# Sai Kottapeta | Aspiring Robotics Researcher

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## About Me

A passionate and dedicated robotics enthusiast with hands-on experience in designing and implementing innovative robotic systems. My expertise spans control systems, embedded systems, and AI integration, demonstrated through successful projects and national-level competition achievements. I am driven by a commitment to solving real-world challenges through cutting-edge research and engineering, with a focus on advancing robotics technology. Eager to contribute to impactful research and collaborate with experts in the field to create meaningful solutions.

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## Technical Skills

- **Programming**: Python, C++, MATLAB, debugging
- **Robotics**: Control systems, ROS2, Gazebo, Foxglove, FreeCAD
- **Embedded Systems**: Arduino, NodeMCU, PCB design, hardware-software integration
- **AI/ML Frameworks**: TensorFlow, Keras (for vision-based robotics tasks)
- **Additional Skills**: Data structures, algorithms, Linux environments, and Git version control

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# Projects

### Image Classification Using TensorFlow(Nov 2024 – Dec 2024)

- Developed a Convolutional Neural Networks capable of accurately classifying images into 24 categories of fruits and vegetables. Utilized chatgpt for coding assistance
- Implemented pre-processing pipelines and trained models to achieve 95% accuracy on the test dataset.

### Self-Driving Car (July 2024 - Oct 2024)

- Built and tested an autonomous vehicle in virtual world using **ROS2** and **Gazebo**. In real-time using ready-made buggy hardware and **navqplus** board for processing, **canhubk3** for controlling the hardware
- Controlled the car based on the road edges(extracted using **opencv** from image), obstacles(algorithm to avoid obstacles based on "scan" topic of lidar)
- Executed extensive simulations for environment mapping and safe navigation.

### Self-Balancing Robot ( March 2024 – May 2024)

- Designed and developed a two-wheeled robot leveraging **PID control** for real-time stabilization.
- Utilized **gyroscopic & accelerometric sensors** to ensure dynamic balance and efficient sensor-data integration.
- Conducted iterative **testing and debugging** to fine-tune control parameters for optimal performance.

### Drone Development Project (Nov 2023, Under-Development)

- Designed the **UAV** with custom hardware like **atmega328p** microcontroller for sensor input, motor control and processing, **nrf-module** for radio transmission in the flight controller and transmitter.
- Did circuit debuggin and coding then Conducted initial **PID tuning** trials to improve flight stability.
- Demonstrated strong understanding of robotics hardware and software integration, paving the way for further optimization in future projects.

## Achievements

- **2nd Place**: NXP AIM Competition – Designed and simulated a self-driving car with camera and LiDAR integration in Gazebo. Recognized for innovation and performance in problem-solving and debugging under time constraints.
- **2nd Place**: ROBOTRAC Competition – Built and programmed a high-accuracy line-following robot utilizing HuskyLens and Arduino.

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## Research Interests

- Control systems, path-planning for UAVs and mobile robots
- Visual-slam, sensor fusion, reinforcement learning
- Multi-agent robotics and swarm intelligence

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## Extracurricular Activities

- Active member of the Robotics Club, where I led workshops on Arduino programming, IoT, and robotics. Organized robotics competitions
- Regular participant in robotics competitions(like e-yantra) and hackathons, contributing to the design and implementation of innovative robotic systems.

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## Education

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| Bachelor of Technology in Electronics & Communication Engineering at RGUKT, Ongole | Expected 2026 |
| Pre-University Course at Rajiv Gandhi University of Knowledge Technologies, Ongole | 2020-2022 |
| High schooling at Z.P. HIGH SCHOOL, Kondur | 2016-2020 |

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## Why Me?

I have a strong background in robotics and control systems, proven through my successful projects and achievements in competitions. I specialize in designing and integrating robotics hardware with efficient control algorithms, which aligns closely with the research focus at RRC. I am excited about the opportunity to relocate to Hyderabad and contribute to the innovative work at IIIT Hyderabad.

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I hereby declare that all the information furnished above is true to the best of my knowledge and belief

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