

# S. SHANMUGASUNDARAM KOGULSHIYAM

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## PROFILE

A motivated and technically skilled Electrical and Electronic Engineering undergraduate with a strong foundation in embedded systems, IoT, and robotics. Passionate about innovation and problem-solving, I have hands-on experience in developing intelligent systems using sensors, microcontrollers, and wireless communication. Known for my adaptability, fast learning ability, and collaborative mindset, I actively seek opportunities to apply theoretical knowledge to practical challenges. With a keen interest in automation, AI integration, and real-world impact projects, I am well-prepared for roles that demand creativity, precision, and continuous learning.

## Education

April 2022...	<b>University of Jaffna, Sri Lanka</b> BSc Eng(Hons) in Electrical and Electronic Engineering
2018-2020	N/ Talawakelle Tamil Maha Vidyalayam G.C.E ADVANCE LEVEL EXAMINATION (A B C)

## RESEARCH

**Topic:** Predictive Air Quality Monitoring with Adaptive Sampling and Data Fusion

**Description:** This project involves designing a smart air quality monitoring system using adaptive sampling to save energy, data fusion for accurate measurements. The system predicts future air quality trends, enabling proactive measures. It can be expanded into a Wireless Sensor Network (WSN) by integrating multiple nodes for large-scale, reliable monitoring.

Technologies C++, python, data fusion (Kalman filter), LSTM, Embedded system

## PROJECT

### Smart Autonomous Robot for SLRC Challenge (Robotics and Embedded System Design)

**Description:** Designed and developed a multifunctional robot for the Sri Lanka Robotics Challenge (SLRC) 2023. The robot was capable of line following, object detection and classification, color and metal identification, as well as executing precise ball-throwing mechanisms using angle adjustments. Integrated sensor systems and control logic to navigate complex tasks autonomously.

**Technologies:** Arduino, IR sensors, Ultrasonic sensors, Motor control, Embedded C, PID control

### Smart Wind Energy Charger for Mobile Devices (Renewable Energy and Embedded Power Electronics)

**Description:** Designed and developed a compact, eco-friendly system to convert wind power into electrical energy for charging mobile phones while traveling. The system uses a CPU fan as a wind turbine connected to a 12V DC generator, with a capacitor rectifier and buck-boost converter for voltage stabilization. Key features include voltage regulation, energy buffering via capacitors, and overcharge protection to ensure safe and consistent charging. The design emphasizes portability, efficiency, and real-world usability for travelers.

**Technologies:** DC Generator, P-Channel MOSFET, Capacitor Rectifier, Buck-Boost Converter, Voltage Regulation, Embedded Power System Design

### Vision-Guided Robot Navigation using ArUco Markers (OUSL Impacto Challenge)

**Description:** Developed a vision-based robotic system for the OUSL Impacto Challenge using OpenCV and Raspberry Pi. The robot detected ArUco markers in its environment and navigated accordingly by adjusting its direction based on the marker's ID and orientation. Played a key role in algorithm development, system integration, and real-time control.

**Technologies:** Raspberry Pi, OpenCV, Python, ArUco Marker Detection, Image Processing, Embedded Systems

### Autonomous LEGO-Based Mobile Robot for Shape Detection (Robotics and Automation)

**Description:** Developed an intelligent LEGO EV3-based autonomous robot capable of navigating a circular path and identifying geometric shapes (circle, triangle, square) placed at the center. Utilized PID control for precise line-following and an ultrasonic sensor for non-contact shape detection through real-time distance fluctuation analysis. The robot performed both navigation and shape recognition simultaneously and provided immediate LED-based feedback for visual confirmation.

**Technologies:** LEGO EV3, Ultrasonic Sensor, PID Control, Embedded Robotics, Real-Time Shape Classification, Visual Feedback System

## RELEVANT COURSEWORK

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Power Electronics, Digital design system	Power System, Renewable Energy,	Electric Power, Robotics and Automation,	Embedded System and Design, Artificial Intelligence, Machine Learning
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## SKILLS

**Simulation Software:** Quartus, Modalism, MATLAB, Proteus, PSCAD, LTspice

**Microcontroller:** AVR , ESP32, STM32

**Programming Language:** Matlab, c++, PLC Programming, Python, Embedded C, Micro python

**Designing Software:** SolidWorks, EasyEDA , Altium

## LANGUAGES

**English** –working proficiency

**Tamil** – Native proficiency

**Sinhala** – Basic comprehension only

## REFERENCES

**Prof. Tharmarajah Thiruvaran**

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