

Object-based image analysis (OBIA) is an approach commonly used to identify urban and natural “objects” on satellite and aerial imagery and has been successfully used in the past to map various forms of soil erosion [7,21–30]. OBIA creates image segments by grouping pixels with similar properties together, which can then be classified based on object information (spectral, spatial, textural, and contextual) with expertly developed classification rules and/or various machine learning classifiers. OBIA is a method suitable for smaller study areas, but large-scale studies become difficult to manage.

In [this](#) article authors demonstrated that the U-Net approach is capable of performing as well as OBIA with respect to identifying trends in the spatial and temporal development of degraded soil, and can therefore replace OBIA in large-scale studies. The results of training are:

Scores	U-Net
Recall	84%
Precision	73%
F ₁	78%

To my mind it's pretty nice results but we see that there is still a big area for exploration. So I think that experiments with the architecture of CNN can be promising.

In the second [paper](#) authors explore Principal Component Analysis and SEUFM method. In this study, the PCA-based method achieved higher accuracy than the multiplication-based method because it handles the five factors according to their contributions (loadings) to each PC. The lower accuracy of the multiplication-based models is due to its assumption of an equal independent association of the five factors with soil erosion. Among the four developed models, SEUFM1, the PC1-based model, mapped the areas of soil erosion in forest with the highest accuracy.

In both papers authors get high results, so I think that CNN and PCA methods are good fields of exploration in solving soil erosion detection problems.

Also I think that GAN`s (Generative Adversarial Networks) can be useful in soil erosion detection problem. Nowadays, GAN`s show very high results in different fields, so CNN based GAN can be very useful in erosion detection.

