A PROJECT REPORT

on

"Driver Performance in Formula 1: A Data-Driven Approach"

Submitted to

KIIT Deemed to be University

In Partial Fulfillment of the Requirement for the Award of

BACHELOR'S DEGREE IN

COMPUTER SCIENCE AND ENGINEERING

BY

Soham Raj Jain - 2105410
Rahul Sinha - 21052689
Abhinav Manghrati- 21052639
Mohammad Nazim Qureshi- 21052804

UNDER THE GUIDANCE OF

PROF. JHALAK HOTA

SCHOOL OF COMPUTER ENGINEERING

KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY

BHUBANESWAR, ODISHA - 751024

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CERTIFICATE

This is certify that the project entitled

"Driver Performance in Formula 1: A Data-Driven Approach"

submitted by

Soham Raj Jain - 2105410
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is a record of bonafide work carried out by them, in the partial fulfilment of the requirement for the award of Degree of Bachelor of Engineering (Computer Sci-ence & Engineering OR Information Technology) at KIIT Deemed to be university, Bhubaneswar. This work is done during year 2022-2023, under our guidance.

Date : / /

(Prof. Jhalak Hota)
Project Guide

ACKNOWLEDGEMENT

We are profoundly grateful to **Prof. Jhalak Hota** of Affiliation for his expert guidance and continuous encouragement to see that this project rights its target from its commencement to its completion. His willingness to give his time so generously has been very much appreciated. We would also like to thank the staff of KIIT University for encouraging us to do this project with full enthusiasm.

Soham Raj Jain-2105410

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ABSTRACT

Formula 1 (F1) is the pinnacle of international open-wheel racing. Across a season, drivers compete in various Grands Prix on custom-built tracks or closed public roads. Teams with technologically advanced single-seater cars battle for the World Championship title, decided by points awarded based on race finishes.F1 showcases peak performance in both car design and driver skill.

While points are the ultimate measure of success in F1, they don't tell the whole story. Reliability, teammate comparisons, and race finishes all contribute to point totals and require further analysis for a complete understanding of driver performance.

Beyond points, there are a wealth of statistics available for F1 drivers. These might include qualifying times, race pace compared to teammates, pit stop efficiency, and even overtaking success rates. Examining these advanced metrics can provide a more nuanced understanding of driver performance and identify areas of strength and weakness.

Keywords: Race Winner, Qualifying times, Race finishes, World Championship, Drivers

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Chapter 1

Introduction

Formula 1, often shortened to F1, is the highest class of international auto racing sanctioned by the Fédération Internationale de l'Automobile (FIA). It's a global spectacle featuring races (called Grand Prix) held on purpose-built circuits around the world.

Driver skill is paramount in F1. Several factors paint a picture of a driver's performance.

Race Results: Finishing positions in each Grand Prix are the most basic measure of success, with points awarded to the top finishers. Consistency in high placements is key.

Qualifying: Qualifying determines the starting grid for each race. Faster times here translate to a strategic advantage in the main event.

Advanced Metrics: Beyond the basics, F1 dives deep with complex data. Statistics like race pace compared to teammates, pit stop efficiency, and overtaking success rates paint a more detailed picture of driver strengths and weaknesses.

By analyzing driver statistics, fans and analysts can not only rank current performance but also identify future stars and potential rivalries that will keep the races exciting.

Chapter 2

Basic Concepts/ Literature Review

2.1 Driver Performance in Formula 1: A Data-Driven Approach

Formula 1 (F1) racing is a pinnacle of motorsport, where driver skill and cutting-edge technology converge. While raw talent has always been a critical factor, the role of data analysis in optimizing driver performance has become increasingly prominent. This literature review explores how F1 teams leverage data to elevate driver performance and examines the key metrics used for evaluation.

The Rise of Data-Driven Decision Making in F1

Several studies highlight the transformation of F1 into a data-driven sport. Articles like "How Data Analysis Transforms F1 Race Performance" [1] discuss how telemetry data from hundreds of sensors on the car provides real-time insights into various aspects like speed, engine performance, and tire wear. This data empowers teams to make strategic decisions regarding pit stops, fuel management, and car adjustments to optimize race strategy for the driver [1, 3].

Furthermore, "Is Formula 1 the world's most data-driven sport?: [invalid URL removed]" explores F1's collaboration with Amazon Web Services (AWS) to leverage machine learning for objective driver ranking, removing car bias and highlighting individual skill [4].

Key Performance Metrics in F1

Understanding driver performance requires analyzing various data points. An article, "A Data-Driven Analysis of Formula 1 Car Races Outcome" explores metrics like:

Race Laps Led: The percentage of laps a driver spends in the lead indicates their ability to maintain speed and overtake opponents.

Pit Stop Efficiency: Faster pit stops can significantly impact race position, making average pit stop time a crucial metric.

Tire Management: Data on tire wear and degradation helps strategize pit stops and driving style to maximize tire life.

These metrics, along with others like qualifying times and race finishes, provide a comprehensive picture of driver performance.

Beyond the Numbers: The Human Element

It's important to acknowledge that data is just one piece of the puzzle. Articles like "It's the data, stupid!" emphasize that driver talent remains a critical factor. A driver's ability to interpret data, react under pressure, and push the car to its limits remains irreplaceable. The true strength lies in the synergy between human skill and data-driven insights.

Chapter 3

Problem Statement / Requirement Specifications

Formula 1 racing is a complex sport where driver skill plays a critical role in determining success. However, evaluating driver performance objectively can be challenging due to factors like car differences, race strategy variations, and external conditions.

This project aims to develop a data-driven approach to quantify driver performance in Formula 1.

3.1 Project Planning

Data Acquisition: Collecting and integrating relevant data points from various sources, including car telemetry (sensor data), race results, weather conditions, and driver historical performance.

Data Preprocessing and Feature Engineering: Cleaning, transforming, and creating new features from the raw data to best capture aspects of driver skill.

Model Development: Employing data analytics techniques like machine learning or statistical modeling to build a model that isolates driver performance from external influences.

Model Evaluation: Assessing the accuracy and effectiveness of the developed model in quantifying driver performance through validation techniques.

3.2 Project Analysis

Strengths:

Objectivity: Data analysis reduces bias in driver evaluation.

Holistic View: Incorporating various data points paints a more complete picture of driver skill.

Actionable Insights: The model can identify areas for driver improvement and team strategy optimization.

Weaknesses:

Model Complexity: Striking a balance between model accuracy and interpretability is crucial.

Dynamic Environment: Formula 1 regulations and car technology constantly evolve, requiring model adjustments.

Potential Outputs:

Driver Ranking: The model can generate a ranking system that reflects drivers' relative performance across a season or their entire career. This ranking would be independent of car performance and race strategy variations.

Performance Breakdown: The model can potentially identify areas where a driver excels or struggles (e.g., qualifying pace, racecraft, tire management).

Driver-Car Synergy: The analysis might reveal which drivers best extract performance from specific car types, aiding team decisions during driver selection.

Project Deliverables:

- A data-driven model capable of quantifying driver performance in Formula 1.
- A report outlining the methodology, model development process, and key findings.
- Visualization tools to effectively communicate the driver ranking and performance insights.

3.3 System Design

- AMD Ryzen 7 processor 5000 series
- Graphic Card– 2GB
- Ram 8GB

3.3.1 Design Constraints

- Windows 10
- Python 3.7 (Jupyter)
- Visual Studio Code
- OpenCV
- Matplotlib
- NumPy
- Pandas
- Google Chrome

Chapter 4

Implementation

The methods and materials required to our platform are described in this section.

4.1 Methodology OR Proposal

The methodology used in the code follows a data analysis approach to evaluate Formula 1 driver performance. Here's a breakdown of the method:

Data Acquisition:

The code retrieves data from a Formula 1 driver dataset stored in CSV format, likely downloaded from a source like Kaggle.

Data Exploration and Cleaning:

While the specific cleaning steps aren't explicitly shown in the code, it likely involves handling missing values, inconsistencies, or data transformations to prepare the data for analysis.

Feature Engineering (Potential):

The code might calculate additional features from existing data. For instance, it could create a "win rate" feature by dividing wins by race starts.

Driver Performance Analysis:

The code focuses on several driver performance metrics:

Race Winners: It identifies drivers with wins, then filters to those with multiple wins, potentially to reduce the influence of luck and highlight consistent performance.

Pole Sitters: Similar to race winners, it analyzes drivers with the most pole positions, indicating strong qualifying performance.

Champions: It identifies drivers who have won championships, signifying overall success.

Win Rate: It calculates and analyzes win rate (wins divided by race starts) to assess driver consistency in converting starts into victories. This metric is particularly useful when comparing drivers across eras with different race lengths per season.

Data Visualization:

The code employs various visualization techniques to present the findings:

Histograms: Visualize the distribution of drivers across decades, providing insights into driver participation trends.

Pie Charts: Illustrate the win rate distribution among top drivers.
Images: Display pictures of prominent drivers mentioned in the analysis.

Conclusion:

Based on the analysis of various performance metrics, the code identifies drivers like Lewis Hamilton, Michael Schumacher, and Juan Manuel Fangio as potential contenders for the "greatest of all time" title.

Future Work (mentioned in the code):

The code hints at the possibility of using the data for real-time analysis, potentially tracking driver performance on a lap-by-lap basis during races. This could help identify mistakes and optimize car setups for future races.

4.2 Testing with Result Analysis

Click here to ask Blackbox to help you code faster

```python
championship_winners= drivers_df.drop(drivers_df[drivers_df.Championships==0].index)
```

Python

Click here to ask Blackbox to help you code faster

```python
championship_winners
```

Python

	Driver	Nationality	Seasons	Championships	Race_Entries	Race_Starts	Pole_Positions	Race_Wins	Podiums	Fastest_Laps	...	Championship Years	Decade	Pole_Rate	Start_Rate	Win_Rate	Podium_Rate	FastLap_Rate	Points_Per_Entry	Years_Active	Champion
17	Fernando Alonso	Spain	[2001, 2003, 2004, 2005, 2006, 2007, 2008, 200...	2.0	359.0	356.0	22.0	32.0	99.0	23.0	...	[2005, 2006]	2010	0.061281	0.991643	0.089136	0.275766	0.064067	5.782730	19	True
25	Mario Andretti	United States	[1968, 1969, 1970, 1971, 1972, 1974, 1975, 197...	1.0	131.0	128.0	18.0	12.0	19.0	10.0	...	[1978]	1980	0.137405	0.977099	0.091603	0.145038	0.076336	1.374046	14	True
35	Alberto Ascari	Italy	[1950, 1951, 1952, 1953, 1954, 1955]	2.0	33.0	32.0	14.0	13.0	17.0	12.0	...	[1952, 1953]	1950	0.424242	0.969697	0.393939	0.515152	0.363636	3.261818	6	True
107	Jack Brabham	Australia	[1955, 1956, 1957, 1958, 1959, 1960, 1961, 196...	3.0	128.0	126.0	13.0	14.0	31.0	12.0	...	[1959, 1960, 1966]	1960	0.101562	0.984375	0.109375	0.242188	0.093750	1.976562	16	True
135	Jenson Button	United Kingdom	[2000, 2001, 2002, 2003, 2004, 2005, 2006, 200...	1.0	309.0	306.0	8.0	15.0	50.0	8.0	...	[2009]	2010	0.025890	0.990291	0.048544	0.161812	0.025890	3.996764	18	True
169	Jim Clark	United Kingdom	[1960, 1961, 1962, 1963, 1964, 1965, 1966, 196...	2.0	73.0	72.0	33.0	25.0	32.0	28.0	...	[1963, 1965]	1960	0.452055	0.986301	0.342466	0.438356	0.383562	3.493151	9	True
238	Juan Manuel Fangio	Argentina	[1950, 1951, 1953, 1954, 1955, 1956, 1957, 1958]	5.0	52.0	51.0	29.0	24.0	35.0	23.0	...	[1951, 1954, 1955, 1956, 1957]	1950	0.557692	0.980769	0.461538	0.673077	0.442308	4.711538	8	True
239	Nino Farina	Italy	[1950, 1951, 1952, 1953, 1954, 1955]	1.0	34.0	33.0	5.0	5.0	20.0	5.0	...	[1950]	1950	0.147059	0.970588	0.147059	0.588235	0.147059	3.392059	6	True
250	Emerson Fittipaldi	Brazil	[1970, 1971, 1972, 1973, 1974, 1975, 1976, 197...	2.0	149.0	144.0	6.0	14.0	35.0	6.0	...	[1972, 1974]	1980	0.040268	0.966443	0.093960	0.234899	0.040268	1.885906	11	True
334	Mika Häkkinen	Finland	[1991, 1992, 1993, 1994, 1995, 1996, 1997, 199...	2.0	165.0	161.0	26.0	20.0	51.0	25.0	...	[1998, 1999]	2000	0.157576	0.975758	0.121212	0.309091	0.151515	2.545455	11	True
338	Lewis Hamilton	United Kingdom	[2007, 2008, 2009, 2010, 2011, 2012, 2013, 201...	7.0	311.0	311.0	103.0	103.0	191.0	61.0	...	[2008, 2014, 2015, 2017, 2018, 2019, 2020]	2010	0.331190	1.000000	0.331190	0.614148	0.196141	14.197749	16	True
351	Mike Hawthorn	United Kingdom	[1952, 1953, 1954, 1955, 1956, 1957, 1958]	1.0	47.0	45.0	4.0	3.0	18.0	6.0	...	[1958]	1960	0.085106	0.957447	0.063830	0.382979	0.127660	2.396596	7	True
363	Damon Hill	United Kingdom	[1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999]	1.0	122.0	115.0	20.0	22.0	42.0	19.0	...	[1996]	2000	0.163934	0.942623	0.180328	0.344262	0.155738	2.950820	8	True
364	Graham Hill	United Kingdom	[1958, 1959, 1960, 1961, 1962, 1963, 1964, 196...	2.0	179.0	176.0	13.0	14.0	36.0	10.0	...	[1962, 1968]	1970	0.072626	0.983240	0.078212	0.201117	0.055866	1.508380	18	True

Fig-1- Data set of championship winning drivers

Q4.) Driver with the most championships ?

Sorting out the values we could find the driver/drivers with the most championship or hence the greatest of all drivers.

Click here to ask Blackbox to help you code faster

```
championship_winners.sort_values(by=['Championships'],ascending=False)
```

Python

	Driver	Nationality	Seasons	Championships	Race_Entries	Race_Starts	Pole_Positions	Race_Wins	Podiums	Fastest_Laps	...	Championship Years	Decade	Pole_Rate	Start_Rate	Win_Rate	Podium_Rate	FastLap_Rate	Points_Per_Entry	Years_Active	Champion
710	Michael Schumacher	Germany	[1991, 1992, 1993, 1994, 1995, 1996, 1997, 199...	7.0	308.0	306.0	68.0	91.0	155.0	77.0	...	[1994, 1995, 2000, 2001, 2002, 2003, 2004]	2000	0.220779	0.993506	0.295455	0.503247	0.250000	5.084416	19	True
338	Lewis Hamilton	United Kingdom	[2007, 2008, 2009, 2010, 2011, 2012, 2013, 201...	7.0	311.0	311.0	103.0	103.0	191.0	61.0	...	[2008, 2014, 2015, 2017, 2018, 2019, 2020]	2010	0.331190	1.000000	0.331190	0.614148	0.196141	14.197749	16	True
238	Juan Manuel Fangio	Argentina	[1950, 1951, 1953, 1954, 1955, 1956, 1957, 1958]	5.0	52.0	51.0	29.0	24.0	35.0	23.0	...	[1951, 1954, 1955, 1956, 1957]	1950	0.557692	0.980769	0.461538	0.673077	0.442308	4.711538	8	True
628	Alain Prost	France	[1980, 1981, 1982, 1983, 1984, 1985, 1986, 198...	4.0	202.0	199.0	33.0	51.0	106.0	41.0	...	[1985, 1986, 1989, 1993]	1990	0.163366	0.985149	0.252475	0.524752	0.202970	3.804455	13	True
812	Sebastian Vettel	Germany	[2007, 2008, 2009, 2010, 2011, 2012, 2013, 201...	4.0	300.0	299.0	57.0	53.0	122.0	38.0	...	[2010, 2011, 2012, 2013]	2010	0.190000	0.996667	0.176667	0.406667	0.126667	10.326667	16	True
748	Jackie Stewart	United Kingdom	[1965, 1966, 1967, 1968, 1969, 1970, 1971, 197...	3.0	100.0	99.0	17.0	27.0	43.0	15.0	...	[1969, 1971, 1973]	1970	0.170000	0.990000	0.270000	0.430000	0.150000	3.590000	9	True
612	Nelson Piquet	Brazil	[1978, 1979, 1980, 1981, 1982, 1983, 1984, 198...	3.0	207.0	204.0	24.0	23.0	60.0	23.0	...	[1981, 1983, 1987]	1980	0.115942	0.985507	0.111111	0.289855	0.111111	2.326087	14	True
107	Jack Brabham	Australia	[1955, 1956, 1957, 1958, 1959, 1960, 1961, 196...	3.0	128.0	126.0	13.0	14.0	31.0	12.0	...	[1959, 1960, 1966]	1960	0.101562	0.984375	0.109375	0.242188	0.093750	1.976562	16	True
442	Niki Lauda	Austria	[1971, 1972, 1973, 1974, 1975, 1976, 1977, 197...	3.0	177.0	171.0	24.0	25.0	54.0	24.0	...	[1975, 1977, 1984]	1980	0.135593	0.966102	0.141243	0.305085	0.135593	2.375706	13	True
720	Ayrton Senna	Brazil	[1984, 1985, 1986, 1987, 1988, 1989, 1990, 199...	3.0	162.0	161.0	65.0	41.0	80.0	19.0	...	[1988, 1990, 1991]	1990	0.401235	0.993827	0.253086	0.493827	0.117284	3.765432	11	True
364	Graham Hill	United Kingdom	[1958, 1959, 1960, 1961, 1962, 1963, 1964, 196...	2.0	179.0	176.0	13.0	14.0	36.0	10.0	...	[1962, 1968]	1970	0.072626	0.983240	0.078212	0.201117	0.055866	1.508380	18	True
17	Fernando Alonso	Spain	[2001, 2003, 2004, 2005, 2006, 2007, 2008, 200...	2.0	359.0	356.0	22.0	32.0	99.0	23.0	...	[2005, 2006]	2010	0.061281	0.991643	0.089136	0.275766	0.064067	5.782730	19	True
334	Mika Häkkinen	Finland	[1991, 1992, 1993, 1994, 1995, 1996, 1997, 199...	2.0	165.0	161.0	26.0	20.0	51.0	25.0	...	[1998, 1999]	2000	0.157576	0.975758	0.121212	0.309091	0.151515	2.545455	11	True

Fig-2- Data set of drivers with the most championships

```
plt.subplots(figsize=(8,8));
plt.title("World Champions")
champion=championship_winners.sort_values(by="Championships",ascending=False)
sns.barplot(x=champion.Championships,y=champion.Driver);
```

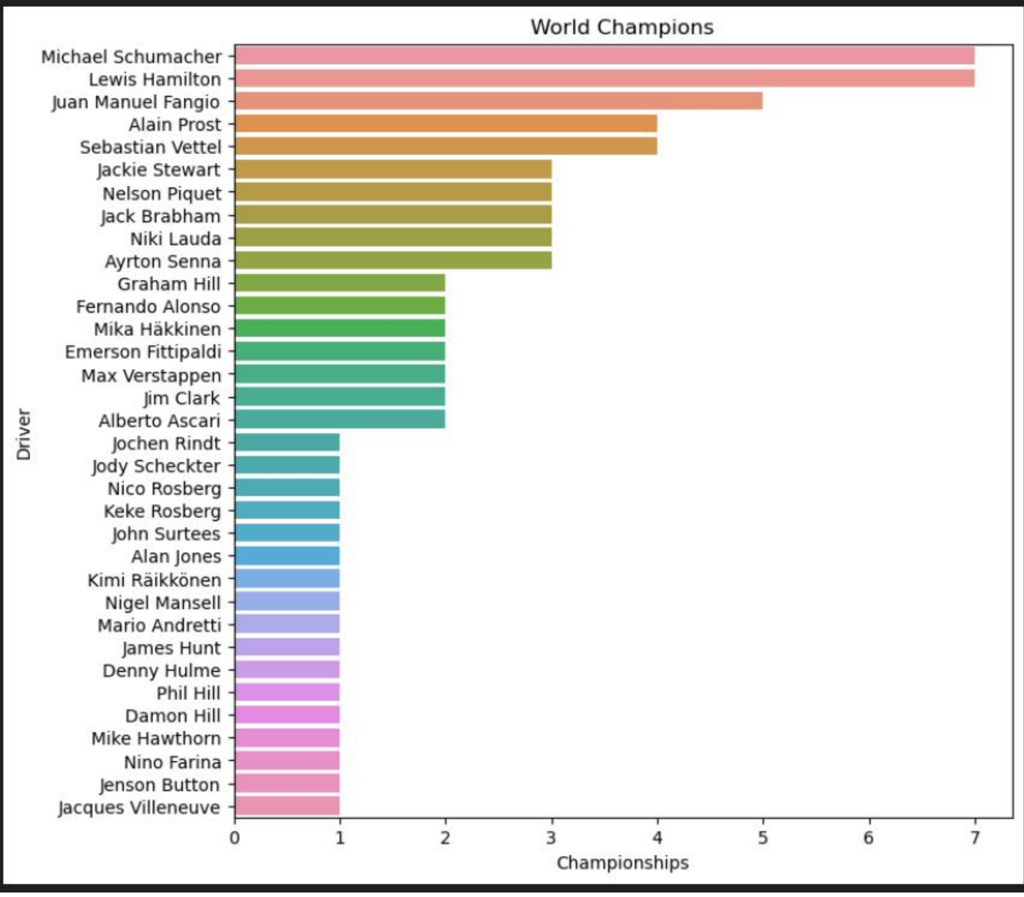

Fig-3- heat chart of the driver winning chamiponships

```
top_20=win_rates.head(20)
plt.figure(figsize=(20,20))#to increase piechart size
plt.title("Drivers with highest winning percentage")
plt.pie(top_20.Win_Rate,autopct='%1.1f%%',startangle=180,pctdistance=0.9)
plt.legend(loc="lower right",labels =top_20.Driver)
plt.show()
```

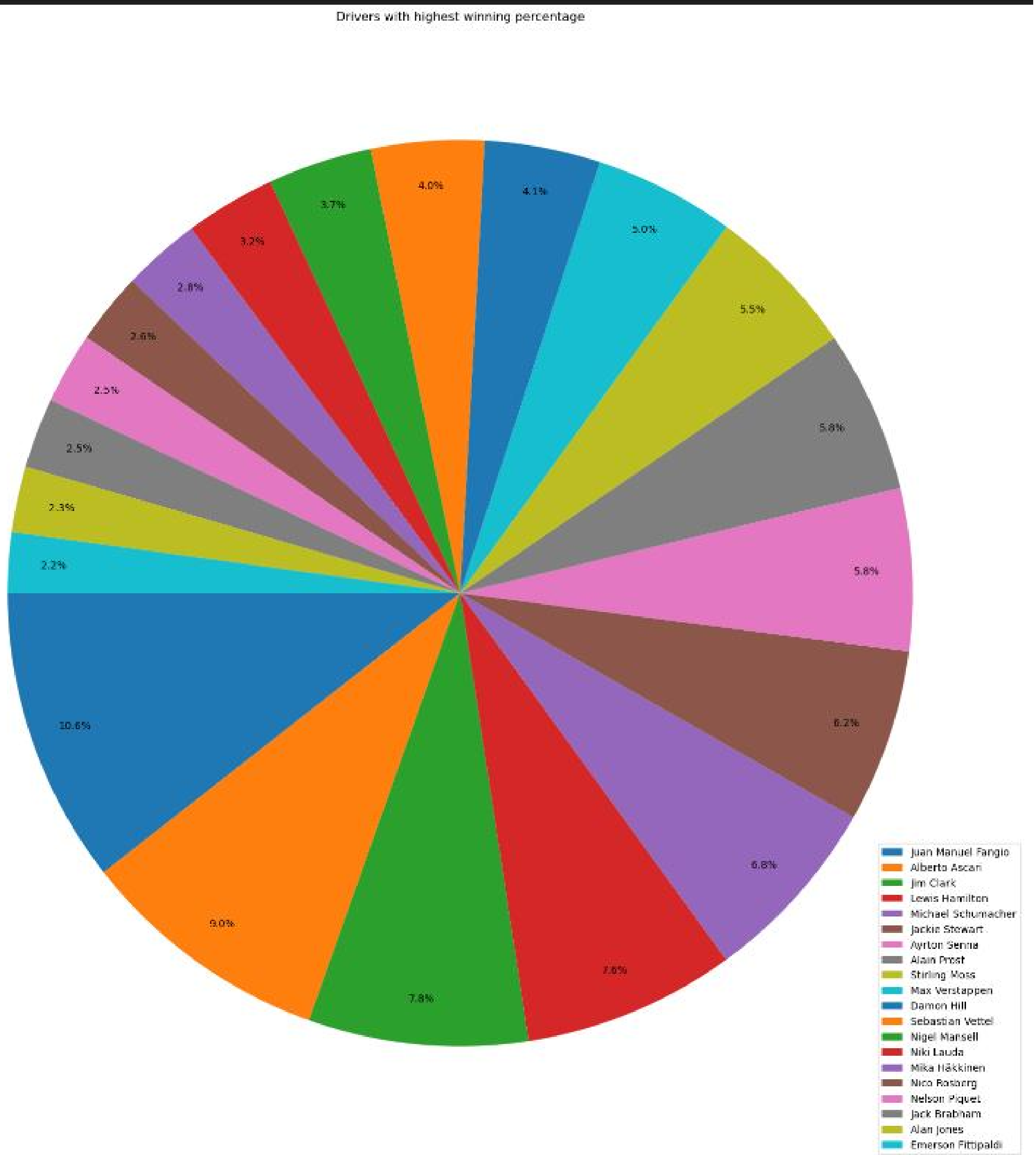

Fig-4- figure showing driver with the highest winning ratios

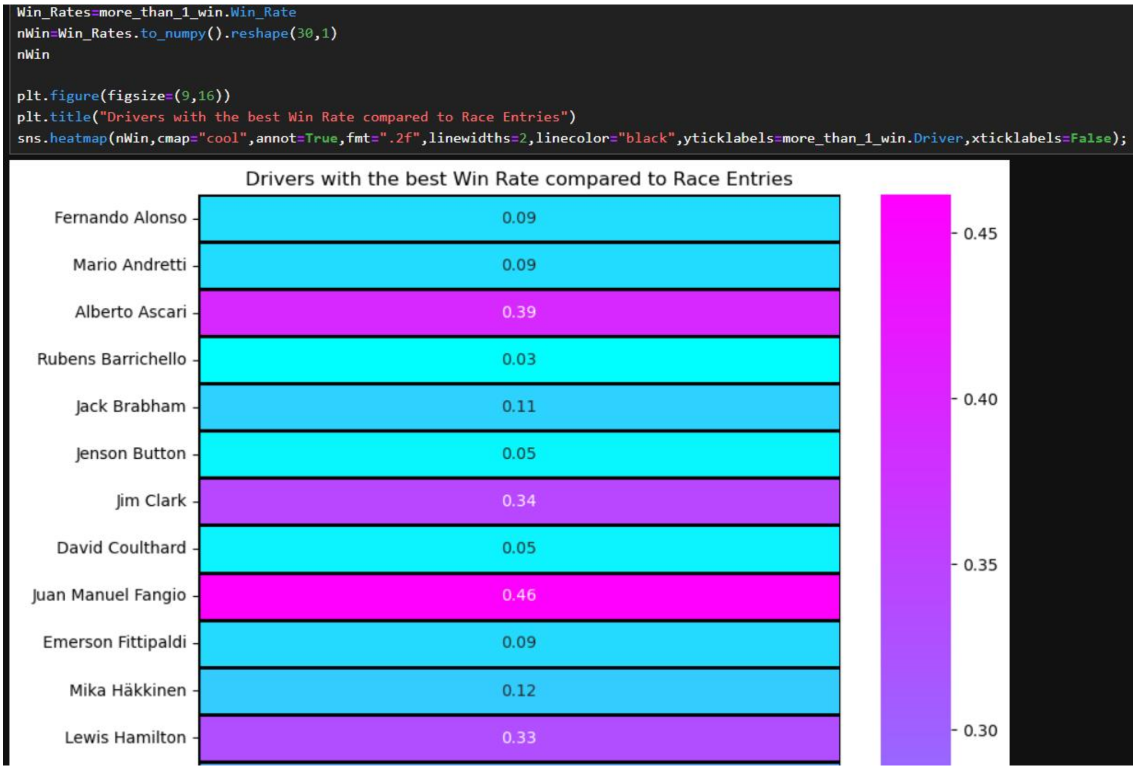

Fig-5- Chart showing drivers with the best win ratio

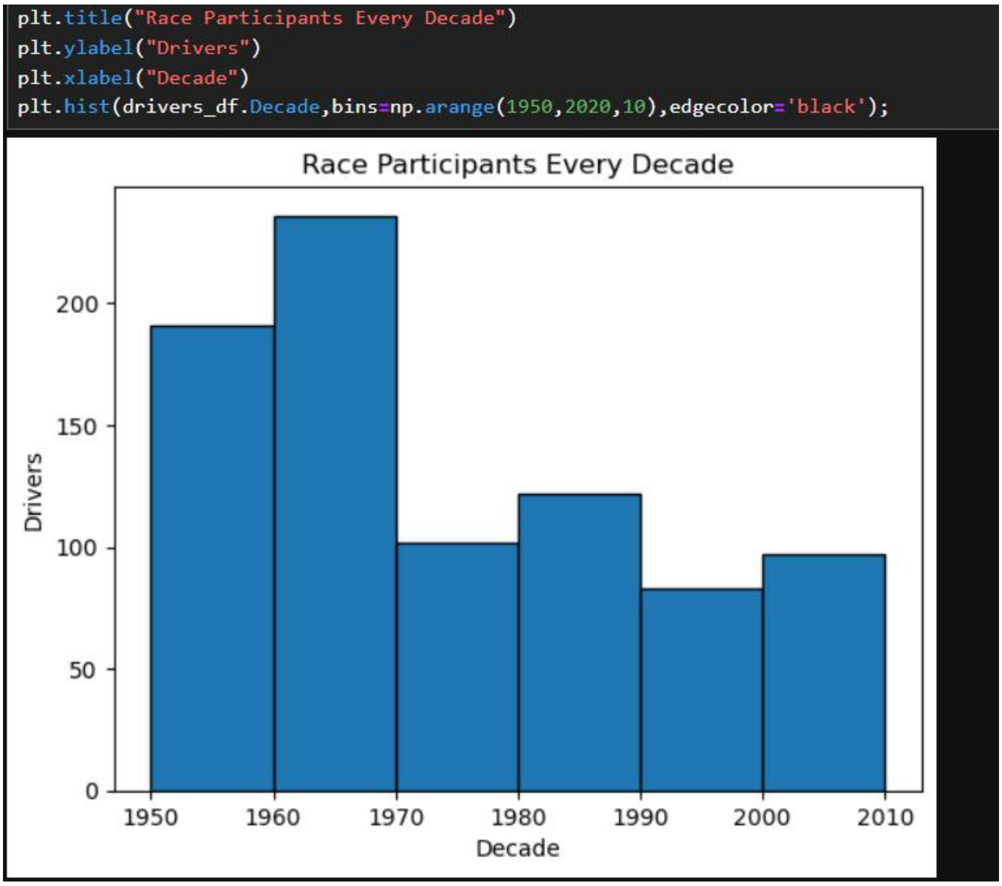

Fig-6- Histogram showing race participants every decade

4.4 Quality Assurance

In the working organization, if some department is there to verify the quality of your work, they can produce a certificate or guidelines followed.

- Unit-Testing
- Black-Box Testing
- White-Box Testing

Chapter 5

Standards Adopted

5.1 Design Standards

Data analysis projects often lack formal design documents. While the code with comments might reflect a design approach, specific design patterns or frameworks aren't necessarily employed in this scenario.

5.2 Coding Standards

The code snippet has basic elements of coding practices like using meaningful variable names and comments.

- Trytowrite as few lines as you can.
- Adoptsensible naming practices.
- Dividecode snippets from the same section into paragraphs.
- Indent control structures at their beginning and end using indentation.
- Avoidcalling long functions. A single function should, ideally, complete a single task

5.3 Testing Standards

Data analysis scripts often involve less rigorous testing compared to traditional software development. There might be manual checks to ensure the code produces the expected output, but formal unit testing or integration testing might not be implemented.

Chapter 6

Conclusion and Future Scope

6.1 Conclusion

A Formula 1 driver data set offers a treasure trove of insights into the world's most elite motorsport athletes. By analyzing this data, we can move beyond simple race results and delve into the complex tapestry of factors that contribute to driver performance. We can identify the key metrics that correlate with race wins, such as qualifying prowess and overtaking efficiency. Furthermore, the data can shed light on the characteristics that define championship-caliber drivers, like strategic tire management and consistent performance across diverse conditions. Ultimately, analyzing a Formula 1 driver data set allows us to not only appreciate the raw talent of these remarkable athletes but also gain a deeper understanding of the intricate blend of skill, strategy, and mental fortitude that defines success at the pinnacle of motorsport.

6.2 Future Scope

The future of Formula 1 driver data analysis is brimming with exciting possibilities. Machine learning algorithms can be trained on historical data to predict future race outcomes, potential championship winners, and even identify rising stars. This could revolutionize scouting and race strategy development.
Advanced data analysis can be used to create personalized driver performance models. These models could identify areas for improvement, suggest optimal race strategies, and even predict potential equipment failures to maximize a driver's chances of success.
By analyzing data from sensors on the car and driver biometrics, we can gain insights into factors that contribute to accidents and improve safety measures for drivers and track design.

The potential for Formula 1 driver data analysis is vast and continues to evolve as new technologies and data sources emerge. The future holds exciting possibilities for shaping the sport.

References

Data Set- Kaggle

(https://www.kaggle.com/datasets/dubradave/formula-1-drivers-dataset)

INDIVIDUAL CONTRIBUTION REPORT:

Driver Performance in Formula 1: A Data-Driven Approach

Soham Raj Jain
2105410

Abstract: This report explores data-driven methods to evaluate Formula 1 driver performance. It analyzes a driver dataset, identifying top performers based on race wins, pole positions, championships, and win rate. Visualizations like histograms and pie charts reveal trends in driver participation and win rates. Lewis Hamilton, Michael Schumacher, and Juan Manuel Fangio emerge as contenders for "greatest of all time" based on these metrics. Future work suggests real-time analysis of driver performance on a lap-by-lap basis.

Individual contribution and findings: I played a key role in providing coding solutions and software support. This involved evaluating the software to meet the analytic requirements. I worked on implementing various codes to automate the analytic processes, which greatly reduced the time and effort required to analyze the performance manually. Also worked on Creating informative visualizations (histograms, scatter plots, bar charts, heatmaps) to showcase driver performance trends and insights. My contribution to the project was vital in making the analytic console processes seamless, efficient, and reliable.

Individual contribution to project report preparation: I was responsible for identifying and elaborating on all the problem statements and system requirements. By taking up these tasks, I played a vital role in setting up the project, ensuring that the goals and objectives were clear and well-defined. My efforts contributed to the smooth running of the project and helped in achieving its ultimate goals.

Individual contribution for project presentation and demonstration: In addition to my other contributions, I took charge of the coding standards employed in the project. I also shared the project's objectives and outlined its potential future possibilities.

Full Signature of Supervisor: Full signature of the student:

……………………………… ……………………………..

INDIVIDUAL CONTRIBUTION REPORT:

Driver Performance in Formula 1: A Data-Driven Approach

Rahul Sinha
21052689

Abstract: This report explores data-driven methods to evaluate Formula 1 driver performance. It analyzes a driver dataset, identifying top performers based on race wins, pole positions, championships, and win rate. Visualizations like histograms and pie charts reveal trends in driver participation and win rates. Lewis Hamilton, Michael Schumacher, and Juan Manuel Fangio emerge as contenders for "greatest of all time" based on these metrics. Future work suggests real-time analysis of driver performance on a lap-by-lap basis.

Individual contribution and findings: I played a key role in collecting data (exploring sources like Kaggle or official Formula 1 data) and surveys information to gain a comprehensive understanding of the current scenario. Afterward, I meticulously analyzed all the datasets and their usefulness in obtaining the desired results. Helped in debugging of the code. Worked on performing initial data exploration to understand variable types, identify missing values, and assess data quality.

Individual contribution to project report preparation: I was responsible for contributing to the literature review section. This involved conducting thorough analyses of various reference papers, synthesizing their contents, and presenting a comprehensive summary of their findings clearly and concisely. Additionally, I took charge of preparing the section on standards adopted, ensuring that all necessary information was included and presented accurately

Individual contribution for project presentation and demonstration: I was responsible for contributing to the literature section which included introduction and conclusion of the project.

Full Signature of Supervisor: Full signature of the student:

…………………………… ……………………………..

INDIVIDUAL CONTRIBUTION REPORT:

Driver Performance in Formula 1: A Data-Driven Approach

Abhinav Manghrati
21052639

Abstract: This report explores data-driven methods to evaluate Formula 1 driver performance. It analyzes a driver dataset, identifying top performers based on race wins, pole positions, championships, and win rate. Visualizations like histograms and pie charts reveal trends in driver participation and win rates. Lewis Hamilton, Michael Schumacher, and Juan Manuel Fangio emerge as contenders for "greatest of all time" based on these metrics. Future work suggests real-time analysis of driver performance on a lap-by-lap basis.

Individual contribution and findings: I played a role in developing the design solution to solve our attendance marking and maintenance problem and also helped in training and testing the model. Also worked on Performing initial data exploration to understand variable types, identify missing values, and assess data quality.

Individual contribution to project report preparation: My contributions to the project also included preparing report writing areas such as problem statement and requirement specifications.

Individual contribution for project presentation and demonstration: I prepared the part of the PowerPoint presentation that contained the problem statement, and future scope.

Full Signature of Supervisor: Full signature of the student:

……………………………. ……………………………..

INDIVIDUAL CONTRIBUTION REPORT:

Driver Performance in Formula 1: A Data-Driven Approach

Mohammad Nazim Qureshi
21052804

Abstract: This report explores data-driven methods to evaluate Formula 1 driver performance. It analyzes a driver dataset, identifying top performers based on race wins, pole positions, championships, and win rate. Visualizations like histograms and pie charts reveal trends in driver participation and win rates. Lewis Hamilton, Michael Schumacher, and Juan Manuel Fangio emerge as contenders for "greatest of all time" based on these metrics. Future work suggests real-time analysis of driver performance on a lap-by-lap basis.

Individual contribution and findings: Worked primarily in providing coding solutions. Tested various analytical elements that could best fit for our project and took on the best one. Worked on improving performance of the code to get faster analytics on the given data set. Also worked on Creating informative visualizations

Individual contribution to project report preparation: My contributions to the project also included preparing report writing primarily in implementation.

Individual contribution for project presentation and demonstration: I prepared the part of the PowerPoint presentation that contained the problem statement and project planning.

Full Signature of Supervisor: Full signature of the student:

……………………………. ……………………………..

TURNITIN PLAGIARISM REPORT

Driver's performance in Formula 1: A data driven approach ORIGINALITY REPORT

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