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A FRAMEWORK FOR IMPROVED GROUND TRUTHING OF SPACE IMAGERY UTILIZING SPACE IOT FOR BETTER SOCIO-ECONOMIC GROWTH

Abstract

Satellite data has emerged as a valuable resource for a variety of applications, including environmental monitoring, disaster management, and urban planning. However, the accuracy of satellite data is heavily dependent on the quality of ground truthing, which can be difficult to obtain in inaccessible or remote locations. This paper proposes a novel approach to improving the ground truthing accuracy of satellite data by incorporating Space Internet of Things (S-IoT) data from an engineering management standpoint. Traditional ground truthing approaches frequently include manual data collection, which is time-consuming, expensive, and susceptible to human error. The emergence of S-IoT technologies, such as satellite-connected sensors and devices, provides a unique opportunity to use real-time data from disconnected regions. We can significantly improve the accuracy of ground truthing for satellite imagery by applying engineering management principles to effectively collect data, integrate the data, and data analysis. The suggested framework entails installing a network of IoT devices outfitted with various sensors in the target area to record important environmental characteristics like temperature, air quality, and vegetation indices, which are necessary for ground truthing satellite data. The acquired IoT data is then combined with satellite imagery utilizing modern data fusion techniques, resulting in more accurate and dependable ground truth information. From an engineering management perspective, implementing this strategy necessitates thorough planning, resource allocation, and team coordination. It calls for the seamless integration of satellite data, IoT infrastructure, and data analytics capabilities. Furthermore, the study examines the problems of data quality, sensor calibration, network connectivity, and data privacy, and how to effectively address them. This framework showcases the understanding of a major improvement in the accuracy of ground truthing, which in turn makes the analysis and interpretation of satellite data more reliable with the aid of data fusion. In addition, it lessens the need for extensive manual data gathering efforts, which results in cost savings and enhanced efficiency in data acquisition operations. The framework paves the way for future research and development in the context of IoT integration for improved satellite data processing and validation, which opens further options for accurate analysis. The framework considers the engineering management perspective to tackle technical and managerial aspects, therefore, guaranteeing effective implementation and long-term operation as it has the potential to transform disconnected areas by empowering communities, bridging the digital divide, promoting socio-economic growth, and to increase the amount of validated data available in the open and commercial market.