Ayush Kumar

ayush_7102@yahoo.in | +91 9833182692 | Manipal, Karnataka | GitHub | LinkedIn

EDUCATION

Manipal Institute of Technology, Manipal *Oct '20 - May '24*

BTech Computer and Communication Engineering (minor in Computational Mathematics)

Cumulative GPA: **9.61**, won Achievers' Scholarship, ranked 1st out of 116 in branch by CGPA

EXPERIENCE

SAP Labs *June '23 - August '23*

Summer Intern

- Built an interactive dashboard to streamline internal communications and event management workflows for SAP Labs India
- Utilized UI5 and NodeJS to integrate custom APIs, implementing features such as comments, status tracking and attachments on the application deployed on SAP's BTP platform
- Built an LLM-based context aware conversational agent to answer queries about employee benefits
- Implemented a pipeline to scrape SAP-internal sites to collect policy information and store vectorized data in Flask and Python backend

CiSTUP, Indian Institute of Science (IISc) *Dec '22 - Feb '23*

Research Intern

- Studied and implemented mathematical models to predict and simulate congestion patterns on Bangalore's BMTC bus network
- Parallelized a pipeline for route assignment algorithm using OpenMP, and achieved $\approx 68\times$ speedup, for 100,000+ queries
- Developed a logit-based choice model to simulate commuter behaviour for optimal route selection
- Co-authored paper *'A Scalable Framework for Public Transit Assignment with Explicit Capacity Constraints'*, which was accepted at the Dynamic Traffic Assignment Symposium '23, Evanston, USA and at AI Impact '23, IIT Bombay

Project MANAS *May '21 - Present*

Artificial Intelligence Team Member

- MIT Manipal's official AI and Robotics Team, we build and research autonomous ground/aerial vehicles.
- Developed a surveillance area coverage path planning algorithm for an unmanned aerial vehicle (UAV), using a sweep line approach to solve the watchman route problem from computational geometry
- Represented India at AUVSI SUAS '22, team ranked 2nd in Flight Review, 10th in Technical Design

PROJECTS

FlockSim *C++, OpenGL, GLMath*

Built an interactive simulator to visualize bird flocking, using the Boids algorithm. Implemented spatio-temporal models for disease spread

Vacuum BotNav *C++, ROS*

A path planner for autonomous vacuum cleaners to navigate and clean a room with obstacles, given a map - generates an optimal heuristic-based path using A* search, after discretizing map into cells

Thumbs Up: Hand Gesture Recognition *PyTorch, OpenCV, Python*

Track hands in a video frame and identify gestures as defined by the HaGRID dataset - robust preprocessing pipeline implemented with OpenCV to extract regions-of-interest, reducing false positives

TECHNICAL STRENGTHS

Programming Languages	Python, C++/C, Java, NodeJS, SQL
Data Analysis	PyTorch, TensorFlow, OpenCV, Matplotlib
Software Tools	CMake, Bash, Git, OpenGL, LaTeX
Relevant Coursework	Analysis of Algorithms, Graph Theory, Computational Linear Algebra, Data Mining