

TANet: A Lightweight Deep Learning Model for Large-Scale Remote Sensing Image Classification

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Abstract. The amount of geodata is increasing considerably with the growing number of satellites and aerial sensors. Classification of remote sensing imagery plays a crucial role in analyzing this geospatial data. Traditional methods rely on hand-crafted features and human expertise, which is difficult due to the huge amount of data. Deep learning models, especially Convolutional Neural Networks (CNNs), offer superior performance and an automated way. Many classification models have proven to be efficient for general classification tasks, but suffer from great complexity. This paper presents TANet, a lightweight CNN designed to improve classification accuracy while reducing computational costs. TANet integrates four modules: Inverted Residual Blocks, Efficient Modules, Inception Modules and a self-attention mechanism to improve feature extraction and representation. TANet was trained and evaluated with the MLRSNet dataset. TANet was tested and classified with Neural Networks (NN) and Support Vector Machine (SVM) classifiers. The results prove to be efficient and have an accuracy of 93.73%, underlining the potential of lightweight deep learning models for large-scale remote sensing applications.

Keywords: Remote sensing images, Deep Learning, Classification.

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