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Expert advice from experts

Marie Curie

Nobel Prize, PhD

Pierre Curie

Nobel Prize, PhD

Report for
Acme Corporation

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**Department of
Econometrics &
Business Statistics**

☎ (03) 9905 2478
✉ BusEco-Econometrics@monash.edu

ABN: 12 377 614 012

1 Introduction

What positions should players stand and get a better impact on the serve return? Are there any strategies that the players used during their tennis games? As we know, the serve return is also important in tennis, however, there is lots of analysis about the tennis before and return impact analysis were not really common, mainly because the positions of the data containing the 3D position is not easy to collect and there is not too much sample for analysis. In the project, we are going to explore a model for the return impact position of the professional players using recently go public tracking data summaries on the ATP Tour websites of the 2D position of the ball at the time of return impact,

2 Overview the dataset

The data set Figure 1 includes return impact for returned points in ATP singles matches for events between 2018 and 2020. There are 25 variables and 126455 observations in this data set and each observation refers to a single point within a match. From Figure 2, there is no missing value in the data set, so we omit the data wrangling this step and use the data directly.

	match_id	X	Y	Z	serve	player	opponent	playerid	event_name	year	surface	Ad	Clay	Grass	server_n	receiver_n	ServeType	AdT	AdBody	AdWide	DeuceT	DeuceBody	DeuceWide	server_id	return_id
1	2018/352/N/5001	-13.186	6.680	1.344	1	K. Khachanov	N. Djokovic	K239	paris	2018	Hard	0	0	0	52	43	Wide	0	0	0	0	0	0	1	147
2	2018/352/N/5001	-13.032	5.731	1.505	1	K. Khachanov	N. Djokovic	K239	paris	2018	Hard	0	0	0	52	43	Wide	0	0	0	0	0	0	1	147
3	2018/352/N/5001	-13.442	5.919	1.274	1	K. Khachanov	N. Djokovic	K239	paris	2018	Hard	0	0	0	52	43	Wide	0	0	0	0	0	0	1	147
4	2018/352/N/5001	-13.309	6.840	1.352	1	K. Khachanov	N. Djokovic	K239	paris	2018	Hard	0	0	0	52	43	Wide	0	0	0	0	0	0	1	147
5	2018/352/N/5001	-14.905	1.172	1.185	1	K. Khachanov	N. Djokovic	K239	paris	2018	Hard	0	0	0	52	43	T	0	0	0	0	0	0	1	147
6	2018/352/N/5001	-13.551	-5.544	1.888	1	K. Khachanov	N. Djokovic	K239	paris	2018	Hard	1	0	0	52	43	Wide	0	0	0	1	0	0	0	147
7	2018/352/N/5001	-13.291	-5.597	1.126	1	K. Khachanov	N. Djokovic	K239	paris	2018	Hard	0	0	0	52	43	Wide	0	0	0	0	0	0	1	147
8	2018/352/N/5001	-13.239	-5.542	1.106	1	K. Khachanov	N. Djokovic	K239	paris	2018	Hard	1	0	0	52	43	Wide	0	0	0	1	0	0	0	147
9	2018/352/N/5001	-14.188	-3.489	1.093	1	K. Khachanov	N. Djokovic	K239	paris	2018	Hard	0	0	0	52	43	Body	0	1	0	0	0	0	0	147
10	2018/352/N/5001	-13.746	1.574	1.275	1	K. Khachanov	N. Djokovic	K239	paris	2018	Hard	0	0	0	52	43	T	0	0	0	0	1	0	0	147
11	2018/352/N/5001	-12.880	6.195	1.395	1	N. Djokovic	K. Khachanov	D543	paris	2018	Hard	0	0	0	43	52	Wide	0	0	0	0	0	0	1	108
12	2018/352/N/5001	-14.007	-0.818	1.217	1	K. Khachanov	N. Djokovic	K239	paris	2018	Hard	0	0	0	52	43	T	0	0	0	0	1	0	0	147

Figure 1: Data set overview

```
##      match_id              X              Y              Z
## Length:126455      Min.   :-23.111      Min.   :-10.587000      Min.   :-0.004
## Class :character  1st Qu.: -13.902      1st Qu.: -3.951000      1st Qu.: 1.191
## Mode  :character  Median : -12.841      Median :  0.782000      Median : 1.328
##                      Mean  : -13.012      Mean   :  0.006236      Mean   : 1.344
##                      3rd Qu.: -11.867      3rd Qu.:  2.903000      3rd Qu.: 1.493
##                      Max.   :  -6.423      Max.   : 10.212000      Max.   : 3.902
##      serve      player      opponent      playerid
## Min.   :1.000      Length:126455      Length:126455      Length:126455
## 1st Qu.:1.000      Class :character      Class :character      Class :character
## Median :1.000      Mode  :character      Mode  :character      Mode  :character
```

```
## Mean      :1.408
## 3rd Qu.:2.000
## Max.      :2.000

## event_name      year      surface      Ad
## Length:126455   Min.    :2018   Length:126455   Min.    :0.0000
## Class :character 1st Qu.:2019   Class :character 1st Qu.:0.0000
## Mode  :character Median :2019   Mode  :character Median :0.0000
##                      Mean  :2019                      Mean  :0.4229
##                      3rd Qu.:2020                      3rd Qu.:1.0000
##                      Max.   :2020                      Max.   :1.0000

##      Clay      Grass      server_n      receiver_n
## Min.    :0.0000   Min.    :0.00000   Min.    : 1.00   Min.    :10.00
## 1st Qu.:0.0000   1st Qu.:0.00000   1st Qu.:16.00   1st Qu.:21.00
## Median :0.0000   Median :0.00000   Median :29.00   Median :32.00
## Mean    :0.1465   Mean    :0.05388   Mean    :28.18   Mean    :32.78
## 3rd Qu.:0.0000   3rd Qu.:0.00000   3rd Qu.:37.00   3rd Qu.:38.00
## Max.    :1.0000   Max.    :1.00000   Max.    :66.00   Max.    :66.00

## ServeType      AdT      AdBody      AdWide
## Length:126455   Min.    :0.0000   Min.    :0.000   Min.    :0.0000
## Class :character 1st Qu.:0.0000   1st Qu.:0.000   1st Qu.:0.0000
## Mode  :character Median :0.0000   Median :0.000   Median :0.0000
##                      Mean  :0.1102   Mean  :0.138   Mean  :0.1747
##                      3rd Qu.:0.0000   3rd Qu.:0.000   3rd Qu.:0.0000
##                      Max.   :1.0000   Max.   :1.000   Max.   :1.0000

## DeuceT      DeuceBody      DeuceWide      server_id
## Min.    :0.0000   Min.    :0.00000   Min.    :0.0000   Min.    : 1.00
## 1st Qu.:0.0000   1st Qu.:0.00000   1st Qu.:0.0000   1st Qu.: 50.00
## Median :0.0000   Median :0.00000   Median :0.0000   Median : 98.00
## Mean    :0.3154   Mean    :0.09277   Mean    :0.1689   Mean    : 99.94
## 3rd Qu.:1.0000   3rd Qu.:0.00000   3rd Qu.:0.0000   3rd Qu.:151.00
## Max.    :1.0000   Max.    :1.00000   Max.    :1.0000   Max.    :205.00

## return_id
## Min.    : 1.00
```

```
## 1st Qu.:21.00
## Median :39.00
## Mean   :41.05
## 3rd Qu.:63.00
## Max.   :84.00
```

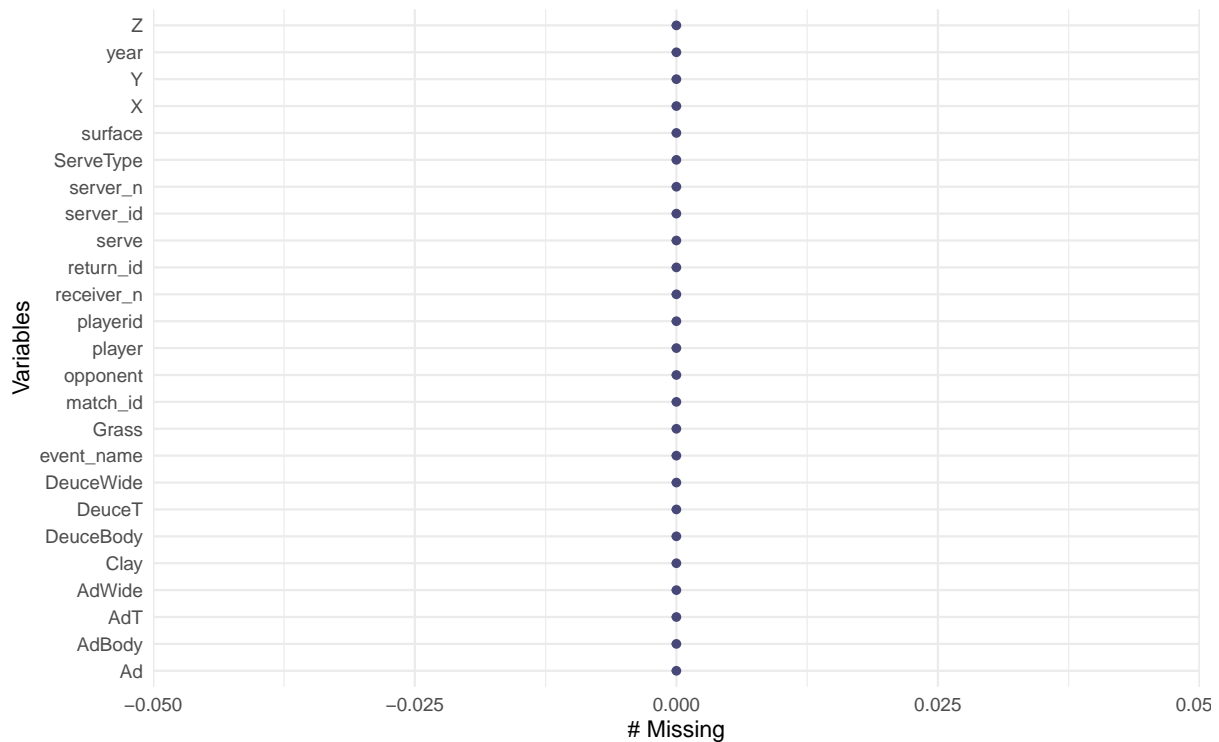


Figure 2: *Check missing value*

3 Project Goals

This project will develop a generative model for the return impact position of professional male players. Furthermore, the project will identify key contextual variables that may influence return impact, including but not limited to: * Serve number * Serve direction * Surface * Receiver * Server. Moreover, there is a shiny dashboard designed for the project visualisation.

4 How variables influence player's return impact

5 Return Impact model

6 Implementation

7 User Guide

8 Conclusion