Saptarshi **Nag**

MSc in Embedded Systems, with expertise in Firmware development and C/C++ scripting

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saptarshi-nag01

Profile Summary

Embedded Software Developer with a deep understanding of the ARM, RISC-V and x86 platforms. I am committed to advancing expertise in C/C++ software development, debugging and enhancement for both embedded and desktop applications. Ability to integrate agile practices into the software development process. Demonstrated collaborative experience in diverse, cross-cultural teams. Also possess intermediate-level programming knowledge of Python for Data analysis and Deep learning applications.

Core Skills

Programming Skills

- Proficiency in programming using GCC C, C++ (GCC and Clang compilers). Debugging using GDB and writing unit tests (Gtest).
- Experience with CMake and Makefiles
- Experience with C++ libraries: STL, Boost , Qt , OpenCv and imgui
- Deep understanding of Design patterns for the C++ software development and profiling tools for code enhancement(using gprof).
- Python scripting with proficiency in Python libraries for data analysis (Pandas, Numpy, Matplotlib) image processing(OpenCV) and deep learning(PyTorch).

Embedded Software Development

- Proficiency in Low-Level driver development for ARM Cortex M0 and M4 architecture.
- Developed and maintained Yocto-based build systems for embedded Linux projects
- Developed IoT projects using Raspberry Pi and Esp32, utilising 3rd party cloud services of the Azure and Node-Red
- Developed firmware with the family of MSP430(TI's), STM32, PIC and NXP processors to implement I2C, SPI , UART protocol for Sensor interface.
- Developed real-time applications using RTOS, possess deep knowledge of FreeRTOS for an embedded system.
- Implemented wireless communication Bluetooth Low Energy (BLE 5), Zigbee and LoRa for Embedded Systems.

Product and Team Management

- Version control using GIT and Atlassian tools for project management, and an ability to write clean technical documentation or presentation description of the product using Latex, Markdown, UML or MS office suite
- Mentored junior developers for their seamless integration with existing working teams and helped them align their software development goals.
- Effectively communicated project progress and impediments to stakeholders during regular sprint reviews.

Languages Known

- English (High-level Professional Proficiency, C1 Level, IELTS '7.0' Appeared on 2018)
- Hindi (High-level Professional Proficiency)
- Bengali (Native)
- French (Beginner Level)

Work Experience

INRIA
Rennes, France

Research Engineer
April. 2023 - Present

- Designed and tested customized hardware platforms(SoC) using the open-source framework "Chipyard" with a focus on AI accelerators
- Explored RISC-V platform, on QEMU and Chipyard's Rocket core

HCL Technologies
Noida, India

Senior Consultant
April. 2022 - January 2023

- Provide support to multiple teams to help establish sensor interface and embedded device setup with Azure cloud system
- Software development for Raspberry Pi (C/C++) for IoT applications
- Supervised Interns with their training and assignments
- Product documentation, testing and validation

Micron Technologies
Hyderabad, India

Senior Design Engineer - Contract Position
Aug. 2021 - April 2022

- Verification and Testing of Firmware written in C++
- Debugging the firmware using JTAG and TRACE32 (Lauterbach)
- Writing Scripts for Automating tasks within the existing internal workflow to provide support to multiple teams in Bash and Python

ARM Holdings
Noida, India

CIRCUIT LAYOUT DESIGN ENGINEER (MEMORY SYSTEMS) - CONTRACT POSITION
Feb. 2015 - Oct. 2016

Semiconductor and software development company. Department : Artisan Embedded Memory IP

Designed Circuit layout for the various memory architecture.

- Involved in testing and checks for quality assurance and final verification of the layout designs.
- Developed deep understanding of ARM architecture and memory architectures.

Glitz India
Ghaziabad, India

CIRCUIT LAYOUT DESIGN ENGINEER (POWER SYSTEMS)
July. 2013 - July. 2014

Consumer electronics startup specializing in LED lighting applications. • Designed Printed Circuit Boards(PCB) of voltage regulator and DC-DC converter for lighting appliances. • Designed, Developed and verified various hardware for production stages, documenting the workflow to create Bill of Materials (BOM).

EFY Tech
New Delhi, India

INTERNSHIP
Dec. 2012 - Feb. 2013

- Consumer electronics startup specializing in LED lighting applications.
- Designed Printed Circuit Boards(PCB) of voltage regulator and DC-DC converter for lighting appliances.
- Designed, Developed and verified various hardware for production
- Stages, documenting the workflow to create Bill of Materials (BOM).

Education

Kingston University
London, UK

M.SC IN EMBEDDED SYSTEMS
Jan. 2017 - Feb. 2018

- Academic Exposure to Parallel programming in C++ with GPUs using CUDA. Implementing Multithreaded applications in OpenMP and OpenMPI.
- Academic Exposure to Robotics, Actuators, Sensor and Feedback loop for Control.
- Academic Exposure to 3D/2D Computer Graphics and Vision processing using MATLAB.

CDAC - Central Department of Advanced Computing
Noida, India

POST GRADUATE DIPLOMA IN EMBEDDED SYSTEMS AND VLSI
Aug. 2014 - Jan. 2015

- Academic Exposure to Embedded C and writing firmware to operate ARM7 and AVR microcontrollers.
- Academic Exposure in writing VHDL/Verilog Code to implement RTL for state machines and controllers for I2C and UART control

IETE - Institute of Electronics and Telecommunication Engineers
New Delhi, India

GRADUATION IN ELECTRONICS AND TELECOMMUNICATION ENGINEERING
Mar. 2008 - Aug. 2013

- Academic Exposure to the world of Electronic Circuits and Devices.
- Academic Exposure to theory of Signal Processing and scripting in MATLAB

Online Certifications

2021	**Introduction to Embedded Machine Learning**, EDGE IMPULSE	*Coursera*
2021	**Development of Secure Embedded System Specialization**, EIT Digital School	*Coursera*
2020	**Design Thinking for the Greater Good: Innovation in the Social Sector**, University of Virginia	*Coursera*
2020	**Developing Industrial Internet of things Specialization**, University of Colorado	*Coursera*
2018	**Architecting Smart IoT Devices**, University of Colarado	*Coursera*
2017	**Software Architecture for the Internet of Things**, University of Colarado	*Coursera*

Publications

Underwater bioinspired sensing: New opportunities to improve environmental monitoring)
IEEE, Instrumentation

JEFFREY A TUHTAN, SAPTARSHI NAG, MAARJA KRUUSMAA
April 2020

- DOI: 10.1109/MIM.2020.9062685
- The Paper proposed various Bioinspired designs can lead to a new generation of devices to ensure that environmental monitoring networks remain accurate and reliable over a wide range of physical conditions.