Akhilesh Anant Gonabal

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Education

National Institute of Technology Karnataka, Surathkal, India — ***Aug 2016 - June 2020***

B.Tech in Electrical and Electronics Engineering — CGPA: 7.63/10

Key Coursework: Digital & Analog Systems, Microcontrollers & Embedded Systems, Control Systems, Sensors & Actuators, Machine Learning

Work Experience

Research Assistant | Indian Institute of Science, Bengaluru, India — ***May 2024 - May 2025***

- Developed a multi-modal robotic system for complex inspections in constrained spaces, integrating an Intel D435i depth camera and Jetson Nano to enable reliable teleoperated navigation.
- Designed embedded and mechatronics systems for modular mechanisms, including wall-press systems and 2-DoF joints, to enable the robot to navigate 90° pipeline bends, significantly enhancing adaptability and projected to cut inspection cost from ₹ 1,000 to ₹ 108 per meter.

Junior Research Fellow | National Institute of Technology Karnataka, Surathkal, India — ***Sept 2022 - May 2024***

- Led the establishment of an advanced Applied Cyber-Physical Systems (ACPS) lab, integrating sensor-actuator nodes with robust networks to bridge theoretical concepts with practical, hands-on applications.
- Developed lab platform for ACPS, enabling remote experimentation for 40+ students with real-time data analytics, improving practical understanding by 28% as measured by course feedback.

Lead Engineer | TATA Power Company Ltd, Mumbai, India — ***Sept 2020 - Jan 2022***

- Developed a SCADA-integrated operations and maintenance (O&M) dashboard with automated email/SMS alerts for critical substation faults, cutting customer power downtime by 30–40% through proactive real-time monitoring.
- Automated SCADA system health monitoring and periodic reporting by analyzing three years of historical data, boosting operational efficiency by 60–70% and enabling data-driven optimization of substation maintenance.

Patents and Publications

Patent: "A System for Inspection and Maintenance of Complex Environments using Multiple-Modal Operations and Method Thereof" — ***Dec 2024***

Published and Awaiting Examination | Application No. 202441099717

Publication: "Lab Experimental Framework for Demonstrating Integral Concepts of Applied Cyber-Physical Systems" 11th ISSS National Conference on MEMS, Smart Materials, Structures and Systems — ***Dec 2023***

Projects

SMART CITY — *Feb 2019 – Apr 2019*

Guide: Prof. Gangadharan K. V | Technical Stack: *Python, C, Arduino, Raspberry Pi, ESP8266, MQTT, JavaScript, HTML*

- Engineered a scalable IoT-driven smart city test-bed, integrating diverse sensors, actuators, and an MQTT-enabled communication network to demonstrate autonomous resource management and system-wide interconnectivity.
- Implemented a centralized command system for real-time monitoring and control of all smart city modules, coordinating autonomous tasks through sensor data and decision logic.

REMOTE TESTING OF RASPBERRY PI : DC MOTOR — *Jan 2019 – Apr 2019*

Guide: Dr. Pruthviraj U | Technical Stack: *Django, HTML, JavaScript, CSS, Raspberry Pi, Motor Driver, DC Motor*

- Developed a web-based interface enabling remote control of a DC motor via Raspberry Pi, featuring an online Python compiler for interactive experimentation in a virtual lab environment.
- Integrated real-time video streaming of the motor setup, allowing users to observe instantaneous results of their code execution and enhancing the interactivity of the remote lab for distance learning.

HOMEMAKER ASSISTANCE SYSTEM — *Aug 2018 – Apr 2019*

Guide: Dr. Jora M Gonda | Technical Stack: *Raspberry Pi, ESP8266, C++, Python, Django, HTML, JavaScript, CSS*

- Developed a Raspberry Pi-based voice-activated home automation system tailored for disabled and elderly users, integrating ESP8266 and GSM modules with sensors and actuators to enable hands-free device control and improve accessibility.
- Implemented real-time alerts and notifications for critical home events, providing immediate feedback to users, and enhanced system usability through iterative testing to meet diverse accessibility needs.

Skills

Programming Languages	C/C++, Python, HTML, JavaScript, CSS
Hardware & Embedded Platforms	Jetson Nano, Raspberry Pi, STM32, Teensy, Arduino, ESP32, ESP8266
Frameworks & Utilities	ROS 2, Gazebo, FreeRTOS, MQTT Explorer, Postman, Wireshark, Docker, Git, ThingsBoard, LaTeX
Software & Simulation Tools	KiCad, Altium, Onshape, NI LabVIEW, SolidWorks, Fritzing, MATLAB, Simulink, MS Office
Operating Systems	Linux, Microsoft Windows