TECHNOMART Malaysia -Navigating The Future Through Drone-Related Technologies

10 & 11 June 2024

An Auto-Calibration Module for Low-Cost Air Quality Sensor for Drone Application

Introduction

To address these challenges, our project focuses on the development of an innovative solution: an Auto-Calibration Module for Low-Cost Air Quality Sensors tailored specifically for drone applications. This module aims to enhance the accuracy and reliability of air quality measurements obtained from low-cost sensors mounted on drones.

Specifications		Details
Power Supply	Voltage Requirements	28V DC
	Max Flight Time with Payload	13 Min
	Max Flight Time without Payload	38 Min
	Battery type	LiPo 6S
	Battery Capacity	7660mAH x 2
Physical Capabilities	Max Payload	1.57KG
	Max height	3000m (1.86miles)
	Max Flight Speed	38mph
	Flight Area Coverage	r: 2000m
	IP Rating	IP43
Other features	Communication	2.4GHz Frequency Signal
	Remote Controller (RC) Communications	WiFi
	RC OS	Android OS

Figure 1: AiRBONESense Prototype

Methodology

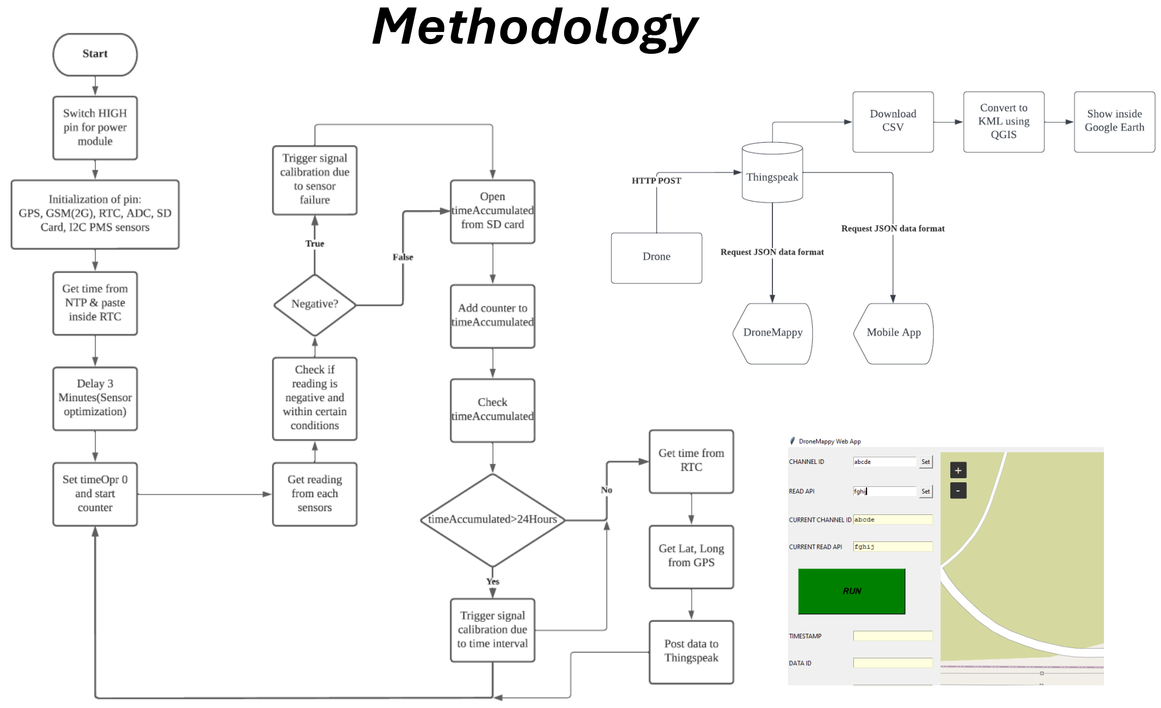
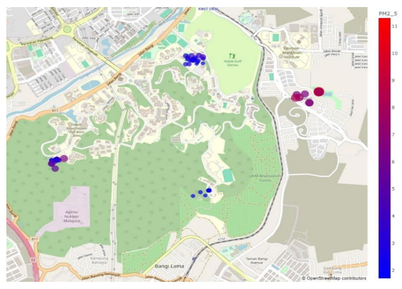
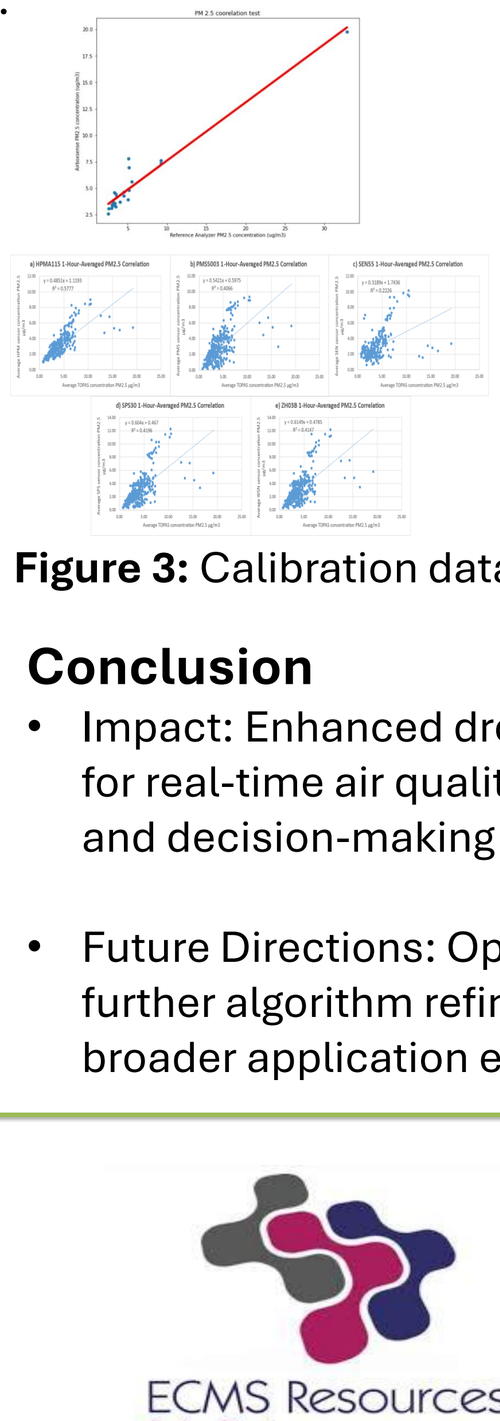


Figure 2: Schematic Diagram for Auto-triggering

Results

- Improved sensor accuracy with developed calibration algorithm.
- Consistent performance across diverse environments.
- Successful integration for autonomous operation within drone systems.
- **Efficient resource utilization:** minimal computational and energy requirements.
- Comprehensive testing validates module performance: accuracy, response time, reliability.





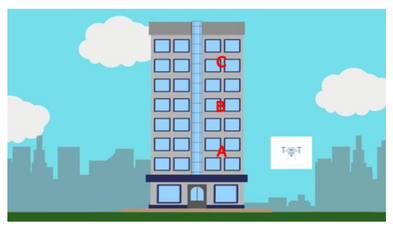


Figure 3: Calibration data plot and Flight testing with reference analyser

Objectives

1. Develop a calibration algorithm to improve air quality sensor accuracy.
2. Enable automatic calibration within drone systems.
3. Optimize Resource Utilization: Minimize computational and energy requirements.
4. Validate Performance: Test and evaluate module effectiveness across environments.

Conclusion

- Impact: Enhanced drone capabilities for real-time air quality monitoring and decision-making processes.
- Future Directions: Opportunities for further algorithm refinement and broader application exploration.

Acknowledgement

CREST – Collaborative Research in Engineering, Science & Technology
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Universiti Kebangsaan Malaysia – National University of Malaysia
Universiti Teknologi MARA
Ministry of Investment, Trade and Industry

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