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DLR – DAAD Fellowships

Fellowship No. 451

Research Area : Space

Research Topic: **Multi-Modal SAR and Deep Learning for Scattering Characterization**

DLR Institute: Microwaves and Radar Institute, DLR Oberpfaffenhofen

Position: Doctoral Fellow

Openings: 1

Job Specification:

While Deep Learning (DL) has shown tremendous success in exploiting latent relations between different input modalities and various target variables, key Synthetic Aperture Radar (SAR) applications still rely on the inversion of physical models (PM). Their combination has the potential to compensate for their respective weaknesses and to boost the estimation performance of critical physical parameters from SAR data. This project aims to combine DL with PM to improve the understanding of remote sensing data for the extraction of bio-/geophysical information. The use of available expert knowledge is twofold: 1) Simplifying the mapping by not learning the complete function but instead only model parameters while the functional family of the model itself is provided. 2) Computing suitable data representations (e.g. using model estimates and learning correction terms) so that model capacity can be spent on learning the mapping. Two important SAR applications are selected: 1) The compensation of the microwave penetration bias in interferometric SAR DEM's over ice sheets; and 2) Forest height inversion from interferometric SAR data. Both applications are of critical relevance as unbiased DEMs over ice sheets are essential for an unbiased mass balance estimates while high-resolution large-scale forest height estimates are dramatically missing in many ecological applications. The combination of DL and PM is innovative and has the potential to ease two of the largest restrictions of DL: Lack of interpretability and the need for large training data sets.

Required Qualification:

- Master degree in Information and Communication Engineering, Computer Science, Mathematics, Physics
- Proficient on multiple platforms (Linux, Mac, Windows) with skilled programming experiences (Phython, IDL, C++, etc.).
- Experiences in statistical modelling, computer vision, and machine learning.
- Good knowledge of English (speaking and writing)

Advantageous Skills:

- Experiences in Deep Learning

English competence: See requirements on www.daad.de/dlr

Earliest Start Date: November 1st, 2020

Application Deadline: September 20th, 2020

Further Information: http://www.dlr.de
http://www.daad.de/dlr