Aneesh Reddy Vallapureddy

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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
  ◦ Conceptualized and developed a smart warehouse automation system, integrating motion-controlled conveyors and vision-based object recognition using OpenCV for barcode detection, item classification, and defect identification to enhance sorting and quality assurance.
  ◦ Designed an HMI with Ignition SCADA for real-time monitoring and modeled the dynamics of the conveyor system in MATLAB Simulink to propose motion control strategies for efficient item transport.

- **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.

- **Control System Development for Pick-and-Place Operations - UR-3 Robot** *Oct 2023 - Dec 2023*
Tools: ROS, Python, Matlab, MoveIt, URSim
  ◦ Designed and implemented advanced control algorithms, including inverse kinematics, for precise joint-level control of the UR-3 robotic arm, enhancing the efficiency of automated pick-and-place operations.
  ◦ Integrated real-time sensor feedback into the control system, allowing dynamic adjustment of robot motion, improving overall system stability and precision during task execution.

- **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, URSim, 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