World Academy of Science, Engineering and Technology
International Journal of Computer and Information Engineering
Vol:11, No:10, 2017

Land Cover Remote Sensing Classification Advanced Neural Networks Supervised Learning

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Abstract : This study aims to evaluate the impact of classifying labelled remote sensing images conventional neural network (CNN) architecture, i.e., AlexNet on different land cover scenarios based on two remotely sensed datasets from different point of views such as the computational time and performance. Thus, a set of experiments were conducted to specify the effectiveness of the selected convolutional neural network using two implementing approaches, named fully trained and fine-tuned. For validation purposes, two remote sensing datasets, AID, and RSSCN7 which are publicly available and have different land covers features were used in the experiments. These datasets have a wide diversity of input data, number of classes, amount of labelled data, and texture patterns. A specifically designed interactive deep learning GPU training platform for image classification (Nvidia Digit) was employed in the experiments. It has shown efficiency in training, validation, and testing. As a result, the fully trained approach has achieved a trivial result for both of the two data sets, AID and RSSCN7 by 73.346% and 71.857% within 24 min, 1 sec and 8 min, 3 sec respectively. However, dramatic improvement of the classification performance using the fine-tuning approach has been recorded by 92.5% and 91% respectively within 24min, 44 secs and 8 min 41 sec respectively. The represented conclusion opens the opportunities for a better classification performance in various applications such as agriculture and crops remote sensing.

Keywords : conventional neural network, remote sensing, land cover, land use
Conference Title : ICDIP 2017 : International Conference on Digital Image Processing
Conference Location : London, United Kingdom
Conference Dates : October 19-20, 2017