

Shravan Ambudkar

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RESEARCH

Interests: Deep Learning/Machine Learning, Computer Vision, Representative Learning, Algorithmic Fairness, GeoAI, Remote Sensing, Environmental Sustainability.

EDUCATION

SYMBIOSIS SKILLS and PROFESSIONAL UNIVERSITY

Pune, India

Bachelor of Technology in Mechatronics Engineering,
Honors: Distinction (CGPA: 8.6/10.0)

June 2017 - May 2021

RESEARCH EXPERIENCE

PIXXEL SPACE

Bengaluru, India

Research Analyst | Advisors - Dr. Rahul Raj & Dr. Logan Wright

April 2022 - Present

Research Intern | Advisor - Dr. Rahul Raj

August 2021 – March 2022

- Developed a Deep Neural Network based bio-properties estimation model for farm-canopy using multi-scale hyperspectral reflectance data and Radiative Transfer Models (RTMs).
- Created a forest tree classification Deep Learning model for the complete Europe region for 20 different tree species using multi-spectral and hyperspectral reflectance and radiance data.
- Developed and maintained satellite data correction pipeline (L0 to L2A) for Pixxel's hyperspectral imagery satellite using both physics and machine learning based models.

EKKLAVYA INFOSYS

Pune, India

Research Intern | Advisor - Ms. Shraddha Surana

August 2020 – January 2021

- This was a joint internship under ThoughtWorks Technologies and Ekklavya Infosys.
- Developed and worked on few-shot Meta-Learning algorithms for image and sentence classification by training on a limited training data-set consisting of 25 images and 25 text sentences.
- Models trained and evaluated - Siamese, Prototypical, Relation and Matching Networks.

Indian Institute of Technology, Mumbai

Mumbai, India

Summer Research Intern | Advisor - Dr. J. Adinarayana

May 2020 – July 2020

- This internship was a part of Indo-Japan project “Data Science-based Farming Support system (DSFS)” undertaken in the Agro-Informatics Lab, CSRE, IIT-Bombay along with Monash University, Australia.
- Worked on Yolo and Fast-RCNN frameworks for counting of maize tassels from drone-based RGB images and achieved an robust F1-score of 85.9% for accurate maize tassel counts.

PUBLICATIONS

1. S. Surana, **S. Ambudkar**, P. Bihani. "A Comparative Study on Metric Based Meta Learning Approaches for Few-shot Image and Text Classification". (*The 13th International Conference on Communications, Computing and Data Security, AIP Conf. Proc. 2842, 020012 (2023)*)
2. **S. Ambudkar**, R. Raj, K. Billa and R. Hukumchand, "Super-Resolution for Cross-Sensor Optical Remote Sensing Images," *IGARSS 2022 - 2022 IEEE International Geoscience and Remote Sensing Symposium*, 2022, pp. 1880-1883.
3. **S. Ambudkar**, R. Joshi, A. Kadam, K. Jadhav, Dr. S. Sonawane, "Autonomous Drone for Emergency Supplies Delivery during Disasters", *International Journal of All Research Education & Scientific Methods*, Issue 6 (June 2021)

ACHIEVEMENTS & AWARDS

- Finalist - AtmaNirbhar Bharat TOYCATHON (2021)
- Faculty Choice - Committee member, Robotics Club at the Undergraduate University - (2019 to 2021)
- University winner - National Smart India Hackathon - (2020, 2021)
- Awarded technical grant to participate at IIT, Bombay, Techfest competition (USD 500) - (2018)
- Faculty Choice- Student head, Anti Ragging committee at the Undergraduate University - (2017-2018)

SELECTED PROJECTS

Crop Biophysical and Biochemical parameters estimation using Hyperspectral and Multi-spectral Data.

Work Research Project at Pixxel Space (January 2023– September 2023)

- Designed a Deep Learning model for pixel-wise estimation of parameters (Chlorophyll, LAI, Brown Pigment) across varied resolutions and data types (aerial, satellite images).
- Model addressed spectral irregularities like oxygen notch, missing bands, and red-edge shift, enhancing adaptability to diverse scenarios in remote sensing.
- The model demonstrated superior qualitative performance compared to ESA-SNAP's Crop Parameter estimation.

Land Use Land Classification of Hyperspectral Data

Personal Project (July 2021)

- Trained, hyper-parameter optimised and evaluated XGBOOST model that takes hyperspectral satellite imagery (L2A) as inputs and generates a Land Use Land Classification map based on the imagery (mapping each pixel into classes and subclasses).
- Major classes such as agriculture, urban, water bodies. subclasses such as crop types, urbanisation level, type of water body, type of forest, crop species in agriculture land.
- Obtained a robust map-classification accuracy of 91%. (Single geographical location -)

Autonomous Drone for Disaster Management

Undergraduate Thesis Project (January 2021– June 2021) || Guide - Dr. Santosh Sonawane

- Awarded best interdisciplinary thesis 2021, School of Mechatronics Engineering
- The drone's objective is autonomous search in disaster areas, for efficient response and assistance.
- A multi-disciplinary project employed SLAM, Computer Vision with YOLO-v5 for object detection, and U-Net for segmentation, integrating diverse navigation and Deep Learning technologies.

SKILLS

Languages : Python, MATLAB, C++.

ML Tools and Frameworks : TensorFlow (Keras), PyTorch, Numpy, Matplotlib, Sklearn, Plotly, Dask.

Tools/Frameworks : Git, QGIS, ArcGIS, ENVI, GDAL, Rasterio, Geopandas, AWS, Azure Cloud.

Operating Systems : MacOSX, Linux, Windows.

Certifications and Additional Courses

Fundamentals of GIS - 4 Courses

University of California, Davis

Coursera

2023

Deep Learning - 5 Courses

DeepLearning.AI

Coursera

2021

Applied Data Science with Python - 5 Courses

University of Michigan

Coursera

2020

MATLAB Self Paced Online Courses - 5 Courses

MathWorks

MathWorks

2020

Voluntary Work

Robin Hood Army NGO, Pune

Summer Science Tutor for underprivileged children

Pune, India

May 2019 – July 2022

Snehwan NGO, Pune

Volunteer

Pune, India

Feb 2017 – Dec 2018