HAMZA REHMAN

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https://builtfor-developers.github.io/

SUMMARY

I am a Biomedical Engineer skilled in Embedded systems, electronics, IoT and robotics. Proficient with microcontrollers (Arduino, ESP32, PSOC, 8051) and SBCs (Raspberry Pi, Vision Five) and programming in C/C++, Python, Java, MATLAB. Knowledgeable in communication protocols like UART, I2C, SPI, MQTT, BLE, BLE-MESH, SIGFOX and Wi-Fi. I have experience in developing industrial prototypes and medical devices.

EDUCATION

BS Biomedical Engineering Technology **2020- 2024**

NFC Institute of Engineering & Technology

[Final Year Project] Bluetooth Based Digital Stethoscope with Live Heartbeat Visualization and BPM Counts I designed this project to make a low-cost yet effective digital stethoscope for telemedicine. It was based on Instrumentation amplifier and op-amp and Arduino to process the signal with some signal Processing techniques to remove the noise and find the heartbeats and perform calculations

FSC pre-medical **2018 - 2020**

City College of Science and Commerce

PROFESSIONAL EXPERIENCE

Embedded Firmware Developer, Machadev Engineering

My Experience at Machadev Engineering Developed the GUI and Firmware for BLE-MESH based Home Automation. Developed Libraries for smoke sensor, temperature and humidity sensor. Build the prototype for Smart Luggage system incorporating Globally Luggage tracking, Fingerprint based security and many more features. **Feb 2024 – Present**

Biomedical Engineering Intern at BERC Primary and Secondary Healthcare Department

Learned about the maintenance of Medical Equipment and other Critical Life Support Equipment Worked on Ultrasound Machine X-Ray Machines Anesthesia Machine **Sep 2023 - Jun 2024**

AWARDS AND ACTIVITIES

1. First Position at Innovative Competition for Engineers & Scientists (EMG Based Robotic Hand)
2. Sponsored by PCBWAY, developed a Robotic board controller integrating Atmega328 and motor driver along with other peripherals.
3. Sponsored by DFROBOT, to review and develop project based on the components provided. There were multiple components including, Unihiker, Sensors, carrier boards, ESP, displays.
4. Sponsored by StarFive Technology to review and develop applications for their RISC V based Linux SBC.
5. Contest Winner at INSTRUCTABLES for publishing an article and 3+ featured articles.

PROJECTS

1. BLE-Mesh based Home Automation setups for resorts. It has feature like, display weather forecast, current temperature and humidity, Light controls, Motion based Light control and custom libraries for temperature sensor, smoke sensor.
2. Smart Luggage with Location updates, remote lock/unlock, Inbuilt digital weight scale, Land/Take Off notifications, LTO battery BMS and Booster, Power Management functionalities.
3. Digital Alarm Clock with E Ink display, responsive UI, time updates, Alarm triggering, Webserver for remote functionality, WIFI credentials, Alarm control, MQTT for integration with Smart home setups, Integration with Philips HUE lightning system.
4. Quattro Box, a lab equipment with magnetic stirring, Temperature control, Responsive UI, safety features and BLDC motor.
5. MQTT based Home Automation with Unihiker and ESP to send and display temperature, humidity, and general appliances controls.
6. Python Sockets based Home Automation with dedicated Web Server which can be accessed from anywhere.
7. IOT based syringe pump for precise dosage administration. Designed mechanical linear guide and rail with stepper motors, accessed over internet, alarms and alerts.
8. EMG based Robotic Hand for amputees, Single channel EMG sensor to sense the muscle electrical activity.
9. Stepper motor based Robotic arm with 4 Degree of Freedom
10. Physiotherapy kit for ACL rehabilitation for athletes
11. Health Band with step counter, fall detection, temperature, health monitor and Oxygen saturation.
12. Human Following and Line Detection robot based on PSOC6 MCU.
13. Flappy Bird Game based on PSOC6 MCU with custom developed libraries for accelerometer, Display.
14. Basic Single Channel Oscilloscope by utilizing DMA buffers and ADC channels of PSOC6 MCU.
15. Digital Stethoscope with Live heartbeat counting, Java based display, remote data transmission and display, Noise detection, signal processing.

ADDITIONAL INFORMATION

Embedded Controllers

ESP32, Arduino, PSOC6 (Infineon), NRF52-DK (nrf52832), 8051 and SBCs like, Raspberry PIs, Vision Five (RISCV), Unihiker

Communication Protocols

UART, I2C, SPI, MQTT, BLE, BLE-MESH, WIFI, SIGFOX

Programming Languages

C/C++, Python, Java, MATLAB, JavaScript, RUST (Basic)

Tools and Tech

DWIN Displays, TFT displays, Capacitive/Resistive touchscreens, UI Development, Library development, library porting, Oscilloscope, Soldering/Desoldering, Proteus, KiCAD, Blender, Shaper3d (3D CAD), MATLAB, Figma

Professional Skills

Component Selection, Project Feasability reports, Project Lead, Time Management, Teamwork, Excel, PowerPoint, Word

Languages

Urdu, English, Punjabi