Pranav Kumar

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Summary

Embedded Systems Engineer with 4+ years of experience in firmware development, real-time systems, and low-level hardware integration. Passionate about optimizing embedded architectures for performance and efficiency. Strong expertise in C/C++, RTOS, and kernel development.

Technical Skills

- **Languages**: C, C++, Python, Linux, LLVM, Compiler
- **Hardware Protocols**: ARM, I2C, SPI, CAN, UART, BoneBone, Raspberry Pi, ESP32
- **Developer Tools**: Git, Docker, ROS, FreeRTOS, AUTOSAR, LLVM
- **Hardware**: STM32HF7x, TI, Steppers, BLDC, FOC, Xilinx FPGA Spartan
- **Familiar**: Algorithms, LATEX, Shell, Parallel Programming

Education

Virginia Tech **Aug 2024 - May 2026**
MS, Computer Engineering *Virginia*
- **GPA:** 3.9/ 4
- **Coursework:** Compiler Optimization, Multiprocessor Programming

UIET, Panjab University **May 2016 - Sep 2020**
B.E, Electronics and Communication Engineering

Job / Research Experience

SSRG Lab @Virginia Tech **Dec 2024 - Present**
Graduate Student Researcher *Virginia, USA*
- Developing an indirect call mechanism for binary decompilation under Prof. Binoy Ravindran, improving the accuracy of code analysis
- Exploring kernel-level instrumentation and low-level code optimization, enhancing system performance and efficiency

ARTPARK @IISc, Bangalore **May 2023 - Jul 2024**
Embedded System Engineer *Bangalore, IN*
- Designed low-level drivers and communication stacks for quadruped robotics, boosting system and communication efficiency.
- Developed custom firmware for motor controllers (FOC, BLDC), optimizing real-time performance.
- Implemented high-speed CAN protocols for real-time control in embedded Linux systems, which increased the feedback speed by 50%

Flux Auto Pvt. Ltd. **Jun 2021 - Mar 2023**
Embedded System Engineer *Bangalore, India*
- Enhanced low-level peripheral drivers for autonomous vehicle kits (tractors, industrial machinery), boosting efficiency by 50%.
- Designed real-time firmware for multi-node CAN networks, ensuring robust distributed control.
- Implemented an RTOS-based firmware and system architecture, reducing downtime by 60% and improving system control

Futuristic Labs Pvt. Ltd. **Jan 2020 - May 2021**
Embedded Firmware Engineer *Hyderabad, India*
- Developed device drivers and firmware abstraction layers for IoT-integrated autonomous systems, enhancing system performance and reliability.
- Developed kernel-space and user-space communication bridges for real-time data exchange.
- Optimized interrupt-driven firmware to enhance system responsiveness and efficiency, significantly improving processing speed by 30% and reducing latency by 50%.

Long Term Project

Google Summer Of Code(GSOC) **Jun 2019 - Aug 2019**
BeagleBoard.Org *Chandigarh, IN*
- Using BeagleBone and 74hck299 shift Register, provided a reference design for bi-directional communication for multiple peripherals.

Achievements And Awards

- **2019 - ROSCon-19 Scholarship**: Scholarship Holder at Robot Operating System Conference ROSCon-19, Macau, China.
- **2019 - Excellence in Technology Award**: Awardee for excellence in Technology field by Mrs. Kirron Kher (MP, Chandigarh).
- **2019 - Design and Idea Competition Winner**: 1st Award at Design and Idea Competition by IIC, Panjab University at Chandigarh.
- **2019 - Smart India Hackathon Mentor**: Mentor of winning team at Smart India Hackathon-2019 by Kokuyo Camlin at IIT Hyd.
- **2021-2022 - Best Employee Awards**: Three times winner of Best Employee per Quarter at Flux Auto.