Project: Real-Time Traffic Light Detection

Description:

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This Python project detects the status of traffic lights (Red, Yellow, Green) in both static images and video streams. It uses the HSV color space to isolate the specific colors and contours to identify the lights. When a light is detected, it displays a bounding box and corresponding action on the frame:

- Red → STOP

- Yellow → WAIT

- Green → START

How It Works:

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1. The image or video is loaded.

2. The frame is resized and blurred to reduce noise.

3. It is converted from BGR to HSV color space.

4. HSV masks are applied to isolate red, yellow, and green regions.

5. Contours are detected on the masks.

6. If the contour area exceeds a defined threshold, it's considered a traffic light.

7. A rectangle and label are drawn, and the corresponding action is printed.

Files:

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- `traffic\_light\_detection.py`: Main Python script.

- `trafficsignal.jpeg`: Input image file for static detection.

- `trafficsignal.mp4`: Input video file for real-time detection.

- `requirements.txt`: Python dependencies with fixed versions.

- `read.txt`: Project description and usage guide.

Instructions:

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1. Install dependencies:

pip install -r requirements.txt

2. Ensure both image and video files are in the same directory as the script.

3. Run the script:

python traffic\_light\_detection.py

4. Image detection results will show in a popup window.

5. For video, press ESC to stop.

Note:

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- Adjust HSV ranges or contour area thresholds if detection is inaccurate.

- Ensure your camera/video resolution is appropriate for contour accuracy.