PUSHKAR KODIGEHALLI UMESH

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SUMMARY

MSc student in Electronic Communications and Computer Engineering at the University of Nottingham, with hands-on experience across embedded systems, FPGA/VHDL design, and software development. Designed and implemented digital hardware systems using VHDL in Vivado, and built hardware prototypes using Arduino and RFID during undergraduate study. Alongside hardware expertise, developed strong software and machine learning foundations, implementing neural network models from first principles in MATLAB, including perceptron learning and multi-class classification. Built an iOS application using SwiftUI and SwiftData, and deployed a personal portfolio website. Completed AWS fundamentals training with exposure to cloud infrastructure and core services, and comfortable working across the full development lifecycle—from system design and implementation to testing and deployment. Motivated to apply interdisciplinary skills to innovative engineering and technology solutions.

EDUCATION

MSc Electronic Communications and Computer Engineering, University of Nottingham, 2025 – present

Relevant modules:

- Advanced Computational Engineering
- Artificial Intelligence and Intelligent Systems
- HDL for Programmable Devices
- Scalable Cross-Platform Software Design

This degree enhances understanding of the art of electronic engineering and provides an in-depth knowledge of modern technology for electronic engineering and communication systems. Modules strengthened skills in programming, hardware description, algorithm design, and data analysis.

BSc Physics, Mathematics and Electronics, CHRIST (Deemed to be University), India, 2021-2024

Relevant modules:

- Embedded Systems and IoT Fundamentals
- Digital Signal and System Architecture
- Verilog and FPGA-Based Design
- Communication Electronics

Along with Electronics, studying Physics and Mathematics strengthened understanding of fundamental scientific principles. Modules such as Real Analysis, Discrete Mathematics, and Differential Calculus enhanced logical reasoning and quantitative abilities. In Physics, practical and theoretical work in Waves and Optics, Renewable Energy, and Particle Physics helped connect concepts to real-world applications and apply theory in laboratory experiments.

PROJECTS

MSc Dissertation: GNSS Signal Processing for Interference Mapping (JamSail CubeSat Mission) | University of Nottingham, 2026 | *Supervised by Paul Blunt, Nottingham Geospatial Institute*

- Developing a software-defined GNSS receiver in MATLAB, implementing FFT-based parallel acquisition and DLL/PLL/FLL tracking loops for L1 C/A signals under LEO Doppler conditions (±10 kHz).
- Translating validated algorithms into synthesisable VHDL for deployment on a Xilinx Zynq 7030 SoC-FPGA, targeting ≤70% LUT utilisation within CubeSat power constraints.
- Validating the receiver hardware-in-the-loop using the Skydel GNSS simulator and NT1065 RF front-end via AXI bus across three progressive interference scenarios.
- Contributing directly to the JamSail mission roadmap — a dual-antenna CubeSat designed for real-time GNSS jamming and spoofing detection, aligned with the UK's £13M national GNSS interference monitoring programme.

RFID Gate System & Mini Elevator System | *CHRIST University — Final Year Project, April 2024*
- Created an automated gate system with Arduino and RFID to check tags and open/close the gate. Along with a mini elevator model featuring buttons, switches, and LEDs to select floors and display status.
- Programmed Arduino microcontrollers for real-time I/O operations and motor control.
- Tested and debugged the prototypes to ensure they functioned reliably.
- Gained hands-on experience in electronics, automation, and embedded systems.

- **Matrix Processing Core in VHDL** | *University of Nottingham — HDL Coursework, 2025 – 2026*
- Designed and implemented a synthesizable matrix processing core in VHDL on an AMD (Xilinx) FPGA, performing multi-stage matrix multiplication using dual MAC (Multiply–Accumulate) units.
- Developed a modular architecture with multiple dual-port block RAM buffers for input, intermediate, and output data handling, ensuring efficient memory access and data flow.
- Created a comprehensive VHDL testbench using file I/O to load input matrices, validate outputs against a MATLAB reference model, and automate verification.

Neural Network Coursework — Perceptron & Multi-Class Classification | *University of Nottingham, 2025 – 2026*
- Implemented the Perceptron Learning Law from first principles in MATLAB to train a binary NOR gate classifier, with manual weight update logic and convergence verification.
- Extended implementation to a 4-class classification problem, applying one-vs-rest strategy and validating accuracy across training and test sets.
- Analysed decision boundaries and misclassification rates, producing plots to compare model performance across iterations.
- Demonstrated understanding of gradient-based learning, activation functions, and the theoretical limits of linear classifiers.

LivingSolo — iOS App | *Personal Project, Jan 2026 – present*
- Designed and built a full-stack iOS app for individuals living alone, covering kitchen inventory tracking, personal expense management, and to-do organisation.
- Architected multi-view navigation using SwiftUI TabView with dedicated screens for budget summaries, inventory lists, and task management.
- Integrated SwiftData for persistent local storage with secure, schema-driven data models — no third-party backend required.
- Delivered a clean, minimal UI with real-time totals and usage insights, following iOS Human Interface Guidelines throughout.
- Managed the full development lifecycle independently: design, implementation, testing, and iterative refinement in Xcode.

Personal Portfolio Website | *pushkarx17.online • github.com/pushkarx17July 2025*
- Built and deployed a multi-page static portfolio website using HTML and CSS, hosted via GitHub Pages with a custom domain (pushkarx17.online).
- Showcases projects, skills, and a downloadable CV — maintained as a live, publicly accessible reference for job applications.

WORK EXPERIENCE

Freelance Technical Support Engineer | *Infosys (Secondary Engineer), Leeds, UK March 2026*
- Assisted in the on-site installation and configuration of a Cisco Board Pro 52 G2 enterprise videoconferencing system in a corporate environment.
- Collaborated with the primary engineer to complete two full installations within one month, demonstrating reliability and professional conduct.
- Gained hands-on exposure to enterprise-grade AV and networking infrastructure, including cable management, device configuration, and system testing.

SKILLS
- **Programming & Languages:** Python, C, C++, Swift (SwiftUI, SwiftData), SQL (MySQL), HTML, CSS .
- **Hardware & Embedded Systems:** VHDL, Verilog, FPGA (Xilinx Vivado), Microcontrollers,

Embedded Systems, RFID, IoT
- **Signal Processing:** MATLAB, Digital Signal Processing, Communication Systems
- **ML & Data:** Neural Networks, Perceptron Learning, Classification, Data Analysis, NumPy.
- **Cloud & Networking:** AWS (Fundamentals), CCNA Fundamentals, TCP/IP, Basic Network Configuration
- **Tools & Technologies:** Vivado, VS Code, Xcode, Git, GitHub, GitHub Pages, Linux (basic), Final Cut Pro
- **Soft Skills:** Problem-solving, Attention to detail, Team collaboration, Communication, Time management, Self-directed learning

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TRAINING & CERTIFICATIONS

- Artificial Intelligence Fundamentals — IBM SkillsBuild (Feb 2025)
- Cybersecurity Fundamentals — IBM SkillsBuild (Feb 2025)
- Information Technology Fundamentals — IBM SkillsBuild (Feb 2025)
- Material Characterisation Techniques — Christ University (2023–2024)
- AWS Fundamentals — Magic Bus India Foundation (Nov 2024 – Feb 2025)
- Final Cut Pro Essential Training — Completed May 2025

References

- References available on request.