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POTENTIAL APPLICATION OF THE KANYINI MISSION AND ITS USE CASE

Abstract

In recent years, one of the most difficult problems in the field of Earth observation has come to the forefront: on-board data processing. The capacity to process data on board a satellite reduces overall latency, removes the need for downlinking, and shortens the time between the acquisition of the image and its processing. It is possible to promptly deliver warnings and responses that can provide real-time/near real-time alerts when catastrophic occurrences are likely to take place. In this research, the use case for the hyperspectral images from the KANYINI Mission and its prospective applications are the major studies of this work. The payloads, namely Hyperscout 2 and Myriota, allow for the on-board collection and processing of hyperspectral data, and Myriota offers direct connectivity to orbit. The processed data can subsequently be sent to ground-based receivers without using terrestrial networks. This allows for increased real-time/near real-time event management, reduces the amount of data that must be transmitted, or supports faster decision-making for time-sensitive applications. The use case of hyperspectral imagery for various applications in Australia/Australasia is discussed in this paper. Further, we used the PRISMA hypercube collected during the December 2019 Australian bushfires in New South Wales to train a one-dimensional convolutional neural network and proposed a transfer learning method for the KANYINI mission. The network's generalization ability is reviewed, and future potential applications are provided. This project is carried out in partnership between the RMIT University, Khalifa University, The European Space Agency-Philab (ESA- -lab), the Italian Space Agency (ASI), the National Institute of Geophysics and Volcanology (INGV), and the SmartSat Cooperative Research Centre (CRC).