations of Artificial Intelligence, Machine Learning, Algorithms, Web Technologies, Natural Language Processing, 3D Vision

NMAM Institute of Technology — Nitte, India
Bachelor of Engineering in Computer Science and Engineering; ***GPA: 9.59/10*** — Aug 2016 - Aug 2020
Courses : Deep Learning, Data Structures & Algorithms, Business Intelligence, Data Analytics, RDBMS

Skills

Languages : Python, Dart, Java, C, C++, SQL, Javascript, Swift, HTML, CSS.

Frameworks & Tools : PyTorch, PyTorch Lightning, TensorFlow, Keras, JAX, Scikit-learn, Docker, Kubernetes, Git, Django, Flask, MongoDB, PostgreSQL, NodeJS, React, Flutter, GCP (Vertex AI and AI Platform), AWS, Azure (ML), MLOps/DevOps, LLMs, HuggingFace, LangChain.

Experience

Dragonfruit AI — Software Engineer Intern — Jan 2024 - May 2024
- Implemented visualization tools in Python to better analyze tracked objects from multiple viewpoints, improving customer engagement.
- Led the design and development of APIs for an internal review application using Flask, vector stores, Elastic Search, and PostgreSQL, which significantly reduced annotation process time for a key video analytics use case within the company.

Robotics Embedded System Labs (USC) — Research Assistant — Oct 2022 - Jan 2024
- Designed and implemented adversarial target tracking algorithms in C++ and ROS to manipulate object behavior, compelling them into desired states while they respond to tracking robots and seek cover.
- Engaged in developing homogeneous multi-robot task assignment algorithms to achieve almost optimal allocation of robots for various tasks within the environment.

Insureka | Someshwara Software — Machine Learning Engineer — Dec 2020 - Jul 2022
- Integrated MLOps (Azure and GCP) to design an OCR pipeline that captured data from Indonesian government IDs like STNKs, KTPs, and SIMs, encomapssing text detection, recognition, and entity association processes.
- Created Django-based web tool for vehicle keypoint annotation, enabling 2D to 3D mapping for simulations and modeling.
- Built a PyTorch-based pose estimation model for vehicles, enhancing AR video capture integration and vehicular component analysis accuracy.
- Designed automated scripts and established CI/CD processes to enhance the efficiency of web app deployment. Utilized Docker containers on Kubernetes to implement microservices, leading to substantial time and effort savings for the team (across AWS and GCP).
- Architected Restful APIs and analytical dashboards using Flask for VExhibit, an online exhibition and conference platform that hosted government events and academic conferences.
- Built a web application for the State Bank of India using Django, which increased their regional customer acquisition by 10%.

Projects

Self-Driving Car | *Published in the MDPI Sensors Journal* | *Video demo*
- Engineered a Level-3 autonomous vehicle within the Carla Simulator, incorporating image processing, motion planning, state estimation, and localization. Addressed tasks including but not limited to lane stability enforcement, execution of overtaking maneuvers, handling roadblocks, and navigating through jaywalking scenarios.
- Annotated a custom dataset for the visual perception stack, resulting in $\approx 5\%$ enhancement in IOU score and accuracy.
- Introduced a novel method to handle sensor failures and share inferred knowledge across various agents in the environment for efficient decision-making.

Code-Mixed Machine Translation
- Implemented an end-to-end machine translation pipeline using the LLMs (BART) for translating multilingual, code-mixed languages into English.
- Developed a custom tokenizer and fine-tuned the BART model, achieving results comparable to GPT-4 in terms of SacreBLEU, ChrF, and BERTscore metrics.

SimPan
- Implemented a no-code development platform using Django for quicker end-to-end software pipelines building - supporting multiple and isolated packaged environments.
- Designed the system to be scalable and made use of various system design components such as message broker - RabbitMQ, and celery consumers to execute tasks.