Prahlada Varada Mittal

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Areas of Interest : Geophysical Modelling, Remote Sensing, Geodynamics, Seismology, Image Processing, Machine Learning, NLP

Education

Australian National University, Australia Jun 2024 - Jun 2025
Masters Thesis in Geodynamics, RSES
Future Research Talent Award

Indian Institute of Technology Roorkee, India Aug 2020 - Jun 2025
Integrated Masters (B.Tech + M.Tech) in Geophysical Technology
CGPA: 8.72/10.0 (Within top 15 %)

National University of Singapore, Singapore Dec 2022 - Jan 2023
Academic Internship in Deep Learning and Data Analytics
Grade A (Training from NUS & HPE)

Scholar's Academy, Roorkee (CBSE), India Apr 2020
Higher Secondary Education
Grade 12 Percentage : 93 % (2nd in School)

Scholar's Academy, Roorkee (CBSE), India Apr 2018
Secondary Education
Grade 10 Percentage : 92 % (2nd in School)

Journal Publications

Unsupervised learning framework for region based damage assessment on xBD, a large satellite imagery Published Jun 2023
PV Mittal, R Bafna, A Mittal
Pg 1619-1643, Vol 118, Natural Hazards, Springer (2023) | Link to Paper

- Population-based damage assessment due to natural hazards
- Unsupervised density-based clustering algorithm to give us the region-based damage
- Development of navigation system integrated with Google maps to aid navigation during a disaster

Machine Learning Models for Mining Social Media Data for Effective Natural Disaster Assessment Sept 2023
PV Mittal, S Karki, S Parasher, S Narang, A Mittal
Natural Hazards Review, ASCE (In Review) | Link to Paper

- Creating an integrated text and image based framework for damage assessment
- Provision of timely and customized aid to the affected individuals
- Deducing damage types and analysing them

From Field to Diagnosis: Leveraging Farmer Query to Detect Crop Diseases in a Changing Climate Dec 2023
DS Rawat, A Agarwal, *PV Mittal*, A Mittal, N Yeril
IEEE Transactions on AgriFood Electronics (In Review)

- Creating a labelled dataset using N-grams and SMEs
- Using ML algorithms for crop-disease identification
- Correlating the diseases with climate-induced environmental factors
- Aiding farmers and government by providing customised help

Conferences

Natural Disaster Twitter Data Classification using CNN and Logistic Regression Aug 2023
S Parasher, *PV Mittal*, S Karki, S Narang, A Mittal
International Conference on Soft Computing for Problem Solving (SocProS 2023), Aug 11-13, 2023
Link to Paper

- Efficient damage assessment using social media data by classification
- Panic assessment in the general populous
- Swift assistance during natural disasters

Integrating GRACE Satellite Data and ML for Groundwater Level Analysis and Prediction in UP Mar 2024
M Sharma, *PV Mittal*, K Raj, A Karunakalage, M Taqi Daqiq, R Sharma
International Conference on Computations and Data Sciences(CoDS-2024), March 8-10, 2024

- Using the widely available GRACE data to find out the Groundwater level dependence on storage
- Use of Machine Learning tools to find out relationships and prediction groundwater levels for similar geologies
- Finding out the geological implications

A ML Approach for Enhancing Groundwater Data Consistency between GRACE and GRACE-Fo Missions in UP Mar 2024
K Raj, *PV Mittal*, M Sharma, A Karunakalage, M Taqi Daqiq, R Sharma
International Conference on Computations and Data Sciences(CoDS-2024), March 8-10, 2024

- There is a gap between the GRACE and GRACE-FO satellite missions of 11 months
- Objective to fill in this gap with high resolution and not loose important information related to 2017-18
- Validation of results with other satellite data

Research Projects

Constraining mantle properties by inverting for observations of dynamic topography Jun 2024 - Jun 2025
Dr. Sia Ghelichkhan, Prof. Rhodri Davies (Australian National University)

- Use of Dynamic Topography observations to get viscosity and density of mantle
- Synthetic modeling using Finite Element method and Stokes' equations
- Adjoint-based inversion to get viscosity and temperature sensitivities

Image Super-Resolution Using SRCNN and ESRGAN Dec 2022 - Jan 2023
Dr. Amirhassan Monajemi (National University of Singapore)

- Low-resolution or low-quality images taken as input
- Deep learning models applied and compared with respect to various parameters
- Tested using Image quality metrics like PSNR, MSE and SSIM

Prediction the sparsely available Groundwater level using the satellite-based GRACE data Dec 2024 - Jun 2025
Prof. Ravi Sharma (IIT Roorkee)

- Improving GRACE data gaps and increasing the spatial resolution
- Using Machine Learning methods for training and feature extraction of GWL data with GRACE data
- Predicting GWL data for unknown places and similar rheologies

Gravity and Magnetic Survey and Modelling of Mohand Anticline Feb 2023 - May 2023
Prof. Ashutosh Chamoli (IIT Roorkee)

- Collecting and Analysis of Gravity and Magnetic Data
- Applying various gravity correction to get the Bouguer anomaly
- Plotting and verification of results with other data and geological information

RMT and TEM Modelling of HFT Zone Mar 2023 - Apr 2023
Prof. Bülent Tezkan (University of Cologne), Prof. M Israil (IIT Roorkee)

- Use of Radio Magnetotellurics and Transient Electromagnetic methods
- Processing and Modelling the data to get 3-D structure

Analysis of Seismic Records of North-East India Sep 2022 - Oct 2022
Prof. Sagarika Mukhopodhyay (IIT Roorkee)

- Estimating earthquake arrivals by the large North-East dataset and determining earthquake location
- Used Seisan software to analyse our results

Technical Skills

Programming languages : Python (Expert), C++ (Competent), MATLAB (Competent), R (Basics)
Softwares and Tools : Jupyter Notebook, Firedrake, Paraview, MS Azure, MS Excel, LATEX, Orange
Python Lib : OpenCV, Numpy, Pandas, SciPy, Scikit-learn, Matplotlib, Pyvista, Pyadjoint, PetSc, Tensorflow
Geophysics : GAdopt, ObsPy, GPlates, QGIS, Rokdoc, GMSH, Seisan, Res3DInv, KiKNet

Relevant Coursework

Computer Programming(C/C++)	Digital Image Processing	Economics
Machine Learning for Engineers	Plate Tectonics	Seismology
Strong Motion Seismology	Numerical Modelling	Well-logging
Probability and Statistics	Geoinformatics	Hydrology
Multi-dimensional Mechanics	Signal Processing	Field Theory
Physical and Structural Geology	Marine Geophysics	Petrophysics
Multi-variable Calculus	EM Prospecting	Field Training
Fundamentals of Electronics	Economic Geology	Geology of India

Extracurricular Activities

Student Mentor, SMP, IIT Roorkee: Sep 2023 - Apr 2024
Mentoring and Guiding First Year Students

Mentor in Workshops at IIT Roorkee, COER Univ and KRM Univ: Jul 2023 - Jun 2024
Workshops on QGIS, ML, Orange

Mentor, Raman Classes, Roorkee: Jan 2021 - Jul 2023
Mentoring and Teaching students for IIT-JEE and Python

Member, Marketing and Development, Raman Classes, Roorkee: Jan 2021 - Aug 2022
Marketing, Course Preparation

Participant, Hamrock Cricket Tournament, IIT Roorkee: Feb 2024 - May 2024
Bowling allrounder – helped team secure a 2nd place finish

Participant, Institute Open Championship, IIT Roorkee: March 2023, 2024
Participant in Badminton Championship - Singles

Participant, Inter IIT Trials, IIT Roorkee: September 2022
Participant in Squash and Table Tennis

Member, National Sports Organisation, IIT Roorkee: Dec 2020 - Dec 2021
Working to increase interest of youth in sports

Address

Prahlada Varada Mittal, S/O Ankush Mittal (Vice-Chancellor (COER University), Ph.D (NUS, Singapore)) 568, Solani Puram, Roorkee, Uttarakhand, India