Shivansh Pratap Singh

Contact E-Mail Website GitHub

PUBLICATIONS

AIoT Health: Medicine Reminder For The Elderly (Primary Author) **2025**
Accepted at ICDECT 2025
(to appear in Springer LNNS)

- **Designed a two-stage cascading pipeline** on an ESP32-S3 using a Keyword Spotting (KWS) and an Spoken Language Understanding (SLU) classifier (Intent Recognition). With an optimized memory footprint by quantisation and manual tensor arena allocation, fitting the pipeline into 330KB of usable SRAM. Achieved 96.4% KWS accuracy and 94.1% SLU with $\tilde{1}$00ms end-to-end latency on a $\tilde{1}$5 hardware bill-of-materials.
- **Preprint**: 10.5281/zenodo.19034554
- **Implementation**: Full engineering decisions, failure modes, and technical retrospectives documented at Github - AIoT Health

EXPERIENCE

Cadence Design Sytems **Feb 2024 – Feb 2025**
Software Engineer I *Noida*

- Maintained strict system invariants across file I/O, data models, and Qt-based UI layers for libraries, ensuring fast load times.
- Engineered a localized data-consistency layer for the DE-HDL flow, enabling chip designers to perform symbol operations (rename, duplicate, delete) without server-side Pulse connectivity; each operation required full consistency across the symbol, footprint, part, and property layers in DE-HDL file format
- Optimized symbol load pipelines by implementing efficient metadata caching and specialized data structures to handle high-concurrency operations in local mode.
- Collaborated with architects and principal engineers to ship production-ready features into Allegro OrCAD X.
- Authored unit and regression tests in Tcl; worked in Linux environments with Perforce, internal CI/CD pipelines, and regression frameworks

Datacouch.io **Nov 2022 – March 2023**
Intern *Remote*

- Built workflow automation systems using Python and third-party APIs; developed and evaluated image classification ML pipelines; produced architecture documentation for client deliverables

Education

University of Petroleum and Energy Studies (UPES) **2019 – 2023**
B.Tech, Computer Science and Engineering — Honours in DevOps *Dehradun, India*

CGPA: 7.77/10
Relevant Coursework: Advanced Data Structures (A+), Design and Analysis of Algorithms (A), Formal Languages and Automata Theory (A+), Object-Oriented Analysis and Design (A+), Data Communication and Computer Networks (A+), Advanced Linux (A+), Application Containerization (A+), Statistics for Data Science (A+)

Extracurricular Activities

School of Engineering - First Year Football Team **2019 – 2020**
Team Member *UPES Dehradun*

Astronomy Club **2019 – 2022**
Member *UPES Dehradun*

RESEARCH INTERESTS

Exploring the intersection of dynamically scheduled dataflow circuits and resource-constrained inference to improve out-of-distribution robustness. Interested in how runtime-adaptable hardware substrates can overcome the physical limitations of static MCU architectures for edge intelligence.

CERTIFICATIONS

Digital Systems: From Logic Gates to Processors: Universitat Autònoma de Barcelona [Coursera];

VLSI CAD Part I: Logic: University of Illinois Urbana-Champaign [Coursera]

Linear Circuits 2: AC Analysis: Georgia Institute of Technology [Coursera]

C++ For C Programmers Part A and B: University of California, Santa Cruz [Coursera];

SKILLS

Systems Programming: C++ (11/14/17), C, Python, Tcl, Qt Framework

TinyML & Embedded: TensorFlow Lite Micro, ESP-IDF (PSRAM/SRAM Management), RTOS, I^2S/I^2C/UART, Edge Impulse

Hardware & EDA: Verilog (Basic Synthesis), Logic Design Fundamentals, DE-HDL Flow, Allegro X Infrastructure

Developer Tools: Advanced Linux, Git, Perforce (Industrial VCS), Docker, CI/CD Pipelines

PROJECTS

Leaf Disease Detection | *Python, TensorFlow, Keras, OpenCV* **Sem 8**

- Built a CNN-based image classification system to identify diseases across multiple plant species from leaf photographs
- Curated and preprocessed a multi-class dataset with augmentation techniques including rotation, flipping, and brightness adjustment
- Achieved strong validation accuracy through iterative architecture tuning and regularisation; evaluated model robustness across unseen plant varieties

Spam Email Detection | *Python, scikit-learn, NLTK, pandas* **Sem 7**

- Developed a binary text classification system using logistic regression to detect spam emails with high precision and recall
- Implemented a full NLP preprocessing pipeline including tokenisation, stopword removal, stemming, and TF-IDF vectorisation
- Evaluated model performance across multiple classifiers; logistic regression outperformed Naive Bayes and SVM on the chosen dataset

Medicine Reminder with Email Alert System | *Python, SMTP, ESP8266* **Sem 6**

- Built an IoT-based medication reminder system using a Raspberry Pi with ultrasonic sensor-based pill detection
- Implemented scheduled alerts via buzzer and OLED display, with automated caregiver email notifications on detection events
- Served as the prototype that motivated the later ESP32-S3 TinyML system published at ICDECT-2025

Efficient Fuel Stop Planner | *C++, Dijkstra's Algorithm, STL* **Sem 5**

- Developed a route planning system in C++ that used Dijkstra's algorithm to compute the shortest path between source and destination across a road network graph
- Integrated fuel station nodes into the graph with distance and capacity metadata, calculating optimal refuelling stops based on vehicle range
- System outputs the minimum number of stops required, the recommended stations, and cumulative distance, enabling efficient long-distance trip planning