Akif Fazal

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Education

BSc Electrical Engineering 2019 – 2023
University of Engineering and Technology Peshawar

Professional Experience

Embedded Systems Engineer 02/2024 – 11/2024
Chip Soul Technology (SMC-Private) Limited
- Developed and implemented projects using 8051, STM32, and ESP32 microcontrollers.
- Gained expertise in sensor interfacing (EC/TDS, DHT22) and peripheral integration (OLED, ADC, PWM).
- Proficient in communication protocols (UART, I2C, SPI).
- Worked on a Water ATM/Flow Meter project using STM32, focusing on EC/TDS sensor integration for water quality monitoring.

Training and Internship

Data Science and AI Trainee 01/2024 – 09/2024
Atomcamp
- Acquired proficiency in Advanced Excel, Power BI, SQL, GIS, Python, Machine Learning, Deep Learning, NLP, Computer Vision, LLMs, and MLOps.
- Gained hands-on experience in data-driven decision-making, data visualization tools, and implementing AI solutions using state-of-the-art methodologies.

AI Intern 07/2023 – 09/2023
Center for Intelligent Systems and Network Research (CISNR)
- Interned at CISNR, mastering Machine Learning, Deep Learning, and Computer Vision. Contributed to projects, annotating data, gaining practical application skills.

Trainee Engineer 08/2022 – 10/2022
PTCL
- Gained practical experience in ICT services and telecom operations during a 2-month internship at Pakistan Telecommunication Company Limited.

Trainee Engineer 09/2021 – 11/2021
PESCO
- Completed a 2-month internship at Peshawar Electric Supply Company, focusing on power distribution systems and electrical infrastructure.

Skills

Programming Languages
Python | C | C++ | SQL

Communication Protocols
UART | SPI | I2C

Networking

Deep Learning

TensorFlow

Microcontroller Programming
8051 | STM32 | ESP32 | Arduino

Tools
Wireshark | Cisco Packet Tracer | Keil uVision | Arduino IDE | STM32 Cube IDE | Proteus | MS Office

Machine Learning

Scikit Learn

Projects

Water Quality Monitoring System using STM32 and EC/TDS Sensor
- Interfaced an EC/TDS sensor with STM32 using ADC.
- Processed sensor data to compute water quality parameters.
- Transmitted real-time PPM values via UART at 115200 baud rate.
- Implemented HAL drivers for ADC and UART communication.
- Designed an efficient and modular embedded C program for data acquisition.

Temperature & Humidity Monitoring System using DHT22 & STM32
- Interfaced DHT22 sensor with STM32 to measure temperature and humidity.
- Displayed real-time sensor data on an SSD1306 OLED display using I2C communication.
- Configured STM32 peripherals using STM32CubeIDE, including GPIO, timers, and RCC settings.
- Implemented data acquisition logic to read humidity and temperature values from DHT22.
- Processed checksum verification for data integrity before displaying values.
- Debugged and tested the system using SWD debugger and live expressions monitoring.

Microwave Oven Timer using 8051 Microcontroller
- Designed and implemented a microwave oven control system using an 8051 microcontroller.
- Developed a finite state machine (FSM) to handle different operational states, including time input, door status check, and countdown timer.
- Integrated 4x4 keypad for user input and a 16x2 LCD (HD44780 driver) for displaying real-time status.
- Implemented safety features, ensuring the oven pauses when the door is opened and resumes operation upon closing.
- Used a buzzer for audio alerts (key presses, timeouts, and warnings).
- Controlled the magnetron power via an electromagnetic relay, ensuring safe operation.

Pea Plant Disease Detection Using Deep Learning and Computer Vision Techniques
- Implemented and compared three deep learning models (VGG16, Custom CNN, YOLOv8) and two machine learning models (Naïve Bayes, Random Forest) for pea plant disease classification.
- Evaluated models using key metrics: accuracy, precision, recall, and F1 score.
- Achieved 98.7% accuracy with VGG16, making it the best-performing model, followed by Custom CNN (92.1%) and YOLOv8 (87.8%).
- Demonstrated the limitations of Naïve Bayes (40.87% accuracy) and Random Forest (64% accuracy) in image-based classification.
- Provided insights into model selection for disease detection applications in agriculture.

Campus/University System Network Designing Using Cisco Packet Tracer
- I designed and implemented a Campus Network achieving efficient, secure communication with scalability and high availability. Optimized performance, managed interconnectivity. Flexibility for future expansion and adaptability to changing needs.

Foodie-Fi Subscription Data Analysis – SQL
- Conducted thorough data analysis at Foodie-Fi, uncovering insights on customer behavior and subscription trends using SQL.
- Implemented data-driven decision-making, reducing churn rate and improving engagement.
- Calculated key performance metrics to guide strategic growth and fostered a culture of data-driven innovation.

Sales Data Analysis – Power BI
- Designed a dynamic sales dashboard in Power BI for in-depth analysis.
- Transformed and modeled sales dataset to ensure accuracy and efficiency in calculations and visual representations, including key metrics like Total Sales, Total Profit, and Order Quantity.
- Enabled users to customize analysis by implementing filters for date, product category, and state, while also providing detailed regional sales analysis for enhanced insights.