

Open Project Plan Template

1. Team name: AHP

Members: Shuopeng Rao, Xinmeng Shen, Yan Zheng

2. Application

Extinguishing (Especially in the big factory which are easily start fire).

Drones are applied for searching the fire point and send the fire point location to the jetboats with firefighting equipment. When the jetbots receive the location information of the fire point, it will reach the fire point and then put out the fire. The jetbot is familiar with the environment and it can get to the fire point automatically. Therefore, the drones are applied to search and capture target location information. And the jetbots are applied to reach the location automatically.

3. The system

Python, PX4, ROS2, OpenCV (need further discussion)

4. Github repo link:

<https://github.com/pangyaner/RAS-open-project>

5. Background

- Extract the location of the target.
(<https://github.com/vijpandaturtle/Follow-me-drone>)
- Target Tracking algorithms
(<https://github.com/sarthak268/Target-Tracking-Simulator>)
- Jetbot navigation to aiming location
(<https://github.com/jdgalviss/jetbot-ros2>)
- We think it's easier to make drones recognize fire point targets. The challenge is how to accurately obtain the location information of the target, how to communicate between the drone and the jetbot, and how to let the jetbot automatically drive to the designated location.

6. Expected challenges and wishes to learn

We need to investigate ways to get the target location. If our application scenario is fixed, then maybe we can use the coordinate system of the fixed reference for positioning. In addition, we are considering whether it is more advantageous to use thermal sensors than traditional camera recognition. Regarding the communication between the jetbot and the drone, in our plan, the drone will transmit the location information to the jetbot once. But whether this location information is in the same environment for the jetbot, and how to configure the drone and the jetbot in the same environment is also a challenge. If it cannot be achieved, we are considering whether the drone can guide the jetbot to the target location.

We believe that the most important challenge is how to plan a route in the map to automatically reach the target point. Our existing experience is that the jetbot automatically changes direction when it encounters an obstacle, but this method is relatively slow. In our application scenario it is very urgent. Since the environment is known, the fastest path calculation algorithm is also necessary.

7. Team role

Xinmeng Shen: drones target tracking

Shuopeng Rao: target location capture

Yan Zheng: Communication between drones and jetbots and Jetbots navigation.

8. Gantt chart: <https://app.asana.com/0/1202072778667052/timeline>

9. Description of final experiment or demonstration.

We supposed to set up fixed environments with obstacles to simulate complex factory floor instruments, and fire points. The drone first surveys in the air, finds the fire point and sends the location information to the jetbot, and then the jetbot will automatically drive to the position of the fire point.