UMANG SHAH

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SKILLS

- Python
- Computer Vision
- MySQL, MongoDB
- Machine Learning
- Django, Flask
- Keras, PyTorch
- Pandas, NumPy
- OpenCV, SKLearn

EXPERIENCE

AI Research and Development Engineer July 2024 - Present
BluB0X Security *Andover, MA*

- Developed a homography-based pipeline using YOLO to automatically regtister camera views to floor plans, significantly boosting mapping accuracy by 35%.
- Integrated GroundedSAM and ChatGPT-4 to automate regions of interest/disinterest detection, leading to more reliable event triggers and a noticeable reduction in false alarms.
- Engineered a YOLO-driven pipeline to generate heat maps of object movement, optimizing routing analysis and contributing to more efficient spatial planning.
- Designed a system to analyze elevator camera feeds for floor identification, door status, occupancy, and free space using GroundedSAM, OCRs, and YOLO.
- Implemented smart median blending to synthesize background images from multiple frames, effectively eliminating moving objects.
- Containerized all pipelines using Docker, streamlining deployment and maintenance while ensuring consistent performance.
- Developed an LLM leveraging GraphRAG and function calling to answer building queries and assist managers with actionable insights.

Research Assistant May 2023 - May 2024
Visual Attention Laboratory, UMass Boston *Boston, MA*

- Engineered a high-precision CNN model using Keras to significantly enhance facial recognition accuracy, leveraging the Biwi Head Pose Dataset to predict confidence for frontal and non frontal faces. Augmented the dataset to increase diversity. Decreased False positives by implementing the frontal face filter and increased recognition accuracy from 96% to 99%.
- Implemented a face orientation model using MobileNetV2 architecture which predicts confidence values for yaw, pitch, roll of a face.
- Utilized user votes to train a model that ranks various images of the same user based on face appearance and image quality, facilitating the automatic display of the best image for each user. This ranking system is also employed to select optimal images for the automatic retraining of the Facial Recognition Model.
- Streamlined inference efficiency and deployment readiness by converting the Keras model into an ONNX format, ensuring accelerated predictions and seamless integration into diverse systems.
- Researching on ways to speed up the training process and get robust object detections for YoloV8.
- Currently developing an Automatic Annotation Tool capable of detecting various objects within an image without necessitating specific object specifications. Leveraging Language-Image models (LLM), the tool identifies objects present in an image and utilizes GroundingDINO to generate bounding boxes for detected objects.

Associate Software Engineer Jan 2020 - June 2022
GlobalVox Ventures Pvt. Ltd. *Ahmedabad, India*

- Explored and implemented various Deep Learning and Machine Learning techniques for Facial Recognition.
- Architected a robust back-end API system using Flask, orchestrated database schema design with MongoDB, and implemented rapid facial identification for over 100k faces within 2 seconds.
- Successfully developed a system using FER+ dataset for recognizing emotions, categorizing Angry, Sad, Happy, Disgust, Fear, and Surprise expressions with an accuracy of 73%.
- Designed an Indian Numberplate Detection system utilizing YOLO, achieving plate detection within 1 second.The system attained a commendable accuracy rate of 98%, leveraging a dataset sourced from real-world street scenarios.
- Played a key role in the entopedia.in project by developing APIs using Django Rest Framework, supporting a user base of over 10,000 individuals within Reckitt. Streamlined authentication with OKTA Single Sign-On, and incorporated PayPal & Stripe payment gateways, enhancing user experience by eliminating manual bank transfers.

EDUCATION

MS in Computer Science, University of Massachusetts - Boston - GPA 3.97/4.0 May 2024
Relevant Coursework: Analysis of Algorithms, Neural Networks, Computer Vision, Compilers.

MSc in Artificial Intelligence & Machine Learning, Gujarat University - GPA - 4.0/4.0 2018 - 2020
Relevant Coursework: Machine Learning, Deep Learning, Advanced Python.

Bachelor of Computer Application, Ahmedabad University - GPA - 3.97/4.0 2015 - 2018
Relevant Coursework: Data Structures and Algorithms, OOP, Advanced Database Management System.