Predicting Football Plays
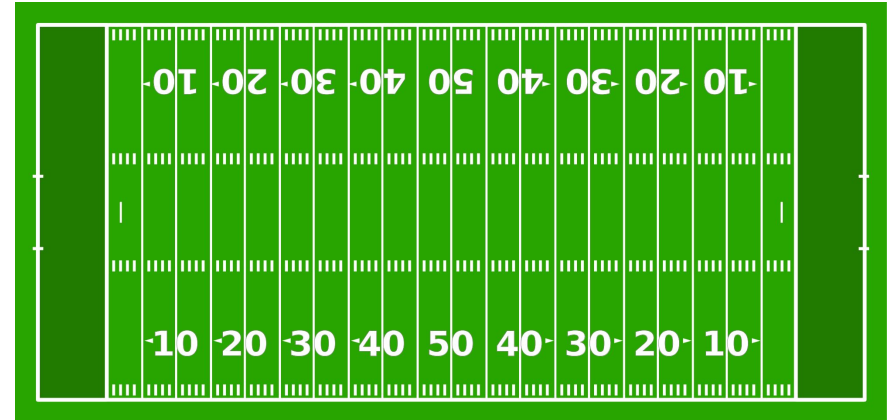
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Introduction

- Motivation

- Revolves around moving the ball

- 4 downs <=> 10 yards

- Two ways to move

Two Types of Plays

Rush

Pass

David Johnson 47 yard TD run v. Seattle
Week 9, 2015 Season

Aaron Rodgers hail mary TD v. Arizona
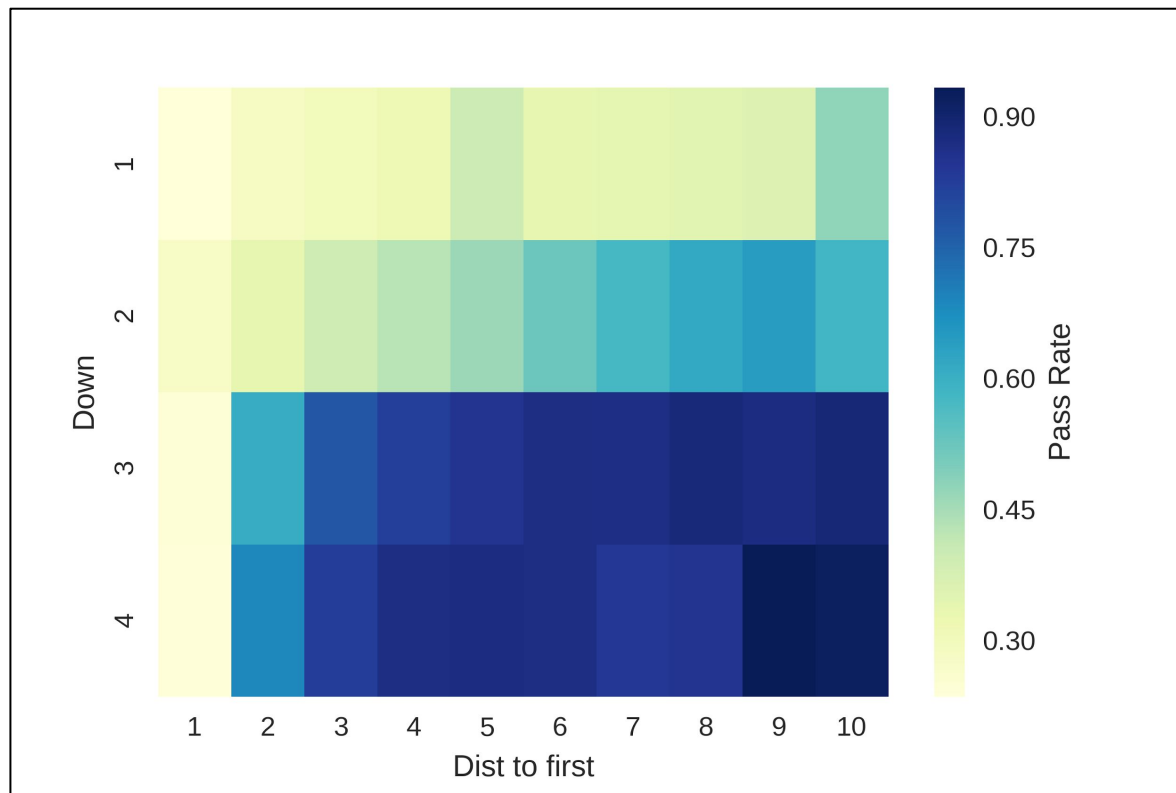NFC Divisional Round, 2015 Season

Data

- Obtained play-by-play data from 11 NFL seasons from advancedfootballanalytics.com
- Categorized these into "pass" and "run" plays
- Over 350,000 plays of which 56% were passes

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(14:20) (Shotgun) K.Collins pass intended for T.
Barber INTERCEPTED by T.Parrish (M.Rumph) at NYG 29.
T.Parrish to NYG 23 for 6 yards (T.Barber).
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M.Bryant kicks 58 yards from
NYG 30 to SF 12. J.Williams
to SF 32 for 20 yards (M.
Rivers  Q.Monk).
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(14:09) J.Garcia right
end ran ob at NYG 7 for
16 yards (B.Short).
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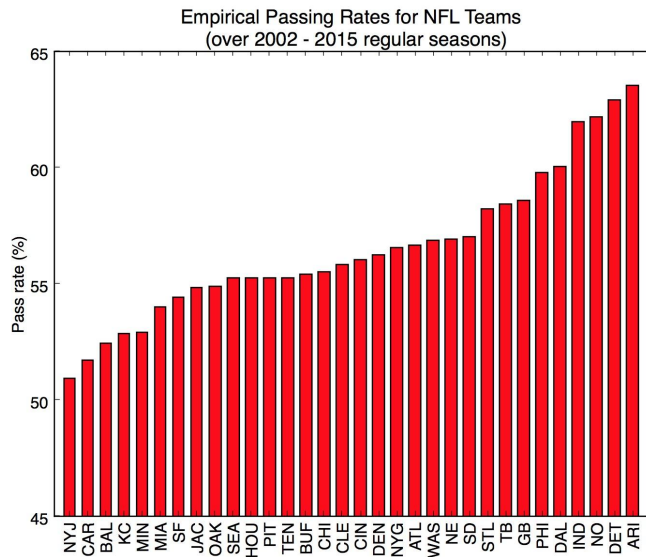
Exploring the Data

Features

Some of the features we used in the models are:

- Down
- Quarter
- Time left in game (secs)

- Offense and Defense teams
- Score difference (offense score - defense score)

Empirical Passing Rates for NFL Teams
(over 2002 - 2015 regular seasons)

Initial Modeling Results

Model	Logistic Regression	KNN	SVM
Training Accuracy (%)	64.8	61.6	48.0
Test Accuracy (%)	65.0	60.2	43.1

Tree Based Modeling Results

Model	Decision Tree	Random Forest	Gradient boosted Trees
Training Accuracy (%)	91.8	69.2	68.7
Test Accuracy (%)	61.7	69.1	68.7

Web Application Demo

http://52.35.109.135:5000/toolbox

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