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Unmanned Aerial Vehicle Applications in Smart Agriculture

Dipankar Bhattacharyay, Sagar Maitra*and Sandipan Pine

Center for Smart Agriculture, Centurion University of Technology and Management, Odisha-761211
**Corresponding author: sagar.maitra@cutm.ac.in*

Abstract

Unmanned aerial vehicles (UAVs) are perfect solution to overcome the resolution issue of satellite images in smaller areas. Not only doing the image analysis, these UAVs are perfect in pesticide or fertilizer spray. These applications reduce the crop damage due to ground equipment. Additionally being unmanned gives a lot of advantage in mountain slopes and other areas. This paper explains different application of UAVs in precision agriculture, different types of UAVs, its advantage and limitations and list of sensors available to use in UAVs for smart agriculture.

Keywords: Unmanned Aerial Vehicle, Precision Agriculture, Smart Agriculture

1. Introduction

As per an estimate, the global population will reach 9 billion by 2050 (United Nations 2019). The population will increase mainly due to Brazil, India, China and Africa. To meet the need of the growing population, agricultural production needs to be increased by 70%. Such a significant increase in crop production cannot be met by traditional farming techniques. Precision and smart agriculture is an answer to the issue. A smart agriculture system requires automation of different operations involved in farming. It has been proposed that agricultural aviation can increase the efficiency of different activities by 12 times compared to that by ground equipment.

Remote sensing is an important tool for smart agriculture (Sishodia *et al.* 2020). Remote sensing is commonly done based on satellite images. However, due to the low spatial resolution and time constraints of the acquired images, satellite images are usually not the best choice. The resolution of the satellite is not always enough