

IAF EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Data Management Systems (4)

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MACHINE LEARNING IN EARTH OBSERVATION OPERATIONS: A REVIEW

Abstract

Analysis of down-linked satellite imagery has undeniably benefited greatly from the ongoing Machine Learning revolution. Other aspects of the Earth Observation industry, despite being less prone to an extensive application of ML, are also following this trend. This work aims at presenting - in the form of a review of Machine Learning applied to Earth Observation Operations - such applications, the existing use cases, potential opportunities and pitfalls, and perceived gaps in research. A wide range of topics are discussed including mission planning, diagnosis, prognosis, and repair of faults, optimization of telecommunications, enhanced GNC, on-board image processing, and usage of Machine Learning models within platforms with limited compute and power capabilities. The review tackles all on-board and off-board applications of machine learning to earth observation with one notable exception: it omits all post-processing of payload data on the ground, a topic that has been studied extensively by past authors. This research was produced by a team of volunteers from the Small Satellite Project Group of the Space Generation Advisory Council.