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DEBRIS MITIGATION AND MONITORING USING AI ALGORITHMS

Abstract

Space debris mitigation and monitoring are critical aspects of ensuring the sustainability and safety of space exploration and satellite operations. This research abstract proposes the utilization of satellite image processing algorithms, including Convolutional Neural Networks, Vision Transformers, and Swin Transformer architecture, for debris mitigation and monitoring in space. This uses advanced algorithms to analyze satellite images and identify potential debris objects. CNNs have demonstrated remarkable capabilities in image recognition tasks, allowing for accurate detection and classification of debris. Vision Transformers and Swin Transformer architecture offer innovative approaches by capturing both local and global information, enhancing the accuracy and efficiency of debris identification in satellite imagery. By leveraging the capabilities of these advanced algorithms, the proposed approach has the potential to enhance the accuracy, efficiency, and responsiveness of space debris detection, tracking, and collision risk assessment, ultimately contributing to the safety and sustainability of space operations.