Ketan Akul Ramaneti

EDUCATION

★ **Vellore Institute of Technology (VIT), Vellore** ⇒ ***Bachelor of Technology in Electronics and Communication Engineering with Specialization in Internet of Things*** [Undergraduate (UG)] **JULY 2018 - JUNE 2022**

- **CGPA:** 9.17 on a scale of 10 [Among the top 10% of students (12 / 137) in the department] VIT SpecialAchiever.pdf
- **Scholarship:** Merit Scholarship for rank 6 of 130 students in the stream for the year 2018-19 Academic Merit.pdf
- **Relevant Courses:** Python Programming - **S (10/10),** Calculus for Eng.- **S (10/10)**, Object Oriented Programming- **S (10/10)**, Signal Analysis and Processing- **A (9/10)**, Communication Eng.- **A (9/10)**, App. of Differential and Difference Eqn. - **S (10/10)**, Data Structures & Algorithms - **A (9/10)**, Principles of Computer Communication- **B (8/10)**, Statistics for Engineers- **S (10/10)**, Applied Linear Algebra- **A (9/10)**, IoT System Architecture- **B (8/10)**, IoT Fundamentals- **A (9/10)**, Deep Learning- **A (9/10)**, Neural Networks & Deep Learning- **A (9/10)**, Advanced Microcontrollers - **S (10/10)**, Applied Numerical Methods- **A (9/10)**, IoT Edge Nodes & Its Applications- **B(8/10)**, IoT Domain Analyst- **A (9/10)**, Cloud Computing & Information Security- **A (9/10)**, Information Theory & Coding - **A (9/10)**, Advanced Java Programming - **S (10/10)**, Introduction to Data Analytics - **S (10/10)**, Machine Learning Fundamentals - **S (10/10)**, Artificial Intelligence with Python - **S (10/10)**

INTERNSHIPS AND RESEARCH EXPERIENCE

★ **Nanyang Technological University, Singapore** - ***[Research Assistant]*** Letter of Admission_NTU.pdf

➔ **JUNE, 2022 - JAN, 2023 (Currently Working)** **[Research Assistant under Prof. Tong Ping]**

Outline: NTU Extension.pdf

- Comparing the performance of existing ML models in picking the first P phase arrival from seismograms in the selected study region using the ***Seisbench* framework**. Choose the best model as the base model - 1. SeisBench's documentation
- Understanding the **PmPNet** (base model -2) architecture and analyzing its performance in picking the later PmP depth phase from seismograms in the selected study region. PmPNet Documentation
- Developing a hybrid DL algorithm, similar to base models' architecture, with **autoencoders, ResNet blocks, CNNs, and RNNs** using **PyTorch** to predict the probability of sP depth phase occurrence in a seismogram and its respective travel/arrival time.
- Training the model using the prepared sP depth phase database for efficient sP phase picking from real-time seismograms.
- Relocating earthquakes' origins using the designed algorithm & performing **seismic tomography** for petroleum exploration.

➔ **JAN, 2022 - JUNE, 2022 (Spring 2022) [UG Capstone - India Connect @ NTU Visiting Research Student under Prof. Tong Ping]**

Key Outcomes: NTU Project Workflow.png NTU Project Report 1.pdf

- Comprehended the principles of Seismology and the characteristics of seismic depth phases, **P & sP phases** in particular.
- Extracted around **200k seismic signals** (= 1 TB of Seismic Data) from open source databases. [IRIS] https://www.iris.edu/hq/
- Preprocessed (remove noise, cut and align, remove signals with less SNR) the extracted seismic signals from a study region.
- Calculated **sP-P differential** travel times, and summarized the detection workflow of sP depth phase picking and its features in the **PREM-1D layered, 'iasp91',** Earth model using **TauP module, Seismic Analysis Code, and ObsPy** Python packages.
- **Correlated** the **sP-P** differential travel times with the **focal depth** of earthquakes using the TauP python module. Concluded that the **sP-P differential travel time is sensitive to the focal depth** with an approximately **linear relationship**.
- Transformed the waveforms into Radial and Transverse components w.r.t. the azimuth angle from station to the earthquake.
- Analyzed the seismic waveforms & **manually picked high-quality sP phases** using the summarized detection workflow.
- Prepared a database based on the characteristics of manually picked sP-phases from waveforms.

★ **QuantaVid LLC** - ***[Machine Learning Engineer Intern]***

1st OCT, 2020 - 28th FEB, 2021 QuantaVid Internship certificate.pdf

Key Outcomes:

- Designed, developed, enhanced, and implemented AI solutions, particularly w.r.t **NLP** for **automatic generation of videos based on the text input**. Implemented **TextRank algorithm** for extractive summarization of user's text input - module 1.
- **Web-scraped, mined, and wrangled relevant data** to train machine learning models for genre classification of text input.
- Designed a **Naive Bayes-based classifier** for genre classification which obtained an average **accuracy of 93.7%** - module 2.
- Integrated modules 1 & 2 to **auto-generate** a short **2-minute video** description of any blog using relevant images and audio.
- Collaborated with the backend team to integrate the ML Pipeline with the company's platform using **Google Cloud Platform.**

★ **Six Red Marbles Inc.** - ***[Subject Matter Expert - Mathematics]***

11th DEC, 2020 - 1st JAN, 2021 Six Red Marbles-Cert.pdf

Key Responsibilities: Provided **optimized and accurate solutions for 500+** University-based high-level mathematics questions from several textbooks for senior-level undergraduate students.

TECHNICAL SKILLS

➢ **IT Constructs**	:	Data Structures & Algorithms ; OOPS ; DBMS
➢ **Programming Languages**	:	Python ; Java ; JavaScript ; SQL ; C ; C++ ; Matlab ; R ; Verilog ; Embedded C
➢ **Libraries and Frameworks**	:	Pandas ; NumPy ; Scikit-learn ; PyTorch ; Tensorflow ; Keras ; Matplotlib ; Seaborn ; Plotly ; NLTK Gensim ; OpenCV ; Django
➢ **Web Technologies**	:	Django ; Flask ; JavaScript ; HTML ; CSS
➢ **Database Systems**	:	SQLite3 ; PostgreSQL ; MySQL

➢ **Cloud Platforms** : AWS EC2 ; Firebase ; IBM Cloud & IBM Watson

KEY INTERESTS: **AI/ML ; Data Science/Analytics ; IoT & Cloud ; Signal/Image Processing ; Computer Vision ; NLP ; HCI**

OTHER SKILLS(TECHNOLOGY/FUNCTIONAL): Exploratory & Explanatory Data Analysis ; Data Visualization ; Backend Dev. ; Embedded Systems ; Public Speaking ; Communication; Leadership

RESEARCH PUBLICATIONS AND PRESENTATIONS

★ **Ramaneti, Ketan. (2022). "An Overview of Recent Advances and Applications of Machine Learning in Seismic Phase Picking."** Preprint Version. DOI: http://dx.doi.org/10.13140/RG.2.2.11669.19689.

★ **"IoT based 2D Indoor Navigation System using BLE Beacons and Dijkstra's Algorithm,"** 2021 IEEE 12th International Conference on Computing Communication and Networking Technologies (ICCCNT), July 6-8, IIT Kharagpur, India, **IEEE Xplore**. **DOI:** 10.1109/ICCCNT51525.2021.9580047 (*Link*)

- ❖ Presented the research paper at the **IEEE 12th International Conference on Computing, Communication and Networking Technologies (ICCCNT-2021),** July 6-8, 2021, IIT-Kharagpur, India. IEEE_ICCCNT Certificate.pdf

★ **"Improving Solar Panel Efficiency by Solar Tracking and Tilt Angle Optimization with Deep Learning,"** 2021 IEEE 5th International Conference on Smart Grid and Smart Cities (ICSGSC), Tokyo, Japan, June 18-20, 2021, **IEEE Xplore. DOI:** 10.1109/ICSGSC52434.2021.9490485 (*Link*)

★ **"Image Steganography Using GANs."** In: Lee R. (eds) Computer and Information Science 2021—Summer. ICIS 2021, Shanghai, China. **Studies in Computational Intelligence, vol 985. Springer, Cham. DOI:** 10.1007/978-3-030-79474-3_12 (*Link*)

- ❖ Presented the research paper at the IEEE/ACIS ICIS 2021 - Summer International Conference. ICIS2021 Certificate.pdf
- ❖ Received a Special Issue Publication (top 13 best papers) at the conference.

★ **"Design and implementation of Sun Tracking Solar Panel and Smart Wiping Mechanism using Tinkercad,"** In IOP Conference Series: Materials Science and Engineering, volume 906, 012030, **IOP Publishing, 2020. DOI**: 10.1088/1757-899X/906/1/012030

ONLINE TECHNICAL COURSES AND CERTIFICATIONS

★ **UDACITY - *Machine Learning Engineer Nanodegree*** https://confirm.udacity.com/N37EMJJ2
★ **UDACITY - *Deep Learning Nanodegree*** https://confirm.udacity.com/RKGH362Q
★ **UDACITY - *Natural Language Processing Nanodegree*** https://confirm.udacity.com/CDDG752T
★ **UDACITY - *Introduction to Machine Learning with Pytorch*** https://confirm.udacity.com/PAJSGVTP
★ Neural Networks and Deep Learning (Coursera) [Certificate Link]
★ Machine Learning with Python by IBM [Certificate Link]
★ Recent Advances in Freeform Electronics [Certificate Link]
★ Software Engineering Virtual Experience (JP Morgan and Chase) [Certificate Link]

STUDENT ORGANISATIONS (VOLUNTEERING)

★ **SKILLSHIP FOUNDATION, VELLORE COMMUNITY** - ***Director of Projects*** **JUL 2020 - MAY 2021**

- Guiding the student community in building projects to solve real-world problems. Skillship_Vellore-Certificate.pdf
- Providing and assisting fellow members with technical skills needed to complete a project.

★ **IET-VIT, Student Chapter of IET** - ***Senior Technical Member*** IET-VIT_TUC.pdf **DEC 2018 - NOV 2020**

- Organizing university-level events, and technical workshops, making innovative projects, and publishing research papers
- Fulfilling the above-mentioned duties and guiding juniors in their fields of interest.

PERSONAL MINI PROJECTS

1. **COVID-19 Tweets' Sentiment Analysis and Classification -** *NLTK, Gensim, Sklearn, Python* [Github Link]
2. **e-Healthify: A COVID-19 Risk Predictor using ANN -** *Python, Keras* [Github Link]
   - An ANN model that can predict the probability of a person getting affected by COVID-19.
3. **EMG Signal Analysis to control prosthetics using ML -** *DSP, MATLAB, Python* [Github Link]
4. **Object Detection and Identification using YOLOv3 for ADAS -** *Python, OpenCV, PyTorch* [Link]
   - Implemented the YOLOv3 algorithm in real-time to build an ADAS system for a 'Semi-Autonomous Driver Assistance System' in cars, helpful for elderly people and people with poor reflexes who fail to react in time, resulting in collisions and accidents.
5. **iGuideU: An Indoor Mapping System -** *Dijkstra's Algorithm, Graph Mapping, OOPS, Python* [Github Link]
6. **Benjamin and Warren Buffett Filter, Stock Market Filter -** *Python* [Github Link]
7. **Stock Market Sentiment Analysis -** *Python, PyTorch* [Github Link]
   - Sentimental analysis of the Stock market to predict a company's performance in the market is based on news headlines.
   - The project won the Fintech domain in VIT hack 2019.