Research Project Installation Guide

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Installation Steps

Prerequisites

Ensure you have git and Docker installed. (optionally you can install Python 3.11 and pip along with the packages in the requirements.txt file if you want to be able to train your own model)

Repository Setup

Clone and navigate to the repository:

```
git clone https://github.com/driessenslucas/researchproject.git
cd researchproject
```

ESP32 Setup

Hardware Installation

- Refer to the hardware installation manual for ESP32 wire connections. hardware installation guide.

Software Configuration

- You will need to have this library installed if you want to use the OLED display ESP32_SSD1306
- Upload the code from the esp32 folder to the ESP32.
- Modify the WiFi credentials in the code to your local network settings.

Web App Setup

Important Note

- Always execute `docker-compose down` after each use to ensure proper virtual display startup.

Setup Instructions

- The code for the web app is in the web app folder.
- Navigate to the web app folder.

  ```
  cd ./web_app/
  ```

- Run the following commands to start the Docker containers:

  ```
  cd ./web_app/
  docker-compose up -d
  ```

Usage

1. In the web app, enter the ESP's IP address and select the model you want to use.
2. You can opt for a virtual demonstration of the project without moving the actual car.
3. Click on the `Start Maze` button to start.

A demo can be found: https://github.com/driessenslucas/researchproject/assets/91117911/b440b295-6430-4401-845a-a94186a9345f

EXTRA: Training

- Use the provided pre-trained model or train a new one using the train script.
- The train script can be run on the RPI itself, it is not too resource intensive.
- The script will ask you if you want to save the model. If you do, it will be saved in the models folder in de `web_app` directory.