Himanshu Sahni

sahni.h1998@gmail.com • +46 (0) 76 714 08 93

LinkedIn - Himanshu Sahni   hsahni55h.github.io

Education

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

Relevant Coursework: Artificial Neural Networks, Stochastic Optimization Algorithms, Simulation of Complex Systems, Algorithms for Machine Learning and Inference, Design of AI Systems, Advanced Machine Learning with Neural Networks, Autonomous Robots, Constraint Programming and Applied Optimization, Distributed 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, Microsoft Azure, 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

Master Thesis Worker, VOLVO Group Jan, 2024 - Present

- 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

Machine Learning Model Deployment and Prediction Pipeline 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.

Voluntary Work

Läxhjalper - Chalmers Pluggstöd, Chalmers University of Technology Oct, 2022 - Present
- Tutoring and guiding high school students with their homework and assignments in Mathematics and Science in schools across Gothenburg.

Chalmers Digital Student Ambassador, Chalmers University of Technology Oct, 2022 - Dec, 2023
- Served as a Program Ambassador for Complex Adaptive Systems at Chalmers University of Technology, guiding prospective students worldwide, addressing program inquiries, and sharing insights into university life based on personal experiences.