

Robust Hyperspectral Anomaly Detection : A Review of Key Methods

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Abstract: *This document discusses unusual data points distinct from typical ones; employing machine learning and deep learning techniques, these anomalies are identified. Its applications include areas such as healthcare surveillance and transportation systems, along with elaborating on recent studies and envisioning upcoming developments in technology. This document examines how machine learning and deep learning techniques apply to detecting anomalies in hyperspectral imagery by comparing results against actual data samples. It also explores potential enhancements for these methods. This study evaluates various Had methodologies across four actual hyperspectral imaging datasets via experimental analysis; subsequently, it concludes regarding HAD's efficacy while also exploring potential avenues for further development within its domain. The program HAD is capable of detecting individual pixel elements within an image. With anomalous spectral signatures compared with their neighbor Lacking all pre-existing knowledge. Mostly all of them. existed researches are related to statistic-based and distance-based techniques, by summarizing the background samples with certain Identifying models followed closely by pinpointing the rare exceptions through different measurements. This critique centers around metrics derived using machine learning techniques specifically for handling annotated data sets. Strategies, having experienced significant advancements recently. Decades. This document evaluates these research projects through an examination of methodologies, datasets, preprocessing techniques, outcomes, constraints, discusses contemporary issues, proposes enhancements aimed at optimizing anomalies detection within hyper-spectral imagery employing deep neural networks.*

Keywords: *Anomaly Detection, Hyperspectral Imagery, Machine Learning, Deep Learning, HAD (Hyperspectral Anomaly Detection), Pixel-level Analysis, Spectral Signatures, Remote Sensing, Image Processing, Statistical Methods, Distance-based Techniques, Neural Networks, Data Preprocessing*

