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AUTOMATIC DEFORESTATION DETECTION WITH DEEP LEARNING: THE CASE OF MASOALA NATIONAL PARK



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Abstract

Large portions of territories are affected by deforestation. We aim to propose an approach based on convolutional neural networks to detect change in tropical forests. Our goal is to propose a model that requires minimal preprocessing and handcrafted features. We will test this approach with images from the Masoala National Park in Madagascar.

Introduction

Large collections of free satellite imagery are made available through the open data policies adopted by major space agencies. We aim to use both optical and radar imagery with a deep learning approach to automatically detect change in forests.

Methods

Convolutional Neural Networks based on Unet :

- High performance for biomedical image segmentation (Ronneberger et al., 2015)
- Can be adapted for classification of satellite imagery (Huynh et al., 2018)



Source: Google Maps



Credit: Mango African Safaris

Top : Coastal view of Masoala Park.

Left : Satellite image of Madagascar showing the location of Masoala National Park in Madagascar.

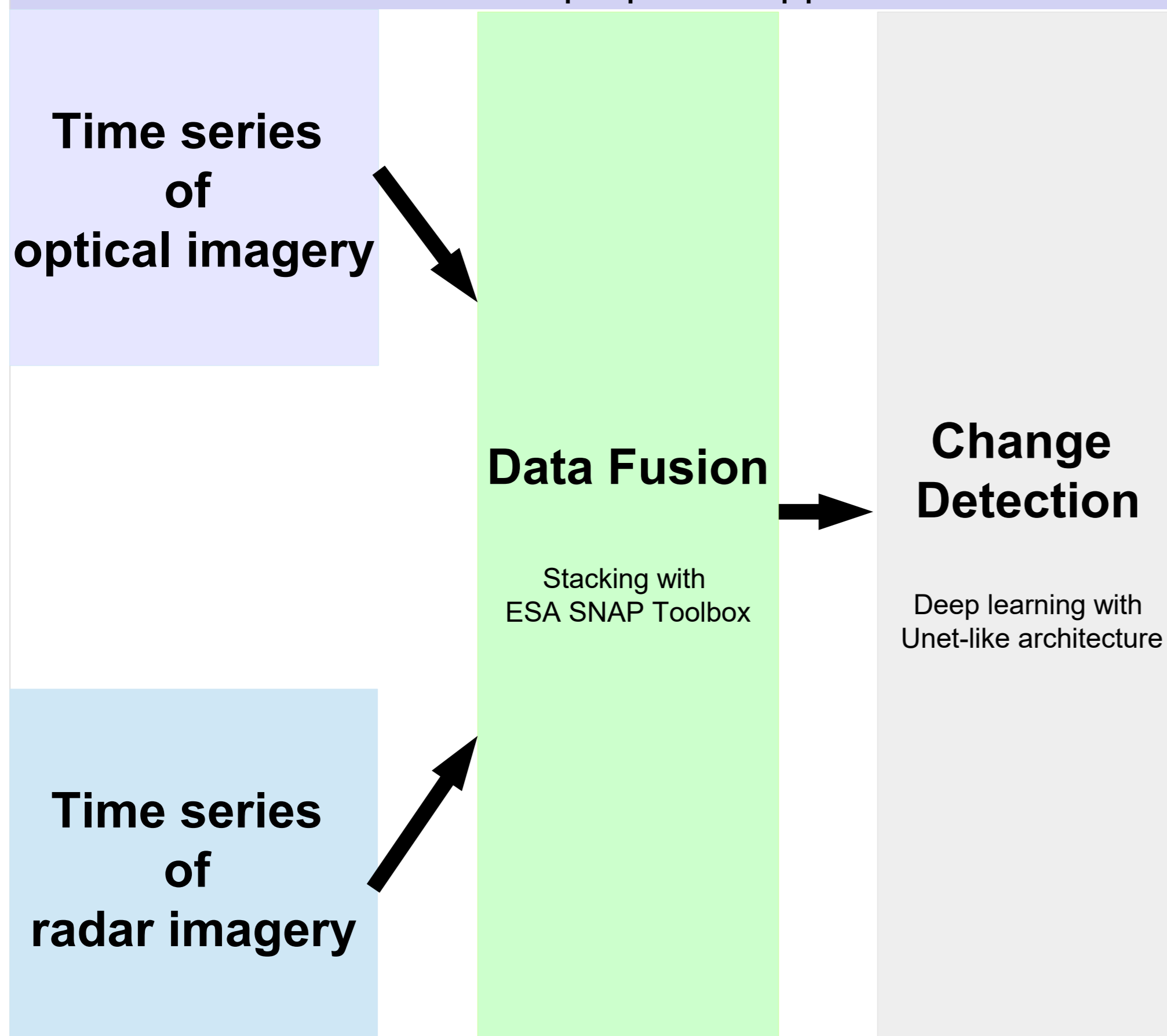
Research objectives

Data fusion: combining data from different optical and radar sensors.

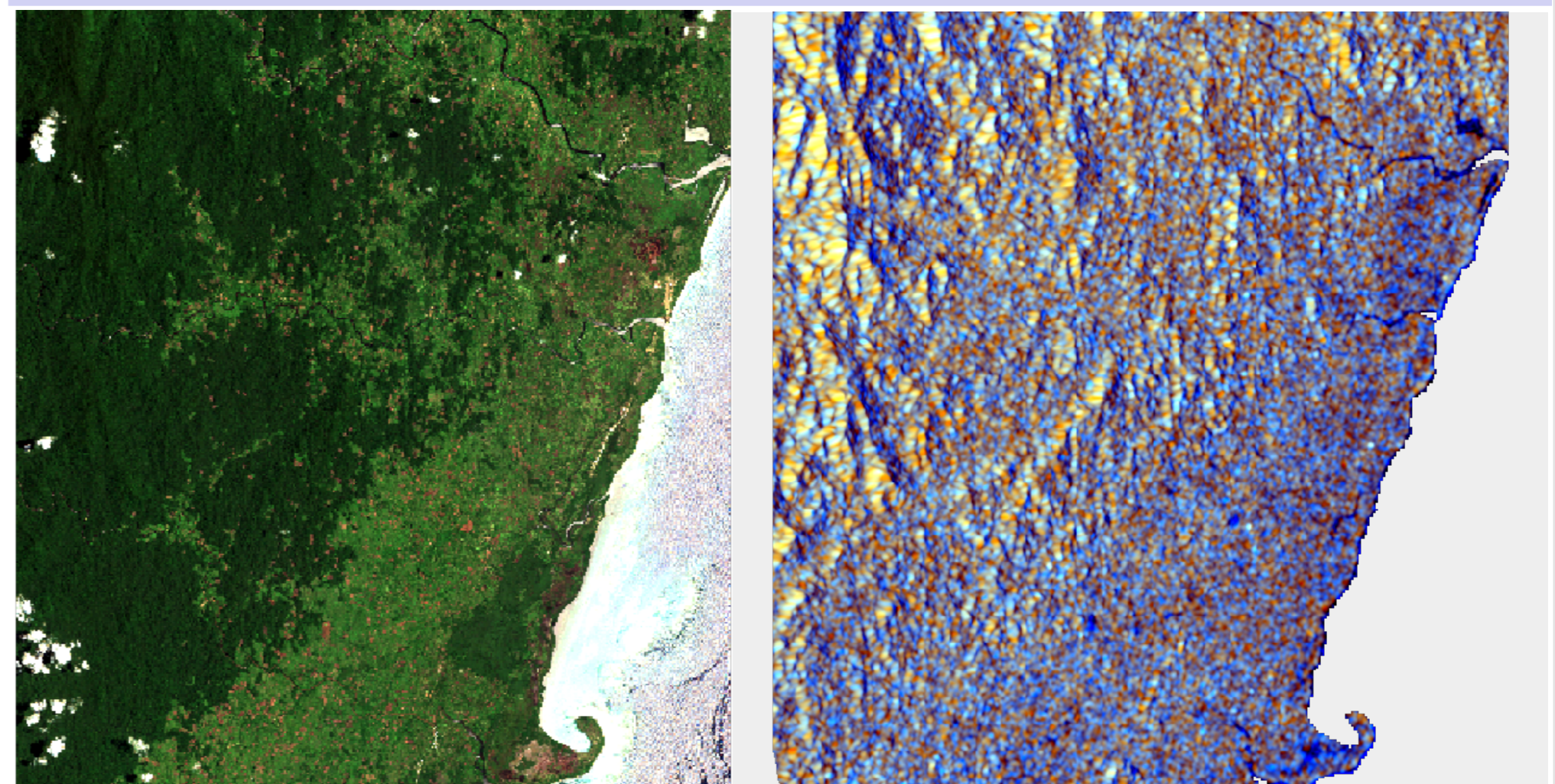
Deep learning architecture: adapting the deep neural network architecture for multi-sensor and multi-temporal data.

Transfer Learning: making robust transfer learning for imagery collected over different areas at different times.

Overview of the proposed approach



Example imagery of the study area. Source : ESA



Sentinel 2 image

Sentinel 1 image

Conclusion

We aim to detect deforestation using free open data from satellite images. This work will be further extended with the addition of scientific documents with information on deforestation events for multimodal learning and knowledge extraction.

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