Development of UAV-based PM2.5 monitoring system

ABSTRACT

This paper proposes a UAV-based PM2.5 air quality and temperature-humidity monitoring system. The system includes an air quality detector comprising four Arduino sensor modules. Specifically, it includes a dust (DSM501A) sensor and a temperature and humidity (DHT11) sensor. The NEO-6M GPS module and DS3231 real-time module are also included for input visualization. A DIY SD card logging shield and memory module is also available for data recording purposes. The Arduino-based board houses multiple sensors and all are programmable using the Arduino integrated development environment (IDE) coding tool. Measurements conducted in a vertical flight path show promise where comparisons with ground truth references data showed good similarity. Overall, the results point to the idea that a light-weight and portable system can be used for accurate and reliable remote sensing data collection (in this case, PM2.5 concentration data and environmental data).

Keyword: Particulate matter; UAV; Air quality; Sensor; Arduino