Himanshu Sahni

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I am a dedicated AI, Robotics, and Data Science professional with a keen interest in developing innovative solutions to real-world problems. With a background in diverse technical projects, I thrive in collaborative environments where strong communication, adaptability, and problem-solving are key. I enjoy taking the initiative in projects and am motivated by opportunities to build technologies that positively impact society, aiming to leverage my skills and passion for innovation to create solutions that improve everyday life and drive technological advancement.

EDUCATION

Chalmers University of Technology, Göteborg, Sweden   2022 - 2024
Master's in Complex Adaptive Systems

RV College of Engineering, Bangalore, India   2016 - 2020
Bachelor of Engineering in Mechanical Engineering

SKILLS AND CERTIFICATIONS

- **Languages:** Python, MATLAB, C++, GO, SQL, Linux scripting, Latex
- **Tools/Frameworks**: ROS, ROS2, Gazebo, GIT, Docker, Tensorflow, Keras, Pytorch, Scikit-Learn, AWS (ECS, ECR, S3, Elastic Beanstalk), Microsoft Azure, MLflow, Kubernetes, JIRA, Flask
- **Soft Skills** Communication, Collaboration, Adaptability, Critical thinking, Leadership
- **Certifications:** Generative Adversarial Networks (GANs) (Coursera), DeepLearning.AI TensorFlow Developer (Coursera), Deep Learning Specialization (Coursera), Machine Learning (Coursera)

EXPERIENCE

Summer Worker, VOLVO Group   Jun, 2024 - Present
- Conducting data analysis and developing machine learning models on customer usage data to derive actionable insights and accurately predict driver behavior patterns, enhancing fleet efficiency and safety.

Master Thesis Worker, VOLVO Group   Jan, 2024 - Jun, 2024
- Developed and implemented **agent-based architectures** using open-source LLMs (Code Llama 2 Series and Mixtral 7x8b) for analyzing industrial logged data, focusing on automating data analysis processes and enabling intuitive natural language interactions.
- Crafted and implemented **advanced prompt engineering** methodologies for complex data interpretation, reasoning, code synthesis, and visualization tasks.
- Collaborated with the team on the development and evaluation of the tool, using standardized and **custom metrics** to ensure accuracy, reliability, and effectiveness.

Teaching Assistant - Robotics Lab, Chalmers University of Technology   Feb, 2023 - Jul, 2023
- Served as a Teaching Assistant under Dr. Elad Schillar, guiding 6 bachelor students in using ROS to design indoor autonomous robot architectures and motion planning algorithms.
- Implemented advanced SLAM algorithms, including **TAG Slam, Orb Slam3, and Gmapping**, on Wifibot with an RGB camera and a Lidar for trajectory and map generation.
- Integrated the developed autonomous system with the in-house local positioning system, **Gulliview**, conducting a comparative analysis of trajectories from both sources.

Robotics Software Engineer, JETBRAIN ROBOTICS   Sep, 2020 - Jun, 2022
- Implemented **SLAM and online motion planning algorithms** for mobile robots, interfacing with sensors like sonars, LIDAR, IMU, and wheel encoders to enable autonomous navigation tasks.
- Developed a **tricycle controller and teach-and-repeat algorithm** for an autonomous floor scrubber, integrating the Alphasense position module for enhanced positional accuracy.
- Upgraded robot systems by porting the navigation stack to **ROS2**, integrating **Slam toolbox** and **NAV2**, and leveraging Docker and shell scripts to develop automation solutions that enhance operational efficiency.
- Constructed **URDF packages** for robot simulations in Gazebo, incorporating camera, lidar, and IMU plugins to model real-world dynamics accurately.

Data Scientist Freelancer, GreyNodes
Nov, 2020 - Mar, 2022

- Conducted **A/B testing** to optimize digital advertising strategies, analyzing user engagement metrics. Implemented data-driven improvements that significantly enhanced user engagement and campaign performance.

- Utilized **ARIMA** models to accurately forecast demand spikes, optimizing inventory for peak periods like back-to-school and holidays, effectively minimizing overstock and stockouts.

PROJECTS

Automated Machine Learning Deployment and Prediction Pipeline
Apr, 2024 - May, 2024

- Developed and deployed a **Flask** web application to predict wine quality scores, utilizing **Docker** for containerization and **MLflow** for experiment tracking and model management.

- Implemented automated CI/CD workflows with **GitHub Actions** and deployed on **AWS ECS**, ensuring scalable and consistent updates across different environments.

Machine Learning-Driven Diamond Price Estimation
Apr, 2024 - May, 2024

- Developed and deployed a **Flask** web application to predict diamond prices using various regression models, including **Random Forest, Gradient Boosting, CatBoost, and a Voting Regressor.**

- Implemented **hyperparameter tuning** using RandomizedSearchCV and GridSearchCV, and automated deployment with **CI/CD pipelines** on **AWS Elastic Beanstalk** and **Microsoft Azure**, ensuring scalability and reliability.

Time-Constrained Scheduling and Collision-Free Control for A Fleet of Mobile Robots
Oct, 2023 - Jan, 2024

- Developed an **automated pipeline** linking scheduler outputs with MPC for seamless **task scheduling** and **trajectory planning**.

- Employed **MILP optimization solvers** (Gurobi, Z3) and CasADi for precise trajectory control and efficient task allocation, enhancing system coordination.

- Created a prototype for a **dynamic online scheduler**, enabling real-time task adjustments and trajectory translations in the MPC system for improved resource management.

Image-to-Image Translations Using GANs
Mar, 2023 - May, 2023

- Developed and implemented **Generative Adversarial Networks** (GANs), including **Conditional GANs** (Pix2Pix) and **Cycle GANs**, for accurate image translation across domains such as **facades to semantic representations** and **maps to satellite imagery**.

- Analyzed network outputs, identified improvement areas, and fine-tuned models to ensure high-quality image translations and enhanced performance.

Intelligent Navigation for Kiwi Cars
Mar, 2023 - May, 2023

- Developed **YOLOv5 Nano model** for rapid cone detection on Kiwi car, and integrating an **adaptive steering algorithm** to enhance autonomous vehicle control.

- Implemented **color-based object detection** for blue paper and green Post-it notes using OpenCV, employing advanced image processing techniques for precise identification.

- Engineered a **dynamic wandering system** for Kiwi car, prioritizing object detection based on battery status and developing a comprehensive **navigation plan** for robust autonomous functionality. Trained **YOLOv5 model** for enhanced car detection, applying advanced steering methods in varied environments.

Cooperative Path Finding with Time-Delay Communication
Nov, 2022 - Dec, 2022

- Developed an **agent-based model with bacteria** to demonstrate communication and cooperation among autonomous agents via environmental signals.

- Aimed to create a foundational algorithm for **cooperative path-finding** in robotic swarms, addressing time-delayed communication complexities.

- Applied model insights to **drone-based search-and-rescue missions**, enhancing communication and cooperation for locating trapped victims during emergencies.