
Saumya Vilas Roy

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Education

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| • Bachelor of Technology in Electronics and Communication Engineering,
Indian Institute of Space Science and Technology (IIST), Kerala | Nov 2020 - May 2024
CG-PA: 7.28 |
| • High School, X+II (Central Board of Secondary Education),
Ryan International School, New Delhi | 2018 - 2020
Percentage: 90.6 % |

Research Experience

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| • Research Intern,
Indian Institute of Technology (IIT), Delhi
Advisors: Dr. Ankur Miglani (IIT, Indore) and Dr. Husain Kanchwala (IIT, Delhi) <ul style="list-style-type: none">– Developed and implemented deep learning convolutional neural networks (CNNs) to detect damage on high-magnification images of wheat grain kernels.– Designed and deployed an Artificial Intelligence-driven safety edge device (esp32) to prevent accidents in construction environments by detecting unsafe behavior and alerting the end-user. | June 2024 - Current |
| • Summer Intern,
National Remote Sensing Center (NRSC), Indian Space Research Organization (ISRO)
Advisors: Dr. Deepak Mishra (IIST) and Ms. Haripriya S. (NRSC) <ul style="list-style-type: none">– Developed and applied a U-net Complex Valued Neural Network for segmenting raw Polarimetric Synthetic Aperture Radar (PolSAR) images using the Pauli representation.– Analyzed the effects of different dropout rates on model overfitting and enabled raw processing of PolSAR image without domain shift. | May 2023 - August 2023 |
| • Undergraduate Researcher,
IIST <ul style="list-style-type: none">– 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. Mishra, 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.– Advisors: Dr. Sadananan and Dr. Mishra
Created a Schlieren/RGB Flame Images Analyzing Tool using Fast Fourier Transform and Wavelet Transform to analyze time-series flame images and identify spatial distribution of flame or flow density oscillations during combustion instabilities.– 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. | Aug 2021 - May 2024 |

Publications

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- **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).

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- **Saumya Vilas Roy**, Deepak Mishra, & Marcos M. Raimundo. HybridMorph: Bridging the Gap between Synthetic and Real Data for Accurate MR Image Registration. DOI: [10.36227/techrxiv.173273622.27560352/v1](https://doi.org/10.36227/techrxiv.173273622.27560352/v1). (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. DOI: [10.36227/techrxiv.173273629.91677656/v1](https://doi.org/10.36227/techrxiv.173273629.91677656/v1). (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 to be published: National Aerospace Propulsion Conference 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](https://doi.org/10.36227/techrxiv.171169316.66809297/v2). (Recent Advances in Intelligent Computational Systems International Conference 2024).

Conference 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, held at IIST organized by the Indian Space Research Organization.

Technical Skills

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

Awards/Recognition

- **3rd** place in the student's flash talks at the 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** place in Tinker Fest 2018 organized by ATAL tinkering labs for the project "Algae Based Air Purifier and Quality Sensor" at Ryan International School.
- Scholarship from Department of Space, Govt. of India for undergraduate studies at IIST.

Courses

- **Core Courses:**
 - Probability, Statistics and Numerical Methods
 - Computer Programming and Applications
 - Digital Signal Processing
 - Control Systems
 - Computer Networks
- **Electives:**
 - Deep Learning for Computational Data Science
 - Machine Learning for Signal Processing
 - Digital Image Processing
 - Computer Vision
 - Complex Network