NFL 4th down Analytics

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Contents

Goals

Predict whether a team is going to **Punt**, kick a **Field Goal**, or **Go for it** on 4th down.

1. Motivation
2. Explore and Understand the data
3. What affects their choice on 4th down?
4. Develop a Model

Introduction / Overview

Does anyone know the different decisions a team has on 4th down?

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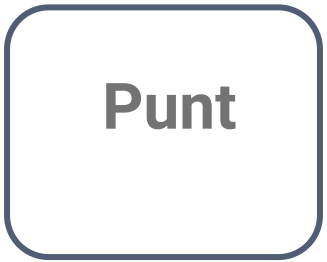


Introduction / Overview

Does anyone know the different decisions a team has on 4th down?

Punt

Field Goal

Introduction / Overview

Does anyone know the different decisions a team has on 4th down?

Punt

Field Goal

Go for it

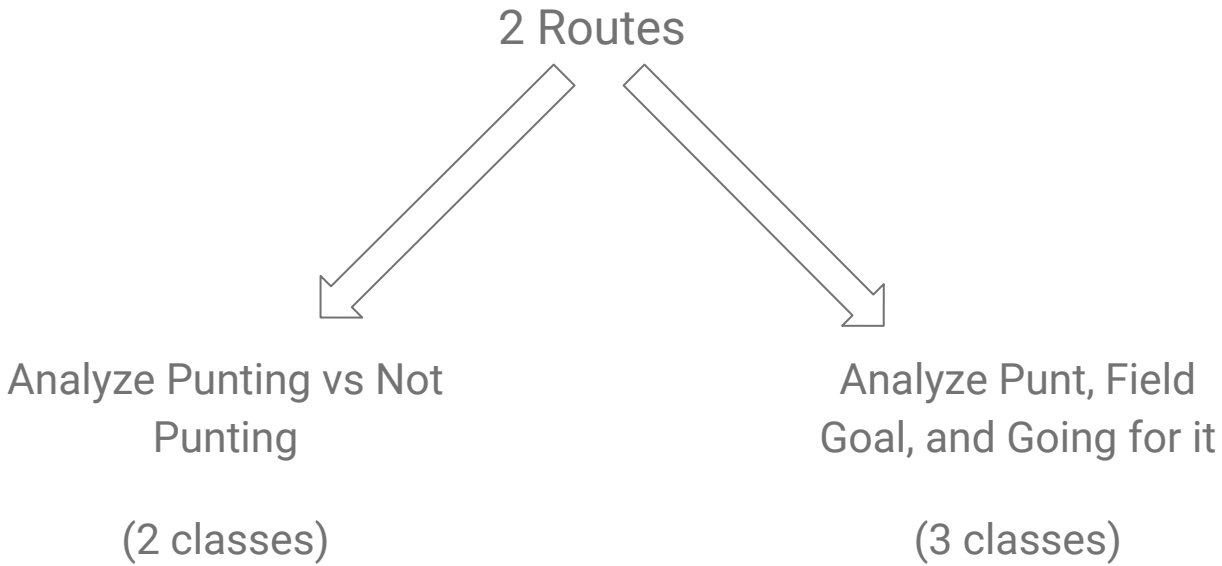
Data

Play-by-play data webscraped from the NFL, provided on Kaggle

Includes:

- 449371 individual plays
- 255 features
- 2009 - 2018 regular seasons
- 2,526 games
- **37,769 4th down plays**

Exploratory Data Analysis



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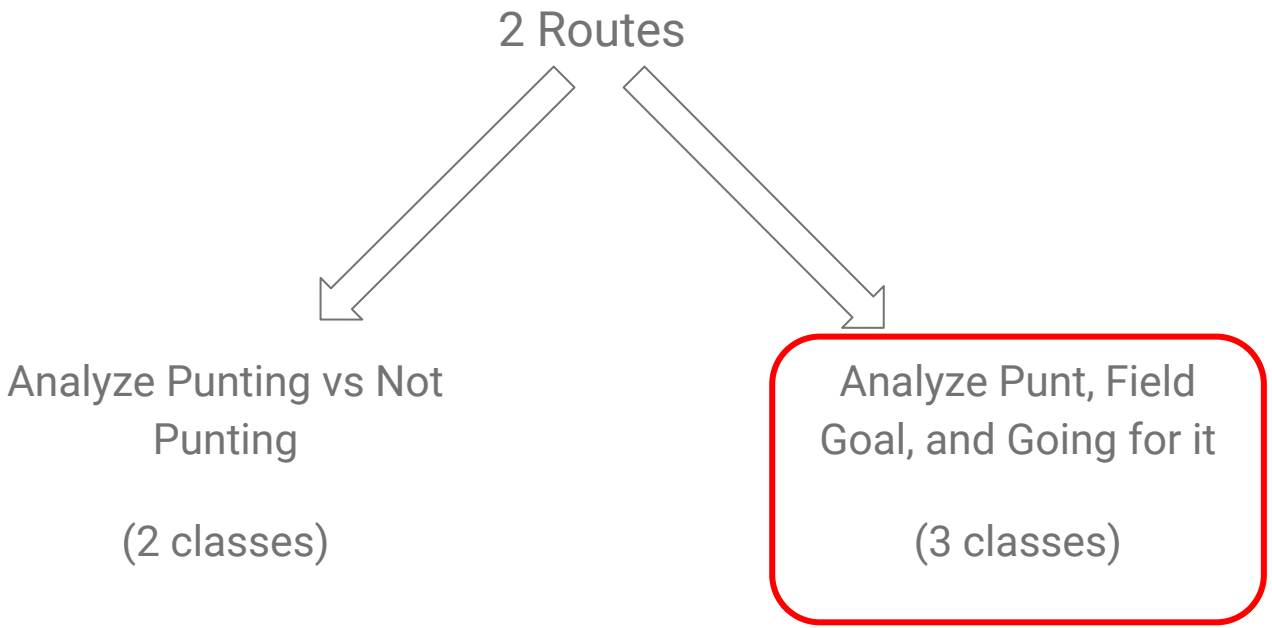
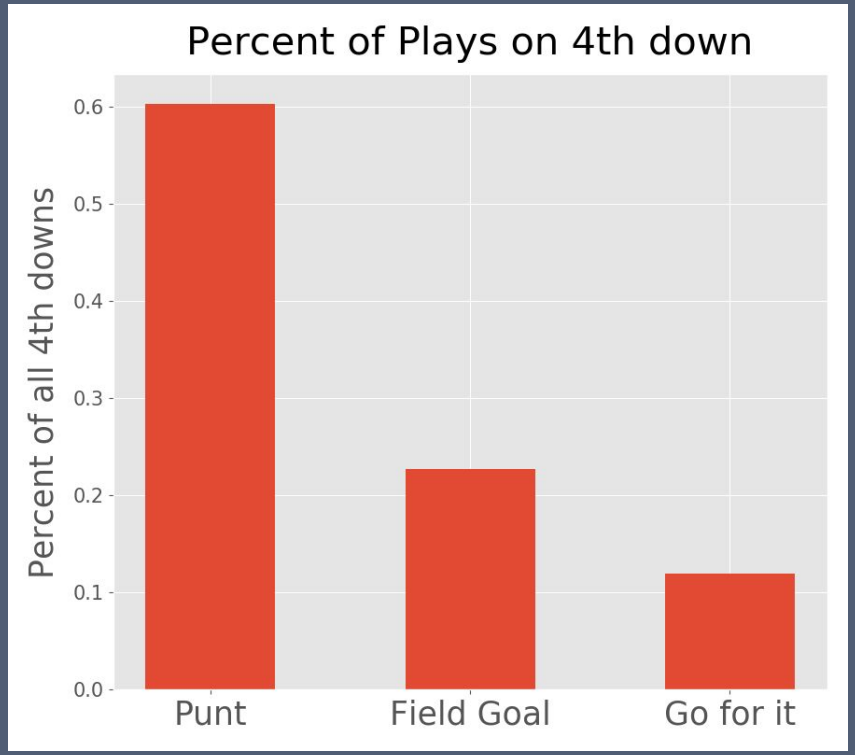
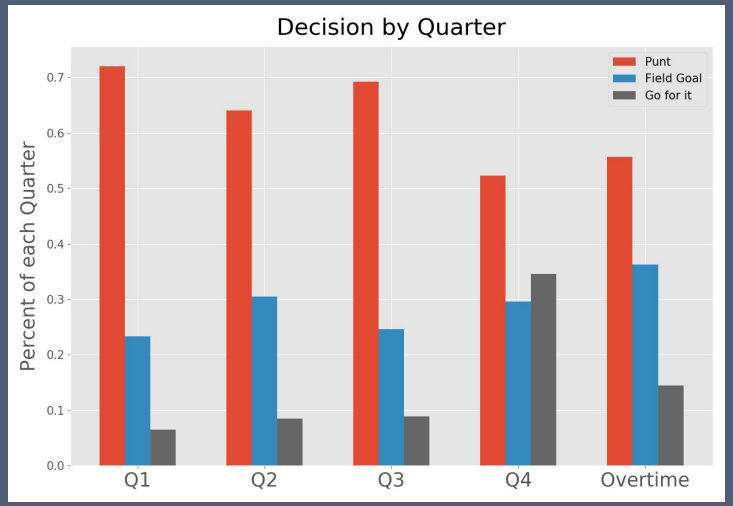
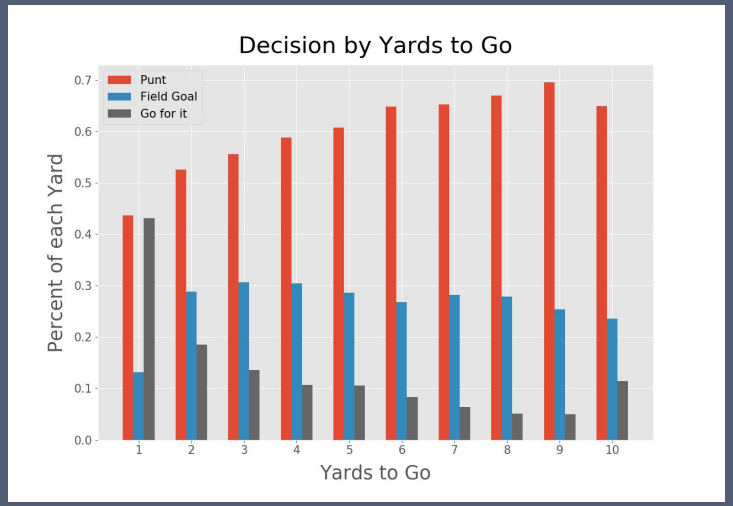


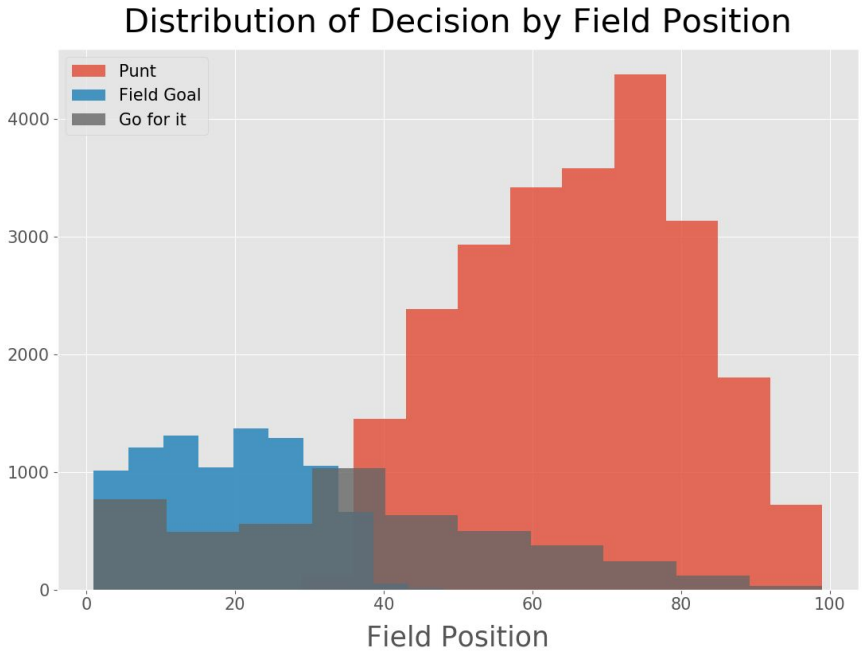


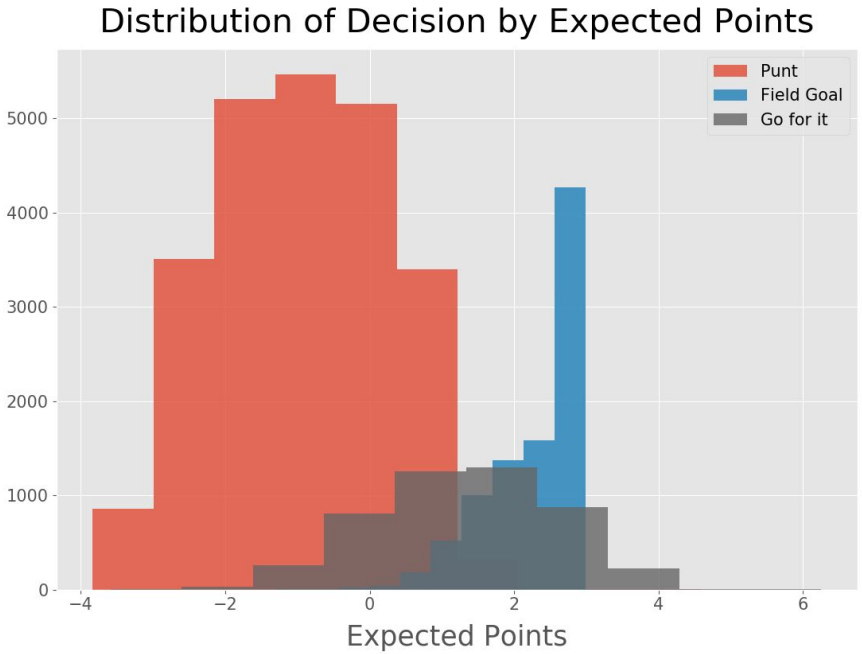




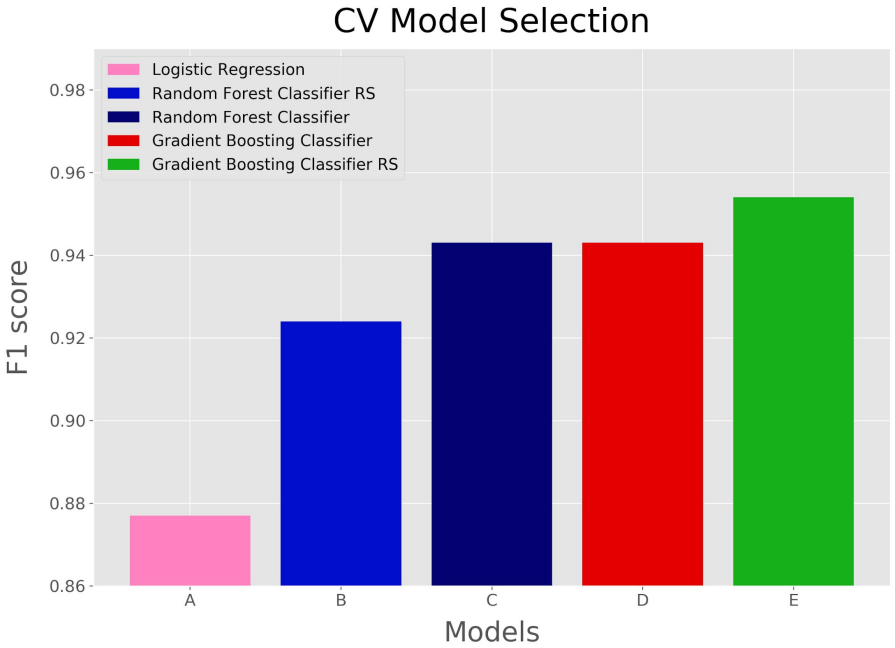
Exploratory Data Analysis on what features (columns) affect the decision on 4th down

Field Position and Expected Points



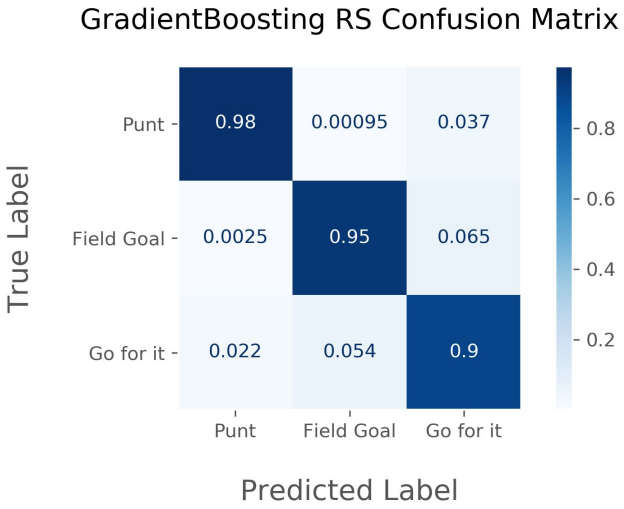


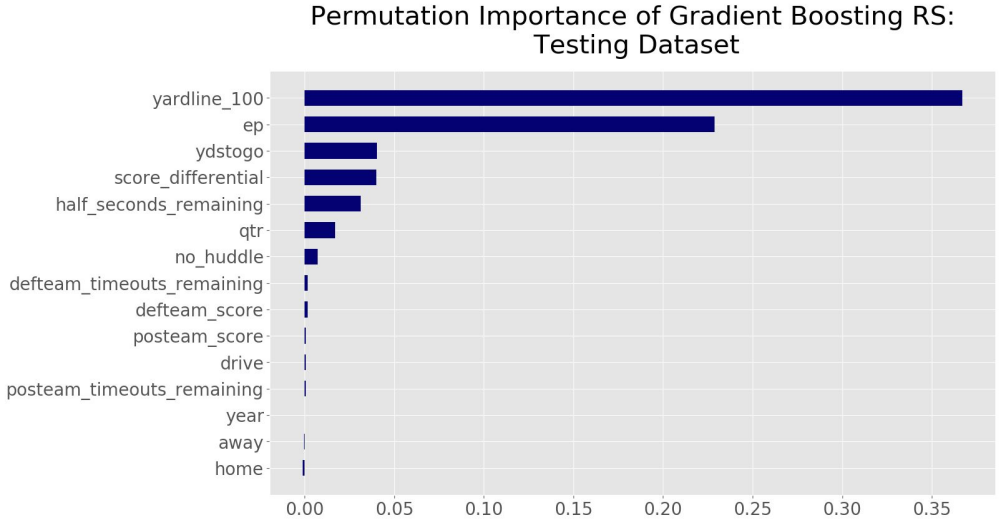
Modeling



- Multi-Classification
- Imbalanced Classes
- Scoring Metric

Final Model





Gradient Boosting RS weighted F1 score: 0.944

Conclusions

Coaching Decisions

- Which unit to have out on the field
- Defense on 3rd down
  - Yards to Go
  - Field Position

Education Tool

Football Leagues