

# ANALYSIS OF PIXEL- AND OBJECT-BASED CLASSIFICATION IN SMALLHOLDER FARM FIELDS

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Crop image classification is a common task in remote sensing studies. Classification results are not only affected by the separability of the target classes but also by the spatial unit used to reference ground truth. Two well-known spatial units are used in remote sensing: pixel-based and object-based [1]. The former is more often used in multi- and hyperspectral images and when plot boundaries are not available; the latter is the most common with Very High Spatial Resolution (VHSR) images and/or when plot boundaries are available.

In the work reported here, we compare pixel- and object-based approaches for classifying crops in VHSR images, collected as part of the STARS<sup>1</sup> project. For this study, we used Google Earth Engine (GEE) to generate a large set of spatial-spectral features from an image time series over our study site in SE Mali, West Africa in 2014. We used multispectral and panchromatic WorldView-2 images, mosaicked, orthorectified, co-registered, with trees and clouds automatically masked out.<sup>2</sup> The images were acquired on seven dates distributed over the crop season and five crop classes of interest were identified (Maize, Millet, Peanut, Sorghum and Cotton). Training and test polygons were available for these five classes.

For the pixel-based approach, we extracted features from the valid pixels inside our training polygons. This led to a relatively high number of training pixels, which might contain noisy (e.g., mixed, edges) pixels. For the object-based approach, we extracted the same features but this time we averaged all the pixels in our training polygons. In this way, we had fewer training samples but also obtained a more “representative” view of each class, postulating that this could lead to more robust classifiers. Preliminary results indicate the usefulness of either approach, useful lessons from comparing the two approaches, among others in how to train and test classifiers using time series of VHSR images.

Keywords: Spatial-spectral features, pixel-based classification, object-based classification, very high spatial resolution, image classification

presentation preference: oral

## REFERENCES

[1] S. W. Myint, P. Gober, A. Brazel, S. Grossman-Clarke, Q. Weng, “*Per-pixel vs. object-based classification of urban land cover extraction using high spatial resolution imagery*,” *Remote Sensing of Environment*, Volume 115, Issue 5, 15 May 2011, Pages 1145-1161.

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<sup>1</sup> [www.stars-project.org](http://www.stars-project.org)

<sup>2</sup> [http://web.natur.cuni.cz/gis/lucc/wp-content/uploads/2016/06/poster\\_2016\\_EARSeL\\_NASA\\_Prague\\_v3\\_printed.pdf](http://web.natur.cuni.cz/gis/lucc/wp-content/uploads/2016/06/poster_2016_EARSeL_NASA_Prague_v3_printed.pdf)