SRILAKSHMI NAGARAJAN

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SUMMARY — MSc ESPACE graduate focusing on Remote Sensing with an Electronics and Communication Engineering background. Passionate about using machine learning with earth observation data for developing solutions for climate action. My experience includes analysis of forest disturbances using deep learning and large-scale remote sensing datasets. I am eager to contribute to research studying ecological disturbances due to climate change.

TECHNICAL COMPETENCIES

Languages	Python, Bash, C++, MATLAB, Fortran	**GIS**	SNAP, GEE, ArcGIS, QGIS
Hardware	Arduino, Raspberry Pi, ARM7, Intel MCS-51	**Libraries**	tensorflow, Keras, pytorch, pandas, cartopy, GDAL, rasterio etc.
Dev Tools	Docker, Podman, JupyterHub, Gitlab, VS Code	**File formats**	netCDF, GeoPackage, json, geoTiff etc.
OS	Debian, Ubuntu, Windows		

EDUCATION

Technical University of Munich | Munich, DE   **2019 - 2023**
M.Sc. Earth Oriented Space Science and Technology

- International master's program for space engineering and satellite applications with a strong focus on remote sensing for AI based Earth Observation applications.
- **Thesis:** Deep learning for segmentation of forest damages due to extreme windstorms

Panjab University | Chandigarh, IN   **2015 - 2019**
B.E. Electronics and Communication Engineering

- An interdisciplinary engineering program with a comprehensive curriculum in analog circuits, digital communications, network theory and embedded systems. Specialised in Wireless Communication Systems and Microwave and Radar Technology.
- **Thesis:** Adaptation to environments based on Knowledge-based Classification of clutter for Radars

RECENT EXPERIENCE

SOLO, LMU Incubator Startup | *Munich, DE*   **Jan 2024 - June 2024**
Software Engineer   *Chair of Experimental Physics - Soft Condensed Matter*

- Designed a GUI for AI-driven single cell analysis, to enhance data visualisation and user interaction
- Built and deployed a docker container with the analysis software as a scalable solution

Technical University of Munich | *Ottobrunn, DE*   **Oct 2021 - Jan 2023**
Working Student   *Chair of Big Geospatial Data*

- Implemented Deep Learning models for Remote Sensing Scene Classification
- Created lean custom CNN architectures for hardware deployment
- Co-published results from analysis of impact of compression and quantization of images in spatial deep learning performance
- Built and deployed a docker container for automatic grading system based on JupyterHub

German Aerospace Center (DLR) | *Oberpfaffenhofen, DE*   **Oct 2020 - March 2021**
Working Student   *Remote Sensing Technology Institute: Atmospheric Processors*

- Calculated the reflection function with 3-D radiative transfer models
- Utilised Fortran 90 based 3D atmospheric radiative transfer model (SHDOM) to simulate for different medium conditions

Defence Research and Development Organisation (DRDO) | *Bengaluru, IN*   **Jan 2019 - April 2019**
Internship   *Electronics and Radar Development Establishment (LRDE)*

- Wrote bachelor thesis on using knowledge-based systems to classify Radar clutter.

SELECTED PROJECTS

Deep learning for forest damage segmentation due to extreme windstorm | Python, TensorFlow

- Developed Deep Learning models (UNet, Attention UNet) for segmentation of forest disturbances from extreme windstorms with bitemporal multispectral Sentinel 2 images and used damage polygons as ground truth from FORWIND databse.
- Built Python script to convert vector polygon ground truth to raster and align it with satellite image's reference system
- Compared performance of DL models to traditional machine learning algorithms (Logistic Regression, Random Forest).

Compression in Spatial Deep Learning | Python, TensorFlow
- The impact of compression and quantization of images in spatial deep learning performance was evaluated.

Building reconstruction with SAR images | Scientific Literature Survey and Presentation
- Presented methodical basis and results of different SAR based techniques for reconstructing buildings in an urban context.
- Reviewed and surveyed current literature to evaluate state of the art SAR based methods

Wind Energy Marine Environment Compatibility Analysis | MATLAB
- Prepared and Presented a project proposal in accordance to ECSS standards as the **Product Assurance Manager.**
- Define work packages and requirement trees, Created and Structured the documents for satellite data analysis on offshore windfarm impacts with AI.
- Set performance requirements, Ensured software compliance to the performance and system requirements and Documented it in a Product and Quality Assurance document.

Satellite Mission Design for Forest Fire Observation | Mission Design
- Develop and Present optimal ground segment architecture, and link budget design for the satellite constellation to observe forest fires.
- Supported trade-off analysis for mission design, subsystem specification definition.

Knowledge-based Radars | Python
- Fuzzy logic used to classify received echo into clutter and target echo with the help of DTED level 3 raster and LCLU maps for the area under study.

Relevant Coursework

Machine Learning and Data Science
Introduction to Deep Learning, Principles of Spatial Data Mining, Estimation Theory and Machine Learning, Signal Processing, Image Processing and Computer Vision

Earth Science
Introduction to Earth System Science, Atmospheric Physics, Physical Oceanography, Numerical Modelling

Geoinformation and Remote Sensing
Applied Earth Observation, Microwave remote Sensing, Remote Sensing Advanced Methods, Remote Sensing for Atmosphere, Photogrammetry, Geoinformation

Publications

1. **Compression Supports Spatial Deep Learning**
   G. Dax, S. Nagarajan, H. Li and M. Werner, "Compression Supports Spatial Deep Learning," in IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, doi: 10.1109/JSTARS.2022.3226563.

2. **Global Active Fire Detection–Towards a SAR-enabled Multi-Sensor Global Monitoring System**
   Denizoglu, D., Dax, G., Nagarajan, S., Zhang, N. and Werner, M., 2022. Global Active Fire Detection–Towards a SAR-enabled Multi-Sensor Global Monitoring System. In Living Planet Symposium 2022.

Languages

English, Hindi	Native Proficiency	**German**	Elementary (A2)
Tamil	Intermediate		