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Litu Rout

Research Interest

I am interested in studying Artificial Intelligence at the intersection of Computer Vision, Self-Supervised Learning and Reinforcement Learning, including the theoretic puzzles of sample complexity and generalization.

Education

2014–2018 **Bachelor of Technology**, *Indian Institute of Space Science and Technology (IIST)*, Trivandrum, Kerala, India, Major: *Electronics and Communication Engineering* Minor: *Computer Science*.
CGPA: 8.81/10, Major GPA: 9.13/10

Work Experience

Research Scientist

Aug 2018 – Present **Signal and Image Processing Group, Space Applications Centre**, *Indian Space Research Organisation*, Ahmedabad, Gujarat, India.

Missions: Worked as a part of the data processing division for several recent earth observation payloads:
○ Cartosat-3S ○ Cartosat-2S ○ Resourcesat-2/2A ○ HySIS ○ OCM ○ IRS-1C/1D ○ Worldview-2 ○ Quickbird

Projects:

- Developed machine/deep learning based *operational solutions* to address various challenges in satellite image processing: - Multi-spectral band synthesis - Partial data reconstruction - Panchromatic band sharpening - Super-resolution - Denoising - Destriping - Non-linear contrast stretching - Cloud and snow segmentation - Radiometric normalization
- Developed a decentralized AI platform at national level.

Workshops:

- Attended "Machine Learning (ML) applications to remote sensing", MathWorks, India.
- Attended "Accelerating Artificial Intelligence (AI) research on GPGPU", Intel, India.

Selected Peer Reviewed Publications

1. **Litu Rout**, Indranil Misra, S Manthira Moorthi, Debajyoti Dhar, "S2A: Wasserstein GAN with Spatio-Spectral Laplacian Attention for Multi-Spectral Band Synthesis", in Proceeding of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Earth Vision Workshop, Jun, 2020.
2. **Litu Rout**, Saumyaa Shah, S Manthira Moorthi, Debajyoti Dhar, "Monte-Carlo Siamese Policy on Actor for Satellite Image Super Resolution", in Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Earth Vision Workshop, Jun, 2020.
3. **Litu Rout** "ALERT: Adversarial Learning with Expert Regularization using Tikhonov Operator for Missing Band Reconstruction", in IEEE Transactions on Geoscience and Remote Sensing (TGRS), Jan, 2020.
4. Matej Kristan, **Litu Rout**, Rama Krishna Gorthi et.al. "The seventh Visual Object Tracking VOT2019 challenge results", in International Conference on Computer Vision (ICCV) Workshops, Nov, 2019.
5. **Litu Rout**, Priya Mariyam Raju, Deepak Mishra, Rama Krishna Gorthi "Learning Rotation Adaptive Correlation Filters in Robust Visual Object Tracking", in Asian Conference on Computer Vision (ACCV), Dec, 2018.
6. Matej Kristan, **Litu Rout**, Deepak Mishra, Rama Krishna Gorthi et.al. "The sixth Visual Object Tracking VOT2018 challenge result", in European Conference on Computer Vision (ECCV) Workshops, Sep, 2018.
7. **Litu Rout**, Deepak Mishra, Rama Krishna Gorthi "WAEF: Weighted Aggregation with Enhancement Filter for Visual Object Tracking", in European Conference on Computer Vision (ECCV) VOT Workshop, Sep, 2018.
8. **Litu Rout**, Sidhartha, Rama Krishna Gorthi, Deepak Mishra "Rotation Adaptive Visual Object Tracking with Motion Consistency", in IEEE Winter Conference on Applications of Computer Vision (WACV), Mar, 2018.

Patents

2020 **Litu Rout**, Debajyoti Dhar, "ALERT: Adversarial Learning with Expert Regularization using Tikhonov Operator for Missing Band Reconstruction", Indian Space Research Organisation. [Applied]

2020 **Litu Rout**, Indranil Misra, S Manthira Moorthi, Debajyoti Dhar, "S2A: Wasserstein GAN with Spatio-Spectral Laplacian Attention for Multi-Spectral Band Synthesis", Indian Space Research Organisation. [Applied]

2020 Tapan Misra, **Litu Rout**, "A Method for Sequential Information Condensation using Fourier Basis", Indian Space Research Organisation, App. No. 202041004166.

Tools

Coding	Python, MATLAB, Familiar with C, C++, Bash
ML	PyTorch, Tensorflow, Keras, MatConvNet, scikit-learn
Visualization	Matplotlib, Seaborn, Inkscape
Software	git, vim, Linux, LaTex

Honors and Awards

2018 **Innovative Student Project Award**, Bachelor Level, Indian National Academy of Engineering (INAE).

2018 **Bronze Medal** in "Toxic Comment Classification", Kaggle.

2014 **Chief Minister Merit Scholarship** in "Council of Higher Secondary Education".

2014 **Pathani Samant Mathematics Scholarship** in "Council of Higher Secondary Education".

2012 **Chief Minister Merit Scholarship** in "Board of Secondary Education".

2012 **National Sanskrit Scholarship** in "Board of Secondary Education".

2006 **District Merit Scholarship** in "Board of Primary Education".

Invited Talks

Apr 2020 **Litu Rout** "S2A: Wasserstein GAN with Spatio-Spectral Laplacian Attention for Multi-Spectral Band Synthesis", Space Applications Centre, Indian Space Research Organisation, India.

Apr 2020 **Litu Rout** "Monte-Carlo Siamese Policy on Actor for Satellite Image Super Resolution", Space Applications Centre, Indian Space Research Organisation, India.

Mar 2020 **Litu Rout** "Global and Local Residual Learning for Spatio-Spectral Synthesis of SWIR Band using Multi-Sensor Concurrent Datasets", National Remote Sensing Agencies, India.

Jul 2018 **Litu Rout**, Deepak Mishra "Understanding Artificial Neural Networks to Deep Learning", Mohandas College of Engineering and Technology (MCET), Kerala, India.

Service and Leadership

2020 Evaluator, Smart India Hackathon, Software Edition, India.

2019 – 2022 Mentor, ISRO Technology Incubation Centre, NIT Jalandhar.

2019 Reviewer, IEEE TENCON, Kochi, Kerala, India.

2018 – 2023 Student-Member, Indian National Academy of Engineering (INAE).

Students Mentored

2020 Saumyaa Shah, Undergraduate Research, Nirma University, Ahmedabad.

2019 – 2020 Mayur D Chopda, Scientist/Engineer, Space Applications Centre, ISRO.

2019 Modhuli D Goswami, Undergraduate Research, now a MS student at Columbia University.

2018 – 2019 Bala Suraj Pedasingu, Undergraduate Research, Indian Institute of Technology, Tirupati.

References

- Available upon request