RUSHIL VENKATESWAR | 20CS30045

COMPUTER SCIENCE & ENGG. (M.Tech Dual 5Y)

EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2025	M.TECH DUAL	IIT Kharagpur	8.74 / 10
2020	Indian School Certificate	Little Flower School	96.40%
2018	Indian Certificate of Secondary Education	Little Flower School	94.83%

INTERNSHIPS

Maternal & Child Health Monitoring | Stanford University | Prof. Pascal Geldsetzer **May '23 – Present**

Objective: Estimate key indicators of health status in low income countries using satellite imagery

- Trained a **random forest regressor** for **multi-output regression** using **11000 numerical features** and performed **K-Fold Cross Validation**
- Utilized the **Dask** distributed database package to load an **8GB dataset** and perform **out-of-memory preprocessing** and **cleaning**
- Selected to participate in a **Kaggle competition** hosted by **Stanford University** and currently holding second position out of 30+ teams

Semantic Segmentation of Remote Sensing Images | ISRO | Dr. Debasish Chakraborty **Apr '22 – Dec '22**

Objective: Develop an efficient and performant CNN model to be trained on small datasets

- Built an encoder-decoder based network with **depth-wise separable convolutional layers** which **outperforms** a **standard U-Net** model
- Utilized a novel **Unified Focal Loss function,** which works well with class imbalanced datasets like the training dataset, **LandCover.AI**
- Developed **TensorFlow** scripts to **create a dataloader** for an **efficient input pipeline** and to perform **inference** on **variable-sized** images

PROJECTS

Hospital Management System | Database Management Systems Lab **Feb '23 – Mar '23**

Objective: To design a web application for a hospital management system

- Developed a **python flask** based web application to connect a **MySQL** database to a **bootstrap front-end** coupled with **jinja templates**
- Implemented **user session management** using **flask-login** and provided **access control** through **python decorator functions**
- Modelled entities in a real-life hospital using a **relational database** and its **schema** with support for querying & storage of patient data

Message Oriented TCP | Computer Networks Lab **Feb '23 – Mar '23**

Objective: To build a message oriented TCP Protocol using socket programming

- Created a library for 'MyTCP' protocol, guaranteeing **reliable**, **in-order** delivery of **messages** up to **5000 bytes** using standard TCP sockets
- Utilized **POSIX threads** and **mutex locks/ conditional signals** to ensure **synchronised access** to global buffers used for messages
- Ensured that all **global data structures** were cleared on closure of socket and performed tests using simple **client/ server programs**

Linux Shell Development | Operating Systems Lab **Jan '23 – Feb '23**

Objective: To create a shell that will run as an application program on top of the Linux kernel

- Effectively managed **process groups** and employed **signal handlers** to monitor child processes and ensure **synchronized execution**
- Designed a CPU usage heuristic to detect **fork bomb** based **malware** and utilized the **flock syscall** to ensure **exclusive access** to files
- Implemented advanced features including **background execution**, **pipelining**, **wildcard handling**, and **command history navigation**

COMPETITION/CONFERENCE

Solo Gold | Chandrayaan Moon Mapping Challenge | Inter-IIT Tech Meet 2023 **Jan '23 – Feb '23**

Objective: Create a high-resolution map of the Moon using a pipeline of Image Super-Resolution models

- Proposed a novel **GAN-based** architecture with turing test based **adversaries** for ensuring **accurate reconstruction** of **craters** and **hills**
- Achieved a competitive **SSIM** of **0.794** while increasing image spatial resolution from **5m per pixel** to **30 cm per pixel**, a **16x magnification**
- Created a pipeline capable of **tiling** and super-resolving an image using **Lunar T-GAN, HAT**, **RealESRGAN** and **sharpening** algorithms
- Developed a **Lunar Atlas** by correcting coordinates & **stitching** together individual image patches from the Chadrayaan-2 TMC payload

AWARDS AND ACHIEVEMENTS

- Secured an **All India Rank 473** in Joint Entrance Examination Advanced, 2020 amongst 2+ lakh shortlisted candidates
- Secured an **All India Rank 1176** in Joint Entrance Examination Main, 2020 amongst 10+ lakh candidates
- Amongst the **top 300** IITians that were selected for **Optiver Winter Trading School** conducted by **IIT Delhi**
- **Specialist** at **Codeforces**, having a peak rating of **1459** on the portal with the handle **rv4102**

SKILLS AND EXPERTISE

Languages: C/C++, Python, LaTeX, MySQL, Bash, MIPS, Assembly
Libraries/ Frameworks: Keras, Tensorflow, NumPy, Pandas, Flask, scikit-learn, Git, C++ STL, C pthreads
Skills: Systems Programming, Socket Programming, Data Science, Object Oriented Design

COURSEWORK INFORMATION

Theory + Lab: Operating Systems, Computer Networks, Database Management Systems, Computer Organisation & Architecture, Compilers, Software Engineering, Programming & Data Structures, Algorithms-I
Theory: Deep Learning, Machine Learning, Probability & Statistics, Statistical Inference, Discrete Structures, Linear Algebra, Calculus

POSITIONS OF RESPONSIBILITY

SWG Mentor 2023 | Students' Welfare Group, IIT Kharagpur **Dec '22 – Present**

- Mentoring three juniors on various academic and non-academic activities and how to work towards achieving their goals

!Self declared by the student, CDC could not verify the relevant documents