Nikhil Bola Kamath

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Education

University of Southern California — Los Angeles, CA
Master of Science in Computer Science; ***GPA: 3.85/4.0*** — Aug 2022 - May 2024
Courses : 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 — Menlo Park, USA — 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 — LA, USA — 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 — Bangalore, India — 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/Tensorflow**-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.
- Currently working on implementing improved **state estimation** model using **3D Vision** (SLAM, Gaussian Splatting, NeRF) to enhance the motion planning of the ego vehicle.

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.