Sai Dikshith Varanasi

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EDUCATION

Amrita Vishwa Vidyapeetham | Bachelor of Engineering — India, Kerala | **2021-2025**
Major: Electronics and Communication Engineering — **CGPA:** 8.08/10
Relevant Coursework: Software Engineering, Digital Electronics, Analog Electronics, FPGA Based System Design, Microcontrollers, IoT, Digital Communication, Computer Networks (TCP/IP, UDP, HTTP, FTP).

Sri Chaitanya Junior College | Higher Secondary Education — India, Andhra Pradesh | **2019-2021**
Course subjects: Maths, Physics, Chemistry (MPC) — **Score:** 904/1000

Sri Chaitanya EM School | Secondary Education — India, Andhra Pradesh | **2017-2019**
Board of Secondary Education Andhra Pradesh — **CGPA:**9.8/10

TECHNICAL SKILLS

Programming Languages: C++, Python, Verilog, MATLAB, ARM Assembly
Communication Protocols: I2C, SPI, UART, TCP/IP
Tools: ANSYS HFSS, Cadence Virtuoso, Proteus, TinkerCAD, Arduino IDE, ModelSim.
Simulation & Design Tools: ModelSim, Gazebo, ROS, RViz
Operating Systems: Unix/Linux, Microsoft Windows
Interests: Embedded Systems, VLSI Design, IoT.

WORK EXPERIENCE

Humanitarian Technologies Labs (HuT Labs) | Student Intern — India, Amritapuri | **June 2022-Present**

- Evaluated 3 **SLAM algorithms** using ROS, improving robotic navigation accuracy by **20%**.
- Integrated 3D Lidar with **Arduino** and ROS libraries, optimizing data processing for **sensor-based** applications.
- Authored a publication on robotics and navigation, boosting field engagement by **15%**.

TECHNICAL PROJECTS

MosquitoID: Wingbeat Frequency-Based Species Classification | Machine Learning

- Developing an **intelligent mosquito identification system** using machine learning to differentiate mosquito species based on wingbeat frequencies.
- Designing a **low-cost embedded system** using microcontrollers and sensor arrays for **real-time mosquito detection**, aimed at improving vector control strategies. Utilizing **signal processing** and machine learning techniques to classify mosquito species.
- Aiming to enhance public health monitoring and enable targeted mosquito control strategies to support broader disease prevention efforts.
- **Tech Stack: Hardware -** Acoustic Sensors, Raspberry Pi**; Software -** Python, Signal Processing Libraries.

3D LiDAR Prototype for Real-Time Mapping | Robotics

- Developed a custom 3D LiDAR system using **TF Luna ToF sensor**, Arduino UNO, and Nema 17 stepper motor for **real-time mapping** and point cloud generation.
- Integrated servo and stepper motors to control elevation and **azimuth angles**, allowing for **full 360-degree** horizontal rotation and precise vertical scanning.
- Processed LiDAR data in Python and visualized point clouds using Gazebo to map 3D environments. Achieved coordinate conversion from spherical to Cartesian system for accurate 3D spatial mapping.
- **Clinched First Prize** at **IIC Regional Meet**, outperforming **500+** colleges.
- **Tech Stack: Hardware -** Arduino UNO, TF Luna, Nema 17, MG995 Servo Motor**; Software -** ROS, Python Arduino IDE**; Simulation -** Gazebo, Rviz.

Efficient Dual-Band 5G Antenna for Millimeter-Wave Applications | Telecommunications

- Designed a compact microstrip patch antenna with **dual-band** operation at 28GHz and 38GHz for **5G communication**.
- Enhanced **bandwidth (up to 4.34 GHz)** and **gain (8.43 dB at 28GHz, 8.39 dB at 38GHz)** using an inset-fed technique and dual-slot modifications.
- Utilized **Rogers RT Duroid 5880** for improved efficiency and stability in high-frequency applications.
- Modelled and simulated the antenna in ANSYS HFSS, achieving **excellent return loss** and **low VSWR**, suitable for high-speed 5G networks.
- **Tech Stack: Design -** ANSYS EDT**; Simulation -** HFSS.

Verilog HDL Integration in Laundry Machine | FPGA Systems

- Architected Verilog HDL-based **FSM** model with **multiple modes** and **sensors**.
- Optimized energy **efficiency** and user **safety** through **innovative design**.
- **Tech Stack**: **Hardware Description** - Verilog HDL; **Simulation** - Model Sim; **Sensors** - Load sensor, Temperature sensor.

Fire Rescue Alarm System | IoT

- Prototyped IoT-based fire alarm system using gas and temperature sensors.
- Tech Stack: Hardware - Arduino, Gas sensors, Temperature sensors; Software - Arduino IDE, C++; IoT Platform - Tinker cad.

Tele-Operated Robot | Robotics

- Designed and built robot using Arduino Mega 2560 R3, Fly sky RF remote controller and motor drivers.
- Implemented rapid prototyping and iterative refinement techniques.
- Tech Stack: Hardware - Arduino Mega 2560 R3, Fly sky Remote controller and Motor drivers; Software - Arduino IDE, C++.

PUBLICATIONS

- "*Robotic Navigation Unveiled: A Comprehensive Study of GMapping, Hector Slam, and Cartographer*" - **3rd International Conference on Innovation in Technology** (INOCON).
- "*Smart and Sustainable: Verilog HDL Integration in Laundry Machine*" - **2024 4th Asian Conference on Innovation in Technology**
- **(ASIANCON). (Presented)**

ACHIEVEMENTS

- **1st Runner-Up**, *International Design Competition ROBOCON-23*, Chulalongkorn University, Bangkok
- **1st Position**, Innovation Exhibition, **IIC Regional Meet**, Cochin.
- CODECURE- **4th place out of 19 teams** in Tech-Med Hackathon which was conducted in AIMS Kochi with Doctors and Engineers.

LEADERSHIP AND COMMUNITY OUTREACH

- **Chair,** IEEE **Power and Energy Society,** Amrita Vishwa Vidyapeetham IEEE Student Branch, Amritapuri.
- **Technical Executive,** Embedded Systems and IoT Workshop, Vidyut'23 Techfest.
- **Volunteer**, Amrita SREE Self Help Groups.
- **Mentor,** Research and Innovation Summer Camp (RISC).
- **Co-ordinator**, Developed a wellness program for 100+ students at Z P High School, Sirlapalem. Achieved 90% positive feedback by guiding students through yoga poses, breathing exercises. Conducted as part of **Student Social Responsibility (SSR).**