

Explore Toronto crime data: Relationship between crimes, age and sex in Toronto crime statistics*

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[1] "RMSE on test set: 4.26374098881656"

1 Introduction

Football is an established industry in the United States with teams, fans, franchise merchandise, etc., and a complete economic system. Understanding the dynamics of a team can help a team succeed on the field. One of the important metrics when evaluating individual plays' effectiveness is Expected Points Added (EPA). This score effectively quantifies the impact of individual plays on scoring and can capture information beyond traditional methods. In this study, we predicted passing EPA through a linear regression model utilizing a variety of game-related variables. By focusing on quarterback performance, we analyzed the key factors that influence a team's ability to score.

*Code and data supporting this analysis is available at: <https://github.com/UofT-DailinLi/toronto-crime-report.git>

2 Data

Our dataset was obtained from Opentoronto and includes 15449 observations and 53 variables (Gelfand 2022). We are only curious about the regional session QB position in the first nine weeks of 2023. Therefore, the number of observations dropped to 335. so the Individual data from games inside the NFL are included, with a focus on quarterbacks (QB). The selected predictors include pass attempts, completions, passing yards, passing touchdowns, interceptions, and sacks. These variables were chosen because they are closely related to passing performance and may have a potential impact on EPA. The dataset was divided into a training set and a test set, randomly assigned in an 80-20 ratio, to develop the model and test its predictive ability.

Data was cleaned and analyzed using the open source statistical programming language R (R Core Team 2022), and additional packages from `tidyverse` (Wickham et al. 2019), `ggplot2` (Wickham 2016), `nflverse` (Carl et al. 2023), `here`(Müller 2020), `nflreadr`(Ho and Carl 2023), `caret`(Kuhn and Max 2008), `lmtest`(Zeileis and Hothorn 2002) and `knitr` (Xie 2014). The cleaned dataset contains 318 observations, and four variables will be shown below.

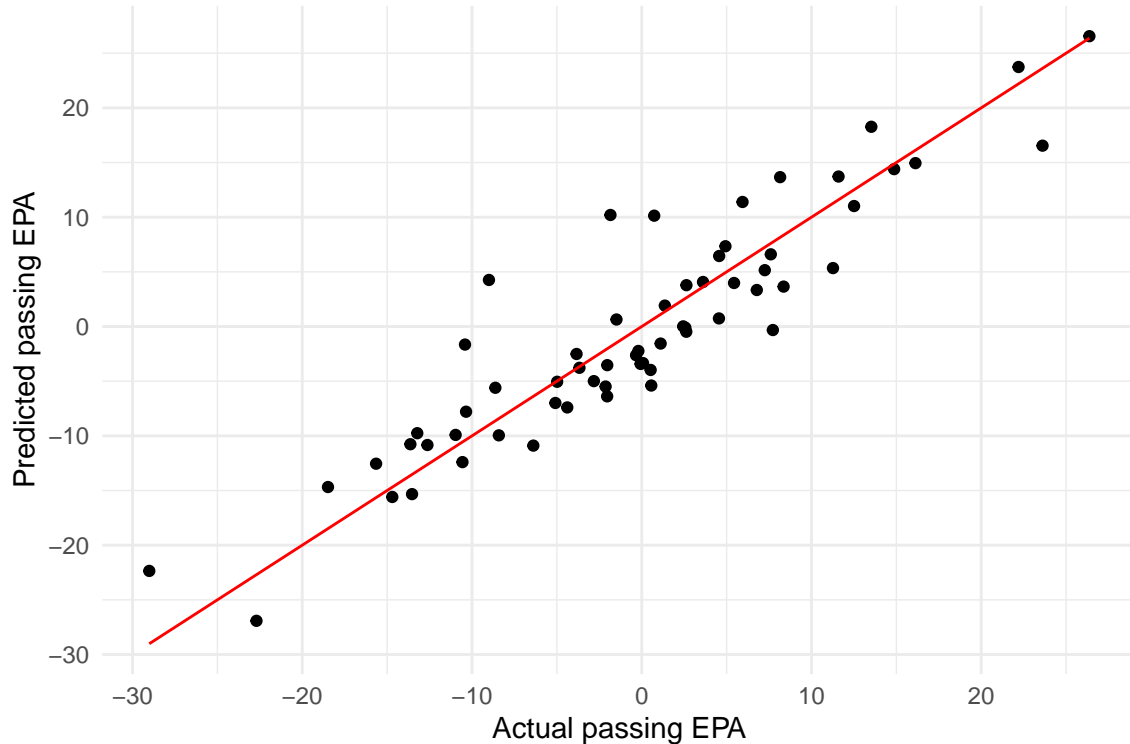


Figure 1: Actual vs. Predicted passing EPA

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