Road Sight Navigator- Lane Line Detection with OpenCV

This project is focused on detecting road lane lines using Python and OpenCV. It processes video frames to highlight lane lines, assisting in tasks like autonomous driving and road safety analysis.

Project Description

This Python script uses OpenCV, a powerful library used for computer vision tasks, to detect and highlight lane lines in a video. It applies techniques like Canny edge detection and Hough line transform to identify and draw lines over detected lanes.

Features

- Real-time lane detection
- Utilizes Canny edge detection
- Implements Hough Line Transform for line detection
- Region of interest selection for focusing on lane lines

Requirements

- Python 3.x
- OpenCV-Python
- NumPy
- Matplotlib (Optional for additional visualization)

Installation

Ensure you have Python installed. Install the necessary packages using pip:

```bash
pip install opencv-python numpy matplotlib
```

Usage

1. Place your test video in a known directory.
2. Update the video path in the script (`/Users/aishwaryadekhane/Desktop/test_video.mp4`).
3. Run the script:

   ```bash
   python lane_detection.py
   ```

4. Press 'q' to close the video window.

How It Works

1. Video Capture: The script reads a video file frame by frame.
2. Image Processing: Each frame is converted to grayscale and processed to detect edges using the Canny method.
3. Region of Interest: A triangular region, typically where lane lines are expected, is selected for further processing.
4. Line Detection: The Hough Line Transform method is used to detect straight lines in the selected region.
5. Drawing Lines: The detected lines are drawn on the original frames for visualization.

6. Video Display: The processed video with lane lines highlighted is displayed in real-time.

Contributions

Contributions, issues, and feature requests are welcome. Feel free to check project code, if you want to contribute.