



Queen Mary

University of London

Science and Engineering

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JP Student Innovation Centre
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Drone-based Aid-Symbol detection for pandemic disaster

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Division of Personnel

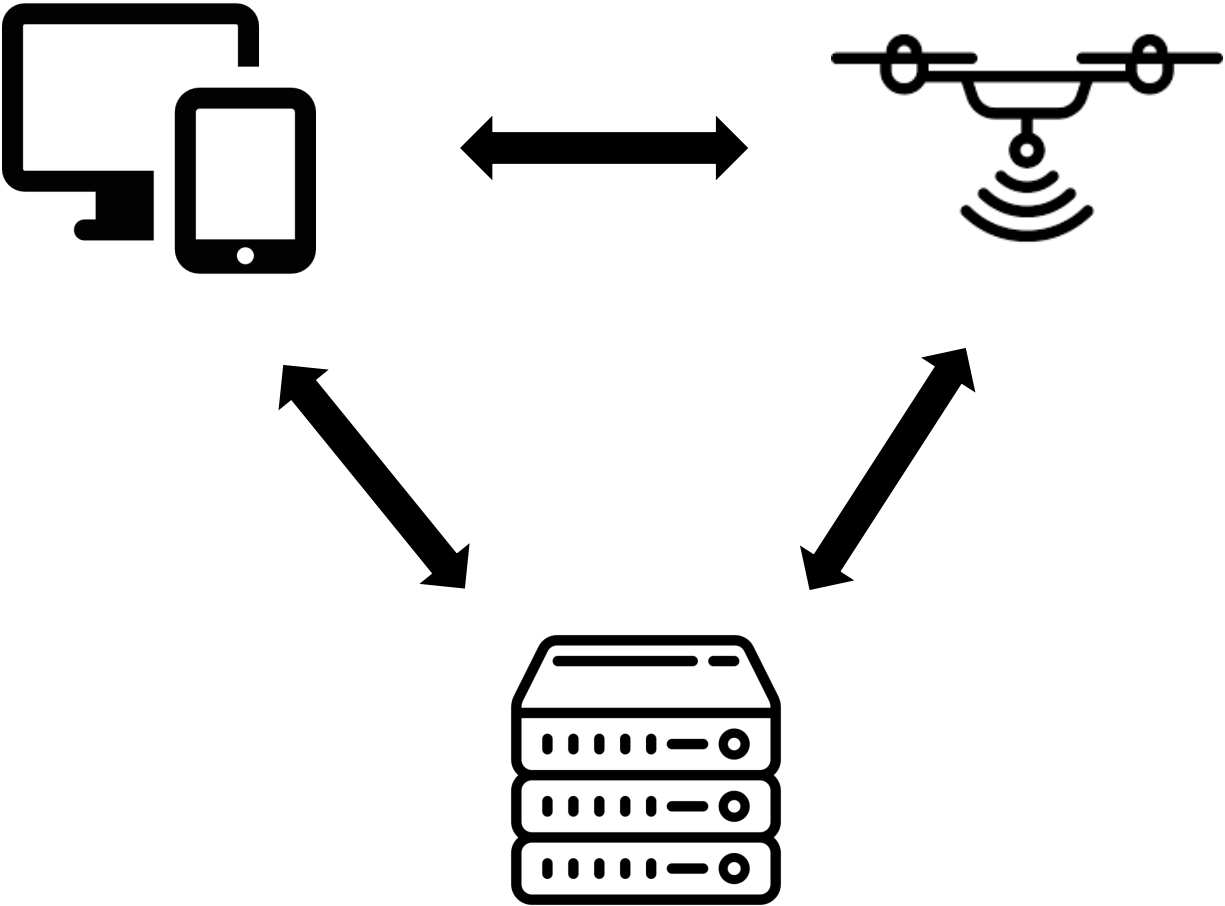
- 1. Yuandi Wang:
 - Data augmentation
- 2. Yuxuan Ou:
 - Object detection model
- 3. Zhengxiao Li:
 - User interface

Introduction



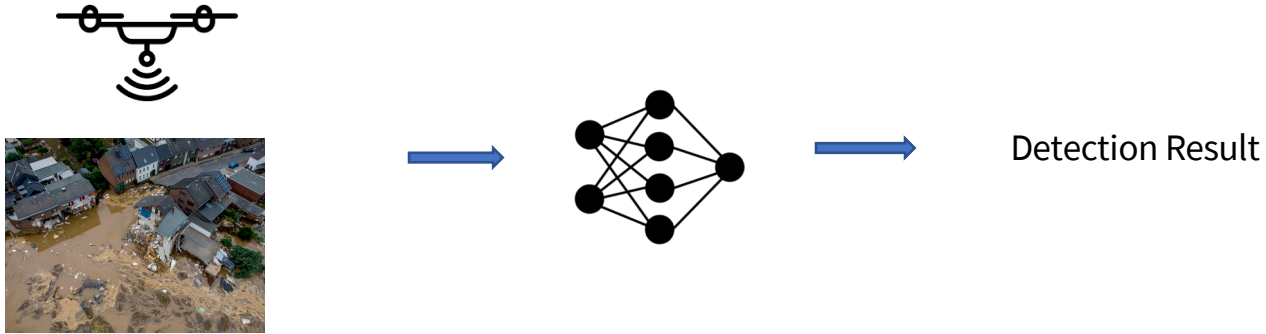
Due to its speed and agility, drones could be used in emergency situations and natural disasters. With more advanced technologies like high-resolution camera sensors and high-speed communication systems are applied to drones, we can obtain much more useful information with drones.

System design



Data augmentation

To make the drones able to detect crucial message in emergency, a CNN-based method could be utilized.



To train the CNN-based model, a proper dataset is essential.

However, there is a set of constraints to directly collect the images as the dataset. Both the amount and variety of the dataset will be limited.

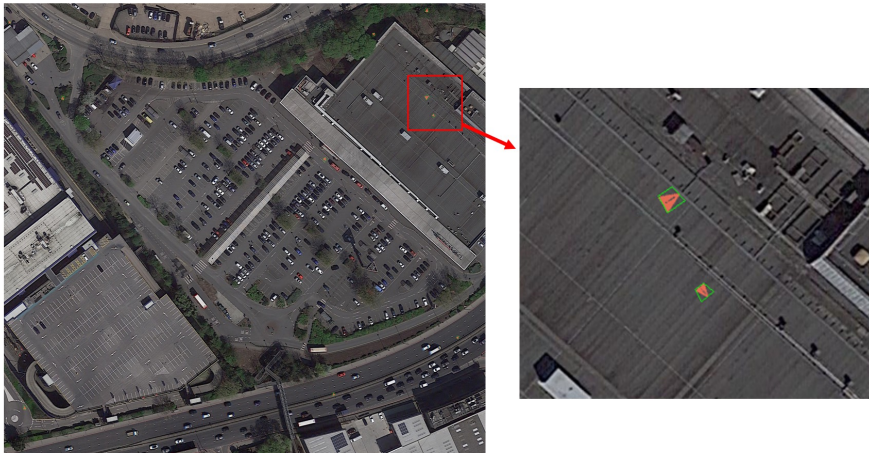
Hence, this project proposes a solution that is using augmentation methods to pasted fake object to images from existing aerial datasets.

Aerial images

- OHCA has released 20 collections of different icons and many of them aim to help people communicate during emergencies [1]. **This is the target of detection in this project**



- There are many existing aerial datasets aim for general object. The icons could be pasted to the images from the dataset with the help of data augmentation methods



Icons on high resolution DOTA image



Icons on VisDrone image

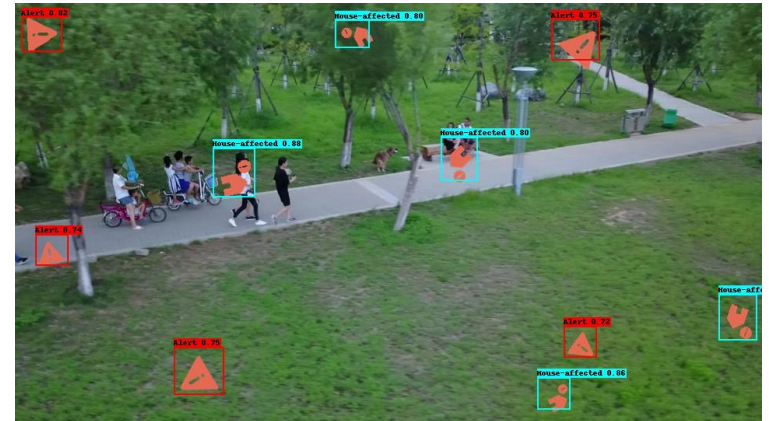
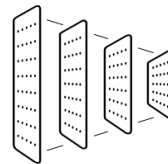
Object detection

State-of-the-art detection methods cares more about the **local region-based feature** but not the location of the instance.

Therefore, we can use the augmented dataset to train a deep learning network and utilized it in real world.



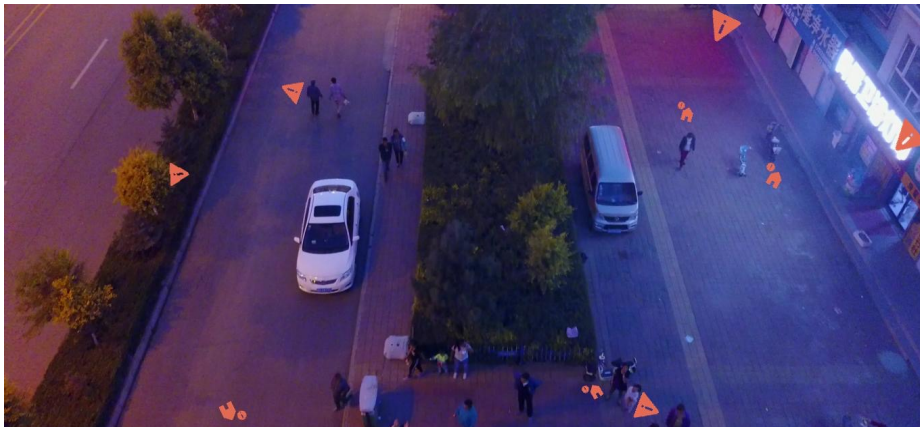
Image with icons



Detection result

Object detection model

We used Yolov5s to implement training and testing on our Dataset



Input



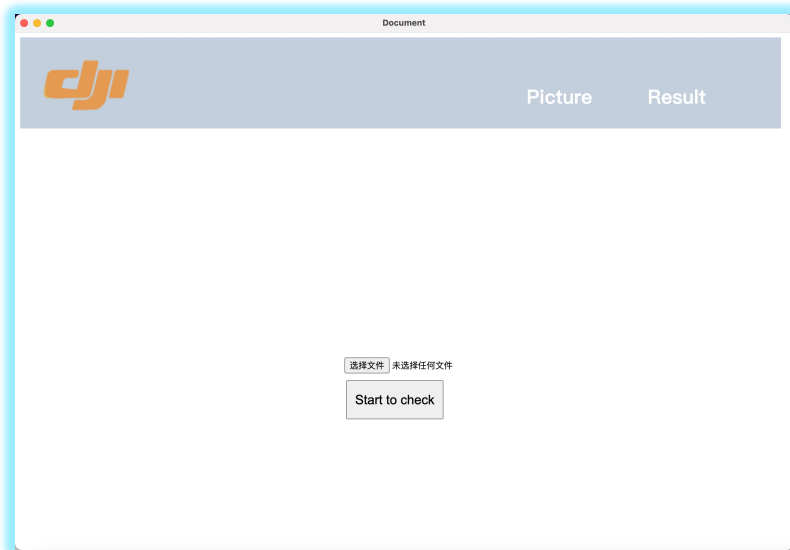
Predict

Table 1 Test result

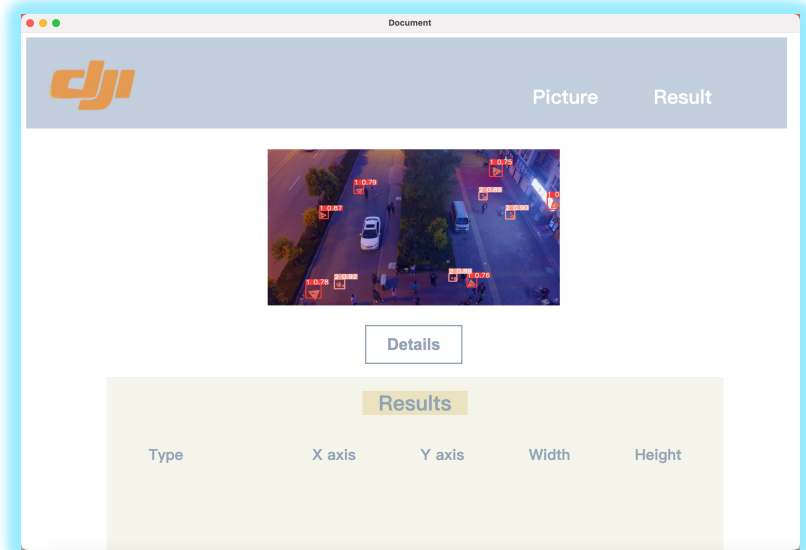
Class	Precision	Recall	mAP@0.5	mAP@.5:.95
Alert	0.991	0.967	0.976	0.573
House-affected	0.962	0.950	0.973	0.733

User interface

There are two pages([Pic.1](#) is the page we can upload the pictures we want to detect,[Pic.2](#) shows the pages of results) in our user interface, both are written by Html5, Javascript, and Python, we use html to build the page, Js to communicate with server, and Python to deal with the results from the server.



Pic.1



Pic.2

Detecting Steps

<https://707819.ma3you.cn/articles/RlGPWYA/>

Thanks for your attention