

MA 797 Final Project Description

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1 Data Set

The [data set](#) chosen contains [Next Gen Stats](#) tracking data for National Football League (NFL) league games between the 2017 and 2018 NFL seasons. This data is collected by sensors stationed around the stadium that track tags in player's shoulder pads during the game. The (x, y) location of all twenty-two players on the field is accounted for as well as their velocity vector and magnitude of acceleration. Other game conditions such as weather, play information, and game score information are also contained in the data set for a total of 49 unique features.

2 Problem Introduction

In the NFL, roughly a third of a teams offensive yardage comes from run plays. Ball carriers are assigned the most credit for these plays, but their teammates (by way of blocking), coach (by way of play call), and the opposing defense also play a critical role. These facets of the game are understood in great detail by coaches, but using data to provide evidence for this “eye-test” is tricky. Traditional metrics such as ‘yards per carry’ or ‘total rushing yards’ can be flawed as they can be inflated by long runs and are not informative of the underlying distribution of production. Instead, using detailed data at the time of the hand-off, we will construct cumulative distribution for the predicted yards gained on the play.

3 Machine Learning Methods

This project will include both regression and classification methods that we have learned in class. The objective function is a CDF of yards gained/lost on each play, so we plan to incorporate this specific structure into our network architecture, possibly following the procedures outlined in [Li et. al](#). Success in this project will require extensive feature engineering to combine the raw data into features relevant for the domain of interest, e.g. partitioning the field into Voronoi spaces for each player and enforcing player orientations to determine field position leverage.

The submission deadline for the competition is November 27th, so we can check with you after the submission to see if there is more you would like us to do.