Sandeep Kumar

Curriculum Vitae

Personal Data

Name	Sandeep Kumar
Birth Place	Biharsharif, India
Citizenship	India
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Affiliation

Ph.D. Student
Microwave Remote Sensing Lab (MRSLab)
Center of Studies in Resources Engineering
Indian Institute of Technology Bombay, Powai, Mumbai – 400076, India
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Education

2022 – Ongoing **Ph.D., Geoinformatics and Natural Resources Engineering**, *Centre of Studies in Resources Engineering (CSRE)*, Indian Institute of Technology Bombay, India

- **Thesis:** "*Modelling of Forest Disturbances Using Multi-Sensor Remote Sensing Data*,"
  Supervisor: **Prof. Avik Bhattacharya**

2016–2021 **Integrated M.Tech., Geoinformatics**, CGPA: 8.98/10.0, Central University of Jharkhand, Ranchi, Jharkhand, India

- **Post Graduation (PG) Thesis:** "*Hydroponics Farming Identification and Estimating GPP over Croplands using High-Resolution Satellite Imagery in Majuli Islands*,"
  Supervisor: **Dr. Bikash Ranjan Parida**
- **Under Graduation (UG) Thesis:** "*Crop Damage Assessment and Risk Mapping Due to Locust Attack in Affected States of India*,"
  Supervisor: **Dr. Bikash Ranjan Parida**

Experiences

Oct 2021–July 2022 **Junior Research Fellow**, Indian Institute of Technology Bombay, Mumbai, India

- **Project:** *Lunar Regolith Characterization Using Dual Frequency Full-polarimetric SAR Data*

May 21 - July 04, 2018 **Summer Internship**, Council of Scientific & Industrial Research - Central Institute of Mining and Fuel Research (CSIR-CIMFR), Dhanbad, India

Professional Biography

My research aims to advance and apply multi-sensor remote sensing datasets for the modeling of vegetation disturbances. I am particularly interested in developing new and robust vegetation parameters using optical and Synthetic Aperture Radar (SAR) datasets, which will be useful in detecting disturbances in vegetation. The advancement and availability of the global open access high-resolution optical and SAR datasets open the scope of global vegetation monitoring.
I look forward to broaden and deepen my knowledge of geoinformatics, specifically remote sensing of vegetation. Moreover, I want to employ my expertise and understanding of the subject to better manage forest ecosystems.

Research Interests

✓ **Remote sensing of vegetation**
✓ **Vegetation health assessment**
✓ **Vegetation parameter development**
✓ **Forest disturbances**
✓ **Burnt area mapping**

List of Publications

1. **S. Kumar**, A. Nihar, A. Verma, S.S. Ghosh, A. Bhattacharya, "Crop Residue Burning and its Impact on Air Quality: A Case Study on Northern India," *2024 IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, Athens, Greece, 2024. [Accepted]
2. S.S. Ghosh, D. Mandal, **S. Kumar**, N. Bhogapurapu, B. Banerjee, P. Siqueira, A. Bhattacharya, "Enhancing crop type classification from multi-frequency dual-pol SAR data by probabilistic fusion of Gaussian Processes," *2024 IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, Athens, Greece, 2024. [Accepted]
3. S.S. Ghosh, U. Khati, **S. Kumar**, A. Bhattacharya and M. Lavalle, "GP4F - A Gaussian Process Regression Model for Forest Biomass Retrieval Utilizing Simulated Nisar Data," *2023 IEEE India Geoscience and Remote Sensing Symposium (InGARSS)*, Bangalore, India, 2023.
DOI: http://dx.doi.org/10.1109/InGARSS59135.2023.10490338.
4. **S. Kumar**, S.S. Ghosh, D. Mandal, A. Porwal and A. Bhattacharya, "A Sentinel-2 Vegetation Health Index," *2023 IEEE India Geoscience and Remote Sensing Symposium (InGARSS)*, Bangalore, India, 2023.
DOI: http://dx.doi.org/10.1109/InGARSS59135.2023.10490434.
5. S.S. Ghosh, D. Mandal, **S. Kumar**, N. Bhogapurapu, P. Siqueira, B. Banerjee and A. Bhattacharya, "Phenology-Based Crop Classification from Multi-Frequency Dual-Pol SAR Data Utilizing Gaussian Processes," *2023 8th Asia-Pacific Conference on Synthetic Aperture Radar (APSAR*, Bali, Indonesia, 2023.
DOI: http://dx.doi.org/10.1109/APSAR58496.2023.10388965.
6. A. Verma, **S. Kumar** and A. Bhattacharya, "A Cloud-Based Global Land Cover Clustering Framework Using Sentinel-1 And Sentinel-2 Data," *2023 International Symposium on Signals, Circuits and Systems (ISSCS)*, Iasi, Romania, 2023.
DOI: https://doi.org/10.1109/ISSCS58449.2023.10190932.
7. S.S. Ghosh, U. Khati, **S. Kumar**, A. Bhattacharya and M. Lavalle, "Gaussian process regression-based forest above ground biomass retrieval from simulated L-band NISAR data," *International Journal of Applied Earth Observation and Geoinformation*, Vol-118, pp.103252, 2023.
DOI: https://doi.org/10.1016/j.jag.2023.103252.
8. **S. Kumar**, B.R. Parida, M.D. Behera and N. Singh, "Estimating GPP over Croplands Using PlanetScope High-Resolution Satellite Data, Vegetation Index, and Photosynthetically Active Radiation on Majuli Islands in Assam," In Book *Handbook of Himalayan Ecosystems and Sustainability, Volume 1*, pp.163-182, CRC Press, 2022.
DOI: http://dx.doi.org/10.1201/9781003268383-12.
9. S. Kumar, A. Prakash, **S. Kumar** and B.R. Parida, "Effects of Land Use/Land Cover Changes on Surface Temperature and Urban Heat Island over Kathmandu District in Nepal," In Book *Handbook of Himalayan Ecosystems and Sustainability, Volume 2*, pp.275-291, CRC Press, 2022.

DOI: http://dx.doi.org/10.1201/9781003265160-17.

10. **S. Kumar** and B.R. Parida, "Hydroponic farming hotspot analysis using the Getis–Ord Gi* statistic and high-resolution satellite data of Majuli Island, India," *Remote Sensing Letters*, pp.408-418, 2021.
DOI: https://doi.org/10.1080/2150704X.2021.1895446.
11. **S. Kumar**, U. Biswas, M. Ahmad and S. Kumari, "An Integrated Approach for Land Suitability Analysis for Agriculture through Remote Sensing and GIS - A Case Study of Seoni District (Madhya Pradesh), India," *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, Vol-7(VII), pp.661-674, 2019.
DOI: http://dx.doi.org/10.22214/ijraset.2019.7106.
12. P. Lal, **S. Kumar**, S. Kumari, A. Prakash and S. Kumar, "Spatio-Temporal Analysis of Land Surface Temperature - Sikkim, India," *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, Vol-7(VIII), pp.267-271, 2019.
DOI: http://dx.doi.org/10.22214/ijraset.2019.8037.
13. S. Kumari, U. Biswas, M. Ahmad and **S. Kumar**, "An Integrated Approach for Land Resource Management through Remote Sensing and GIS -A Case Study of Keolari Block, Seoni District (Madhya Pradesh), India," *International Journal for Research in Applied Science & Engineering Technology (IJRASET)*, Vol-7(VIII), pp.345-360, 2019.
DOI: http://dx.doi.org/10.22214/ijraset.2019.8050.

Technical Skills

✓ **Programming Skill:** Python — R — Climate Data Operator

✓ **Software and Tools:** ArcGIS — QGIS — ERDAS Imagine — ENVI — PolSARPro — SNAP — Google Earth Engine

Synergistic Activity

- **Workshop**: A five-day workshop on "Remote Sensing Applications for Earth Observations" conducted at the Department of Geography, Sikkim University (18 - 22 March 2024);
- **Presenter**: Represented Centre of Studies in Resources Engineering (CSRE) in "Tech RnD Expo 2023" organized by IIT Bombay, India, 2023;
- **Presenter**: Poster Presentation in"Conclave on Sustainability" organized by Research Park IIT Bombay (ASPIRE), India, 2022; Title: Explainable Earth Observation AI (XEOAI) for SDGs
- **Workshop tutorial**: Training Program on Synthetic Aperture Radar Data Processing and Analysis for Ocean Applications (May 9 - May 13, 2022)

Fellowship & Awards

- **First Prize in** *2023 Earth at Risk Image Contest* organized by IEEE GRSS (https://www.grss-ieee.org/resources/news/2023-earth-at-risk-image-contest-winners/)
- Prime Minister's Research Fellow (July 2023 - Present)

Teaching Assistant

- GNR 653 - Data Analysis Methods for Geospatial Applications
- GNR 603 - Communication Skills

Professional membership

- IEEE Geoscience and Remote Sensing Society (S'2023)

References

- **Prof. Avik Bhattacharya**
  Professor
  Microwave Remote Sensing Lab (MRSLab)
  Center of Studies in Resources Engineering
  Indian Institute of Technology Bombay
  Powai, Mumbai – 400076, India
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- **Prof. Alok Porwal**
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