**Paper:1**

Title: ARIA: Air Pollutants Monitoring Using UAVs

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Review:

This paper focuses on the UAV technology. UAVs are a great help and are very much beneficial in our Wireless Sensor Network. Their main advantage is their flexibility to fly at different heights. It is demonstrated in this paper that air pollution changes rapidly even at moderately short distances. This too at level plane and vertically.The thing intended in this paper is to build a cost efficient device to examine air quality at various statures that even private residents could used for other purposes. The main aim of ARIA is to measure the contaminated air by using drones(low-cost UAV). Since it is cost efficient, low cost budget friendly UAVs and sensors are used for the ARIA project as proposed in this paper.

The six common pollutants studied and analyzed in this paper are::

CO - Carbon Monoxide

NO2 - Nitrogen Dioxide

O3 - Ozone

SO2 - Sulfur Dioxide

PM2.5 and PM10 - Particulate Matter

Pb - Lead

Characteristics:

Colorless, odorless gas - CO

Highly reactive gas – NO2

Pale blue gas – O3

Colorless, irritating smell gas – SO2

Inhale able particles – PM2.5 and PM10

Metal particles – Lead

How ARIA works?

ARIA works in gathering data about the values of major pollutants in urban areas at various heights. The main hardware will be a vertical drone equipped with low- cost detecting sensors and GPS sensors. The data collected is stored in a database, so that they can be later processed and studied as needed.

For the measurement system in drone the following are used:

1. Raspberry Pi 3
2. Analogue Front End (AFE) by Alphasense
3. Gas sensors by Alphasense
4. Particulate and Volatile Organic Compounds (VOCs) sensor by Alphasense
5. A/D Front End by South Coast Science

Advantage: Flexibility of the UAV being able to fly at different heights

Disadvantage:

1)Challenges in controlling the UAV and Monitoring the nature.

2)Air pollution varies within short distances.

Scope of improvement: There is a lot of scope of improvement as they are only dealing with the preliminary result which is just a verification of this idea. The authors have mentioned due to the inherent hurdles in environmental monitoring and UAV control, they just have provided with justifiable verification of this idea.

In future such a thing can measure air pollution level at countryside, roads and elsewhere.