# Naveen Kumar Rajarajan

**Senior Embedded Engineer**

linkedin.com/in/naveenar196 | nkumarrajarajan@gmail.com | +1 850 339 8125

## Profile Info

Results-oriented Electrical Engineering Master's Graduate with a research focus on Teleoperation and Autonomous Systems, bringing over 5 years of industrial experience in Embedded Systems, IoT, and ROS middleware suite. Specialising in developing innovative solutions for advanced robotic and automation applications. Proven track record in designing, implementing, and maintaining cutting-edge embedded and IoT systems. Strong problem-solving skills with a commitment to delivering high-quality, well-documented, and maintainable code.

## Work Experience

### Graduate Research Assistant – Research

Florida State University - CAPS(1+ Years)

Tallahassee, Florida | 2022 - 2024

- ➔ Developed a teleoperation system for an F1/10th car using Jetson Nano and G29 Cockpit joystick with force feedback and time delay compensation.
- ➔ Led a team to create middleware components for an autonomous go-kart with Jetson Orin, ROS2, Protenta, and microROS, including Steer-By-Wire and Drive-By-Wire modules.
- ➔ Managed the design and integration of sensors, actuators, and communication modules for an autonomous boat.
- ➔ Utilized hex cube controller and Ardupilot firmware for autonomous boat development, overseeing all technical aspects and team coordination.

### Embedded Engineer – Research & Development

Tata Consultancy Services (4+ Years)

Chennai, India | 2018 - 2022

- ➔ Developed an indoor localization module with Wi-Fi transmitters, Rpi-3B, and KNN algorithm, using 50,000+ samples and testing in a 15,000 sq. ft. warehouse.
- ➔ Won the best idea award at IBM Code for Kerala for CommunicaBall, utilizing LoRa for data transmission and BLE for communication with Arduino/Rpi controllers.
- ➔ Contributed to Palpicker, an autonomous mobile robot for warehouse management, focusing on sensor integration and ROS1 framework. Engineered Palpicker for pallet transport, specializing in sensor integration and development.

### Co-Founder | Development Lead - Platform and Services

Smazee

Chennai, India | 2017 - 2022

- ➔ Mentored a team at Smazee to enhance embedded projects for the market, providing guidance and expertise.
- ➔ Contributed to the university project Kaksa, assisting in resource utilization and team support for understanding and development. Envisioned and developed Kaksa, a smart board, including feasibility research, and logic improvements.
- ➔ Implemented voice command features and a Stokes Mapping Module for Kaksa, and addressed hardware and embedded logic issues. Supported the MVP development for eCycle by integrating dual BLE in-out logic and implementing cost-efficient power solutions.

## Skills and Tools

**Communication Interface**
*UART | SPI | I2C | CAN*

**Controller / Processor**
*Arduino | STM | RPi | Jetson*

**Sensor / Actuator**
*Proximity | Object Detector | High Torque Motor | ESC*

**Robotic Middleware**
*ROS1 | ROS2 | MicroROS*

**Programming Languages**
*Embedded C | Python | C++*

**Cloud**
*Firebase | AWS | Azure | ThingWorx | Firestore*

**Development Tools**
*Git | Github | Gitlab*

**Simulation Software**
*Matlab | Simulink | Proteus*

**Controller**
*Feedback Compensator | PID | Observer & Controller Design*

## Education

MS in Electrical Engineering
Florida State University
Tallahassee, Florida | 2022 - 2024

Bachelor of Electronics and Communication Engineering
Anna University
Chennai, India | 2014 – 2018

## Projects

### Internet-Based Platoon Control

- ➔ Conducted a master's thesis on human control of the leader agent in multi-agent platoon formations, addressing delay impacts on consensus and developing solutions with Wave variable and Predictor Techniques.
- ➔ Developed a teleoperation system for an F1/10th car using Jetson Nano and G29 Cockpit joystick, incorporating force feedback and time delay compensation.
- ➔ Implemented and tested the teleoperation system, focusing on optimizing control and response for the vehicle.

**TechStack** : *C++ | ROS1/Melodic | Python | PID*

### Autonomous Go-Kart

- ➔ Led a team of 4 to develop middleware components with Jetson Orin, ROS2, Protenta, and microROS, bridging the software and hardware teams and creating modules for Steer-By-Wire and Drive-By-Wire.
- ➔ Currently working with ROS2 Humble, focusing on communication between master and slave systems.
- ➔ Specializing in creating nodes, implementing business logic, and analyzing ROS2 communication for system integration.

**TechStack** : *C++ | ROS2/Humble | Python | Docker | Protenta | Ubuntu 22.04 | MicroROS*

### PalPicker for Warehouse

- ➔ Developed Palpicker, an autonomous mobile robot for warehouse management, focusing on pallet and roller cage transportation. Specialized in integrating lidar sensors for point cloud formation and saving, as well as camera integration for enhanced navigation.
- ➔ Implemented the ROS1 framework with Django to manage communication and control systems effectively.
- ➔ Contributed to design and development, optimizing the robot for efficient warehouse logistics.

**TechStack** : *Python | Ubuntu 18 | ROS1/Melodic | Django | REST Api*

### Kaksa

- ➔ Envisioned and developed the Kaksa smart board from the Future Blackboard concept.
- ➔ Conducted feasibility research, improved logic, and architected algorithms for the project.
- ➔ Implemented voice command features and a Stokes Mapping Module, and supported hardware issues and embedded logic using Arduino, RPI3.

**TechStack** : *Embedded C++ | Python | Arduino | Raspbian OS | Bluetooth | Ultrasonic Sensor*

## Publications

- ➔ *Passive Stability and Adaptive Control of Teleoperated System Using Wave Variables and Predictor Techniques - In ACC 2024 – Presented*
- ➔ *Internet-Based Adaptive Teleoperation Of Lead Vehicle In Platoon Using Wave Variable and Predictor Techniques - Thesis 2024 – Defended*

## Links

*LinkedIn* - http://linkedin.com/in/naveenar196
*Portfolio* - https://naveen.smazee.com
*Github* - https://github.com/Naveenkumarar