

REVIEWARTICLE

UAV based remote sensing in crop monitoring: Current status and future perspectives

KHAN MS¹ • SEMWAL M*

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ABSTRACT

Precision agriculture (PA) remote sensing entails applications of a set of technologies that improve the farming inputs to enhance the agricultural yields and decrease the input losses. The practices of remote sensing (RS) technologies in PA developments have rapidly increased in the past few decades. The technologies such as the Internet of Things (IoT) can provide significant potential in precision agriculture and smart farming practices, allowing the real-time acquisition of environmental data. In IoT tools, the Unmanned Aerial Vehicles (UAVs) remote sensing sensors have now become very intelligent and miniaturized with a large application potential in ecological, geological, forestry, and agriculture growth monitoring and evaluations. UAVs-based sensors have significant potential in spatial data acquisition with many advantages such as short revisiting time, low cost, flexibility, and high accuracy and have played a great role in crop management providing high spatial-spectral and temporal resolution data. Nowadays, UAVs are very popular in agriculture research. The recent advances in remote sensing due to availability of spatial, spectral and temporal high-resolution satellite data have many applications in PA including crop health monitoring, nutrient management, irrigation managements, pest-disease management, and applications of yield forecasting. This paper reviews UAV remote sensing platforms and different sensors in crop monitoring for PA. The remote sensing-based PA tools such as site-specific nutrient management application technology in the green cover seeker and cropping patterns have already been integrated into commercial cultivation agriculture. In the last few decades, the increased demand for UAVs because of their flexibility and cost-efficiency in acquiring the high spatial resolution images (in cm-scale) for desired PA applications. At the same time, availabilities satellite data has encouraged the researcher to search for advanced methods in data storing and processing such as cloud computing and machine-learning.