AI drones to track suspect vehicles

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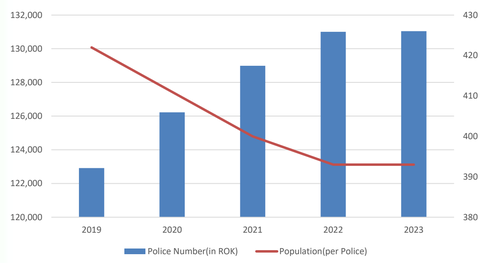
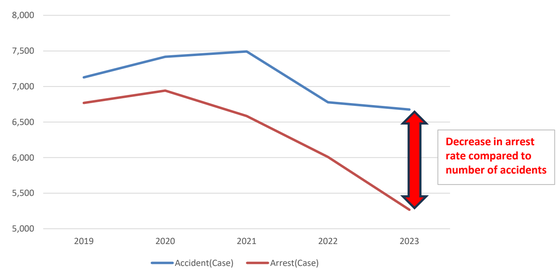
Purpose

- Criminals sometimes use cars as a means of transportation and get away at **high speeds**.
- Tracking suspicious vehicles is expensive and can lead to **safety incidents.**
- Drones will be developed for **widespread exploration** and **low-cost** tracking of stolen vehicles.
- It will utilize stereo cameras to **track** the vehicle, recognize nearby obstacles, and use YOLO to improve vehicle recognition

Police personnel and population served

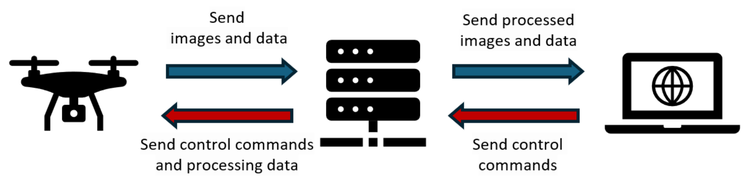


Hit-and-run incidents and arrests



What are deliverables?

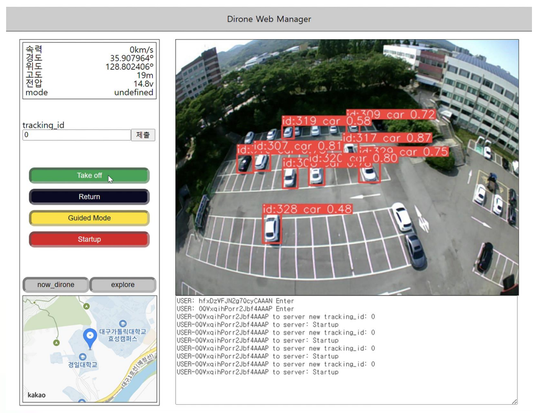
- Use a fixed camera mounted on the drone to send footage to the server.
- Tracking is done by using AI to enter the number of the object in question on a webpage, which then sends the coordinates of the drone.
- The drone uses the data it receives to track objects based on video footage



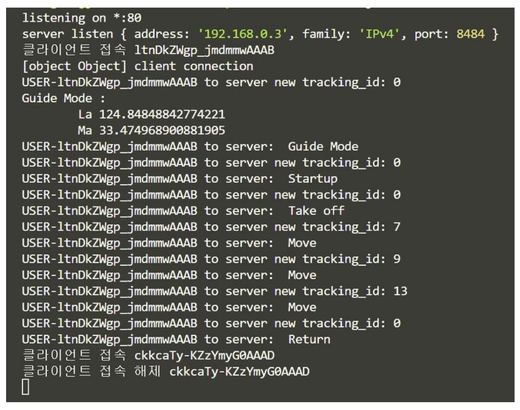
How dose it work?

Server

Web Client



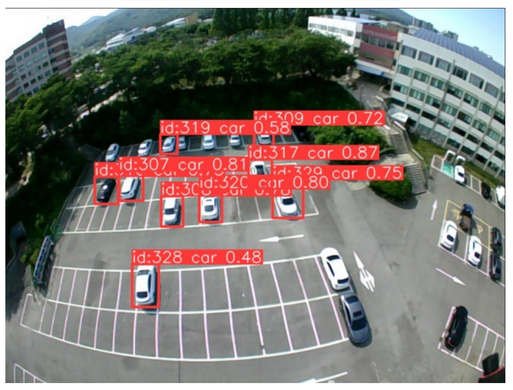
Server log



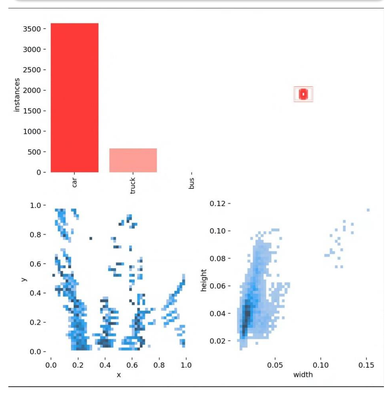
- It communicates with the drone to receive drone status data and real-time video, and uses the AI module on the server to send the results to the drone and web client.
- Get the drone control commands from the web client and pass them to the drone.

AI

AI learning result

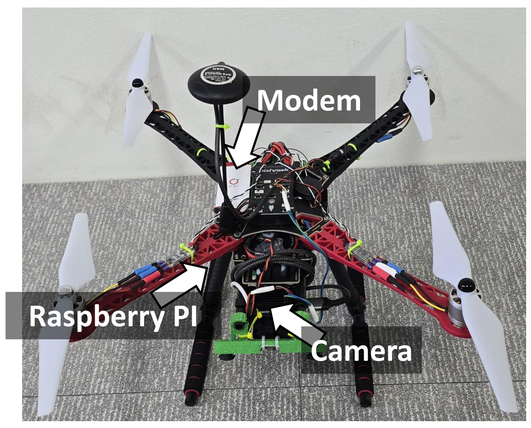


Objects used during learning

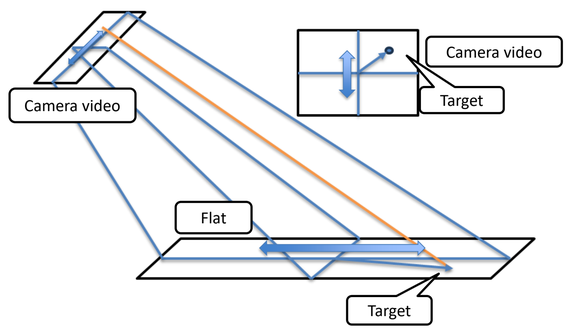


- We collected about 200 aerial photos to train AI deep learning (about 3500 total differential car objects and 500 truck objects)
- Use YOLO to train on data to create a model.
- Recognize and track vehicle images and send data to the server.

Drone



Prototype drones in development



- It uses TCP sockets to communicate between the drone and the server to autonomously drive and track objects.
- Receives the object coordinates and calculates the difference between the camera image center coordinates and the object coordinates.
- Distance and horizontal distance are calculated from the object's coordinate values, from which the object's GPS value is derived.

Application plan

- If the police are tracking a suspect rather than a vehicle, they can change the target to identify and track the suspect.
- Drones can also be used for rescue efforts, such as quickly identifying the scene of a fire or accident to reduce the risk of loss of life.
- With so many people with disabilities, dementia, or children going missing, police can use data to collect, track, and locate missing persons.

Expected effect

- Using drones to help police track suspects to maximize arrest rates
- Reduce the cost of suspect vehicle tracking
- Developed drones can be scaled up for a variety of uses, including rescue.

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