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Similarity Metrics for Cartographic Sentinel-2 Multispectral Imagery Comparison

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Drones localize through GPS signal transmission, but sometimes this is not possible due to interference or noise, and sensors alone are not enough for accurate positioning in the long run. In the era of digitization, many fields, including agriculture or the military industry, use drones for various purposes. Using an orthographic image similarity metric based on triplet neural networks is one way to determine the drone's location. The topic of this study is the calculation and comparison of similarity metrics based on the developed EfficientNet, EfficientNetV2, MobileNet, ResNet and VGG neural network architectures by using different band composites of Sentinel-2. The trained base layers of these networks are used in triplet neural networks. During the experiments of image processing time, distances from the anchor picture and precision metrics, which would help to determine more acceptable architectural configurations and band composites for comparing orthographic images and finding the location of drones, the results of the similarity metrics between band composites were compared with each other. By using combinations of bands, we can extract specific information from an image. E.g., there are combinations of bands that highlight geological, agricultural or vegetation features in an image. The final choice of the triplet neural network model and band combination may depend on various factors and, it is important to emphasize that it is worth considering all the results of the obtained metrics before applying the respective architectures to single cases, to evaluate the importance of each metric and composite in personalized application situations.