Aneesh Reddy Vallapureddy

+1-716-292-9828 | aneeshrvallapu@gmail.com | aneesh-vallapu
Buffalo, NY - 14228, USA

Education

- **University at Buffalo** *Aug 2023 - Dec 2024*
  Masters in Robotics Engineering Buffalo, USA
- **Mahindra University** *Aug 2019 - May 2023*
  Bachelor of Technology in Mechanical Engineering Hyderabad, India

Experience

- **Kakatiya Institute of Technology & Sciences** *Jan 2023 - May 2023*
  Image Processing Intern Warangal, India
  - Implemented a U-Net-based model for semantic segmentation in self-driving cars, using Python and TensorFlow to classify road objects and enhance autonomous navigation.
  - Processed real-time video data to segment and detect key features such as lanes, vehicles, and pedestrians, improving object recognition and path planning in self-driving systems.
- **Indian Institute of Technology - Delhi** *July 2022 - Aug 2022*
  Engineering Intern Delhi, India
  - Executed a predictive model using Arduino to estimate the State of Charge (SOC), State of Health (SOH), and predict thermal runaway events for mobile robots.
  - Integrated IoT-enabled battery monitoring and Battery Management Systems (BMS), improving system reliability and efficiency by 10% while enhancing battery health monitoring and failure prediction.
- **Rashtriya Ispat Nigam Limited - RINL** *Dec 2021 - Jan 2022*
  Industry 4.0 Intern Visakhapatnam, India
  - Implemented sensor-driven rotor balancing procedures to optimize machine performance, integrating real-time data analysis for improved operational efficiency in line with Industry 4.0 principles.
  - Collaborated with senior engineers to present insights from data analysis, identifying key areas for automation and enhancing process efficiency, earning commendation for innovative contributions to machine optimization.

Projects

- **Autonomous Vehicle Navigation and Obstacle Detection Development** *Feb 2024 - May 2024*
  Tools: ROS, Python, OpenCV, ML, Pytorch, Tensorflow, Path Planning Algorithms, Control Systems
  - Applied the pure pursuit method using the bicycle model for lateral vehicle control and integrated gap-following, RRT, A*, and visual odometry algorithms for path planning and object detection in the F1Tenth Simulator, enhancing navigation and obstacle avoidance.
  - Utilized LiDAR data and sensor fusion to enhance real-time object detection and vehicle localization, leading to more accurate and efficient autonomous navigation in complex environments, ultimately improving the system's robustness in dynamic scenarios.
- **Facial Emotion Detection for Social Robotics** *Oct 2023 - Dec 2023*
  Tools: Python, OpenCV, and TensorFlow/Keras, Edge Detection, CNNs
  - Developed a real-time facial emotion recognition system using a Convolutional Neural Network (CNN), employing techniques like grayscale conversion, Canny edge detection, and data augmentation to improve feature extraction and model generalization.
  - Deployed the model for real-time emotion classification across seven emotional states, using live webcam feeds, enhancing user interactions in real-time social robotics applications.
- **Transforming Existing CNC Machine to Cyber Physical System (Sensor Integration)** *Aug 2022 - Dec 2023*
  Tools: Python, IoT Sensors, RaspberryPi, NodeMCU, Google Firebase, Sensor Fusion Techniques
  - Engineered a framework to retrofit the Intelitek Promi11-8000 CNC machine with IoT sensors, providing real-time data on feed rate, tool position, vibration, and cutting forces.
  - Created a web-based database for data collection and visualization, enabling digital twins and performance dashboards for optimized machining.

Skills

- **Programming Languages:** Python, Matlab/Simulink, Arduino Programming (C), SQL
- **Libraries/Frameworks:** TensorFlow/Keras, PyTorch, OpenCV, OMPL, RViz, NumPy, Pandas
- **Cloud/Database Technologies:** Plotly Dash, Google Firebase
- **Software:** ROS, F1Tenth Simulator, Gazebo, Ansys, Ubuntu, Git

Publications

[1] Aneesh Reddy Vallapureddy, et al. (2023). **Transformation of Industry 3.0 CNC Machines to Industry 4.0 Machines: Sensor Selection and Integration**, IEEE Xplore. 22 August 2023, Harbin, Heilongjiang, China. DOI: 10.1109/ICMA57826.2023.10216083