# SHOURYA PRATAP SINGH

CS JUNIOR AT VIT CHENNAI

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| Examination | Majors | Institute | Year | Score |
|---|---|---|---|---|
| BTech | Computer Science Engineering(CPS) | VIT Chennai | 10/22 - 07/26 | 8.63/10 |
| Class 12 | PCM with IP - CBSE | The Orbis School, Pune | 06/20 - 07/22 | 94.80% |
| Class 10 | Science with Math - ICSE | The Bishop's School, Pune | 06/07 - 06/20 | 96.80% |

## EXPERIENCE

**Machine Learning (ML) Research Intern**, NATIONAL TAIWAN UNIVERSITY 05/24 - 07/24

- Interned at **Computational Intelligence** in Biomedical Imaging lab at NTU under Prof. Cheng Ying Chou.
- Worked on image segmentation to detect colon cancer from CT Scan images using Machine Learning (ML).
- Engineered a ML model using UNet and EffTrans, **achieving 91.5% diagnostic accuracy** in detecting colon cancer, **surpassing previous research benchmarks by more than 5%.** Worked with Python, Pytorch, CuDNN and CUDA.
- Developed auto annotation software for NTU Hospital to use our model for efficient medical decision making, allowing for scalability and deployment to other medical establishments, deployed in a Linux environment.
- Worked within a team of 3 to establish a Medical Inference providing software which will enable doctors to work with CT Scans of patients efficiently. Created a space and time efficient Transformer and UNet based model which could run **inferences 30% faster** than previously recorded, through C++ based CUDA programming.

## PUBLICATIONS

**A review on rhodamine probes for metal ion recognition with a future on AI and ML**

Published in Elsevier - Coordination Chemistry Reviews (Journal IF-24.83) Paper Link

- Worked in a multi-disciplinary team under the guidance of Dr. Pritam Ghosh on developing a Rhodamine reaction-based ML tool for chemical analysis via **image analysis.** Developed ML model using chemosensing datasets to analyze analytes in unknown specimens. Developed it using Tensorflow and Python based OpenCV, CNN, SVM. Lead regular code reviews and collaborations to integrate various aspects of ML.
- Lead a team of 4 to work on local deployment of the model. Applied Software Engineering principles to maintain code readability and usability, incorporating git. The publication has been cited 19 times since publication.

## PROJECTS

**AMKR - Assistive Eyewear for the Visually Impaired**

*Tech: Raspberry Pi0, PiCam V3, Text-to-Speech (TTS) API, GPT-4 Vision API, Google TensorFlow Lite(TFLite), Microsoft Azure*

- **Designed eyewear** to assist the blind with reading text, recognizing faces, and scene perception.
- Pitched to VNEST (VIT Start-up Incubator) and **secured seed funding** to help scale the product.
- The product was ADA-compliant and worked perfectly for our use cases and can be used to assist 100% blind people. Utilized Meta NougatOCR for text recognition, OpenAI Text-to-Speech (TTS) for auditory feedback and Google TensorFlow Lite(TFLite) for face recognition.

**Nyaya - Sahaya** *Winning project - VITISH 23, intra VIT hackathon*

*Tech: Flutter, Firebase* GitHub Link

- Developed an intuitive software enhancing accessibility for users within legal system. **Demoed at Google Build with AI in Bangalore** along with my team of 2.
- Leveraged Firebase's real-time database with SSL encryption and integrated OAuth 2.0 for secure user authentication to ensure robust data protection and privacy of legal documents.
- Increased legal documentation processing efficiency by 85%, enabling lawyers and court officials to handle cases 50% faster compared to traditional methods.

**hostelHub** *Winning project - VNEST Solvathon '23*

*Tech: Flutter, Firebase, TensorFlow, PaLM V2, GCP, MakerSuite* GitHub Link

- Created a versatile mobile application designed to streamline hostel management processes. Provides **70% better database network latency** than currently used systems.
- Developed the **facial recognition** feature to obtain about 97% accuracy when interfacing with registered users.
- Automates the management level tasks to reduce paperwork by 80%, is easily scalable since it has a simple architecture. Deployed **Database level algorithms** for searching, indexing, and querying, increasing efficiency.

**DSA Solver** *Course project - Fall Semester '23*

*Tech: Flutter, Firebase, TensorFlow, Google Cloud, Python*

- Created a Micro Language Model which learnt from Leetcode Questions, Editorials and Solutions about various categories of questions and the way to solve them.
- Developed a 2 million parameter model which could work without the requirement of GPU. Took LLaMa 1 as a reference.
- Deployed the model onto the cloud and developed a Flutter based android application which allowed users to access the DSA solver through text and image inputs.

## Positions of Responsibility

**Research Lead, Data Science Club, VIT Chennai**

- Student Lead of the Dr. Syed Ibrahim Research Group under the Data Science Club.

**Student Chair, Campus Development Committee, VIT Chennai**

- **Leading a team of 6 students** in a digital transformation initiative for campus facilities, impacting over 5000 students and increasing administrative efficiency by 30%
- Set up a Linux server and maintained a CI/CD pipeline to ensure seamless integration and deployment of new features and updates to VIT applications. Deployed digitization tools for health centre and hostel management using SQL and Python.
- Coordinated review systems to improve developmental efficiency and project completion. Demonstrated leadership and teamwork skills by managing student developer expectations and management expectations regarding the projects.

## Skills

- Python and C++ for ML and Computer Vision; Flutter, Firebase for app development; Node for backend;
- Heroku and Google Cloud Platform to host projects and products developed. Worked with Linux systems as well.
- Experience with Jupyter, Power BI and R for Data science. Used Scikit Learn for data mining and SQL for managing RDBMS.

## Achievements

- Google Build with AI, Bangalore Project Demonstration - 2024
- 2x VNEST - Intra VIT Hackathon winner - 2023
- IEEE YESIST12 Bangalore section winner - 2023
- Top 15 - CyberX Hackathon, Greater Chennai Police - 2023
- Times NIE, Star Correspondent, Pune 2018-2022. Part of Google Cloud Career Practitioner '22

## Relevant Coursework

- Programming Languages: Python, C, C++, Java, R*
- Mathematics: Calculus, Differential Equations and Transforms, Discrete Mathematics, Complex Variables and Linear Algebra, Probability and Statistics*
- Core CS: Data Structures and Algorithms (C++), Design and Analysis of Algorithms*, Operating Systems(Linux), Computer Architecture and Organisation, Web Development (HTML, CSS, JS), Computer Networks, Theory of Computation, Database Systems (Oracle SQL, MySQL, MongoDB in NoSQL), Software Engineering*, AWS Solutions Architect*
- Specialisation: Microprocessors and Microcontrollers, Signals and Systems (Signal processing), Human Computer Interaction*
- Basics: Engineering Chemistry, Engineering Physics, English, Spanish

* - Ongoing courses in Jul-Dec 2024