Saumya Vilas Roy

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SUMMARY

- Machine Learning/Deep (ML/DL) Learning enthusiast with 2.5 years of data analysis experience.
- Skilled in ML/DL, Electronics, and Communication with an emphasis on biomedical data analysis.
- Proven track record of developing innovative solutions in projects with diverse backgrounds.
- 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 CG-PA: 7.28/10
  - 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 (2020) Percentage: 90.6 %

EXPERIENCE

- Research Intern, June 2024 - Current
  Indian Institute of Technology, Delhi
  - Spearheaded the development of a deep learning-based computer vision techniques to identify damage on wheat grain kernels with Dr. Ankur Miglani (Indian Institute of Technology [IIT], Indore).
  - Designed and implemented an AI-driven safety edge device (esp32) to prevent accidents in construction environments by alerting on unsafe behavior with Dr. Husain Kanchwala (IIT, Delhi).
- Summer Intern, May 2023 - August 2023
  National Remote Sensing Center, Indian Space Research Organization
  - Developed and applied a U-net Complex Valued Neural Network for segmenting raw PolSAR images using the Pauli representation with Dr. Deepak Mishra (IIST).
  - 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
  - Collaborated with Prof. Marcos M. Raimundo (University of Campinas, Brazil) and Prof. Mishra to develop 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 while leveraging transfer learning to curtail computational overhead.
  - Created and validated a Schlieren/RGB Flame Images Analyzing Tool based on Fast Fourier Transform (FFT) and Wavelet Transform to analyze time-series flame images to identify the region of instability and the corresponding oscillating frequency in collaboration with Dr. Rajesh Sadananan (IIST).
  - Collaborated with Dr. Manoj B.S. (IIST) on a Complex Network Analysis project, focusing on the OPEC Crude Oil Trade Network. Utilized graph theory to model global crude oil flows between nations,

identifying key time-series trends and predicting potential fluctuations in price and demand.

SKILLS

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

AWARDS/RECOGNITIONS

- 3^{rd} position in student's flash talks at Frontiers symposium in Data science 2024, IISER Trivandrum.CVNN
- Ranked among the top 2% of over 1.1 million candidates in the Joint Entrance Examination (JEE) Advanced, a highly competitive national-level engineering entrance examination in India..
- Won 1^{st} position in Tinker Fest 2018 organized by ATAL tinkering labs for the project "Algae Based Air Purifier and Quality Sensor" at Ryan International School.

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).

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