BAIBHAV KUMAR PATHAK

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EDUCATION

Northeastern University **Aug 2023 - May 2025**

Master of Science in Internet of Things

Core Courses: Data Structures and Algorithms, Wireless Sensors and Networks and Internet of Things, Mobile and Wireless Networks, Introduction to Machine Learning and Pattern Recognition, High-Level Design of Hardware-Software Systems, Network Security.

Visvesvaraya Technological University **Aug 2016 - Sep 2020**

Bachelor of Technology in Computer Science

Core Courses:Operating Systems, Machine Learning, Computer Networks, Python, Theoretical Foundations of Computer Systems, Computer Architecture.

TECHNICAL SKILLS

Languages: C, C++, Python, SystemC, Shell Scripting
Frameworks & Tools: Node.js, Streamlit, Git, Jenkins, AdminStudio, SCCM, VS Code, JIRA
Embedded Systems & IoT: Arduino, Raspberry Pi, UART, I2C, SPI, TCP/IP, UDP, MQTT, Wi-Fi
Concepts: Object-Oriented Programming, Algorithms, CI/CD, REST APIs, Data Structures
DevOps & Cloud: AWS, PowerShell, Azure, Agile, Microsoft Graph

PROFESSIONAL EXPERIENCE

PPD - part of Thermo Fisher Scientific, Bangalore, India **Jan 2021 - Aug 2023**

Software Engineer (Packaging & Automation) *Bangalore, India*

- Developed and deployed over 50 software packages for **macOS and Windows** using **AdminStudio, Shell Scripting, and SCCM**, ensuring 100% seamless integration with the organization's IT infrastructure.
- Streamlined functional testing and deployment processes by automating tasks with **PowerShell**, **Python**, and **VBScript**, reducing manual effort by 30% and enhancing reliability before **User Acceptance Testing (UAT)**.
- Resolved complex package-related issues at **3rd-level support**, maintaining a success rate of 95%, thereby enhancing the operational stability for over 200 **Autopilot** and **Azure end-users** through effective **troubleshooting strategies**.
- Led **data extraction projects** from **Azure Database** using **Microsoft Graph**, improving data accuracy by 35%, and created **custom tools** with **PowerShell and Python**, supporting data-driven decision-making and streamlining operations.

RELEVANT PROJECTS

Vision Transformer SoC | *SystemC, C++* **Nov 2024 - Dec 2024**

- Designed a Vision Transformer **(ViT)** System-on-Chip **(SoC)** using **SystemC**, implementing **modular patch embeddings, transformer blocks**, and an **MLP classifier** for efficient image classification.
- Optimized **inference performance** by integrating **pretrained weights, parallelizing patch embeddings**, and exploring **fixed-point arithmetic** for hardware compatibility.
- Conducted feasibility studies for FPGA deployment, laying the groundwork for **real-time ViT inference on edge devices**.

ASL Interpretation Tool | *TensorFlow, OpenCV, Google MediaPipe, Scikit-learn, Python* **Mar 2024 - Apr 2024**

- Created a **real-time interpretation system** for American Sign Language (ASL) using **OpenCV** paired with **Google MediaPipe**; enabled precise **gesture tracking** that maintained **more than 90% recognition accuracy** in diverse lighting conditions.
- Enhanced the system's gesture recognition accuracy by 20% through the integration of a **Random Forest classifier**, refining the detection of **complex ASL signs**.
- Designed an **intuitive user interface** using **StreamLit**, allowing users to easily interact with the **ASL interpreter**, view **real-time translations**, and navigate the application with ease.

Boston Subway Network Visualization | *Processing, Python, Graph Theory, Image Mapping* **Feb 2024 - Mar 2024**

- Designed a **comprehensive mapping tool** that represents the intricate layout of **Boston's subway system** through visually engaging graphics in **Processing**; positively impacted daily users' ability to navigate transit options seamlessly.
- Integrated a **shortest path algorithm** within the visualization, allowing users to **calculate and view optimal routes in real-time**, enhancing the usability of the tool for navigation purposes.
- Automated the **extraction and processing of data** from the MBTA website using **Python**, converting the data into structured **CSV files**, and dynamically updating the **subway map** with **real-time information and color-coded paths**.

Cellular Network Drone | *Python, C++, Networking Protocols* **Nov 2019 - Mar 2020**

- Engineered a **quadcopter** employing **Arduino C** and **Python**, utilizing **mobile network towers** to enhance communication capabilities; achieved an operational range increase of 30% compared to previous designs.
- Integrated an **array of sensors and actuators** with **Arduino**, enhancing **SPI and I2C protocols** for data transmission efficiency; achieved a 25% faster signal response time during real-time flight operations.
- Equipped the **drone with a camera** for **aerial data capture and analysis**, enabling **advanced environmental monitoring** and **seamless real-time data transmission** between the drone and ground control via **networking protocols**.