**Preenu Ann Ponnachan**

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# PROFESSIONAL SUMMARY

Embedded Software Engineer with 3+ years of experience building reliable firmware. Skilled in **C/C++, STM32, FreeRTOS,** and **Linux** programming with proven expertise in driver development, multithreading, and real-time systems. Proficient in debugging, performance optimization, and hardware-software integration to deliver robust embedded solutions. Currently upskilling in Modern C++ and Linux kernel development.

PROGRAMMING SKILLS

* **Languages:**  C, C++, Embedded C, Python
* **Platforms & OS:**  STM32, FreeRTOS, Linux
* **Frameworks & APIs:**  Qt (GUI, signals/slots), IPC, multithreading
* **Tools:**  Git, SVN, Jira, Confluence, cppCheck, GDB, Valgrind, TestRail, MATLAB
* **Peripherals:** SPI, I2C, UART, GPIO, DAC, Timers, ADC
* **Build Systems:** Makefile, CMake
* **Database:** SQLite

EXPERIENCE

**Eaton MTL**

### Software Engineer, Aug 2022 – June 2023

* + Implemented Direct Digital Synthesis (DDS) on STM32 microcontrollers, achieving accurate audio tone generation and improving system test reliability using oscilloscope.
  + Developed a Python automation script to control hardware power device via smart plug, reducing manual testing time significantly.

**Gadgeon Systems Inc**

### Software Engineer, May 2020 - Dec 2020

* + Developed and optimized device drivers in Embedded C for STM32 peripherals (SPI, I2C, UART), ensuring stable sensor communication.
  + Implemented FreeRTOS-based firmware applications in Embedded C including GPIO button interfacing with debouncing logic.
  + Debugged and flashed firmware using ST-Link/JTAG; validated communication with Tera Term for command-based testing and logging.
  + Conducted POC research on LoRaWAN protocol, Cantata, and SonarQube for client projects.

**Inntot Technologies**

### Software Engineer, Aug 2018 - Mar 2020

* + Designed and developed Internet Radio software on Linux from requirements to deployment in C with Qt-based GUI development in C++.
  + Integrated SQLite and third-party libraries (mpg123, FDK AAC) for full functionality.
  + Deployed IPC mechanisms like shared memory, pipes, and semaphores for embedded systems.
  + Conducted unit testing and integration on Raspberry Pi platforms.
  + Monitored multi-threaded application performance using Linux tools (top), optimizing CPU usage and system efficiency.

CAREER BREAK (July 2023- June 2025)

* Took a planned career break for maternity.
* Continued professional growth through self-learning in in Modern C++ (advanced features, templates, and STL containers) and Linux kernel development; Actively contributing to open source.

# EDUCATION

* **University of Hertfordshire, Hertfordshire, UK** (2021 –2022)

Master of Science in Data Science and Analytics

* **Mahatma Gandhi University, Kerala, India** (2014-2016)

Master of Technology in Advanced Communication and Information Systems; Distinction

* **Mahatma Gandhi University, Kerala, India** (2009-2013)

Bachelor of Technology in Electronics and Communication; Distinction

PROJECTS

1. **Virtual I2C Bus Simulation (C++ / CMake / GitHub)**

* Developed a virtual I2C master-slave system simulating sensors such as a TemperatureSensor using modern C++ (shared pointers, polymorphism).
* Implemented register-based read/write communication and structured with CMake.
* GitHub <https://github.com/preenu91/VirtBusCPP>

1. **Open-Source Contributions**

* Contributed to Cppcheck (<https://github.com/danmar/cppcheck)> improving documentation.

1. **Academic Thesis & Publication**: *Comparison of PAPR Reduction Techniques in OFDM Systems* using MATLAB – modelled and simulated communication systems for performance analysis; published in IEEE ICCES 2016.