

Task 2. Computer vision. Sentinel-2 image matching

IMPROVEMENTS

By analyzing analogues on the implementation of image matching, we come to the implementation of our own model and dataset for it. Firstly, we will process our satellite images and represent them in binary form. We will use SIFT algorithm to obtain the similarity data of two images. We will normalize the obtained data and make a dataset consisting of image pairs defined above and a matrix of key points. After that, we define the layers of the model based on the CNN approach. Then we train the model on our data using Adam's optimization function and binary cross entropy.

The implemented SIFT (Scale-Invariant Feature Transform) algorithm is used to find key points in images, taking into account their invariance to scale and rotation. It involves constructing Gaussian pyramids of images, finding local extreme and estimating key points.

A model has been analyzed to find similarities between structures. It is trained on image data of different architectural structures to detect and classify differences.

Below are options for improving the model:

- *Image processing using data augmentation:*
Applying data augmentation techniques such as contrast modification, noise filtering or image enhancement can improve data preprocessing and model quality.
- *Learning Optimization:*
Performing optimization of model hyperparameters, using more efficient optimization algorithms and regularization techniques to improve model training.
- *Utilizing multi-resolution approaches:*
Considering approaches that allow processing images of different sizes while preserving key feature information. For example, using pyramidal algorithms to handle different levels of image resolution.

Conclusion:

Having analyzed approaches to implementing similar tasks, ways were found to solve their problem. The used algorithm and preprocessing can be reused and implemented in the model. The recommendations should significantly increase the accuracy and expand the capabilities of the model.