Master thesis subject

What do we like in the Alps and why ?

Context

The Alps are a strong tourism attractor and have major impacts on the local economy of mountain regions. It is therefore important to understand what are the services that the territory can provide to tourists and which areas could be exploited for new cultural and sport activities. Volunteered Geographic Information sources like Flickr are a goldmine for such analysis (Havinga et al., 2020).

In this work, the student will create a dataset for uncovering and analysing activities in the Swiss Alps, starting from pairs of images and tags from Flickr. The analysis of the tags will allow identifying groups of activities (skiing, hiking, meditation, ….), that will then be used to train a classification model (for instance, convolutional neural networks, He et al., 2016, Zhu et al., 2017) able to recognize scene attributes - and eventually the activities - in new areas or in a multitemporal setting. The models developed will use either the Flickr images or environmental variables (or both) to recognize the activities. The effect of scale of analysis, as well as of the users' profile (when available) will also be studied.

Using the predictions of the models, the offer of activities will be analyzed and potential new areas highlighted.

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Objectives

- Create a dataset for touristic activities from Flickr in the Swiss Alps
- Train a series of machine learning models to predict the activities
- Map the hotspots of activities.

Requirements and practical info

- Background in machine/deep learning is welcome.
- Programming skills in Python.
- The thesis will be supervised from the Sion campus.
- Access to parallel computing resources is provided.

Literature

- Havinga, Bogaart, Hein, Tuia (2020), Defining and spatially modelling cultural ecosystem services using crowdsourced data, Ecosys. Serv. Avialable at: https://www.sciencedirect.com/science/article/pii/S2212041620300334
- He, Zhang, Ren, Sun (2016), Deep residual learning for image recognition, CVPR. Available at: https://arxiv.org/abs/1512.03385
- Zhu, et al. (2017), Deep learning in remote sensing: a review and future directions, IEEE GRSM. Availble at: https://arxiv.org/abs/1710.03959

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