Rushil Venkateswar

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Education

- **Indian Institute of Technology Kharagpur** — Kharagpur, India
  Dual Degree (B. Tech. + M. Tech.) - Computer Science and Engineering; CGPA: 8.79 — *Dec 2020 - ongoing*
- **Little Flower School** — Jamshedpur, India
  Higher Secondary - ISC; percentage: 96.25% — *Mar 2018 - Mar 2020*
  Subjects: *Mathematics, Physics, Chemistry, Computer Sc. (Java), English*
- **Little Flower School** — Jamshedpur, India
  Secondary - ICSE; percentage: 95.40% — *Mar 2007 - Mar 2018*

Projects

- **Students' Auditorium Management System (*CS29202: Software Engineering*)**
  Front-end: HTML, CSS, Javascript Backend: Flask Database: SQLite — *Spring 2022*
  - An **auditorium management website** which runs on localhost (127.0.0.1) and allows the user to maintain a database of shows to be screened, along with providing functionality for seat booking.
  - **OTP-based login** for users of the software is supported.
- **KGP-miniRISC Processor (*CS39001: Computer Organisation & Architecture*)**
  Tech: Verilog (HDL), AMD Xilinx ISE, Nexys Artix-7 FPGA — *Autumn 2022*
  - Developed a 32-bit word-length **single-cycle** instruction execution unit with a purely combinational design.
  - Successfully dumped the bitstream onto a **Nexys A7 FPGA board** using Xilinx ISE and ran programs (written in assembly) such as sorting and linear search.
- **tinyC Compiler *(CS39003: Compilers)***
  Tech: Flex, Bison — *Autumn 2022*
  - Created library for standard input-output operations and followed International Standard ISO/IEC 9899:1999 (E).
  - Defined flex specifications for the language of tinyC using the Phase Structure Grammar given in the C Standard.
  - Used Bison specifications to define the tokens of tinyC and write the semantic actions in Bison to translate a tinyC program into an array of 3-address quad's, a supporting symbol table, and other auxiliary data structures.
  - Developed target code translator to generate the assembly language of x86-64 from the Three-Address-Code quad array.
- **Instance Segmentation and Detection (*CS29202: Software Engineering*)**
  Tech: MaskRCNN (Pytorch), PIL, Tkinter — *Spring 2022*
  - Developed a **Tkinter based GUI** to display bounding boxes or segmentation masks for the image selected.
  - Used a pre-trained MaskRCNN model from Pytorch library to generate **masks** and **bounding boxes** for a given image and used **matplotlib** to plot them.
  - Created a **python package** from source code.

Experience

- **Maternal & Child Health Monitoring — Stanford University — Prof. Pascal Geldsetzer** Kharagpur, India
  Objective: Estimate key indicators of health status in low income countries using satellite imagery — *May '23 - Aug '23*
  - Trained a **random forest regressor** for **multi-output regression** using **11000 numerical features** and performed **K-Fold Cross Validation**
  - Used Protégé for making an ontology for Python language. Explored OWLReady python package to create ontologies.
  - Implemented Frequent Itemset Mining and used it to perform query expansion.
- **Research Intern — Prof. Partha Pratim Das, IIT Kharagpur** — Kharagpur, India
  Topic: Development of a Python Tutor — *May 2022 - July 2022*
  - Tech: Python
  - Used Protégé for making an ontology for Python language. Explored OWLReady python package to create ontologies.
  - Implemented Frequent Itemset Mining and used it to perform query expansion.
- **Research Intern — Dr. Debasish Chakraborty, ISRO** — Kharagpur, India
  Topic: Semantic Segmentation of Remote Sensing Images — *Apr 2022 - Dec 2022*
  - Tech: Python, TensorFlow, Keras, OpenCV
  - Studied existing literature on CNNs, deep learning and their usage in the remote sensing context.
  - Using the Tensorflow framework, built a U-Net like model with improved performance and a fraction of the number of parameters as the original U-Net.
  - Created various other scripts to perform inference on variable sized images. Tested on Indian context images taken from Google Earth.

Coursework

- **Computer Science (Theory+Lab):** Algorithms-I, Software Engineering, Systems Programming, Compilers, Computer Architecture and Organization, Machine Learning, Algorithms-II, Programming & Data Structures
- **Mathematics:** Discrete Structures, Advanced Calculus, Linear Algebra, Numerical and Complex Analysis, Probability and Statistics, Econometric Analysis, Statistical Inference
- **MOOCs:** Machine Learning **(Andrew Ng)**, Deep Learning Specialization **(DeepLearning.AI)**

Skills Summary

- **Languages:** C, C++, Python, MySQL, LaTeX, MATLAB, MIPS Verilog, Bash.
- **Libraries and Frameworks:** STL(C++), NumPy, Pandas, Tkinter, PIL, Pytorch, TensorFlow.
- **Platforms & Tools:** Linux, macOS, Git, Jupyter Notebook.

Honors and Awards

- **All India Rank 473 among 160k candidates** *JEE Advanced*, Sept 2020
- **All India Rank 1176 among 1.12 million candidates** *JEE Mains*, Jan 2020
- **KVPY round 1 qualified** *IISER Kolkata*, Feb 2019
- **Inter IIT Tech Meet 11.0 solo gold medalist** *IIT Kanpur*, Feb 2023
- **Optiver Winter School participant** *IIT Delhi*, Jan 2023
- **ACM ICPC Preliminary Round rank 498** *IIT Kharagpur*, Nov 2022

Position of Responsibility

- **Associate Member**
  Business Club, Indian Institute of Technology Kharagpur *Dec 2020 - Sept 2021*
  - Authored a **Whitepaper on XGBoost** .
  - Conducted a webinar on Cryptocurrency with Dr. Akshat Shrivastava as the guest lecturer.
  - Participated in an intra-club case study competition and guided newly inducted teammates.

Volunteer Experience

- **SWG Mentor (Mentor-Mentee Programme)**
  Students' Welfare Group, Indian Institute of Technology Kharagpur