Shvetanshu Gumma

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Education

University of Bath **October 2023 – October 2024**
Master of Science, Computer Science *Bath, Somerset, UK*

- First Class Honours (Distinction)
- **Subjects:** Functional Programming, Artificial Intelligence, Reinforcement Learning, NoSQL, MySQL, Automata Theory, Software Engineering Principles, Human Computer Interaction, Academic Writing

Bennett University **August 2019 – August 2023**
Bachelor of Technology, Computer Science *Uttar Pradesh, India*

- 8.75/10 CGPA
- **Subjects:** Competitive Programming, Unity, OOPs, Game Development, UAV Development, DSA and Algorithms, Databases, Basics of Artificial Intelligence and Machine Learning, Web Development, Computer Networks, Cloud Computing

Projects

YOLOv8 Image Detector | *YoloV8, OpenCV, PyQT, PyTorch, Numpy* 2025

- A detection, segmentation and pose estimation model with a working GUI leveraging PyQT on a windows system built using the YoloV8 model on an executable application.
- This application helps detect various objects such as humans, vehicles, animals, and other miscellaneous items from an uploaded image, video file or the system's camera leveraging OpenCV.

Wordle | *Python, Numpy, Pandas, Torch, Pytorch, Gymnasium, Pygame, Time* 2024

- Using reinforcement learning to solve a custom Wordle environment based on the popular game Wordle. Our implementation uses the A2C algorithm, with a CNN being utilized to extract spatial information about colours and letters on Wordle grid.
- Our approach also uses RND to encourage the agent to visit unfamiliar states through an intrinsic exploration reward. Agent was trained over 80,000 episodes. After training, the agent was accruing rewards between 10.2 and 11.0, and this range is small enough to indicate a stable policy.

Airline Delay Detection Model | *Python, Numpy, Pandas, Matplotlib* 2024

- An ML powered model to predict delayed airlines and aircrafts for smoother logistic and operational conditions for employees, ground crew, and customers.
- Built this project to better understand and experiment with multiple Supervised Machine Learning techniques. Achieved an F1 score of 0.89 with a custom random forest model, with multiple attempts using KNN, LR, and SVM powered models.

Adventure Catto | *Lua, LOVE2D, Tiled, Winfall, Soren, Cupid* 2024

- A platform based original serious game built using Lua on LOVE2D and Tiled framework aimed at teaching young teenagers basics of coding in Python. Leveraged skills learned from the Jumper project.
- Used windfall library for world building and cupid library for debugging.
- Used this game as a testing environment to develop an agent to learn python by playing this game powered by Q-Table based reinforcement learning techniques.

Research

Supporting Single Handed Control for Independent Movement of Each Axis in 3-D Space 2024
University of Bath, UK

- MSc research extended
- Supervisor: University professor (Dr. Ollie Hanton).
- Duties: Prototype Development, Participant Recruitment, Quality Assurance, Tool Administration, Academic Presentation.
- Tools: EdgeTX, ExpressLRS, DRL, ROS2, LuaScript, OpenTX, AutoCAD, MATLAB, Python, Overleaf.

Machine Learning based approach in Automating FPV Racing Simulation 2023
Bennett University, India

- BTech Summer Break Independent Project (ongoing peer review).
- Supervisor: Independent Research (due help from Dr. Neeraj, HoD Research).
- Duties: Research Survey, Literature Review, Comparison Studies, Technical Testbed testing.
- Tools: Unity, LOVE2D, Lua, Betaflight BBL, CNN, DQN (RL), ROS2, Lua, Python, Microsoft Azure, Overleaf.

Design, Modeling, and Control of an Aerial Robot DRAGON 2023
University of Bath, UK

- Research Review (Coursework).
- Supervisor: University lecturer.
- Duties: First, Second and Third pass of paper, critical review, possibility of further developments, literature survey.

Experience

Student Teaching Assistant **June 2022 – July 2023**
Bennett University *Greater Noida, India*

- Taught OOPs using Java and C++, focusing on Inheritance, Abstraction and Encapsulation concepts, and singleton, factory and strategy design patterns.
- Mentored students on their personal C++ and Java projects, reviewed code written by my students, and made sure students deliver high-quality code and assets that solve interesting problems.
- Founded and led the Bennett DroneSoc with over 120 members working at the forefront of Unmanned Aerial systems in Greater Noida.

Research Assistant **February 2022 – April 2023**
Bennett University *Greater Noida, India*

- Facilitated further technical experimentation on the published research project "Efficient data management and control over WSNs using SDN-enabled aerial networks" enhancing a virtual topology predicated on the charge of WSN nodes utilizing software-defined networks (SDNs).
- Assisted in data transcription and coding of interviews using interpretative phenomenological analysis (IPA), contributing to advanced data analysis.
- Worked on an independent research project titled "Machine Learning based approach in Automating FPV Racing and Freestyle" and explored automated FPV drones.

Software Development Intern **March 2022 - June 2022**
Osmosys Software Solutions *Remote, India*

- Gained hands-on experience with REST API to create services based on apps for front-end company webpage using Django REST framework and Python and tested on Postman to demo and share with clients.
- Developed alongside team members to integrate a ChatGPT API onto company's AI chatbot.
- Operated on developing multiple microservices, tested APIs, and reported results to supervisors.
- Collaborated with colleagues on creating a new authorization technique using RBAC(role-based access control) to increase overall efficiency and transparency.

Technology Associate **January 2020 - October 2022**
Indian Flying Community *Hybrid, New Delhi, India*

- As the a technology consultant for the startup, I was responsible for managing and updating firmware (iNav, Betaflight, KISS) on STM32 Arm based Flight Controllers and BLHeli based firmware on ESCs.
- Monitored, maintained and experimented on Proportional, Integral and Derivative values of new builds with minimum frame resonance while flight using Fusion 360. Instructed interns on clean builds and cable management.

Front End Development Intern **March 2021 - July 2021**
Defence Research and Development Organization, MoD *Bangalore, India*

- Developed an automated form submission system using HTML, CSS and Java, increased the efficiency of form automation by 24 percent.
- Used XAMPP and MySQL to store form database and tie HTML with SQL on system server.
- Optimized our systems' response latency to act 120ms faster and followed strict Agile (XP + Scrum) Methodology throughout the development since the quality, demands, and questions of the forms are never static.
- Wrote an 24-page report and gave multiple presentations on-campus.

Achievements and Societies

Distinction, MSc Dissertation 2024
University of Bath, UK

Harvard CS50 Game Development Course 2021
Harvard University

Chancellor's Medal 2023
Bennett University, India

Annual Project Showcase Winner 2023
Bennett University, India

Skills

Languages: Java, Python, C/C++, MySQL, SQLite, JavaScript, HTML/CSS, Lua, Arduino
Developer Tools: VS Code, Unity, Visual Studio, PyCharm, Eclipse, Atom, Anaconda, Betaflight, Mission Planner, LOVE2D
Libraries: Pandas, NumPy, Matplotlib, Pytorch, Tiled, Winfall
Research: Overleaf, LaTex, ChatGPT, ResearchGate, GoogleScholar
Designing Tools: DaVinci Resolve, Canva, Solidworks, Fusion 360, Tinkercad
Standard IT Tools: Slack, MS PowerPoint, MS Word, MS PowerBI, MS Excel, Linux Terminal (Ubuntu)