

# Urmil Premal Shah

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## SUMMARY

Embedded systems application developer. Embedded driver development and application programming for interfacing hardware peripherals. Experienced with driver development for ARM-M4 microcontroller boards like the STM32F0407.

## EDUCATION

### California State University, Fullerton, California, USA

Master of Science, Computer Engineering

Graduated December 2020, GPA: 3.78

### University of Mumbai, Mumbai, Maharashtra, India

Bachelor of Engineering, Computer Engineering

Graduated May 2016, GPA: 3.5

## TECHNICAL SKILLS

- Skills: C, C++, Python, Jira, HTML5, MATLAB, SQL, Excel
- Tools: Arduino IDE, STM32CubeIDE, PyCharm, Komodo, MATLAB, RStudio, Spyder, Tableau
- Protocols and Version Control: SPI, I2C, UART, SWD, GIT
- Microcontrollers: Arduino, STM32, ESP32, ESP8266
- OS: Windows, Linux

## PROJECTS

### Low Level Drivers for STM32F407

[Link](#)

- Configuring low level drivers for ARM cortex M4 32-bit STM32F4 to migrate the ADDAT application for better power and run time efficiency
- Development for hardware (STM32F407) and software unit for transmission & reception of standard sensor data
- Implementing the I2C, SPI, UART APIs to interface sensors and ISRs
- Performing debug and diagnosis of hardware and software issues using Serial Wire Debugger (SWD)

### Anti-Drink and Drive with Anti-Theft

[Link](#)

- Designed an Anti-Drink and Drive device with Anti-Theft capabilities and Parental monitoring for combatting drunk driving
- Developed an android application that allows users to call and message emergency contacts or request an Uber when the sensor detects alcohol in user's breath
- Integrated the MQ3, MG811 and fingerprint sensor to authenticate and authorize the user to unlock the mount and drive the vehicle.
- Supervised attributes of Arduino microcontroller design to ensure performance, accuracy, and cost-effectiveness

### Garduino

[Link](#)

- Implemented a budget plant monitoring system, tracking the soil moisture using a STM32, FC-28 sensor, Temperature and Humidity Sensor (DHT11), displaying the stats on an LCD screen
- Devised a mechanism that waters the plant via a button or wirelessly using an Android app or when the soil moisture is low
- A notification is sent every time the level of water in the adjacent bowl is low
- Maintained Source code and files with Git

## EXPERIENCE

### California State University Fullerton

Fullerton, CA

Graduate Research Assistant (Brain-Computer Interface)

July 2019 - December 2020

- Collected EEG data using a g.Nautilus headset with g.HIAMP and g.Recorder to decode the cocktail party phenomenon
- Performed 11 experiments with 7 test subjects in 4 different environments with audio and visual stimuli to observe and understand the changes in the brain activity
- Devised a neural network in MATLAB to differentiate between audio sources with an average accuracy of 92%

### California State University Fullerton

Fullerton, CA

Independent Researcher (3D fractal antenna)

January 2020 - December 2020

- Designed a new 3D fractal antenna for harvesting residual RF signals to charge low power electronic devices for true wireless charging using SolidWorks
- Evaluated the fractal design using LabJack U3 to charge 2 capacitor configurations. Achieved a 33% improvement in performance compared to the previous design

### California State University Fullerton

Fullerton, CA

Graduate and Undergraduate Teaching Assistant (EGCP-565)

May 2020 - July 2020

- Mentored a graduate-level class in Rapid Prototyping for Internet of Things
- Conducted workshops and mentored undergraduate and graduate engineering students for projects in microcontroller programming, robotics, and embedded systems

### Bhabha Atomic Research Centre

Mumbai, MH

Research Intern (Waste Disposal System)

August 2015 - March 2016

- Led a team to create a groundwater modeling system for safe disposal of atomic waste using backpropagation neural network
- Implemented gradient descent algorithm with momentum factor and learning rate for predicting distribution co-efficient using seven distinct parameters with an overall accuracy of 88%

## PUBLICATIONS

- U. Shah, B. Hoang, R. Villanueva, and K. George, "Focus Detection Using Spatial Release from Masking," 2020 10th Annual Computing and Communication Workshop and Conference (CCWC), Las Vegas, NV, USA, 2020, pp. 0913-0917, doi: 10.1109/CCWC47524.2020.9031273
- U. Shah, R. Villanueva, B. Hoang, Y. Martinez, and K. George, "Sensory Audio Focusing Detection Using Brain-Computer Interface Archetype," 2019 IEEE First International Conference on Cognitive Machine Intelligence (CogMI), Los Angeles, CA, USA, 2019, pp. 97-101, doi: 10.1109/CogMI48466.2019.00022
- U. Shah, B. Hoang, R. Villanueva and K. George, "Study of EEG signals for Focus Detection for Cocktail Party Phenomenon using Multiple Sources of Sound," 2020 11th IEEE Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON), Vancouver, BC, Canada, 2020, pp. 0517-0521, doi: 10.1109/IEMCON51383.2020.9284912.
- U. Shah, R. Parekh, and, K. George, "Experimental Study on 3D Fractal Base Antennas Design for Efficient Wi-Fi Energy Harvesting," 2021 11th Annual Computing and Communication Workshop and Conference (CCWC), Virtual Conference, (In press)
- U. Shah, J. Wong, and, K. George, "Classifying Sound Sources Based on Directions Using Audio Visual Stimulus," 2021 11th Annual Computing and Communication Workshop and Conference (CCWC), Virtual Conference, (In press)