



TACKLING THE NFL:

Quantifying Defensive Metrics

Krishanu Datta & Joseph Kajor



PROBLEM

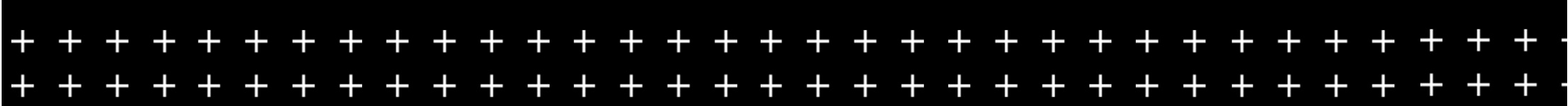
Evaluating Defensive Performance

Current Practice

Number of tackles

Our Innovation

Tackle Probability

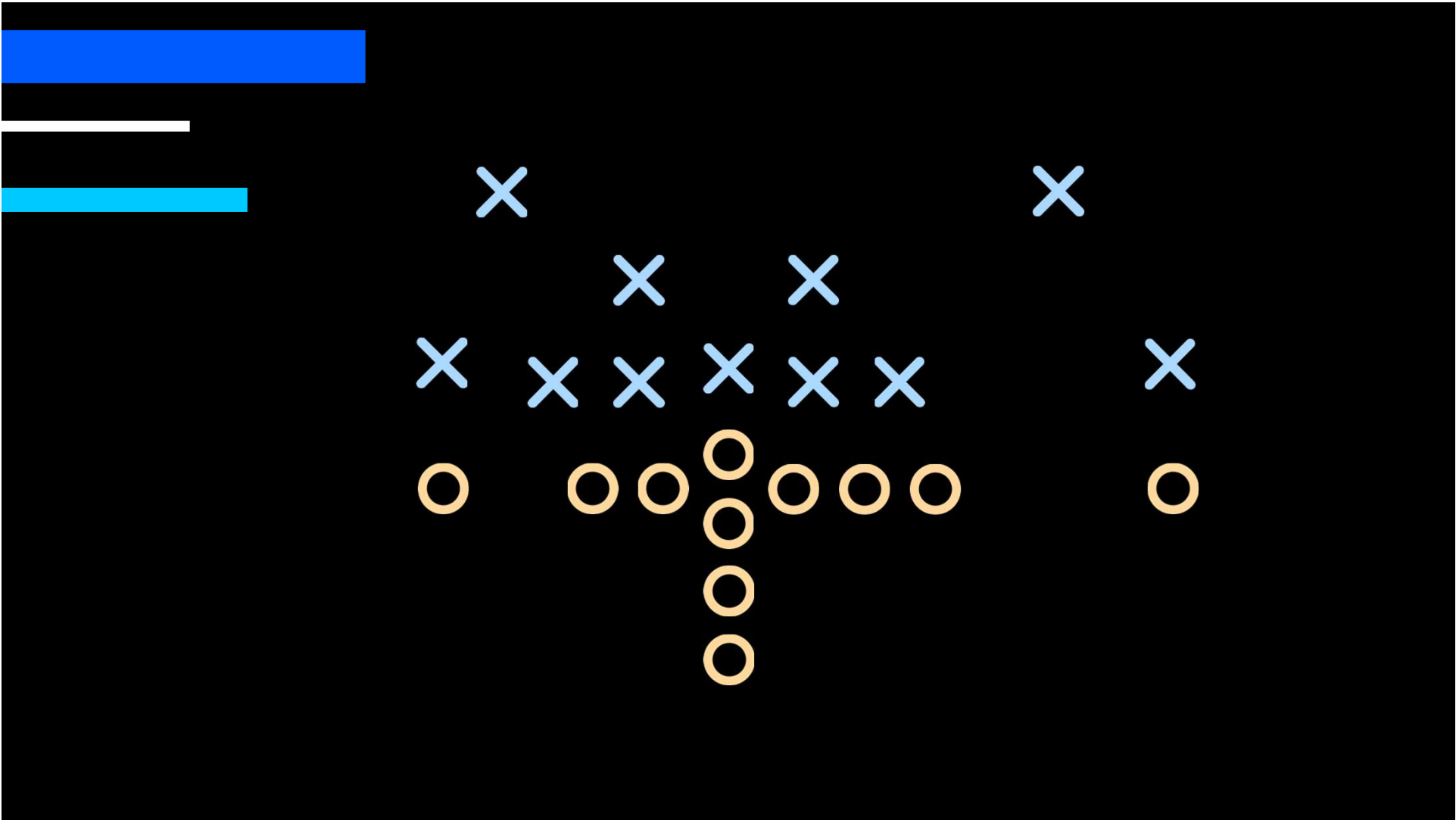


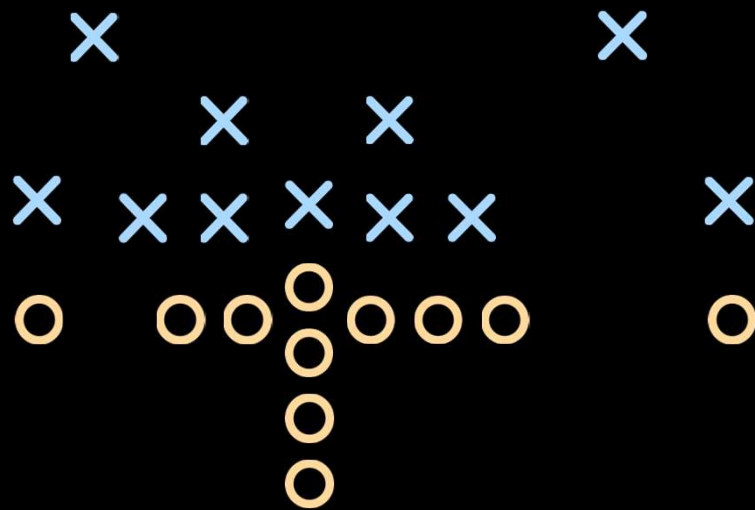
DATA

2022 NFL Season

- **Player**
- **Game facts**
- **Play details**
- **Tracking data**







Tracking Data

| Player | X Position | Y Position |
|----------|------------|------------|
| Theo | 7.29 | 8.35 |
| Dimitris | 7.01 | 8.41 |

. . .

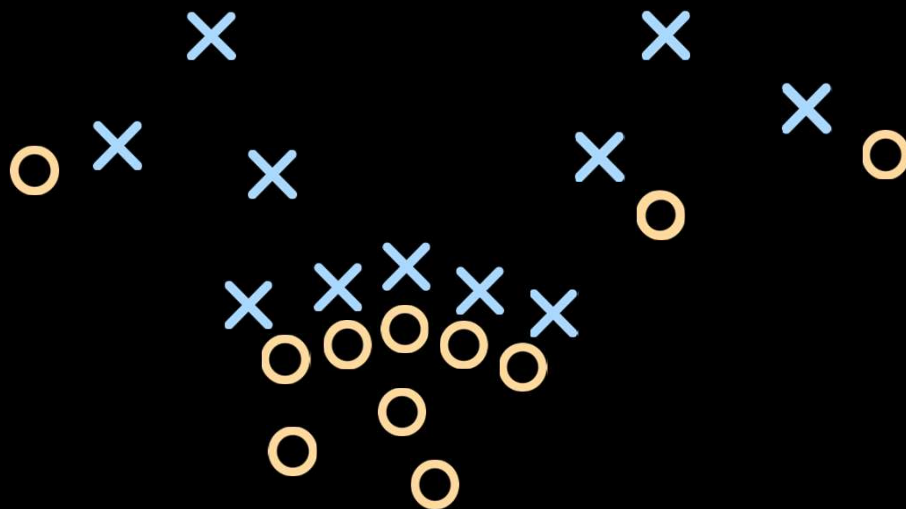
| | | |
|-------|------|------|
| Krish | 7.35 | 8.30 |
| Joe | 7.02 | 8.24 |

Tracking Data

| Player | X Position | Y Position |
|----------|------------|------------|
| Theo | 7.31 | 8.33 |
| Dimitris | 6.92 | 8.61 |

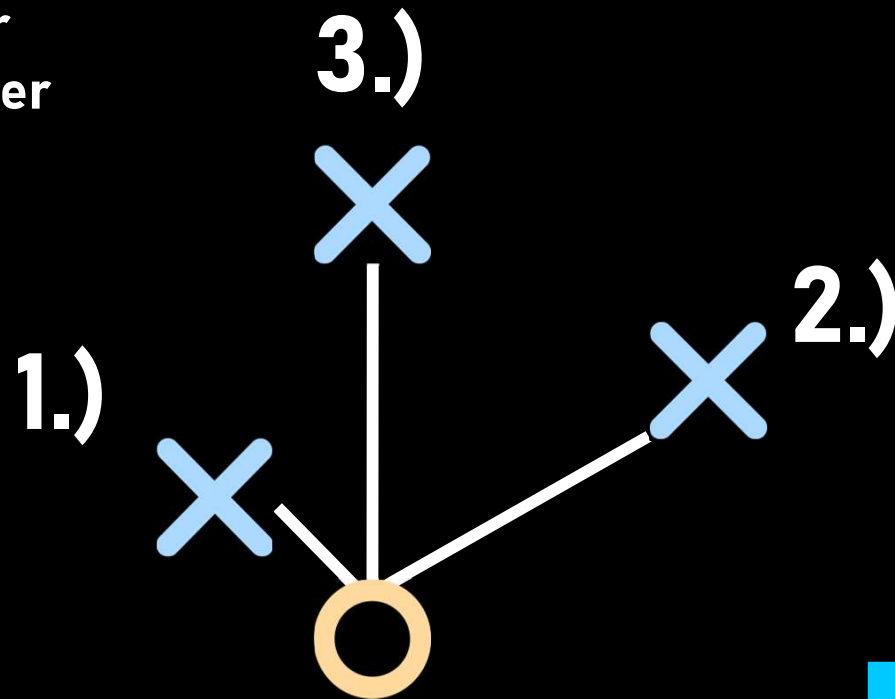
• • •

| | | |
|-------|------|------|
| Krish | 7.34 | 8.21 |
| Joe | 6.84 | 8.57 |



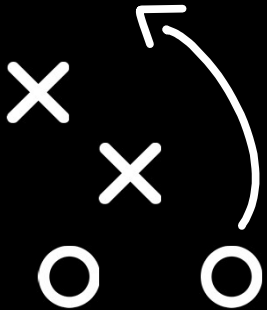
FEATURE ENGINEERING

Distance to ball carrier
Closeness to ball carrier
& more!



MODELS

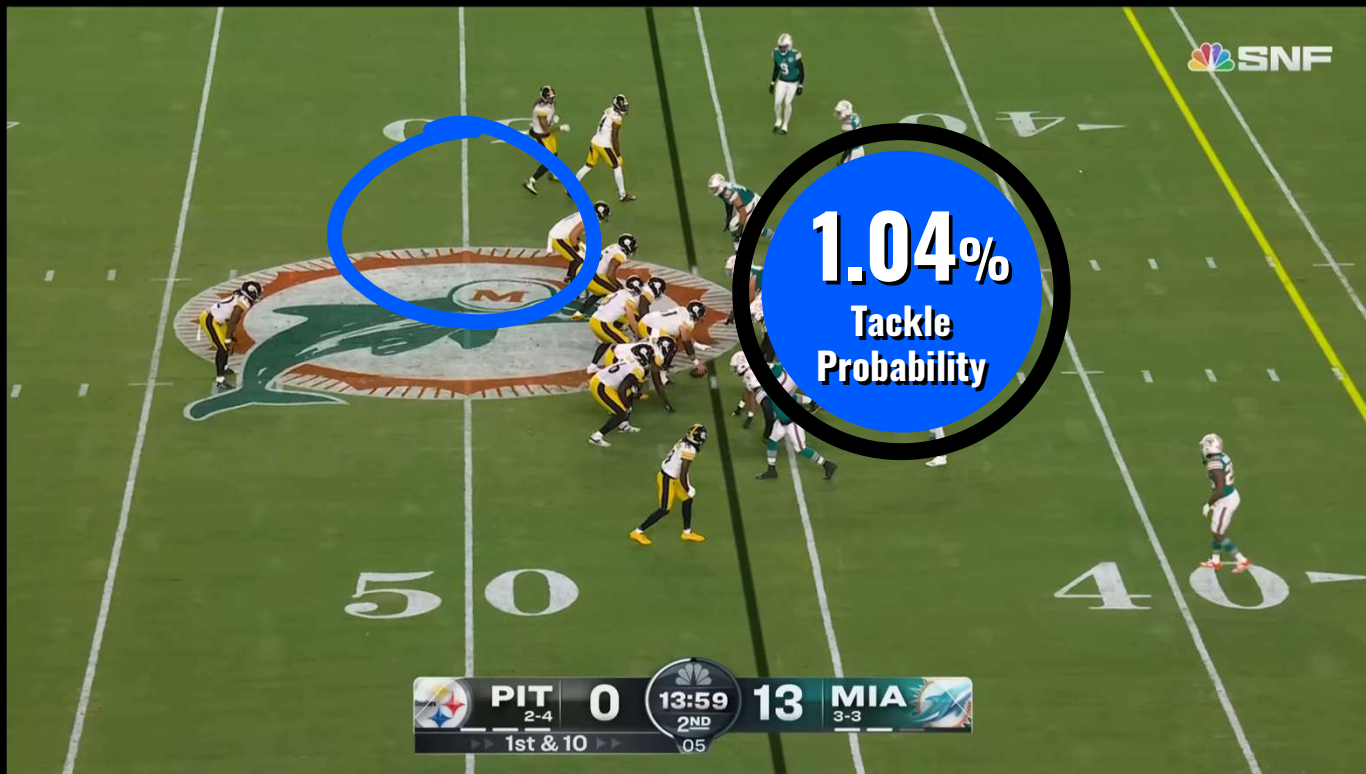
- **Classification model**
 - **Extract raw probabilities**
- **Unbalanced data**
 - **AUC vs Accuracy**



MODELS

| Model | AUC | Accuracy |
|---------------------|------|----------|
| Baseline | 0.50 | 0.8313 |
| Logistic Regression | 0.80 | 0.9350 |
| CART | 0.67 | 0.9222 |
| Random Forest | 0.81 | 0.9376 |
| XGBoost | 0.82 | 0.9398 |
| OCT | 0.88 | 0.9423 |

So what???



IMPACT

- **Identify over-performing players**
 - Hustle
 - Quantify intangibles
- **Utilize to make decisions**
 - Managers (draft, trade)
 - Coaches (start, sit)



THANK YOU!