THE REFEREE'S WATCH

A Framework for Detecting and Classifying Player Movements in American Football

Patil Harshwardhan   Moore Keegan   Shingala Jainish   Gulecha Mitesh
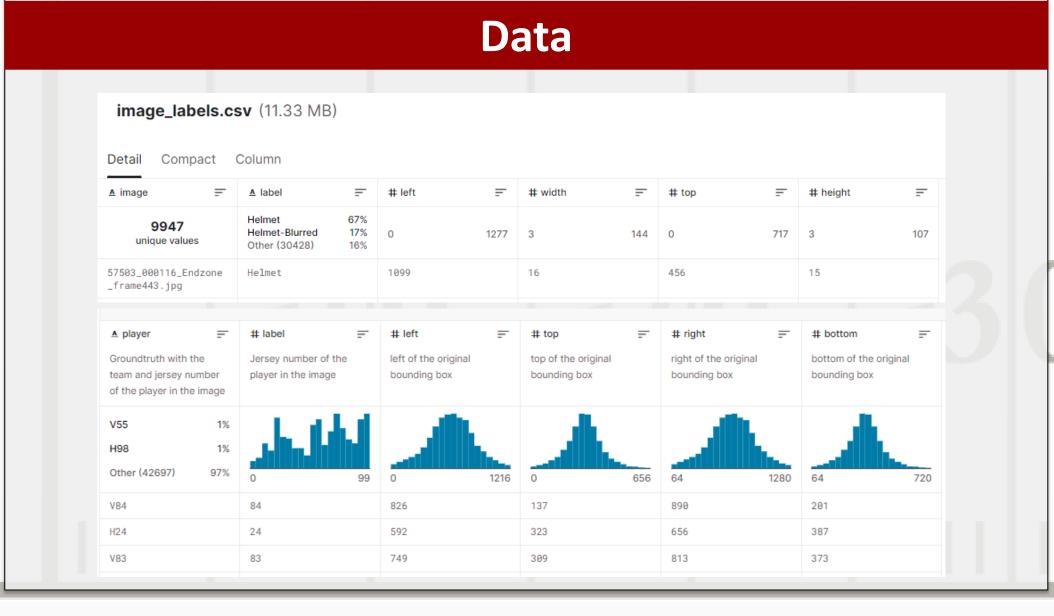
Introduction

The dynamic nature of American football makes the games hard to track. Game tracking is useful to coaches, statisticians, and medical professionals in understanding the movements of players in the game. We have created a system for player detection, tracking, and placement on the field that can ease the pain of manual analysis
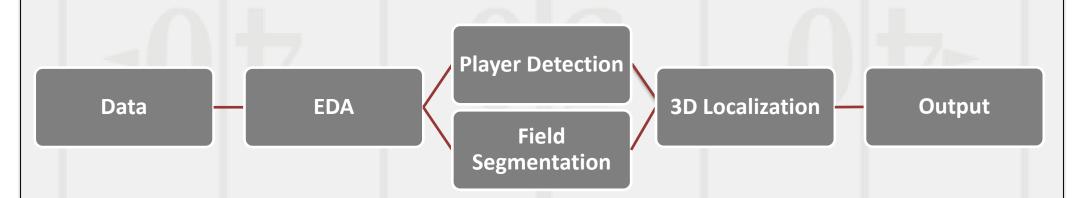
Motivation

The goal of The Referee's Watch is to automate the analysis and comprehension of football games. Together, the two objectives can reveal information on player effectiveness, team tactics, and gaming. Coaches, analysts, and broadcasters may utilize these technologies to give players and teams real-time analysis and feedback while also enhancing spectator viewing.
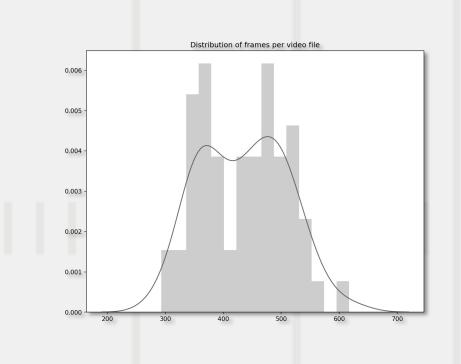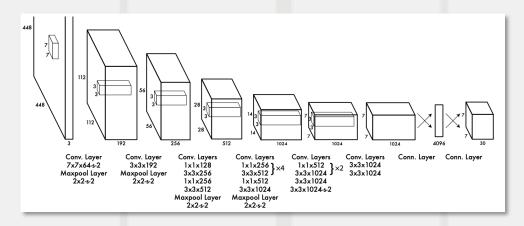
Data

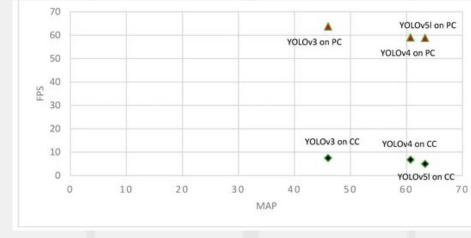## Methods/Models

Exploratory Data Analysis

The plot shows the distribution of the number of video files in the dataset with respect to the count of frames per video file.
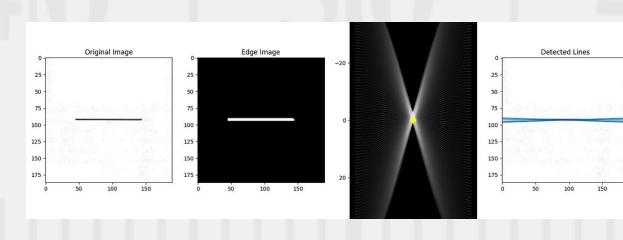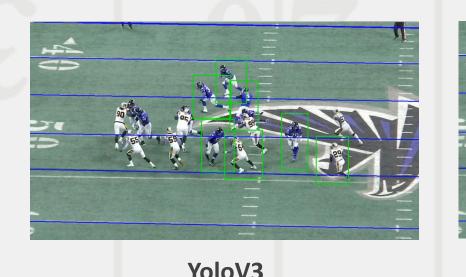

Models

YOLO - YOLO is an object detection algorithm using CNNs from DarkNet. It is meant to be faster than other similar CNN methods, which is better for the purposes of video analysis.
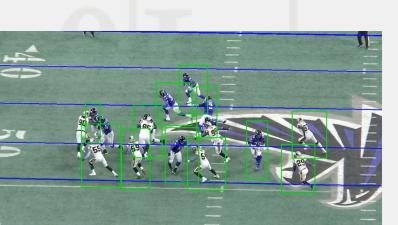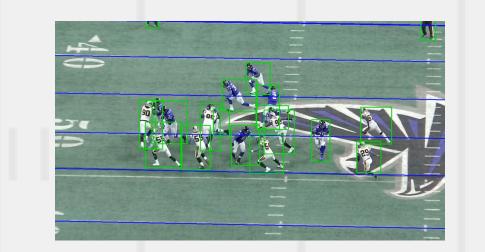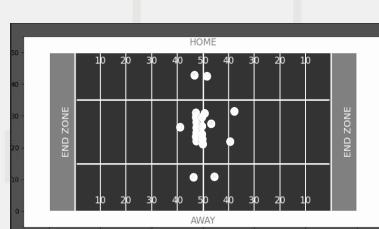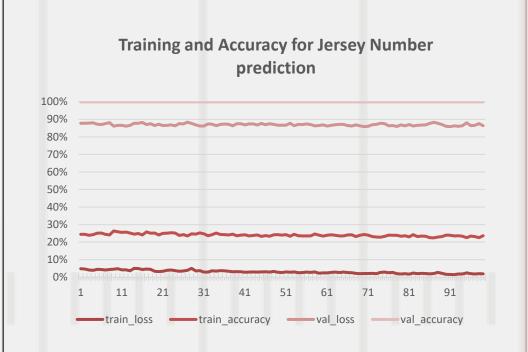

Hough Line Transform

Experiments

YoloV3

YoloV4

YoloV8

2D plane Projection

Training and Accuracy for Jersey Number prediction

Output

References

[1] Redmon, Joseph and Ali Farhadi. "YOLOv3: An Incremental Improvement." ArXiv abs/1804.02767 (2018): n. pag.
[2] Belongie, Serge J., Jitendra Malik and Jan Puzicha. "Shape matching and object recognition using shape contexts." 2010 3rd International Conference on Computer Science and Information Technology 9 (2002): 471-474.
[3] Bewley, Alex, ZongYuan Ge, Lionel Ott, Fabio Tozeto Ramos and Ben Upcroft. "Simple online and realtime tracking." 2016 IEEE International Conference on Image Processing (ICIP) (2016): 3464-3468.