PANKAJA MALSHAN

Address : 1/7,Pahalamadampalla,Katana
Phone   : +94763026019
Email   : pankajamalshan@gmail.com
LinkedIn : www.linkedin.com/in/pankaja-malshan-0a0791295
GitHub   : https://github.com/pankaja2328

SUMMARY

Passionate Embedded Systems and AI Engineer with strong skills in C/C++, Python, Java and IoT. Experienced in designing smart systems using Arduino, ESP32, AI models, and edge computing. Always eager to innovate, solve complex problems, and push technology to the edge.

EDUCATION

BSc. Engineering(Hons.) In Computer Engineering   **April 2022 - Present**

   University Of Jaffna

PROJECTS

All-in-One Adventure Companion Wearable (GitHub)   **2025**
- Developed a smart outdoor wearable using ESP32, ESP-IDF v5.4, and FreeRTOS with real-time health and GPS monitoring, featuring NRF24L01+PA+LNA, Bluetooth SPP, MAX30100, OLED display, and a custom C-coded PCB built with EasyEDA.

   Tech Stack : ESP-IDF v5.4 · FreeRTOS · C Programming · Bluetooth SPP · EasyEDA

ESP-IDF Libraries for ESP32 Development (GitHub)   **2025**
- Developed a robust ESP32 library collection (ESP-IDF-Libraries on GitHub) using ESP-IDF v5.0+ and FreeRTOS to support efficient embedded system development.

   Tech Stack : C Programming · MAX30100 · UART · SPI · I2C · ADC

AI-Based Optimized Energy Utilization System Using Edge Computing(Research)   **2025 - Present**

- Designed and developed an AI-based energy utilization system using edge computing controllers (ESP32/Raspberry Pi) to optimize household appliance usage based on real-time electricity pricing, weather data, and user preferences.
- Integrated LSTM models for short-term energy consumption prediction and Q-learning for adaptive scheduling, enabling dynamic and cost-efficient smart energy management at the edge.

   Tech Stack : Raspberry Pi · Python · LSTM · Q-learning · Edge Computing · Real-time APIs · Energy Optimization · AI Models · Embedded Systems

Smart Water Planting System   **2023**

- Designed a smart plant monitoring system using ATmega328P with soil moisture sensing, Bluetooth-based communication to a Visual Studio desktop app via serial, and email alerts, built with Arduino, EasyEDA, and Proteus.

   Tech Stack:ATmega328P · Arduino Framework · Proteus

Real-Time Video Calling Web Application (GitHub)   **2025**

- Built a Zoom-like video calling app using WebRTC for peer-to-peer real-time communication and Firebase for signaling, messaging, and hosting, with a React frontend supporting audio/video calls and room management.

Tech Stack : WebRTC · Firebase Realtime Database · Firebase Hosting · JavaScript · HTML/CSS · Peer-to-Peer Communication · Video/Audio Streaming

Image Caption Generator Using CNN-LSTM   **2025**

- Built an image captioning model from scratch using a custom CNN encoder and an LSTM decoder with an attention mechanism, implemented in TensorFlow. Designed custom data generators using tf.data.Dataset.from_generator for training on image-text pairs, with a focus on performance tuning and evaluation

Tech Stack : Python · TensorFlow · CNN · LSTM · Attention Mechanism · Image Captioning · Deep Learning · Hyperparameter Tuning

SKILLS

- **Programming Languages:** C, C++, Python, Java, JavaScript, PHP, HTML, CSS .
- **AI & Machine Learning:** Neural Networks, TensorFlow, Keras, LSTM, CNN.
- **Tools and Frameworks:** Git, Arduino, ESP-IDF, Pandas, OpenCV, TensorFlow, Firebase, FreeRTOS, Visual Studio, EasyEDA, Proteus, PlatformIO, React, VS Code.
- **Operating Systems:** Windows · Linux (Kali, Ubuntu).
- **Embedded Systems & IoT:** ESP32 ,ATmega328P , Arduino , FreeRTOS , ESP-IDF.
- **Soft Skills:** Problem Solving , Critical Thinking , Communication , Team Collaboration.

COMPETITIONS AND ACHIEVEMENTS

- AlgoXplore 1.0
- MoraXtream 9.0
- CodeRally 5.0
- SLRC(Sri Lanka Robotics Challenge) 2024

REFERENCES

Dr. Pratheeba Jeyananthan
Head of the Department,
Department Of Computer Engineering,
University Of Jaffna,
Sri Lanka.
Email: pratheeba@eng.jfn.ac.lk
Phone: +94-21-206-0160

Dr. Jananie Jarachanthan
Senior Lecturer,
Department of Computer Engineering,
University of Jaffna,
Sri Lanka.
Email: jananie@eng.jfn.ac.lk
Phone: +94-21-206-0161