

Utkarsh Verma

Embedded Developer

- Chennai, India
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About Me

My fascination with technology has propelled me onto various hardware and software development projects. These projects led me to pursue a career in Embedded Systems. I find the applied nature of this skill particularly rewarding, as it allows me to transform abstract ideas into tangible products, regardless of the industry or domain.

My research background includes experience in both experimental physics and robotics, which has equipped me with a strong foundation in scientific and engineering principles. I am eager to leverage my diverse knowledge and expertise to contribute to other domains and industries.

Skills

Languages

C, C++, Assembly, Python, Go, Shell Scripting / Bash, Verilog

Tools and Platforms

KiCAD, EagleCAD, MATLAB, git, CERN ROOT, GNU Make, Neovim, Linux

Miscellaneous

Firmware Development, PCB Design, Software Development, Automation, Continuous Integration

Interests

Embedded Systems
Low-level Languages
Computer Architecture
Linux
Robotics
Software Development

Note

Please click on the headings to visit respective links.

Education

- May 2023 **Bachelor of Technology - Electronics Engineering**
Indian Institute of Information Technology, Design & Manufacturing - Kancheepuram
 - Courses: Embedded Systems, Computer Architecture, Data Networks, Digital Logic, Analog Circuits, Control Systems, Digital Signal Processing, VLSI Design, Analog and Digital Communications
 - CGPA: 9.1/10
- May 2019 **Indian School Certificate Exam**
Bishop Johnson School and College
 - Courses: Physics, Chemistry, Mathematics, Computer Science
 - 89.25% marks

Work Experience

- Jan 2023 – Apr 2023 **Embedded Systems Intern** [Aerospace Engineers Private Ltd.](#)
 - Re-designed the electronics architecture to improve the Autonomous Underwater Vehicle's hardware topology and communications.
 - Wrote a bootstrapper that preinstalls the AUV's dependencies in a headless Linux image to streamline the deployment.
 - Developed an SPI-based communication link between the STM32 MCU and the Linux SBC to facilitate reliable data transfer.
- Jul 2022 – Oct 2022 **Research Intern** [GSI Helmholtz Centre for Heavy Ion Research](#)
 - Worked on improving the timing precision of MCP-PMT detector data acquired through FPGA frontends called DiRICH boards.
 - Improved the timing precision of the time-of-flight of particles from 150ps down to 70ps.
 - Developed software using CERN's ROOT framework to automate the analysis of huge amounts (2GiB per test) of acquired data.
- Dec 2020 – Mar 2021 **Junior Embedded Systems Engineer** [Dextroware Devices](#)
 - Designed and developed the prototype of a hands-free input device, called Mouseware, for people with upper-limb disabilities.
 - Conducted research and development of the prototype and gained experience with Atmel MCUs and RF communications.
- Dec 2020 **Full-stack Web Developer** [Darmiyaan Podcast](#)
 - Developed a static, multilingual website as a freelance project.
 - Helped me gather funds for working on personal projects.

Accomplishments

- Jul 2022 **GET_INvolved Fellowship** [GSI Helmholtz Centre](#)
Fellowship involved doing an on-site summer research internship at the GSI particle accelerator facility.
- May 2022 **IIT Madras Summer Fellowship** [IIT Madras](#)
Received a summer fellowship for doing a research project at IIT Madras.
- Mar 2020 **Robocon 2020** [IIT Delhi](#)
Led a team to develop [robots](#) capable of playing robo-rugby which secured 98/100 points at the national level.
- Jan 2017 **Maker Sponsorship** [DFRobot](#)
Received sponsorship from DFRobot for my [articles](#) and personal projects on electronics.

Projects

- Apr 2023 **Linux SBC ↔ STM32 MCU Communication Link**
C, Python, GNU Make, SPI
A hybrid project written in Python(Linux SBC) and C(STM32) to allow an STM32 board and a Linux SBC to talk to each other over an SPI-based communication link. It employs a custom data transaction flow inspired by TCP.

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- Feb 2023 **Linux Bootstrapper for NVIDIA SBCs**
Shell Scripting, Linux
A fully-customizable framework, written using POSIX shell scripts, for bootstrapping a custom Debian Linux image for NVIDIA boards. It allows reliable, reproducible and hassle-free deployment of the AUV's software stack.
- Oct 2022 **Fit Routine for PANDA Barrel DIRC** [↗](#)
C++, ROOT, GNU Make, Statistics
A C++ routine which uses the ROOT framework, enables rapid analysis of large experimental datasets by processing 64 input streams and generating 2D histograms to derive timing precision statistics for each stream through appropriate cuts and projections.
- Dec 2021 **OLED Display Driver for ATmega328** [↗](#)
AVR Assembly, I²C, SPI, GNU Make, Python
A bare-metal project to play a video on an OLED display by reading data from an SD card. The video data is read from the SD card to a 1KiB frame buffer over SPI and then sent to the display over I2C. It uses an ATmega328P chip and is written purely in assembly.
- Mar 2021 **8-bit Computer** [↗](#)
Computer Architecture, Digital Logic, Assembly
An 8-bit computer spanning 14 breadboards built using discrete digital logic. It follows the Von-Neumann architecture and is based on the SAP-1 ALU processor. It has its own instruction set and is UART programmable.
- Dec 2022 **dwmblocks-async** [↗](#)
C, Asynchronous Programming, GNU Make, Linux
An asynchronous, efficient status bar for dwm (Linux). It utilizes Linux's `epoll`, signals and pipes to safely synchronize the async calls.
- Apr 2020 **qGmail** [↗](#)
Go, Meta Programming, Continuous Integration
A cross-platform CLI tool for securely fetching Gmail mailbox info. Its interface auto-updates with the upstream Gmail API specification.
- Mar 2018 **Line Follower Robot** [↗](#)
PCB Design, Embedded C
A line-follower robot built up from scratch with the PIC16F84A as its brains. It uses interrupt-based software PWM signals for the motors.

Extracurricular Activities

I believe in serving the community through my discovery, learning, and engagement. Also, I frequently contribute to open-source software and sharing my projects and developments.

- May 2018 – Present **Technical Writing** Blogging
I write about electronics and programming on my [blog](#) and I also document my projects on [Instructables](#).
- Feb 2022 – Apr 2023 **Robotics Club** Interests
As the club core, I have organized workshops, conducted sessions and curated events to culminate the robotics spirit.
- Dec 2020 – Jan 2021 **Vidhai** Social outreach
I developed a [website](#) for Vidhai, a non-profit student-run organisation focused on educating underprivileged children.
- Dec 2020 – Mar 2021 **MaRS, IIITDM** Interests
I led the communications team and researched on long-range communications for their rover.
- Nov 2017 – Jan 2018 **Google Code-in Contributor** Interests
My first experience with open-source software. I contributed to OpenWISP over a three-month period and finished in the Top 10.

Apart from these, I like playing chess, volleyball, and football. I also like cycling and going out on occasional walks in nature.