# Sai Swaroop Reddy Vennapusa

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## Summary:


Experienced Robotics Engineer with a Master's in Robotics from ASU, with strong foundation in robotic systems, software development, database management, cloud technologies, predictive modeling, reporting, and data visualization. Proficient in computer vision, machine learning/deep learning, and embedded systems, I am skilled in Python, R, SQL, and shell scripting. A strong collaborator and communicator, I excel in working with cross-functional teams and engaging customers to deliver innovative solutions.


## Skills:

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|---|---|
| **Operating Systems:** | Windows, Linux, Unix |
| **Languages:** | C++, Python, SQL, R, MATLAB |
| **Libraries& Frameworks:** | Hugging face, Pandas, NumPy, Scikit-learn, Matplotlib, Pytorch, TensorFlow, TensorRT, Keras, NLTK, OpenCV, PCL, Open3D, Streamlit, BS4, Selenium, G-Streamer, Seaborn, Plotly |
| **Data Visualization Tools:** | Tableau, Power BI |
| **Cloud Skills:** | AWS, Oracle |
| **Source Control:** | Git, Docker, Jira |
| **Database:** | RDBMS (MySQL, PostgreSQL, Oracle), NoSQL |

## Professional Experience:

**ASU & Jetsudz Colab | Tempe, AZ**
**AI Engineer | Feb 2024 - Present**

- Leading the development and integration of an **AI-driven chatbot and call assistant** using open source LLM model, enhancing user engagement by 15%.
- Collaborated with the development team to streamline chatbot integration using **RESTful APIs**, boosting security and reducing latency by 30%.
- Leading a team of five in the phased deployment of an AI-driven chatbot on **AWS**.

**HC Robotics | Tempe, AZ**
**Robotics Engineer intern | April 2023 - July 2023**

- **Sensor Integration:** Seamlessly integrated multiple **LiDAR systems (Ouster, Velodyne)** and **omni-directional machine vision cameras (Flir)** and **INS (KVH, VN300)**.
- **Sensor Fusion:** Applied the **Extended Kalman Filter (EKF)** to integrate IMU, point cloud, and GPS data for real-time trajectory estimation.
- **Deep Learning:** Implemented the **PointNet deep learning architecture** for accurate segmentation of LiDAR-derived point cloud data and applied **k-means** clustering to enhance object grouping.
- **Trajectory correction:** Leveraged **regression analysis** to correct real-time trajectory deviations using INS and LiDAR data.

**HC Robotics | India**
**Robotics and AI Engineer | April 2020 - July 2022**

- **Algorithm Evaluation**: Evaluated and tested several algorithms for **detections, tracking**, **indoor mapping** and **sensor fusion**.
- **Research & Implementation**: Studied and implemented algorithms from research papers, adapting them to available hardware for practical results.
- **Software Development**: Architected and developed the complete software stack, integrating **YOLOv4, Deep SORT,** and **Mask R-CNN** on **NVIDIA's Xavier AGX board**, with a user-friendly application to control gimbal and camera settings.
- **Database Integration**: Enhanced the application by integrating **PostgreSQL** for efficient data management, ensuring seamless storage and retrieval of video metadata and analytics results.
- **Model Optimization:** Employed **transfer learning, cross-validation, early stopping** and **pruning** to optimize machine learning models.
- **Collaboration & Integration**: Partnered with product managers and OEMs for procurement, testing, and integration.
- **Customer Engagement**: Demonstrated extensive experience in customer engagement and interaction by presenting at conventions, representing products, and integrating customer feedback for product improvements.

### Data Analyst and Automation Engineer - Oracle **August 2016 - April 2020**

- Developed a tool using **Python** and **SHELL scripts** for automating administrative tasks, resulting in a 40% improvement in workflow efficiency and a 50% reduction in manual interventions.
- Collaborated with data engineers to architect **ETL pipelines**, integrating cross-platform data sources for comprehensive analysis.
- Integrated machine learning techniques into the tool, conducted **Exploratory Data Analysis (EDA)** to uncover patterns and insights.
- Conducted **A/B tests** on different models to analyze and enhance database administrator engagement and retention based on their behavior patterns.
- Collaborated with SMEs and cross-functional teams to optimize **SQL queries(CTEs, views, and functions)**, and developed a **Tableau** dashboard to analyze and visualize critical performance **KPIs** and operational trends.

## Education:

**Arizona State University, Tempe, AZ | December 2023**
Masters in Robotics and Autonomous Systems | GPA - 4.0/4.0

## Academic Projects:

- **Advanced Regression Analysis**: Performed **advanced regression analysis** on EPA data to assess the impact of horsepower and vehicle weight on fuel efficiency, integrating **hypothesis testing** to validate relationships using **p-values and confidence intervals**.
- **Autofinder**: Developed the '**AutoFinder**' desktop application, utilizing real-time web scraping to aggregate car options from various manufacturers. Streamlined the car selection process, reducing search time for users by 80%.
- **Football Analysis Project:** Utilized machine learning and computer vision to develop a real-time football analysis system, employing **YOLO** for object detection, **K-means for pixel segmentation**, **optical flow for motion tracking**, and **perspective transformation** to represent scene depth and perspective.
- **Segment Anything Interactive Web App:** Developed a **Python** and Streamlit-based web application that integrates the "Segment Anything Model" for real-time image segmentation. This application provides an intuitive interface for users to remove backgrounds from images, emphasizing the primary subject, similar to technology currently used in modern smartphone cameras.
- **Quadcopter Gazebo Simulation**: Successfully programmed and executed an autonomous drone mission on an alien terrain using ROS, achieving precise data-muling and mapping of geological features with ORB-SLAM2, incorporating techniques like velocity control and trajectory optimization for efficient and accurate surveying.