Likith Kumar Reddy Yammanuru

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PERSONAL STATEMENT

Robotics engineer with expertise in ROS2, reinforcement learning, sensor fusion, and motion planning, supported by practical experience in developing autonomous systems within simulation-based lab environments. Experience includes contributing to the MARIO in-orbit assembly demonstrator at Cranfield University in collaboration with ESA and Airbus, with a focus on multi-arm coordination and motion planning. Current work involves scalable multi-robot systems using AI-driven task planning and optimization. Strongly motivated to contribute to research that drives practical innovation in robotics through hands-on experimentation, data-driven approaches, and interdisciplinary collaboration.

KEY ACHIEVEMENTS

- Presented MARIO – A Multi-Arm Robot Assembly In-Orbit Demonstrator at RAS 2024 IEEE UK Conference.
- Achieved a first-class Master's degree in Robotics and a Bachelor's degree in Computer Science.
- Received a letter of appreciation from the founder of ALGOSWING for my contribution towards process automation.
- Maintained 100% customer satisfaction and a 5-star rating on FIVERR.

EDUCATION

MSc in Robotics - Cranfield University, Cranfield, UK **Sep 2022 - Sep 2023**

- **Modules:** Artificial Intelligence and Machine Learning, Autonomy in Robotics (SLAM and Sensor Fusion) ,Robot Control, Human-Robot Interaction, Machine Vision, Psychology, Ethics and Standards.
- **Academic courses:** ROS & ROS2 (Robot Operating System), C++, Python, MATLAB, SIMULINK, SolidWorks.
- Individual research project on “Delivering Light-Weight Parcels in a train” in collaboration with RSSB (Rail Safety and Standards Board).
- Served as a member of the Mission Specific team in the Olympus Rover Trial by CranSEDS.
- Participated and represented Cranfield in the ERL - European Robotics League.

Bachelor of Technology in Computer Science - BML Munjal University, India **Jul 2018 – Jun 2022**

- **Modules:** Digital image processing, Robotics, Computer networks, Cybersecurity, Big data, Machine learning, Natural language processing, Object-oriented programming, Software development, Data structures and algorithms, Database management, Geographic information systems, Cloud computing, and Linear programming.
- **Academic courses:** Python, ROS, Arduino, Cisco Packet Tracer, Data Mining, Data Science, Java, C, QGIS, ArcGIS.
- Served as the class representative for machine learning and natural language processing courses.

PROFESSIONAL EXPERIENCE

Robotics Engineer, Autonomous Agricultural Robotics - Remote **May 2024 - Current**

- Designed and developed an autonomous field robot capable of detecting and trimming uneven bamboo branches to enhance plant growth and productivity.
- Integrated computer vision algorithms and sensor fusion (LiDAR, cameras, IMUs) for real-time branch detection and autonomous traversal in unstructured farm environments.
- Developed and tested the system in ROS2, simulating autonomous navigation, cutting precision, and obstacle avoidance to optimize performance before deployment.
- Currently in the final testing phase of the simulation, ensuring system reliability and robustness before real-world implementation.
- Improved operational efficiency by 75%, significantly enhancing precision, productivity, and profitability in bamboo farming.

Data Scientist, Fiverr - Remote **Dec 2021 - May 2022**

Fiverr is a global online marketplace that connects freelancers with businesses and individuals who need their services.

- Engineered advanced recommendation algorithms using NLP and machine learning frameworks, such as TensorFlow and Scikit-learn, to deliver customized solutions for 11 clients across 5 countries.
- Developed robust data processing pipelines with web crawlers, data cleaning, and transformation techniques, using libraries like Pandas and NumPy to ensure data integrity and performance.
- Architected and implemented search systems and recommendation engines, providing comprehensive documentation and clear client presentations to ensure successful deployment and user understanding.
- Adapted to cutting-edge technologies in a dynamic, agile environment and delivered high-impact solutions, achieving 100% client satisfaction through effective communication and precise execution.

Software Engineer, Siva Mechanical Works - Hyderabad, India **Apr 2020 – Sep 2022**

Siva Mechanical Works offers services in equipment repair and maintenance to top-tier pharmaceutical companies in India.

- Engineered a robust software solution in Python to enhance billing and record-keeping processes, overcoming challenges in data handling and integration. Developed scalable, stable services to support operational efficiency.
- Utilized OCR for data extraction and processed it for standardization. Created and maintained data pipelines to ensure accurate data collection, manipulation, and analysis.
- Implemented a standardized data format and conducted extensive training for stakeholders to improve software usability, reducing manual errors by 99.32% and significantly increasing data accessibility and operational effectiveness.

PROJECTS

SWARM Using Reinforcement Learning - Freelancing, UK **May 2024 - Current**

- Designed a decentralized decision-making approach for a multi-robot system to ensure efficient navigation while avoiding collisions and boundary violations.
- Developed a single policy network for multiple autonomous rovers, enabling them to compute optimal control actions based on their state, goal distance, and positions of other robots.
- Utilized Python, TensorFlow, OpenAI Gym, and ROS2 to design and implement a scalable reinforcement learning framework.
- Developed a custom environment using Gym, implementing the reinforcement learning (RL) pipeline from scratch. Refined the reward function to reduce sparse rewards and optimized the observation space for improved learning efficiency.
- Achieved a 73% success rate in goal-reaching tasks while maintaining safe navigation. Currently working on resolving deadlock situations to further improve efficiency and robustness.

ERL Smart City Robotics - Cranfield, UK **Sep 2023 - Oct 2023**

- Developed a 3D reconstruction system using stereo camera point cloud data to enhance robotic perception and spatial awareness.
- Implemented real-time perception algorithms in ROS (C++), leveraging OpenCV for disparity map generation and PCL for point cloud processing to achieve accurate 3D modeling.
- Integrated the system with a UR5e robotic arm, enabling object detection, path planning, and interaction for smart city applications, improving autonomous navigation efficiency.
- Achieved notable success in the European Robotics League (ERL) competition, securing Winner of the "Shopping Pick and Pack" episode and third place in the "Through the Door" challenge.

Multi-Arm Robot Assembly System, Group Design Project - Cranfield University, UK **Feb 2023 - May 2023**

- Collaborated with AIRBUS and the European Space Agency (ESA) to design and develop a ROS-based Simulation of MARIO - A Lab Demonstrator of Multi-Arm Robot Assembly In-Orbit.
- Developed motion planning and control strategies for 6-DOF robotic arms, ensuring precise collision-free pick-and-place operations.
- Programmed and optimized robotic control plugins in C++ and Python, including a custom magnetic effect simulation plugin.
- Simulated robotic assembly tasks in Gazebo and RViz, fine-tuning system behavior through PID control optimization.
- Presented findings and technical reports to AIRBUS board members, contributing to research on multi-arm robotic collaboration and industrial automation.

VOLUNTEERING EXPERIENCE

- **RAS2024 Conference Presentation**: Presented the group project at the RAS2024 IEEE UK Conference in Sheffield, showcasing advancements in in-orbit assembly.
- **Creating a Scientific Superpower Conference**: Attended and tested the Temi robot in London, training it to guide guests and provide interactive guidance. Reported potential issues and insights on Temi's behavior to the team.
- **ERL Smart City Robotics Competition**: Participated in ERL, representing Cranfield. Contributed to integrating YOLO and stereo vision into the MiR robot with an arm, leading the team to win the "Shopping Pick and Pack" episode and secure third place in "Through the Door.".
- **Olympus Rover Trial**: Participated in designing and building a rover from scratch, incorporating various functionalities for sensing and planning.

SKILLS, INTERESTS AND EXTRACURRICULAR ACTIVITIES

- **Technical skills:** ROS, Python, C++, Machine Learning, Data Analysis, Statistical Analysis, Computer Vision, Sensor Fusion, OpenCV, MATLAB, Simulink, Cloud Computing, SQL, MongoDB, SoildWorks,Microsoft Office Suite, LaTeX.
- **Interests:** Blogging, Teaching, Cricket, Chess, Cooking.
- **Languages:** English (professional), Telugu (native), Hindi (basic).