AI Traffic Signs Detection and Recognition

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Class: IT114105/2A
ITP4514 Assignment Presentation

Introduction

With the rise of autonomous vehicles, the need for reliable systems that can interpret road signs has become critical. Traffic sign detection and recognition (TSDR) is essential for ensuring that vehicles can navigate safely and comply with traffic regulations.

Problem Observed

Critical Need for Reliable Systems: Autonomous vehicles require accurate interpretation of road signs.

Objective

1. **Develop a Detection System:** Create a system capable of accurately detecting and classifying various traffic signs from images and videos.

2. **Utilize Deep Learning Techniques:** Implement YOLOv8 for real-time object detection to ensure high accuracy and efficiency in recognizing traffic signs.

3 **Enhance Road Safety:** Contribute to the development of autonomous vehicle technologies by improving the ability of vehicles to interpret traffic signs correctly.

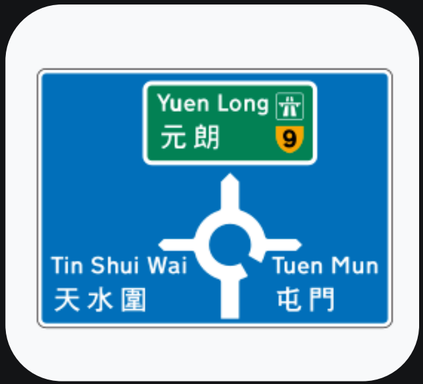
01

DataSource

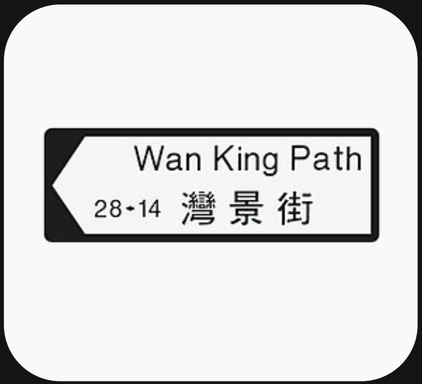
The traffic sign images are captured form Google Street View and annotated using RoboFlow

Traffic Sign Classification

Annotate traffic sign into four categories:

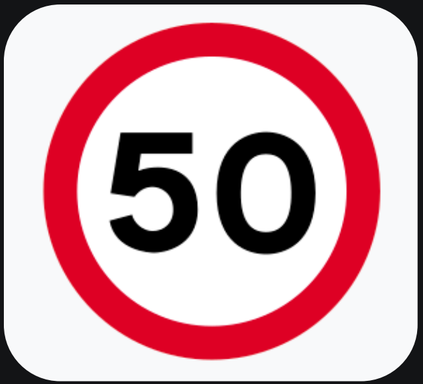


Direction Sign



Street Direction Sign

Warning Sign



Order Sign

Model Used

You Only Look Once version 8 (YOLOv8) is selected to be the model this project used

02

Why YOLOv8

1. **Speed and Efficiency:**
YOLOv8 is designed for real-time object detection, making it suitable for applications where quick decision-making is critical, such as in autonomous vehicles.

2. **High Accuracy:**
This model has demonstrated state-of-the-art performance in various object detection tasks, which is essential for accurately identifying traffic signs that can vary significantly in appearance.

3 **Ease of Use with Annotated Data:**
The integration of YOLOv8 with annotated datasets created using Roboflow simplifies the training process, allowing effective utilization of labeled images collected from Google Street View.

1. **Official Docmentation**

2. **Youtube Tutorial**

03 How I Learn YOLOv8

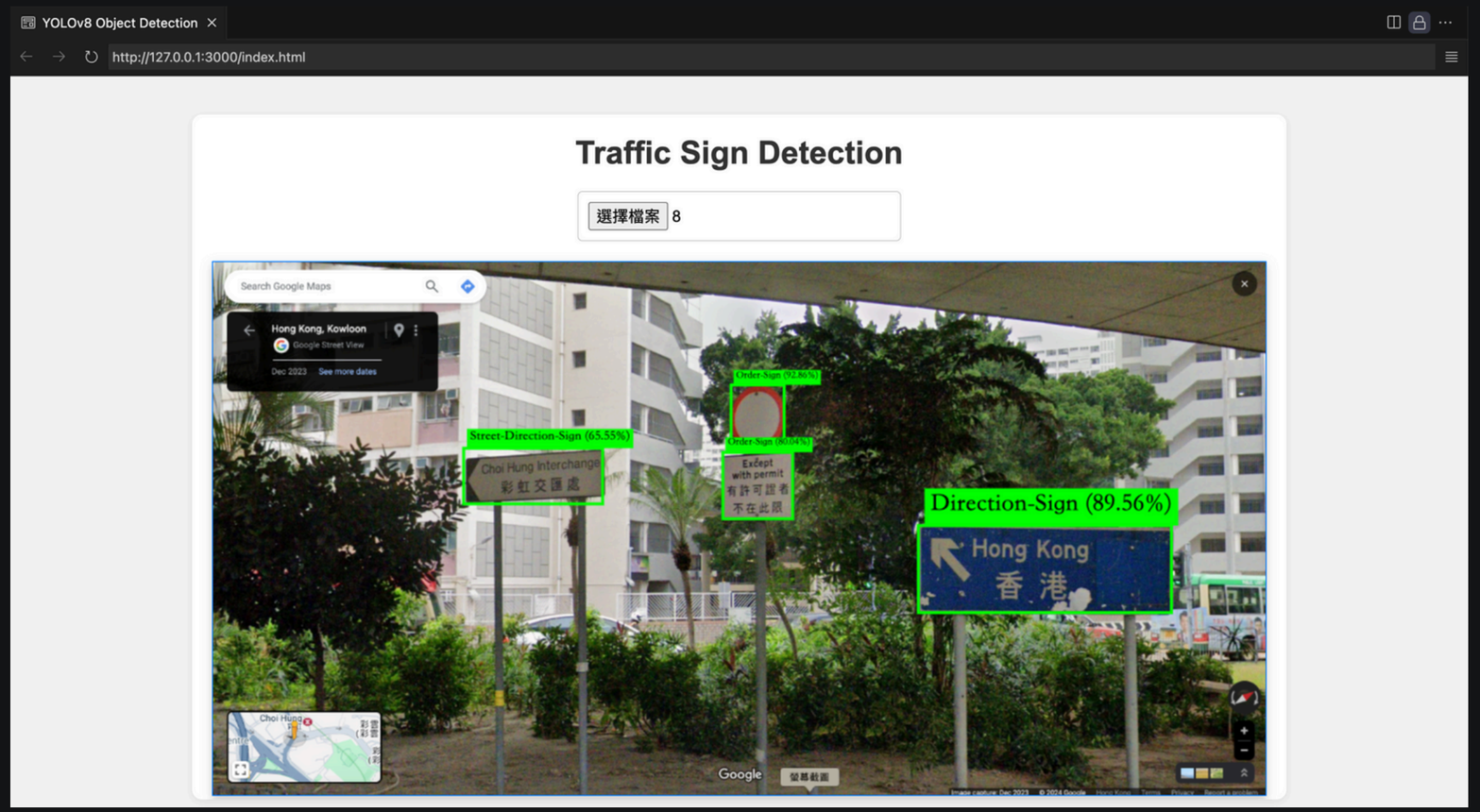
Annotation Tool

RoboFlow is used to annotate the image

04

User Interface

05



What I learned

1. What is computer vision
2. How to annotated image
3. How to train a YOLO Model

Potential Future Work

1. Enhanced Model Accuracy and Generalization
2. Support video detection using the user interface

Reference

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Thank You