

WE DEVELOPED TWO DIFFERENT PROJECT FOR TWO DIFFERENT COMPETITIONS

- **1 - TEKNOFEST MAIN PROJECT**

- TEKNOFEST MAIN project required in the contest consisted of two steps
 - 1 – Object Detection
 - 2 – Visual Inertial Odometry

- **2 - TEKNOFEST CHAMPIONS LEAGUE PROJECT**

1-OBJECT DETECTION

- Technical specifications that were required were human and vehicle (including marine vessels) detection. The purpose of this step is to provide the autonomous aerial vehicle with detection for evacuation. We had the advance through starting with fine-tuning (freeze, adjusting learning rate and optimizer etc.) the backbone of the YOLO algorithm, which we used for object detection. The data set, which we worked to make it have approximate instances to prevent overfitting and underfitting, has made it easier for the model to learn.

2.VISUAL INERTIAL ODOMETRY

- A mapping and location tracking using VIO technics through the camera and the latest GPS data in the case of a GPS sensor failure. Several VIO technics, such as ORB-SLAM 2, ORB-SLAM 3, and OPTICAL FLOW with Lucas Kanade, has been used. Considering the platform compatibility and speed, the camera data has been aligned with the GPS data using Optic Flow algorithm and Lineer algebra-based processing.

TEKNOFEST CHAMPIONS LEAGUE PROJECT

- For the TEKNOFEST Champions League, we were asked to do a unique project that is based on justice and compassion in 48 hours. In this progress, my goal was that the aerial craft to double as a tool to ease and accelerate the coordination in the disaster area and a supplier to reduce the need for human force in the disaster coordination centers.



- In the project, disaster relief operators are required to place the objects for the aerial crafts to detect and transfer the information to the coordination centers. These objects has various colors and types which imply different means. For example, while a characteristic red cloth that was spread over an area implies that the area is in need of human force and construction equipment, a green cloth implies that the area is in need of water and food.



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- With all this system, the specific areas will get the right kind and amount of aid they need and the relief personnel's need for intense communication will be reduced. In case of the infrastructural failure in the disaster area, all this progress will be done through radio frequencies, thus no need for internet connection.

- However, if the infrastructure is intact, people will be able to reach the system through a web interface and they can meet the needs of other areas.

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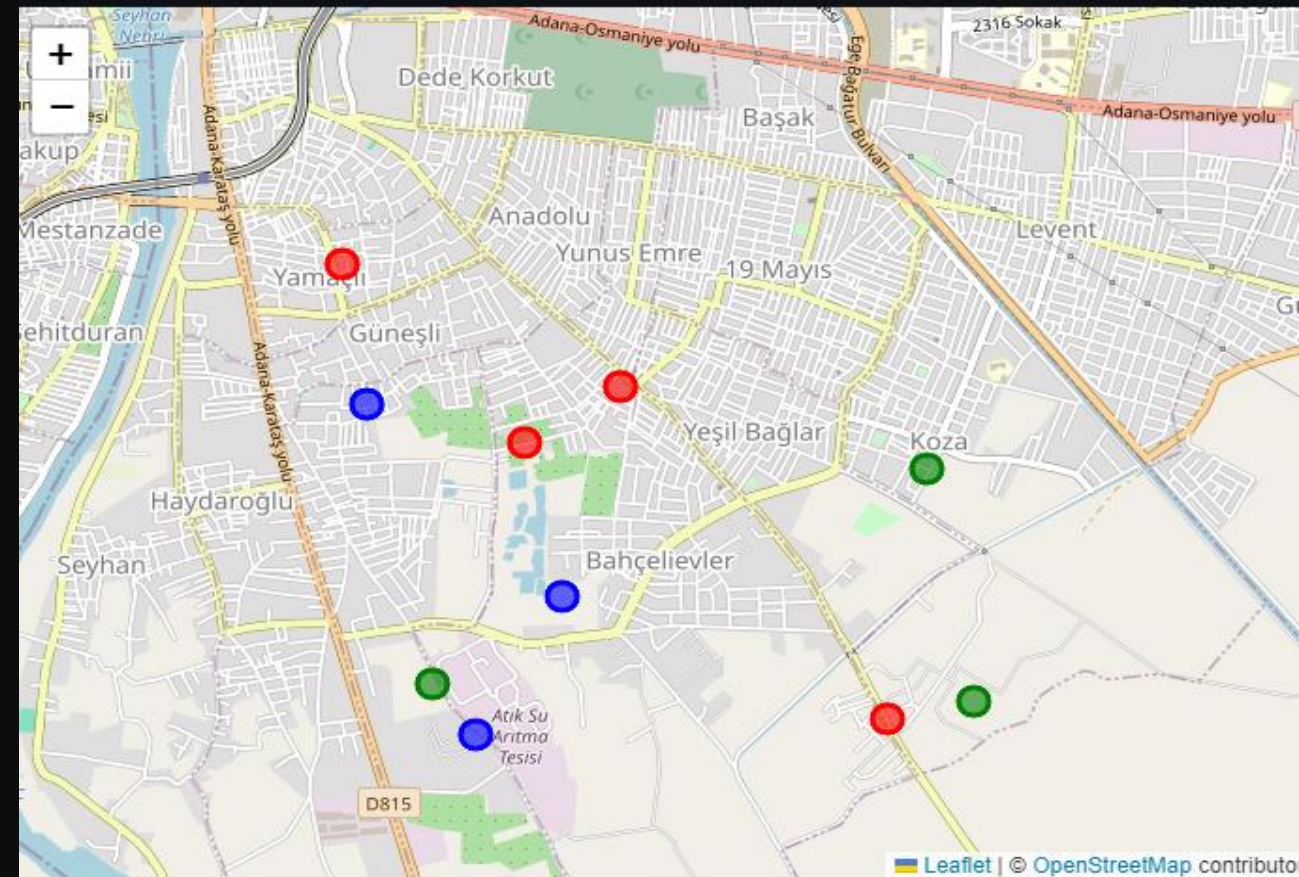
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FIELD PRACTICE

