

Trushti Selarka

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Education

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| Institute of Technology Nirma University, Ahmedabad, India | June 2020 - Present |
| B.Tech in Electronics and Communication Engineering with Minor's in Computer Engineering | GPA: 8.42/10 |
| J. H. Ambani Saraswati Vidhyamandir, Surat, India | April 2020 |
| Central Board of Secondary Education (CBSE) 12th Grade | Percentage: 94% |
| J. H. Ambani Saraswati Vidhyamandir, Surat, India | April 2018 |
| Central Board of Secondary Education (CBSE) 10th Grade | Percentage: 94.2% |

Technical Knowledge

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| Languages | Embedded C, MATLAB, C Programming Language, Verilog VHDL, Python, HTML5 |
| Communication Protocols | I2C, SPI, TCP/IP, UART, BLE, SMTP, ESP-NOW |
| Hardware Devices | STM32F103-Bluepill, STM32F407-Discovery Kit, ESP32, Arduino, Raspberry Pi, 8051 Microcontroller |
| Tools and Platforms | Arduino IDE, Keil uVision, STM CubeMx, Atmel AVR, KiCAD (PCB Designing) |

Experience

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| Research Assistant - Nirma University (Ahmedabad, India) | July 2022 - Present |
| <ul style="list-style-type: none">Orchestrated the setup and calibration of a customized Li-ion Battery pack, ensuring precise functionality.Monitored and analyzed discharge rates and temperature variations on the load bank to assess the impact of PCM integration on thermal performance, resulting in a 20% reduction in peak operating temperatures.Led the development of a highly efficient Battery Management System (BMS) for the custom battery pack, employing an ARM-based STM32 microcontroller which resulted in a 10% improvement in battery lifespan through optimized charge and discharge management. | |
| ASIC Design Intern - eInfochip An Arrow Company (Ahmedabad, India) | June 2023 - July 2023 |
| <ul style="list-style-type: none">Conducted in-depth research on the evolution of FinFET technology and advanced power planning techniques, gaining valuable insights into cutting-edge semiconductor innovations. Engaged in a study of RTL to GDSII flow using the open-source EDA tool OpenROAD.Explored Qflow, a comprehensive digital circuit synthesis toolchain, and implemented the RTL to GDSII flow studied using the EDA tool OpenROAD. | |
| Product Development Intern - Ocean Abrasive (Surat, India) Certificate | January 2023 - June 2023 |
| <ul style="list-style-type: none">Interfaced four weighing machines with ESP32-based M5 Stack, enabling real-time weight data display on LCD screens.Optimized the integration of weighing scales with microcontrollers, ensuring precise weight readings and seamless data logging into Excel files.Streamlined product information capture enhanced user-friendliness, enabling effortless analysis and comparison across different product variations. | |
| Vocational Trainee - Reliance Industries Ltd. (Surat, India) Certificate | June 2022 - July 2022 |
| <ul style="list-style-type: none">Demonstrated proficiency in instrumental device management, excelling in calibration of Instruments, Control Valves, Transmitters, Plant Protection Systems, and PLC Control systems.Engineered SCSI hard drive replacement solutions and enhanced system reliability.Collaborated with the team to implement graphic HMI interfacing using WinCC, improving user interaction with the systems. | |
| Electronics Head - Team Stallions SAE Nirma Collegiate Club (Ahmedabad, India) Certificate | January 2021 - June 2022 |
| <ul style="list-style-type: none">Orchestrated a multidisciplinary team in designing and developing 'Mercury,' an IoT-based Autonomous Electric Solar Vehicle.Collaborated on powertrain optimization for an Electric All-Terrain Vehicle, yielding tangible performance enhancements: a 15% increase in acceleration, a 10% boost in top speed, and an extended operational range by 12%.Conducted rigorous performance testing on the Electric All-Terrain Vehicle to quantify its key characteristics, contributing to the empirical data-driven decision-making process for further enhancements. | |

Projects

DriverMate - A Vision Improvement System for Safer Driving

March 2023 - Present

Skills: RPi4, HMI interface design, Microcontroller Programming

- Successfully implemented haze removal algorithms, significantly enhancing drivers' visibility in adverse weather. This integration not only facilitated dark channel prior statistics but also laid the foundation for future enhancements.
- Interfaced a touch screen LCD display with the microprocessor, enabling the presentation of processed video data in real-time to drivers. This innovation contributed to a 30% improvement in driver reaction times (as tested on electric student vehicles).
- Secured a Rs. 21,000 funding grant from the university, reinforcing our commitment to advancing road safety through embedded systems and innovative technologies.

Power Management and Alert System

January 2023 - February 2023

Skills: Sensor Integration, Embedded Systems Programming, Power Monitoring, GUI Development

[Link](#)

- Spearheaded the design and implementation of a dynamic Power Management and Alert System, utilizing embedded systems on ESP32-based M5Stack and a Raspberry Pi. Developed a user-friendly GUI using Tkinter for real-time monitoring of power status.
- Implemented email alerts via SMTP protocol for instant notifications during power outages, resulting in over 35% increase in system re-establishment time, ensuring prompt action and minimizing disruptions.

Advanced Low Voltage System for Electric and Solar Electric Vehicles

December 2021 - May 2022

Skills: Embedded Systems Programming, STM32, ESP32

- Designed, assembled, and programmed a Grounded Low Voltage (GLV) system for electric ATVs from the ground up, encompassing both hardware and software components
- Pioneered an IoT-based Telemetry System for Solar Electric Vehicles, leveraging the ESP32 microcontroller and MyBlynk Server. This system enabled remote data collection and display of crucial vehicle metrics.
- Engineered and implemented a Real-Time Touch Screen LCD interface using STM32F103C8 and UART protocol. This innovative system facilitated efficient data transmission from the LCD to the vehicle's control systems improving vehicle control.

Publications

- Pujara, D., and Selarka, T. (2023,May). Seat-belt Detection Using Image Processing in MATLAB. Journal of Image Processing & Pattern Recognition Progress, 10(1), 31–36. [Link](#)
- Selarka, T. et, al. (2023, August). Low Voltage Systems for Electric ATVs. Presented at the IEEE 3rd International Conference on Sustainable Energy and Future Electric Transportation 2023, Bhubaneswar, India [Link](#)
- Gajjar, H. et, al. (2023, November). A Comparative Analysis of Various Deep-Learning Models for Noise Suppression. EAI Endorsed Trans IoT, vol. 10, Nov. 2023. [Link](#)
- Selarka, T., Gajjar, H., and Talavia M . Enhancing Home Automation: A Smart System With M5 Stack and Multiple Control Interfaces. Presented at the IEEE R10 Humanitarian Technology Conference 2023, Rajkot, India
- Selarka, T., Viradiya, Y., and Shah D. Neighborhood Image Processing using Verilog VHDL. Presented at the 3rd International Conference on Advancement in Electronics & Communication Engineering 2023, Ghaziabad, India
- Pujara, D., Selarka, T., and Gajjar, S. Data Acquisition System for Abrasive Wheel Manufacturing Industry. Accepted at IEEE International Symposium on Smart Electronic Systems 2023, Ahmedabad, India
- Panara, H. et, al. IoT-Based Smart Dustbin for Effective Waste Management. Accepted at IEEE International Symposium on Smart Electronic Systems 2023, Ahmedabad, India

Awards

ISIE ESVC 2021, Asia's Biggest Electric Solar Vehicle Championship, Chandigarh, India

December 2021

We bagged 8 awards out of the available 11: 1) National Champions 2021 2) Best acceleration 3) Best Hill Climb 4) Best Autonomous 5) Best Business & Cost Presentation 6) Best in Endurance 7) Best Off-road 8) Future Award

[Certificate](#)

BAJA SAE 2022, National Electric All Terrain Vehicle Championship, Pithampur, India

May 2022

We bagged 3 trophies: 1) 4th Overall 2) Best Acceleration 3) 2nd in Raftar Award 4) 2nd in Suspension and Traction

[Certificate](#)

Extra Curricular Activities

- Finalist in L&T Techgium 2023 for redesigning industry-standard Scissorlift among 30,000 students over 450 top colleges.
- Member of the Organizing Team for Technocalypse 2022 - A flagship event for students looking to pursue B. Tech.
- Executive Committee Member and Event Head at the Electronics and Communication Students Organization.
- Assisted elderly residents at Hiramani Old Age Home