ZILLY TEAM

FOREST FIRE FIGHTER

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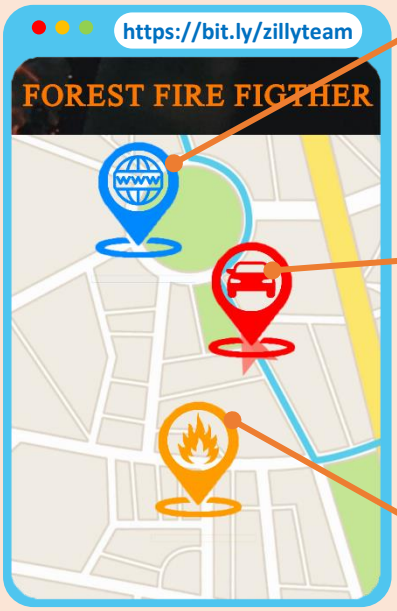
WHY WOULD YOU NEED AN F³?

A fire outbreak is unpredictable and may happen in remote forest, thus not easily accessible. As firefighters can't be everywhere all the time, autonomous ways to detect forest fires may reduce intervention time and damages. Here is our solution: The Forest Fire Fighter or F3 for short. An autonomous car that follows a predefined path given by firefighters ....

WHO NEEDS IT?

- Firefighters
- Rangers
- Hikers
- Citizens who live around forest

HOW TO USE?



STEP 1 - Enter the coordinates

- The user can enter GPS coordinates to be added to the path on a website.
- The GPS data is saved to the Raspberry Pi, and sent to the STM32 board.
- An interactive map is available on the site, displaying the path and alerting users if a fire is detected.

Tech choices: Rapsberry Pi, HTML, CSS, PHP, Flask, Folium

STEP 2 - Deplacement to the point

- GPS coordinates are received by STM32 board through CAN frames.
- Distance and angle between the car's location and the next GPS point are computed.
- Orders are sent to the motors to reach the next location, with a correction if needed.

Tech choices: STM32, CubeIDE, C

STEP 3 - Detection of fire

- At each location, the car does a 360-degree rotation, while taking photos to scan its environment.
- The photos are analyzed using a neural network with a **91% accuracy rate**.
- If a fire is detected, the user is alerted via the website and the car is stopped.

Tech choices: Rapsberry Pi, Python, Pytorch

WHAT'S NEXT ?

- Improve the battery autonomy
- Retrain the neural network to avoid false positives
- Add an obstacle avoidance feature and/or put an off-road chassis
- Add « Auto mode » bypassing user input

More information on our website