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Predicting the Next Offensive Play Types will be Implemented to Maximize the Defense’s Chances of Success in the National Football League

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Abstract : In the realm of the National Football League (NFL), substantial dedication of time and effort is invested by both players and coaches in meticulously analyzing the game footage of their opponents. The primary aim is to anticipate the actions of the opposing team. Defensive players and coaches are especially focused on deciphering their adversaries' intentions to effectively counter their strategies. Acquiring insights into the specific play type and its intended direction on the field would confer a significant competitive advantage. This study establishes pre-snap information as the cornerstone for predicting both the play type (e.g., deep pass, short pass, or run) and its spatial trajectory (right, left, or center). The dataset for this research spans the regular NFL season data for all 32 teams from 2013 to 2022. This dataset is acquired using the nflreadr package, which conveniently extracts play-by-play data from NFL games and imports it into the R environment as structured datasets. In this study, we employ a recently developed machine learning algorithm, XGBoost. The final predictive model achieves an impressive lift of 2.61. This signifies that the presented model is 2.61 times more effective than random guessing—a significant improvement. Such a model has the potential to markedly enhance defensive coaches' ability to formulate game plans and adequately prepare their players, thus mitigating the opposing offense's yardage and point gains.

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