Real-Time Low Cost Air Quality Monitoring with Solar

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Abstract

Drone technology has emerged as a very important platform to do sensing of physical phenomena around us with fine-granularity and offers enormous potential and capability for industrial pollution monitoring and dense areas like urban cities. Air Quality is a local phenomena, that is, it changes in a significant manner from point to point, thus making Air Quality mapping from scarce static Air Quality sensors, practically in-significant. Thus, Air Quality monitoring using mobile sources holds enormous potential as it gives us the ability to perform geospatial-temporal pollution mapping of a geographically wide region using just a few hundred sensors. In this study, we have designed a fixed-wing solar-powered UAV, with potential to perform perpetual flight using solar power and generate Air Quality data in real time. This system was successfully field tested at a low altitude and on ground, collecting, storing and transmitting data through a data fusion module consisting of low cost OPC R1 sensor, Raspberry Pi and Pixhawk Flight controller. We do geospa-tialtemporal analysis of the generated PM 2.5 data from the system, which could be very useful to identify pollution hotspots in urban areas, industrial region and glaciers. Our UAV design, makes it more efficient than previous studies on Air Quality monitoring using quadcopters, due to less propeller wash on sensor readings and more flight time. We also take a look at using state of the art thermal camera on UAV for In-frared signatures of harmful CH4 emissions in oil & gas industry and remote sensing of Air Quality using satellite data.

Speaker Publications:

1. "A review on anthelmintic drugs and their future scope"; International Journal of Pharmacy and Pharmaceutical Sciences. / Vol 3, Issue 3, 2011

2. "VidCEP: Complex Event Processing Framework to Detect Spatiotemporal Patterns in Video Streams "; IEEE / 19393658, 2019

3. "Performance Evaluation of ad hoc Wireless Local Area Network in Telemedicine Applications"; Procedia Computer Science Volume 125, 2018, Pages 267-274.

4. "The Event Crowd: A Novel Approach for Crowd-Enabled Event Processing",DEBS, 3093742.3093922,2017

8th Global Summit and Expo on Pollution Control; Webinar-August 24-25, 2020, 2020.

Abstract Citation:

Piyush Yadav Real-Time Low Cost Air Quality Monitoring with Solar, Pollution Control 2020, 8th Global Summit and Expo on Pollution Control; Webinar- August 24-25,2020, https://pollutioncontrol.globalsummit.com/speaker/2020/piyush-yadav-vedanta-jha-department-of-electronics-communication-engineering-delhi-technological-university-india-1364665354

Biography:

Piyush Yadav worked at Insight Centre for Data Analytics|Lero Research Centre|Tata Research Development and Design Centre