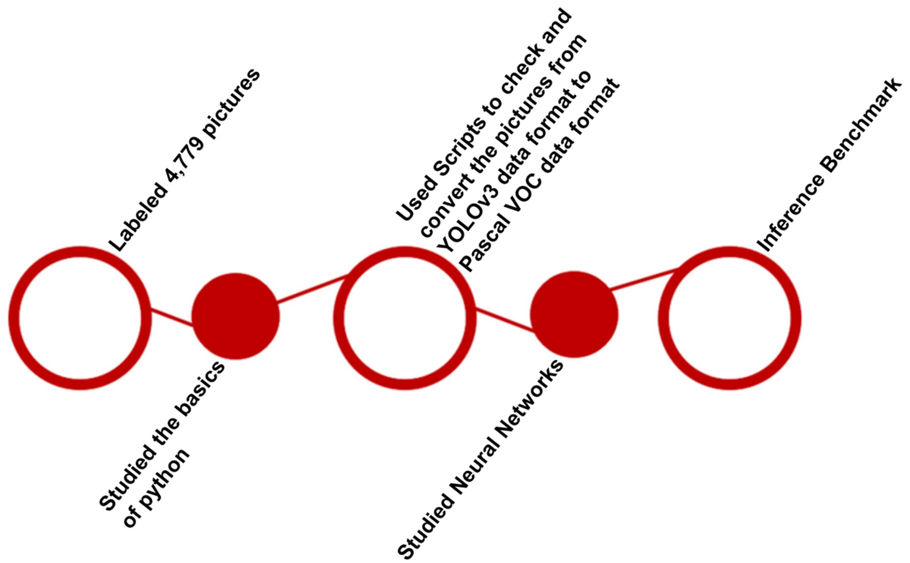
Real Time Object Detection and Data Preparation for Indy 500

La'Andrea Gates and TaJuan Beckworth
Advisor Judy Qiu

Abstract

One of the biggest audience attractions is sports racing. Discovering new information, predicting insights in the future, and the ability to make control decisions from applying machine learning and Artificial Intelligence (AI) is a very important process. This helps the team managers, engineers, organizers, announcers, drivers, and the fans. The biggest problem to solve is detecting anomalies accurately. We worked with part of a bigger project for the IndyCar 500. The focus is mostly towards data preparation to help the current team working on this project.

Methodology



Conclusion

This program shows all the tools and procedures that come together to enhance anomaly detection in racing. The more we train our system with continuous up to date data, the better the system will be at detecting real time anomalies. The system seems to learn much more when being trained with various data sets. The initial results compared to the currents results have improved tremendously with the increased number of data input. After using YOLOv3 to label the data, the results that followed showed outstanding growth in our system's object detection results. We work as a team to develop a program that will ease the minds of the racers, so they have more focus in the race. We use real time object detection and data preparation to ensure the best results for the racers.

Introduction

The IndyCar series is the premier level of open-wheel racing in North America. The racing cars reaches speeds up to 235 miles per hour at the Indianapolis Motor Speedway. They need a system to support real-time data analysis. Some of it would detecting anomalies on the timing and scoring data, although it is challenging. We will prepare the data and train data to aid the original group working on this assignment. Pictures have to be labeled, scripts must be ran, and inferences have to be made. There are three main stages in the project, labelling images, training data, and inference. We primarily worked on labelling. The existing YOLOv3 model pre-trained to identify boats, trucks, trees, etc. But it cannot identify racing cars as it is different from a normal car. The system needs to constantly be trained for more accuracy.

Results

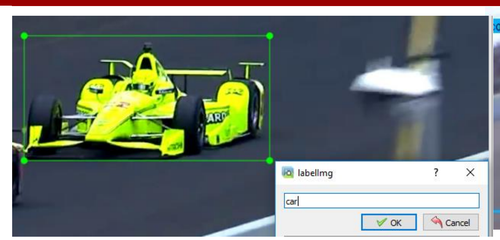


Figure 1.1 LabelImg Tool

Figure 1.2 Inferred Image

The cars in the images were previously labelled as all sorts of objects other than a car. The cars now are labelled as cars as the system is being trained that these are cars. Figure 1.1 is a shot of the labelimg tool used to label the cars. There is a YOLOv3 format and Pascal VOC format and we choose YOLOv3 to use. Figure 1.2 is the inferred images ran through the tool after the other pictures have been converted and used to train that data. The probability of a racecar being detected as a car increases as the system is continuously trained.

References

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