Project Manual Document

Visual communication for traffic sign detection

1. Purpose of the document:

This project manual provides a comprehensive guide for the development of Visual communication for traffic sign detection.

2. System Requirements

2.1 Hardware Requirements:

- **Computer or Digital device:**
  A computer or digital device capable of running the open cv modules and image processing modules and ultralytics packages.

- **Minimum 4GB of RAM:**
  The system needs to be able to take images as input and produce image label as output. This requires a lot of data to be stored and processed. So, minimum it requires 4GB Ram.

- **Minimum 1GB of storage:**
  A minimum of 1 GB of storage is required for detection of traffic signs because it needs to store a variety of data including low resolution images, and high resolution images.

2.2 Software Requirements:

- Windows 10 or above versions
- Python
- Jupiter / google colab
- Modules and Libraries

3. System setup and Installation:

Step 1: Gather the required hardware and software

- Ensure you have a computer or digital device with compatible specifications
- Ensure you have the necessary software components, including a user interface and coding platform.

Step 2: Install the Operating System and Drivers

- Install the appropriate operating system on the computer or digital device for example like windows.
- Install any necessary drivers for processing the images which it can be recognized and functions correctly.

Step 3: Install the necessary Libraries and packages used

- Ultralytics
- Pytorch
- Opencv
- Flask
- PyYAML

4. Issues/challenges faced during development of the project

- **Accuracy and Precision:**

- False Positives and Negatives: sometimes it does not upscale the image better than the original image.

- **User Adaptation and Learning Curve:**

- User Training: Users may require some training or pre trained models to become comfortable and proficient with this system.

- **System Performance and Responsiveness:**

- Latency: Delays when up scaling the low resolution image into high resolution images sometimes.
- Resource Consumption: The system's resource utilization, such as CPU and memory usage, can impact the overall performance and responsiveness.

- **Integration and Compatibility:**

- Software Compatibility: Ensuring compatibility with various operating systems, software versions, and hardware configurations can be complex.
- Integration with Existing Systems: Integrating the visual communication for traffic sign detection with existing software applications or platforms can present challenges
- Integration of webcam and videos to the interface create many disturbances.

❖ **Limited Training dataset:**

- Based up on training datasets the pre trained models are prepared .so, based on different pre trained models only it can detect the image give its label.

5. Challenges while developing the project:

We have done too much research for this problem statement. Collecting the dataset is the immense task,we have collected the image by our own from the various websites. Some libraries didn't installed in the low specifications computer. After collecting the images the main task is to setup the coordinates for the individual images. We need the computer/laptop with good specifications, including hardware. We faced issues with the camera in the low specifications laptop. Images not always detected properly, Took lot of images too to train.