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Automatically identifying snow and sorting out foggy photographs relying on deep learning

The Alpine Remote Sensing group at the WSL Institute for Snow and Avalanche Research SLF in Davos and the EcoVision Lab at ETH Zürich & University of Zurich are offering an exciting Master thesis project using deep learning for snow classification in remote sensed images.

Keywords: Remote Sensing, Deep Learning, Machine Learning, Snow

Description
In a side valley of Davos we have installed a total of 13 cameras at 5 sites. The cameras cover almost the whole valley. Images are acquired every 30/60 minutes (winter/ summer) and available in near real-time. Currently foggy images are sorted out with a threshold and the remaining images are joined to a daily composite image. Snow is then classified with a thresholded Principal Component Analysis (PCA) and images from each camera are linked to a master image with world coordinates (possible as picture sections remain unchanged). Consequently, we end up with a snowcovermap of the valley which has already been used to validate satellite image derived snowcover or monitor snowcover on tree seedling test plots.

Goal
With this thesis the candidate develops and tests a deep learning approach to automatically (and without a manual threshold changing throughout the season) classify snow/no snow in both illuminated and shaded areas of ground- based photographs. Data is plentiful and existing snow classifications may be used for training but the data would need to be manually sorted through in advance. In addition, the algorithm is supposed to be capable of identifying foggy/cloudy images in order to be able to discard them for composite image generation (which is then used for snow classification). Through the automation of those two processes the selection and classification of the images is supposed to become independent of manually set thresholds. Of course, the developed deep learning approach needs to be integrated in the operational daily generation of the snowcovermaps (Python Script).

Contact Details

Elisabeth Hafner (elisabeth.hafner@slf.ch)

Yves Bühler (buehler@slf.ch)

Jan Dirk Wegner (jan.wegner@geod.baug.ethz.ch)

Rodrigo Caye Daudt (rodrigo.cayedaudt@geod.baug.ethz.ch)

Location

Photogrammetry and Remote Sensing (Prof. Schindler) (ETHZ)

Calendar

Earliest start   2022-01-01
Latest end   2022-12-31

Involvements

PERSON	ROLE	ORGANIZATION
Caye Rodrigo	Host	Photogrammetry and Remote Sensing (Prof. Schindler) (ETHZ)

Labels

Master Thesis

Topics

▶ Information, Computing and Communication Sciences

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