Master Thesis: In-season crop classification using satellite imagery

Student: You!  Start Date: September 2023
Advisors: Dr. Gregor Perich & Lukas Graf  Duration: ca. 6 months
Supervisor: Dr. Michele Volpi

Neural networks for crop classification

Satellites offer an efficient tool for monitoring and decision support in agriculture. For this, satellite imagery needs to be combined with models for each specific agricultural crop. The prerequisite for crop-specific models is a map of the region of interest depicting which crop grows where - so called image-based crop classification. With the increasing availability of training data, neural networks (NN) are becoming more powerful for crop classification [1, 2, 3]. However, many NN approaches focus on the classification at the end of the growing season. For practical applications, this is often too late. The ongoing classification of crops within the growing season needs further work.

Research questions

1. How can existing, end-of-season classifiers be adapted to in-season classification?
2. Are time-series approaches such as Recurrent Neural Networks (RNNs) more performant than static approaches?
3. Implement and test your own approaches for in-season crop classification.

What we offer

We are Terensis during our Pioneer Fellowship, we want to bring our research on agricultural Earth Observation into practice and develop a digital twin of farming systems. We have experience working with crop classification, having co-developed a hierarchical RNN approach [2]. We have developed an open-source python package to work with satellite data - you won’t need to worry about satellite data collection and handling. We have access to multiple large, labelled datasets of agricultural fields as training data [2, 4, 5, 6]. We have the domain knowledge and the resources to get you quickly started with an applications-focused Master thesis.

What we are looking for

- Knowledge in Python.
- You should have taken courses in AI/ML.
- Experience in AI/ML libraries such as pytorch or tensorflow is a plus.
- Experience in geo-informatics is a plus, but not necessary.
- Motivation to work together with domain experts in an application-focused project.

Contact

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References


