

Design of a Web-Based Drone Management Platform Using WebSocket

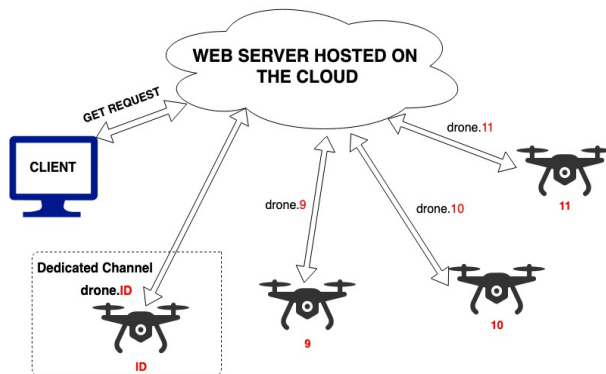
Ali Al Badra

Project No. 1 Supervisor: Craig Evans



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Network Infrastructure

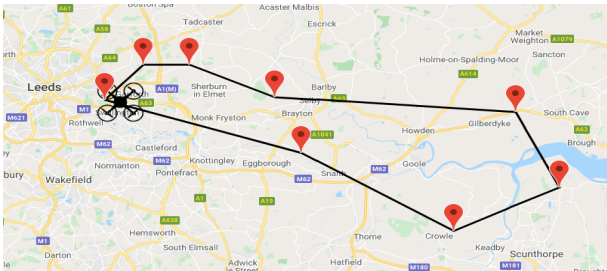


Drone Deployment Protocol (DDP)

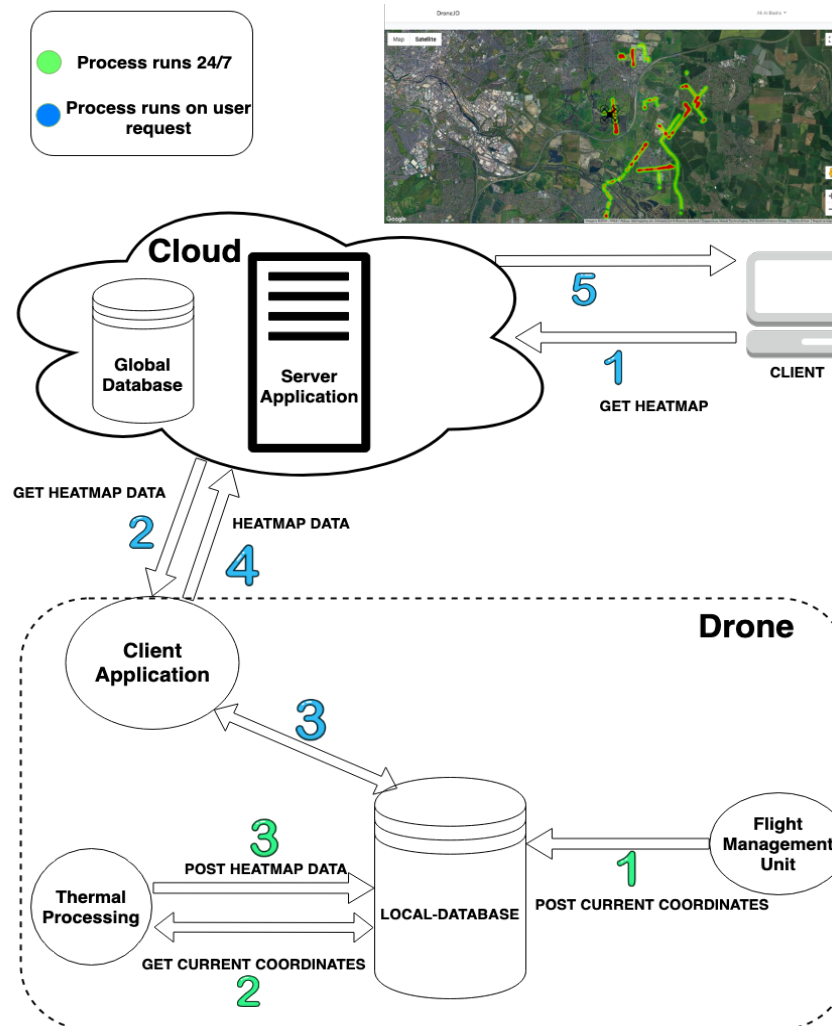
An automated drone deployment protocol has been designed to ease the deployment of new drones into the network; thereby scaling it. DDP is made possible through the network infrastructure designed above; where each drone communicates through a dedicated bi-directional WebSocket channel with the cloud-hosted server.

Fire Prevention Features

Web interface offers several features that help prevent and control fires; including heatmap view, multi-drone map view, manual control, and mission planning through the web.



Data Flow Management: Heat-Map Example



Problem

Lack of a drone management system specialised in autonomous drone deployment and management. Specifically, one that allows for scalability and unlimited range while providing features relative to fire control and prevention.

Aim

- ❖ Design a web-based platform capable of managing a growing network of autonomous drones with real-time data reporting and a dynamic web interface offering fire prevention features.
- ❖ Utilise internet technologies for unlimited range and accessibility.
- ❖ Efficient usage of available network resources, while maintaining an acceptable quality of service.

Method

Database manages data flow locally within drones' sub-systems, and globally at the server level. Data flows from the subsystems, into a local database which then serves it to the client application upon server request. Finally, data is sent in real-time across the WebSocket channel to a cloud-hosted server application where it is stored at the global database. Information is then displayed to the user through a web interface that offers various fire prevention features.

Sub-Systems

- ❖ Database Management
- ❖ Web Interface (Website)
- ❖ Client-Server applications

Improvements

Adopting swarm robotics by enabling drone to drone communication for increased drone autonomy.