

Team
Camel

Quantifying Special Teams Play in the National Football League

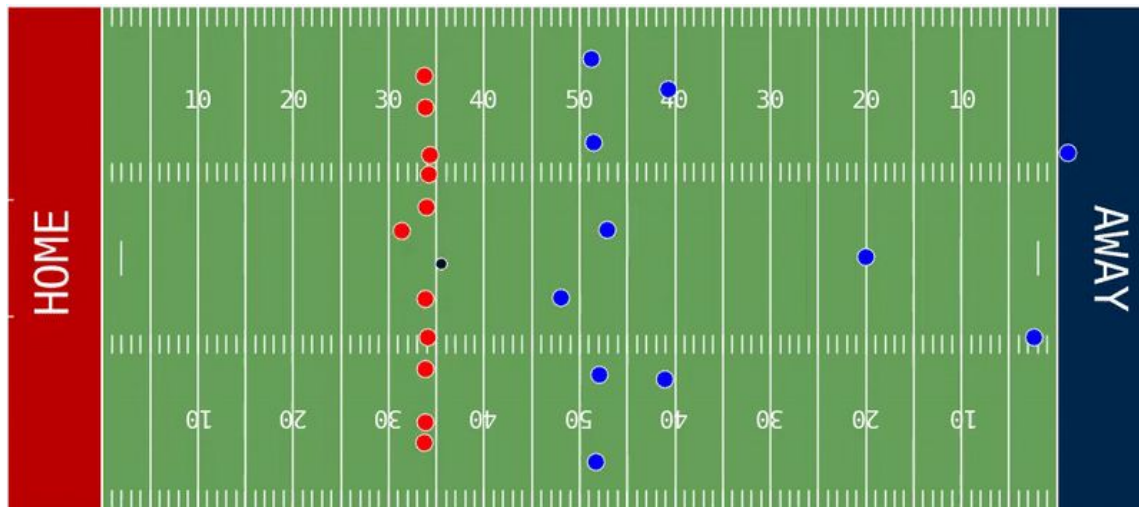
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The Problem

Context

- The use of advanced metrics and data analytics in the National Football League (NFL) is relatively new
- Create metrics in order to quantify special teams play strategy in the NFL



The Goal

Special Teams Strategy

There are four types of special team plays:

- Extra Points
- Field Goals
- Kick Offs
- Punt Returns

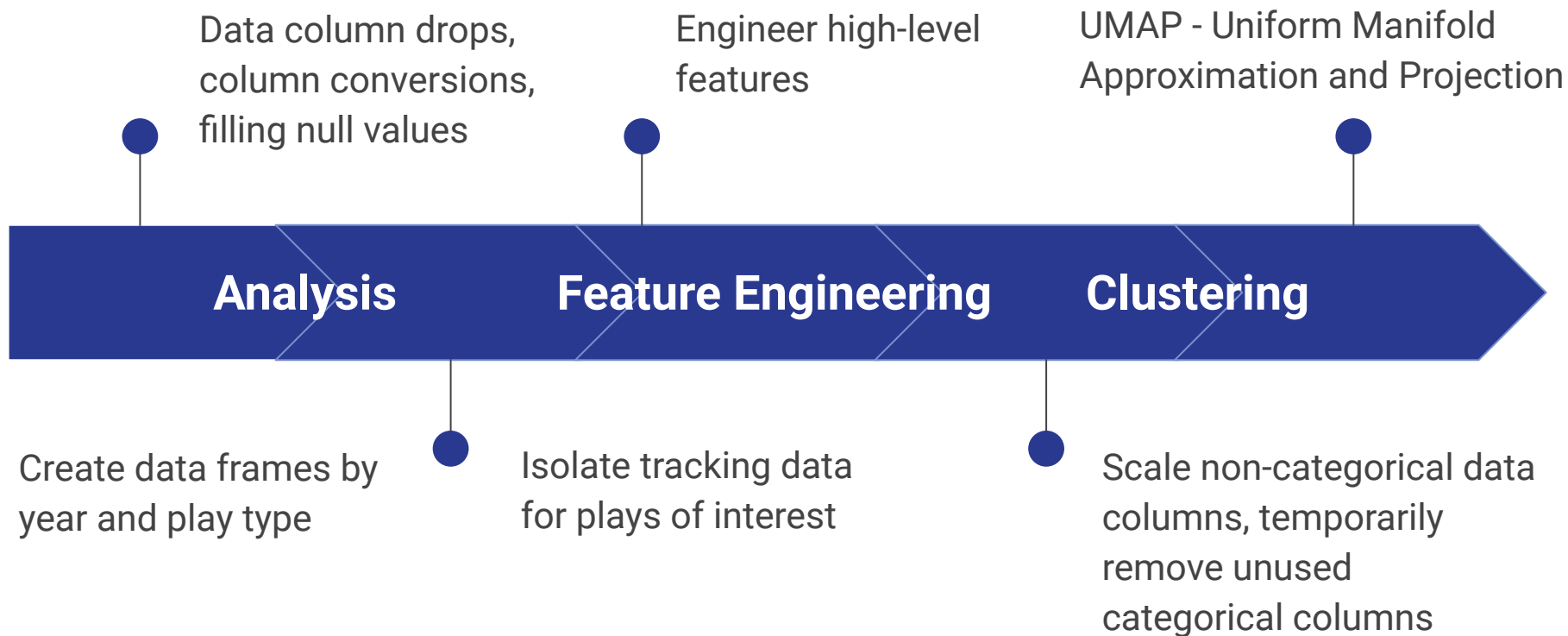


Goal

Establish metrics to quantify extra points and field goals plays using topological approaches

MINEDXAI

Preprocessing



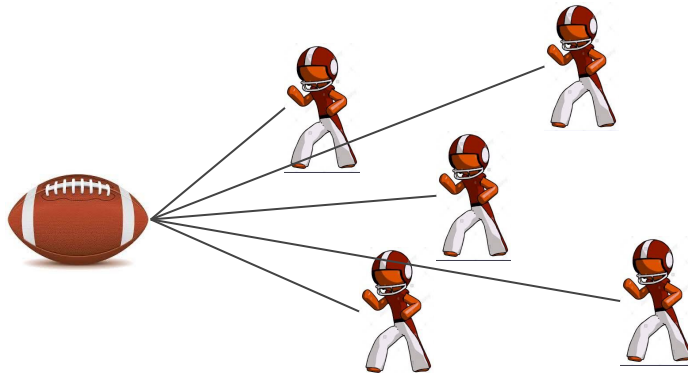
Feature Engineering: Greatest Impact?

Core Distance

Measures Defensive Pressure on Football

Metrics

- Kicker core distance



Kicker Accuracy

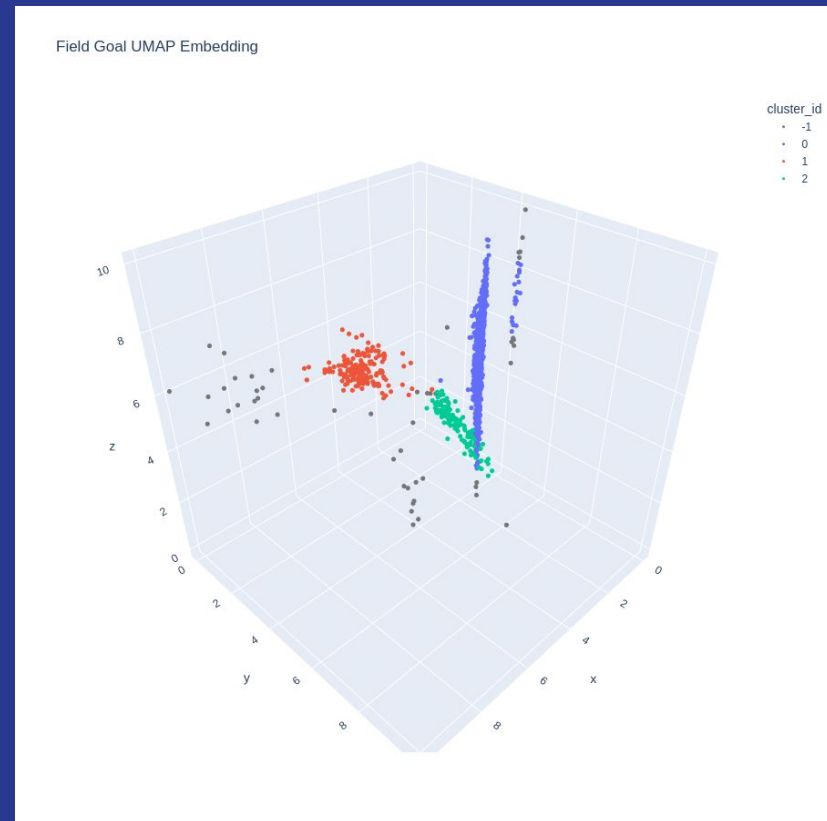
Measures Where Football Crosses the Goalpost

Metrics

- Expected error
- Off center error

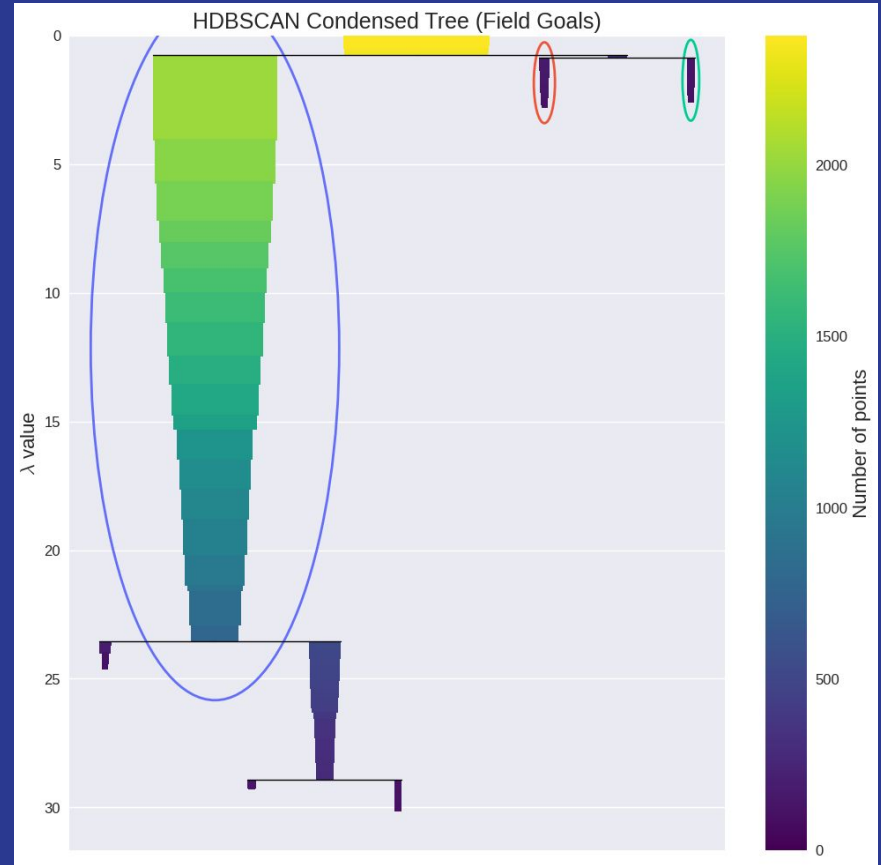
Clustering: UMAP

- Preprocessing step for density based clustering in our analysis
- Uniform Manifold Approximation and Projection (topological foundations)
- Dimensionality Reduction Technique
- Addressed issues with categorical data prior to clustering



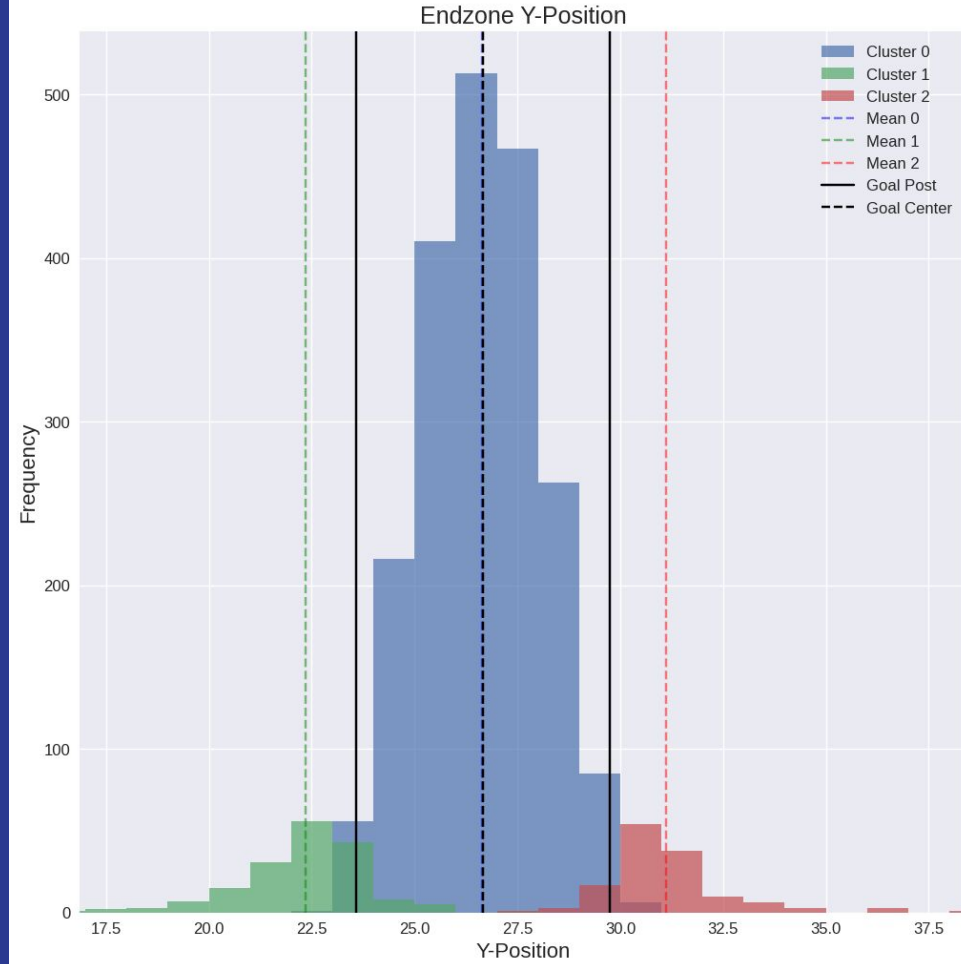
Clustering: HDBSCAN

- Hierarchical Density-Based Spatial Clustering of Applications with Noise (topological foundations)
- 3 clusters + outliers
- Kicker accuracy metrics partitioned data by special teams results



Results: Kicker Accuracy is Crucial

- The UMAP embedding is interpretable!
- Actionable insight: focus on accuracy of kicker.



Recommendations

- Center framework of analysis on kicker accuracy instead of defensive pressure.

Future Work

- Punts and kickoffs
- Analysis at the player or team level



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