Saumya Vilas Roy

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Summary

- Machine Learning/Deep (ML/DL) Learning researcher with 2.5 years of data analysis experience
- Skilled in ML/DL, Electronics, and Communication with an emphasis on biomedical data analysis
- Committed to developing innovative solutions in interdisciplinary projects
- Interested in ML/DL research opportunities in health and biomedical applications

Education

- Bachelor of Technology in Electronics and Communication Engineering, **Nov 2020 - May 2024**
  Indian Institute of Space Science and Technology (IIST), Kerala **GPA: 3.12**
  - Advisors: Dr. Deepak Mishra (IIST), Dr. Rajesh Sadananan (IIST) and Dr. Satheesh K. (IIST)
    Developed a novel method for estimating non-uniform temperature profiles in combustion systems using Laser Absorption Spectroscopy (LAS) and Multi-Output Gaussian Process Regression.
  - Scholarship from Department of Space, Govt. of India.
- High School Diploma, XII (Central Board of Secondary Education), **2018 - 2020**
  Ryan International School, New Delhi **Percentage: 90.6 %**

Research Experience

- Research Intern, **June 2024 - Current**
  Indian Institute of Technology (IIT), Delhi
  Advisors: Dr. Ankur Miglani (IIT, Indore) and Dr. Husain Kanchwala (IIT, Delhi)
  - Developed and implemented deep learning convolutional neural networks (CNNs) to detect damage on high-magnification images of wheat grain kernels.
  - Designed and deployed an AI-driven safety edge device (esp32) to prevent accidents in construction environments by detecting and alerting on unsafe behavior.
- Summer Intern, **May 2023 - August 2023**
  National Remote Sensing Center (NRSC), Indian Space Research Organization (ISRO)
  Advisors: Dr. Mishra and Ms. Haripriya S. (NRSC)
  - Developed and applied a U-net Complex Valued Neural Network for segmenting raw PolSAR images using the Pauli representation.
  - Analyzed the effects of different dropout rates on model overfitting and enable raw processing of PolSAR image without domain shift.
- Undergraduate Researcher, **Aug 2021 - May 2024**
  Indian Institute of Space Science and Technology
  - Advisors: Dr. Marcos M. Raimundo (University of Campinas, Brazil) and Dr. Mishra
    Developed a semi-supervised learning approach with spatial transformers for medical image registration, utilizing a hybrid dataset of real and synthetic images to reduce training data requirements.
  - Advisors: Dr. Sadananan and Dr. Mishra
    Created a Schlieren/RGB Flame Images Analyzing Tool using FFT and Wavelet Transform to analyze time-series flame images and identify instability regions and oscillating frequencies.
  - Advisor: Dr. Manoj B.S. (IIST)
    Utilized graph theory to model global crude oil flows between nations, identifying key time-series trends and predicting potential fluctuations in price and demand accurately over time.

First-Author Publications

- **Saumya Vilas Roy***, Husain Kanchwala & Ankur Miglani. Deep CNN-based damage classification of milled wheat grains using a high-magnification image dataset. (Manuscript in preparation).
- **Saumya Vilas Roy***, Deepak Mishra & Marcos M. Raimundo. HybridMorph: Bridging the Gap between Synthetic and Real Data for Accurate MR Image Registration. (Manuscript in preparation).
- **Saumya Vilas Roy***, Deepak Mishra, Satheesh K. & Rajesh Sadananan. Estimating Non-Uniform Temperature Profiles in Combustion Systems using Laser Absorption Spectroscopy and Multi-Output Gaussian Process Regression. (Manuscript in preparation).
- **Saumya Vilas Roy***, Deepak Mishra & Rajesh Sadananan (2025). Combined FFT and Wavelet Analysis of Schlieren and Flame Luminosity Time-Series to Visualize Regions of Combustion Instability. (Accepted NAPC 2025).
- **Saumya Vilas Roy***, & Manoj BS. (2024). A Complex Network Analysis of the OPEC Crude Oil Trade Network. DOI: 10.36227/techrxiv.171169316.66809297/v2. (RAICS 2024).

Skills

- **Languages:** Python, C++, MATLAB, JavaScript, HTML/CSS, SQL.
- **Developer Tools:** Git, GNU Octave, LaTeX, AWS.
- **Libraries:** TensorFlow, PyTorch, Keras, OpenCV.

Awards/Recognition

- **3rd** position in student's flash talks at Frontiers symposium in Data science 2024, IISER Trivandrum.
- Top **2%** in the Joint Entrance Examination (JEE) Main and Advanced, a highly competitive national-level engineering entrance examination in India.
- **1st** position in Tinker Fest 2018 organized by ATAL tinkering labs for the project "Algae Based Air Purifier and Quality Sensor" at Ryan International School.

Presentations

- "Complex Valued U-Net for Segmentation of PolSAR Images", ISG-ISRS 2023.
- "Meta-Learning for Space Applications for Advancements in Space Technology", Hindi Technical Conference 2023, IIST organized by Indian Space Research Organization (ISRO).

References

- **Husain Kanchwala**
  - **Title:** Assistant Professor, Center for Automotive Research and Tribology, IIT Delhi, India
  - **Email:** husaink@iitd.ac.in
  - **Phone:** +91-112-6548571
- **Deepak Mishra**
  - **Title:** Professor, Department of Avionics, IIST, India
  - **Email:** deepak.mishra@iist.ac.in
  - **Phone:** +91-471-2568583
- **Marcos M. Raimundo**
  - **Title:** Assistant Professor, Institute of Computing, University of Campinas, Brazil
  - **Email:** mraimundo@ic.unicamp.br
  - **Phone:** +55-19-35210322