

**A TECHNICAL REPORT ON THE STUDENT INDUSTRIAL
WORK EXPERIENCE SCHEME (SIWES)
2022/2023 SESSION**

UNDERTAKEN AT

**LUMINIONS TECHNOLOGY
6, FESOMADE STREET, NEW OKO-OBA, LAGOS STATE**

BY

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**IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF BACHELOR OF SCIENCE IN STATISTICS**

**DEPARTMENT OF STATISTICS
UNIVERSITY OF IBADAN**

JULY, 2024

Submission Letter

Department of Statistics,
Faculty of Science,
University of Ibadan,
Ibadan,
Oyo State.

July 15, 2024.

The Director,
Industrial Training Coordinating Centre (ITCC),
University of Ibadan,
Ibadan,
Oyo State.

Dear sir,

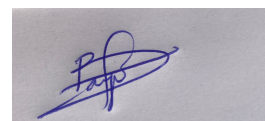
INDUSTRIAL TRAINING WORK REPORT SUBMISSION

I, Onadiran Afeez Bayonle, a final-year student in the Department of Statistics, with matriculation number 222856, I am writing to submit my work report, which I completed as part of the Student Work Industrial Work Experience Scheme (SIWES) training program. The training lasted from May 6, 2024 to June 21, 2024.

I certify that this report was written by me in line with the requirements of the Student Industrial Work Experience Scheme (SIWES) as a summary of my work experience during the period of the program. Alongside this letter of submission are my logbook and industrial training report.

Thank you for this opportunity. This experience has really helped me understand how to apply what I have learned in class. I am hopeful that my submission is considered and accepted.

Yours faithfully,



Onadiran Afeez B.

Acknowledgments

My profound gratitude goes to the Almighty God for the enabling grace He granted me to successfully complete my SIWES programme. I am immensely grateful unto my H.O.D. (Prof. O.I Osowole) Department of Statistics and all other lecturers in the Department for the knowledge that they have over-time impacted in me and for their tangible and indispensable counsels.

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Finally, I appreciate my lovely family for the roles they played ranging from the monetary support, advices, prayers and all other things which greatly contributed to the success of my SIWES Programme.

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Chapter 1

Introduction

1.0 Overview of SIWES

The Students' Industrial Work Experience Scheme (SIWES) is a vital initiative aimed at providing students with practical experience and preparing them for the realities of the professional world after graduation. It was established to bridge the gap between theoretical learning and practical skills in various disciplines such as engineering, technology, science, agriculture, medicine, management, and others within Nigerian educational institutions. The main goal is to give students hands-on experience with machinery and equipment that they do not typically encounter in academic settings. Additionally, SIWES helps students become familiar with workplace environments, enabling them to effectively interact with colleagues and stakeholders, thereby enhancing their readiness for future career demands.

At the University of Ibadan, SIWES is an obligatory component of the academic journey for all 300 level students pursuing degrees in the Department of Statistics. This program spans three months, during which students engage in practical training that complements their classroom learning. By participating in SIWES, students gain valuable insights into industry practices, problem-solving skills, and teamwork dynamics that are essential for their professional development. The experience not only enriches their academic knowledge but also equips them with practical competencies that enhance their employability upon graduation. Overall, SIWES serves as a critical link between academic study and real-world application, preparing students to contribute meaningfully to their chosen fields and society at large.

1.1 Background

Prior to the establishment of the scheme, industrialists expressed concerns that graduates from Nigerian higher education institutions lacked practical training essential for employment in industries. They believed that the theoretical education provided by these institutions did not adequately align with the demands of the job market.

In response to these concerns, the Industrial Training Fund (ITF) initiated and formulated the scheme during the early years of 1973/1974. Initially, the ITF fully financed the program; however, due to financial constraints, it ceased its support in 1978. Subsequently, in 1979, the Federal Government entrusted the management of the scheme to both the National Universities Commission (NUC) and the National Board for Technical Education (NBTE). Nevertheless, in November 1984, the Federal Government transferred the management and execution of the SIWES program back to the ITF. Since July 1985, the Industrial Training Fund has resumed complete responsibility for funding the program on behalf of the Federal Government.

1.2 Participating Bodies

The bodies involved are Federal Government and Industrial Training Fund (ITF). Other supervising agencies are National University Commission (NUC), National Body for Technical Education (NBTE) and National Council for Colleges of Education (NCCE).

1.2.1 Industrial Training Fund (ITF)

The Industrial Training Fund (ITF) is a top-tier government agency operating under the Federal Ministry of Industry, Trade, and Investment. Established over 46 years ago, it specializes in promoting and fostering the acquisition of industrial and commercial skills crucial for national economic advancement. The ITF's primary objective is to enhance human performance, boost productivity, and stimulate value-added production in both industry and commerce sectors. Through initiatives such as the Students' Industrial Work Experience Scheme (SIWES) and vocational and apprentice training programs, the fund also aims to build capacity among graduates and youth, facilitating self-employment within the context of small-scale industrialization in the economy.

1.2.2 Function of The Participating Bodies

The function of the agencies above include among others:

1. To ensure adequate funding of the scheme
2. To establish SIWES and accredit SIWES unit in the approved institution
3. To formulate policies and guidelines for participating bodies and institutions as well as appointing SIWES coordinators
4. To supervise students at their place of attachment and sign their log book and supporting staffs and ITF forms.
5. To ensure payment of allowances for the students and supervisors

Therefore, the success of SIWES depends on the efficiency of the Ministries, ITF, Institutions, Employers of labor, articulation and management of the program. Thus the evaluation of SIWES in tertiary institutions in meeting up with the needs for the establishment of the program is necessary.

1.3 Aims and Objectives of SIWES

1.3.1 Aims

SIWES was established with the aim of making education relevant and to bridge the yawning gap between the theory and practice of engineering, technology, and science-related disciplines in tertiary institutions in Nigeria.

1.3.2 Objectives

The specific objectives of SIWES were summarized by the federal government in its gazette of April, 1978 as follows:-

1. To provide an avenue for students in institutions of higher learning to acquire industrial skills and experiences in their courses of study.
2. To provide students with an opportunity to apply their knowledge in real work and actual practice.
3. To make the transition from school to the world of work easier and to enhance students contacts for later job placement.
4. To expose and prepare students of universities, polytechnics, colleges of technology, colleges of agriculture and colleges of education to industrial work situation they are likely to meet after graduation.

Others objectives of SIWES include:

1. To expose students to work methods and technique in handling equipment and machineries that may not be available in the institution.

2. To provide students with the opportunity to apply their theoretical knowledge in real work situation, thereby bridging the gap between the university work and the actual work practices.
3. To expose students to the latest developments and technological innovations their chosen professions.

1.4 Scope of SIWES

Students' Industrial Work Experience Scheme (SIWES), is a mandatory component of education recognized by the National Universities Commission (NUC). It is integrated into the minimum Academic Standards across various degree programs in Nigerian universities. The program addresses the challenge of insufficient practical skills needed for employment in industries. SIWES offers undergraduate students in fields such as Agricultural Science, Engineering, Environmental Science, Education, Medical Science, and Pure and Applied Sciences the opportunity to gain hands-on experience in approved industrial settings.

1.4.1 The Logbook

This is a book that was designed to assist students in keeping accurate records of their training during SIWES. It shows the department/section of the industry/company where a student has worked, and the period spent in each department/section.

The logbook contains records of the activities of each working day clearly written with sketches and diagrams where necessary. The logbook must be submitted to the (Industry - based) supervisor(s) every week for comments and signature. The University SIWES supervisor/ITF Officer/Industrial liaison officers will check the logbook during their visits to ensure that proper training is being received by each student, and also record their comments. Each student is expected to obtain and complete the information needed as regards the organizational profile of the establishment/company to which they are attached.

Chapter 2

General Overview of Luminions Technology

2.0 Overview of The Organization

Luminions Technology is a dynamic technology and academic solutions brand that excels in providing cutting-edge services in analytics, web development, online tech tutoring, and research writing. Founded on the principles of innovation and excellence, Luminions Technology has established itself as a leader in integrating advanced technology with academic support to meet the evolving needs of its clients. With a commitment to quality and customer satisfaction, the company strives to deliver impactful solutions that drive growth and success in both the technological and educational sectors.

2.1 Historical Background

Luminions Technology was founded in 2010 by a group of visionary technologists and educators who identified a growing demand for specialized tech and academic solutions. Initially starting as a small-scale venture focusing on web development and online tutoring, the company quickly expanded its scope to include advanced analytics services and professional research writing. Over the years, Luminions Technology has built a reputation for reliability and expertise, attracting a diverse clientele ranging from startups to established corporations and educational institutions.

Driven by a passion for innovation, Luminions Technology has continuously evolved its service offerings to stay ahead in the competitive market. By leveraging the latest technologies and trends, the company has successfully positioned itself as a trusted partner for businesses seeking robust tech solutions and academic institutions in need of comprehensive educational support.

2.2 Vision, Mission, and Core Values

2.2.1 Vision

To be a leading provider of transformative technology and academic solutions globally, recognized for innovation, quality, and client satisfaction.

2.2.2 Mission

To empower businesses and educational institutions through advanced technology and academic support, fostering growth, efficiency, and excellence.

2.2.3 Core Values

At Luminions, five core values guide their operations:

1. Innovation
2. Excellence

3. Integrity
4. Customer Satisfaction
5. Continuous Learning and Improvement

2.3 Services Provided

Luminions Technology offers a diverse range of services tailored to meet the specific needs of its clients:

1. **Data Analytics:** Specializing in data analytics using Python, Luminions Technology provides comprehensive insights and solutions to help businesses make informed decisions and optimize their operations.
2. **Web Development:** Crafting customized web solutions that are responsive, scalable, and aligned with modern technological standards, ensuring an enhanced online presence for clients.
3. **Online Tech Tutoring:** Offering personalized tutoring sessions in various tech disciplines, empowering students and professionals to enhance their skills and achieve academic and career goals.
4. **Research Writing:** Providing professional writing services for academic research papers, articles, and publications, adhering to rigorous academic standards and deadlines.

2.4 Scope of Internship at Luminions Technology (Data Analytics with Python)

Interns participating in the data analytics internship at Luminions Technology will be immersed in a hands-on learning experience focused on:

- **Python Programming:** Learning and applying Python programming language for data manipulation, analysis, and visualization.
- **Data Collection and Cleaning:** Understanding the importance of data quality and pre-processing techniques to ensure accurate analysis results.
- **Statistical Analysis:** Performing statistical tests and applying analytical techniques to extract meaningful insights from structured and unstructured data.
- **Machine Learning:** Introduction to basic machine learning concepts and algorithms for predictive analytics and pattern recognition.

By the end of the internship, interns are expected to have acquired practical skills and knowledge that will enhance their academic learning and prepare them for future careers in data analytics and related fields.

In conclusion, Luminions Technology stands at the forefront of technology and academic solutions, offering specialized services that empower businesses and educational institutions to thrive in a rapidly evolving digital landscape. Through its commitment to innovation, quality, and client-centric approach, Luminions Technology continues to drive positive impact and excellence in both sectors, setting benchmarks for industry standards and professional growth.

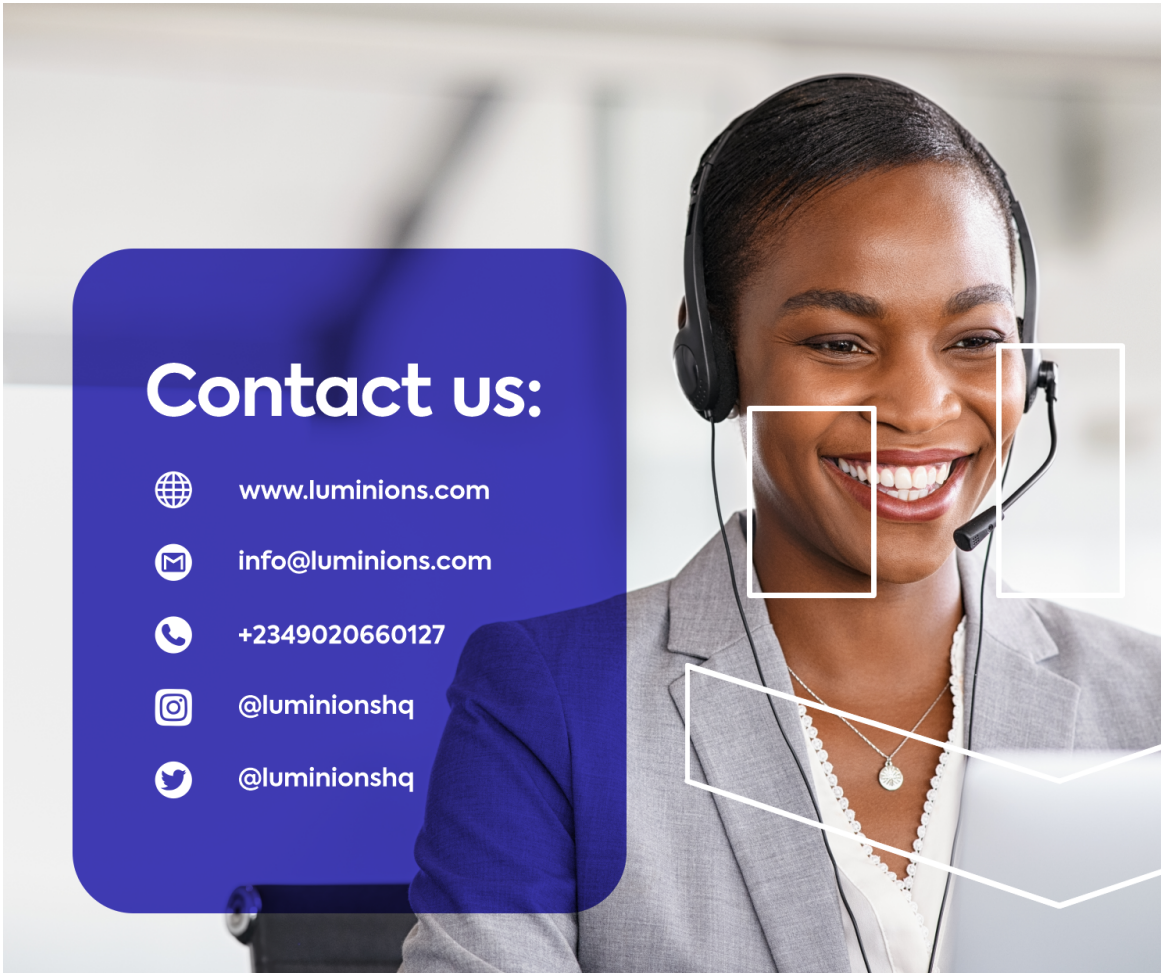
2.5 Learning Objectives

During my Industrial Training attachment at Luminions Technology, I defined the following learning objectives as a student from the Department of Statistics:

1. Apply statistical techniques to solve real-world problems using data analysis and computational methods.

- 2. Develop proficiency in the Python programming language for data manipulation, analysis, and visualization.
- 3. Gain exposure to basic machine learning concepts and algorithms for predictive analytics.

2.6 Organization Contacts



www.luminions.com

Figure 2.1: Luminions Technology Contact Information

Chapter 3

Computational Tool Used at Luminions Technology: Python

Python, a versatile and powerful programming language, serves as a foundational tool at Luminions Technology, deeply integrated into its operations across analytics, web development, online tech tutoring, and research writing. This comprehensive overview explores Python's pivotal role within the company, highlighting its applications, strengths, and strategic importance in delivering advanced technology and academic solutions.

3.1 Introduction to Python

Python, created by Guido van Rossum in 1991, is a popular high-level programming language known for its simplicity and readability. Its clear syntax makes it easy for beginners to learn and for experienced programmers to write efficient code. Python's extensive library and active community support its use in various fields such as web development, scientific computing, data analysis, and automation.

Python's flexibility allows it to integrate smoothly with other technologies, making it ideal for building everything from websites to complex scientific algorithms. Its efficiency and ability to quickly prototype ideas have made it a favorite among developers worldwide. As industries increasingly rely on data-driven decisions and agile development, Python continues to be a driving force in innovation across different sectors.



Python is a versatile and powerful programming language that plays a central role at Luminions Technology. It's used extensively across different areas such as analytics, where it helps analyze complex data using libraries like NumPy and pandas. This capability is crucial for extracting valuable insights and building sophisticated machine learning models that enhance decision-making processes.

In web development, Python shines with frameworks like Django and Flask, which facilitate the creation of scalable and secure applications. These tools enable Luminions Technology to meet diverse client needs effectively. Python also supports online tech tutoring initiatives by providing a user-friendly environment for teaching coding skills. Its straightforward syntax and rich ecosystem make it accessible for learners of all levels, fostering a community of continuous learning and skill development.

Moreover, Python's role extends to research writing within the company. It simplifies tasks such as automating data processing and generating insightful visualizations, which are essential for conducting and presenting academic research effectively. By leveraging Python across these various domains, Luminions Technology enhance their operational efficiency and maintain a competitive edge in delivering advanced technological solutions and academic excellence.

3.2 Python's Applications at Luminions Technology

At Luminions Technology, Python serves as a cornerstone in implementing cutting-edge technology solutions and enhancing academic support services. The language is employed across various departments and services, each leveraging its unique capabilities to deliver tailored solutions to clients.

3.2.1 Analytics and Data Science

Python's robust libraries and frameworks make it a preferred choice for data analytics and machine learning at Luminions Technology. Python's libraries such as NumPy, Pandas, Matplotlib, and Scikit-learn are extensively used for:

1. **Data Manipulation and Analysis:** Pandas facilitates efficient handling and processing of large datasets, essential for deriving actionable insights for clients.
2. **Statistical Analysis:** NumPy and SciPy provide comprehensive statistical functions and tools, ensuring rigorous analysis and validation of data-driven decisions.
3. **Machine Learning:** Scikit-learn and TensorFlow empower Luminions Technology to develop and deploy machine learning models, supporting predictive analytics and pattern recognition tasks crucial for client strategies.

Python's flexibility and scalability in analytics allow Luminions Technology to adapt quickly to evolving client needs, delivering tailored solutions that drive business growth and operational efficiency.

3.2.2 Web Development

Python's versatility extends to web development at Luminions Technology, where frameworks like Django and Flask are utilized. These frameworks offer:

1. **Rapid Development:** Python's concise syntax and extensive libraries accelerate the development of customized web applications, ensuring timely delivery and client satisfaction.
2. **Scalability and Performance:** Python's integration capabilities and support for asynchronous programming enable Luminions Technology to build scalable and high-performance web solutions that meet client demands.

By using Python for web development, Luminions Technology improves how clients appear and function online, creating strong platforms that adjust to changing market needs.

3.2.3 Academic Support

Python plays a crucial role in academic support services at Luminions Technology:

1. **Online Tech Tutoring:** Python's accessibility and versatility make it an ideal tool for teaching programming concepts and techniques. Luminions Technology conducts personalized tutoring sessions using Python, empowering learners to acquire practical skills in programming and data analysis.
2. **Research Writing:** Python is employed for analysis, and visualization in academic research. Luminions Technology uses Python to ensure research papers and publications adhere to rigorous academic standards, delivering insightful findings that contribute to scholarly discourse.

Python's role in academic support underscores its effectiveness in facilitating learning and research across diverse disciplines, reinforcing Luminions Technology's commitment to educational excellence.

3.3 Future Directions and Innovation

Looking forward, Python remains essential to Luminions Technology's pursuit of innovation and excellence. As technological advancements continue to evolve, Python's ecosystem expands, enabling the company to pioneer new solutions and set industry standards. Luminions Technology continues to invest in training and development initiatives to enhance team proficiency in Python and related technologies, ensuring readiness to meet future challenges and opportunities.

3.4 Conclusion

In conclusion, Python stands as a cornerstone of Luminions Technology's ability to deliver transformative technology and academic solutions. From analytics and machine learning to web development and academic support, Python's versatility and robustness empower Luminions Technology to meet diverse client needs effectively. As Python evolves, Luminions Technology remains dedicated to leveraging its capabilities to drive growth, efficiency, and excellence in technology innovation and academic support, solidifying its leadership in the industry.

Chapter 4

Data Analysis with Python

4.1 Definition:

Statistics is a branch of mathematics that transforms numbers into useful information for decision makers. Statistics is sub-divided into descriptive and inferential.

1. Descriptive Statistics: Focuses on collecting, summarizing, presenting, and analyzing a set of data.
2. Inferential Statistics: Uses data that have been collected from a small group (sample) to draw conclusions about a larger group.

4.1.1 Applications of Statistics

1. To summarize business data
2. To draw conclusions from that data
3. To make reliable forecasts of business activities
4. To improve business processes

4.2 Data Collection

The collection of data that are relevant to the problem being studied is commonly the most difficult, expensive, and time-consuming part of the entire research project. Statistical data are usually obtained by counting or measuring items. Data collection is of two form;

1. Primary data are collected specifically for the analysis desired
2. Secondary data have already been compiled and are available for statistical analysis

Most data can be put into the following categories:

1. Qualitative - data are measurements that each fall into one of several categories. (hair color, ethnic groups and other attributes of the population)
2. Quantitative - data are observations that are measured on a numerical scale (distance traveled to college, number of children in a family, etc.)

4.2.1 Sources of Data

1. Data distributed by organizations or individuals
2. Experiment
3. Survey
4. Observational study
5. Cooperate data

4.3 Statistical (Data) Analysis

Data analysis is the process of extracting information from data. It involves multiple stages including establishing a data set, preparing the data for processing, applying models, identifying key findings and creating reports. The goal of data analysis is to and actionable insights that can inform decision making. Data analysis can involve data mining, descriptive and predictive analysis, statistical analysis, business analytics and big data analytics.

Statistical analysis is used to manipulate, summarize, and investigate data, so that useful decision-making information results. Data analysis is one of the more important stages in our research. Without performing exploratory analyses of our data, we set ourselves up for mistakes and loss of time. Generally speaking, the goal is to be able to "visualize" the data and get a sense of their values. We plot and compute summary statistics to observe the trends and the distribution of our data.

An essential component of ensuring data integrity is the accurate and appropriate analysis of research findings. Improper statistical analyses distort scientific findings, mislead casual readers, and may negatively influence the public perception of research. Integrity issues are just as relevant to analysis of non-statistical data as well.

4.3.1 Considerations/Issues in Data Analysis

There are a number of issues that researchers should be cognizant of with respect to data analysis. These include:

1. Having the necessary skills to analyze
2. Concurrently selecting data collection methods and appropriate analysis
3. Drawing unbiased inference
4. Inappropriate subgroup analysis
5. Following acceptable norms for disciplines
6. Determining statistical significance
7. Lack of clearly defined and objective outcome measurements
8. Providing honest and accurate analysis
9. Manner of presenting data
10. Environmental/contextual issues
11. Data recording method
12. Partitioning 'text' when analyzing qualitative data
13. Training of staff conducting analyses
14. Reliability and Validity
15. Extent of analysis

4.3.2 How to Perform Data Analysis

Data analysis is a part of a larger process of deriving business intelligence. The process includes one or more of the following steps:

1. Defining Objectives: Any study must begin with a set of clearly defined business objectives. Much of the decisions made in the rest of the process depend on how clearly the objectives of the study have been stated.
2. Posing Questions: An attempt is made to ask a question in the problem domain. For example, do red sports cars get into accidents more often than others?

3. **Data Collection:** Data relevant to the question must be collected from the appropriate sources. Data might be collected from a variety of sources including: DMV or police accident reports, insurance claims and hospitalization details. When data is being collected using surveys, a questionnaire to be presented to the subjects is needed. The questions should be appropriately modeled for the statistical method being used.
4. **Data Wrangling:** Raw data may be collected in several different formats. The collected data must be cleaned and converted so that data analysis tools can import it. For our example, we may receive DMV accident reports as text files, insurance claims from a relational database and hospitalization details as an API. The data analyst must aggregate these different forms of data and convert it into a form suitable for the analysis tools.
5. **Data Analysis:** This is the step where the cleaned and aggregated data is imported into analysis tools. These tools allow you to explore the data, find patterns in it, and ask and answer what-if questions. This is the process by which sense is made of data gathered in research by proper application of statistical methods.
6. **Drawing Conclusions and Making Predictions:** This is the step where, after sufficient analysis, conclusions can be drawn from the data and appropriate predictions can be made. These conclusions and predictions may then be summarized in a report delivered to end-users.

Chapter 5

Project Worked On

5.1 Project 1: A Practical Approach to Database Management

5.1.1 Objective:

The objective of the project was to demonstrate proficiency in SQL through the design and implementation of a rational database and the execution of various SQL queries.

5.1.2 Insight and Conclusion From the Project

The analysis of the "inspire_ride" dataset revealed insight into user behavior, vendor performance, inventory management, customer feedback, and financial performance, guiding strategies to optimize operations, enhance customer satisfaction, and drive profitability for Inspire Ride in the car rental market

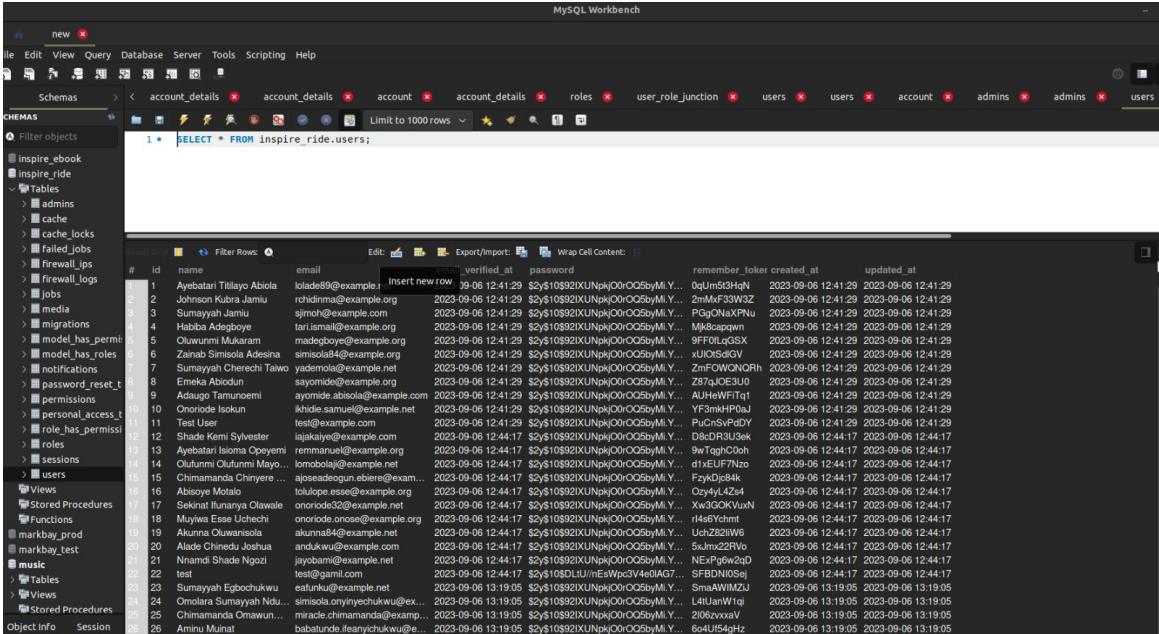


Figure 5.1: Database Mangement in SQL

5.2 Project 2: Data Analysis Dashboard Using Python with MYSQL Database

5.2.1 Aim and Objective:

The objective of this project was to visualize and analyze descriptive statistics of insurance data to gain insights into the company's performance and investment strategies. Specifically, the project aims to explore the frequency distribution of product lines, analyze average investments across different categories, and identify opportunities for optimizing investment goals.

5.2.2 Insight and Conclusion From the Project

This project has not only visualized descriptive statistics but has also unearthed actionable insights that significantly enhance decision-making and strategic planning within the company’s insurance operations. These findings underscore the critical importance of employing data-driven approaches to optimize performance and ensure sustained success in the competitive landscape of the insurance industry.

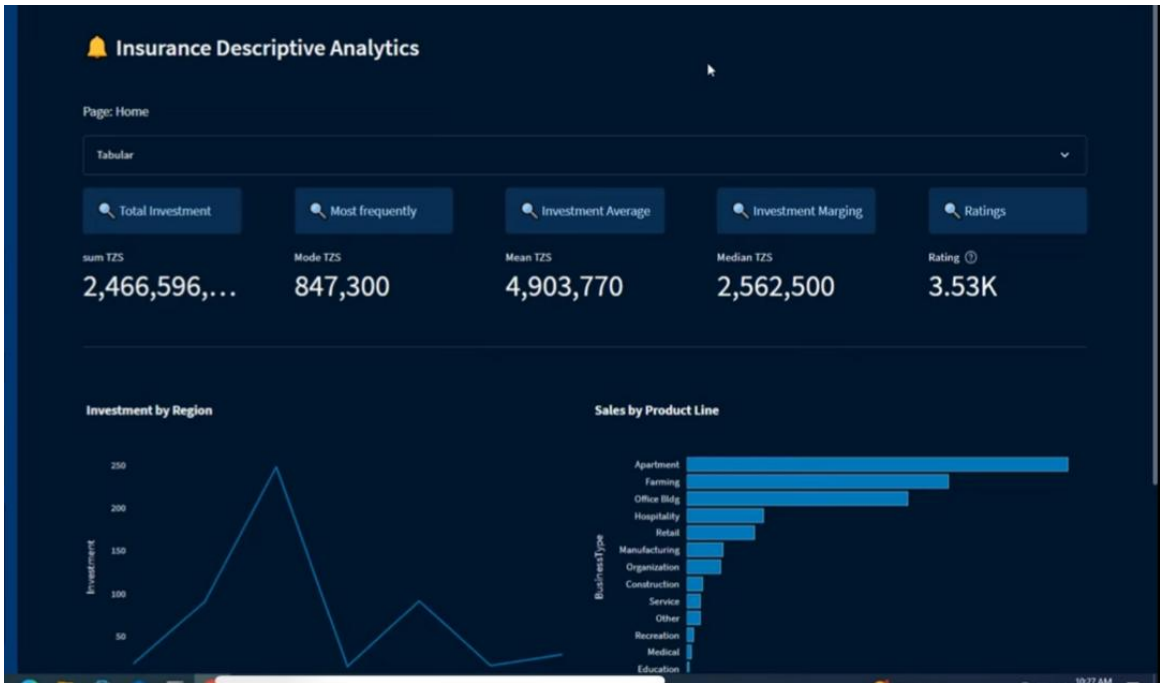


Figure 5.2: Analytical Dashboard

This project showcase my ability to utilize Django for building robust web applications that combine backend data processing with frontend visualization, aimed at enhancing data analysis capabilities and decision support systems.

5.3 Other Hands-On Exercises

5.3.1 NumPy in Data Analysis

This involves utilizing NumPy for data analysis tasks, focusing on numerical computations and array operations to extract meaningful insights from structured data.

Aim and Objective:

The aim was to demonstrate proficiency in using NumPy for data manipulation and analysis, applying statistical methods to derive insights from a dataset.

I was responsible for implementing data preprocessing tasks using NumPy, performing array operations, and applying statistical techniques to analyze and visualize data.

```
import numpy as np

# Creating NumPy arrays
data = np.array([1, 2, 3, 4, 5])
print(data)

# Creating a 2D array
matrix = np.array([[1, 2, 3], [4, 5, 6], [7, 8, 9]])
print(matrix)

mean = np.mean(data)
std_dev = np.std(data)
print("Mean:", mean)
print("Standard Deviation:", std_dev)

# Element-wise operations
data_squared = np.square(data)
print("Squared data:", data_squared)
```

```
[1 2 3 4 5]
[[1 2 3]
 [4 5 6]
 [7 8 9]]
```

Figure 5.3: One of the python codes written during the project Exercise

```
# Matrix multiplication
matrix1 = np.array([[1, 2], [3, 4]])
matrix2 = np.array([[5, 6], [7, 8]])
product = np.matmul(matrix1, matrix2)
print("Matrix multiplication result:")
print(product)

# Eigenvalues and eigenvectors
eigenvalues, eigenvectors = np.linalg.eig(matrix1)
print("Eigenvalues:", eigenvalues)
print("Eigenvectors:", eigenvectors)
```

```
Matrix multiplication result:
[[19 22]
 [43 50]]
Eigenvalues: [-0.37228132  5.37228132]
Eigenvectors: [[-0.82456484 -0.41597356]
 [ 0.56576746 -0.90937671]]
```

Figure 5.4: Another python code written using numpy library

5.3.2 Data Cleaning in Python

This focuses on cleaning and preprocessing data using Python and Pandas, ensuring data integrity and preparing datasets for analysis.

Aim and Objective:

The objective was to develop skills in data cleaning techniques, including handling missing values, eliminating duplicates, and ensuring consistency in data formats.

I led the data cleaning process, implementing scripts in Python to address missing data, remove duplicates, and standardize data formats for consistency.

```
import pandas as pd
import numpy as np

# Example DataFrame with missing values
data = {'A': [1, 2, np.nan, 4, 5],
        'B': [np.nan, 2, 3, np.nan, 5],
        'C': ['foo', 'bar', 'baz', 'qux', 'quux']}
df = pd.DataFrame(data)
print("Original DataFrame:")
print(df)

# Check for missing values
print("Missing values:")
print(df.isnull().sum())

# Fill missing values with mean (or any other method)
df['A'].fillna(df['A'].mean(), inplace=True)
df['B'].fillna(df['B'].median(), inplace=True)

# Drop rows with missing values
df.dropna(inplace=True)
```

Figure 5.5: Data cleaning in python: Handling missing values

```
# Example DataFrame with inconsistent data formats
data = {'Date': ['2023-01-01', '2023-02-01', '2023-03-01'],
        'Amount': ['$100', '$200', '$300']}
df = pd.DataFrame(data)
print("Original DataFrame:")
print(df)

# Convert Amount column to numeric
df['Amount'] = df['Amount'].replace('[\$,]', '', regex=True).astype(float)

# Convert Date column to datetime format
df['Date'] = pd.to_datetime(df['Date'])

print("\nDataFrame after standardizing data formats:")
print(df)
```

Original DataFrame:

	Date	Amount
0	2023-01-01	\$100
1	2023-02-01	\$200
2	2023-03-01	\$300

DataFrame after standardizing data formats:

	Date	Amount
0	2023-01-01	100.0
1	2023-02-01	200.0
2	2023-03-01	300.0

Figure 5.6: Data cleaning in python: Dealing with inconsistency in date format

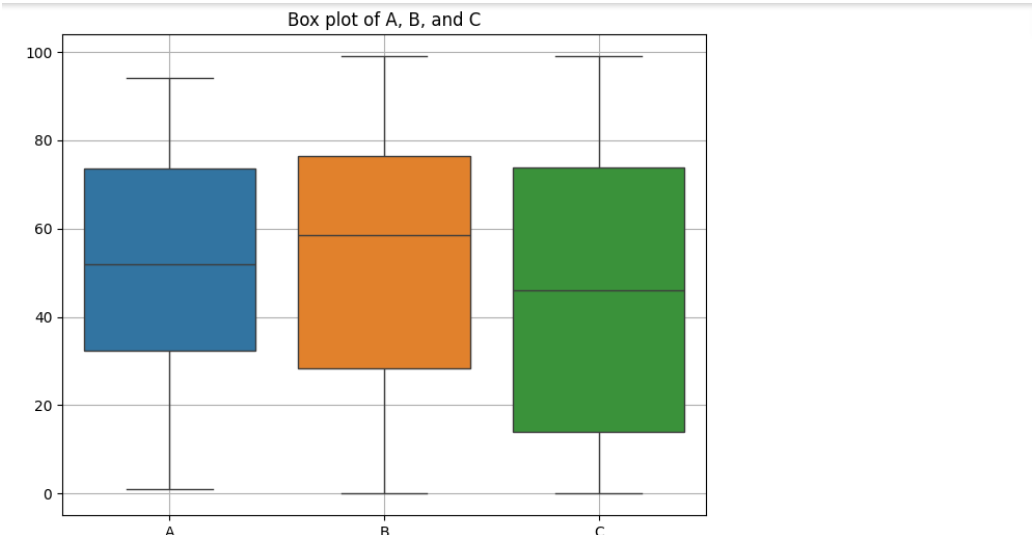


Figure 5.7: Data Visualization: Box Plot

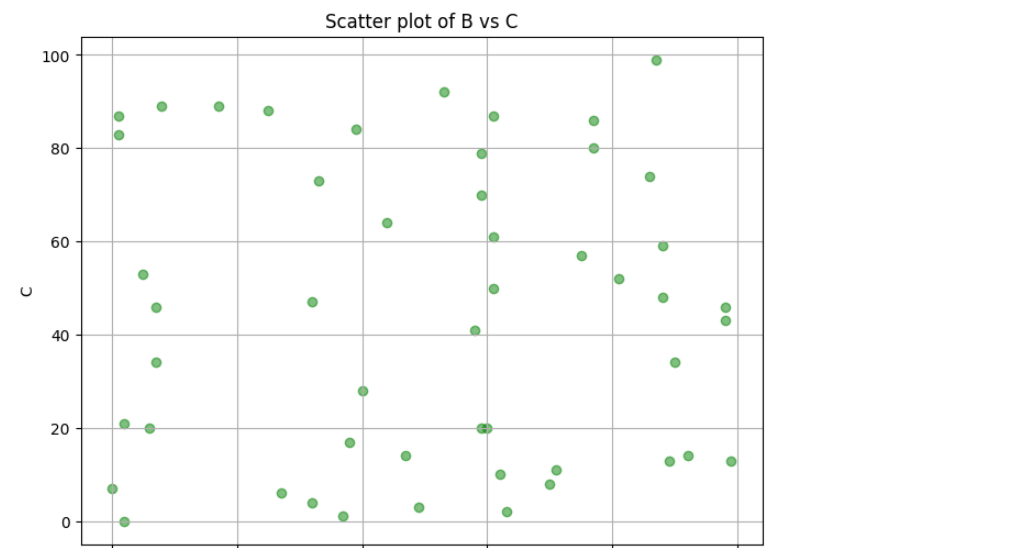


Figure 5.8: Data Visualization: Scatter Plot

Chapter 6

Skills Gained at Luminions Technology

This chapter details the skills acquired during my internship at Luminions Technology, encompassing both technical proficiency and soft skills development.

6.1 Technical Skills Development

My internship experience provided a robust platform for acquiring and refining various technical skills essential in data science and analysis:

- **Python and Anaconda Proficiency:**

I successfully installed and configured Anaconda for Python distribution, mastering the creation of virtual environments. This setup allowed seamless management of Python packages, enhancing my workflow efficiency.

- **Python Programming Fundamentals:**

I deepened my understanding of Python's core concepts, including variables, data types, and basic operations. This foundation enabled me to navigate complex data structures and algorithms effectively.

- **Data Handling with NumPy:**

Through extensive study and practical application, I immersed myself in NumPy, a cornerstone library for numerical computing. I proficiently performed array operations, including matrix manipulations essential for data analysis tasks.

- **Exploration of Pandas for Data Analysis:**

I gained proficiency in Pandas, focusing on its core data structures: Series and DataFrame. This knowledge facilitated the loading and inspection of CSV and Excel data, with techniques for identifying data types and handling missing values.

- **Data Visualization and Analysis:**

Utilizing Pandas, I created various visualizations such as line plots, bar plots, and scatter plots to effectively communicate insights derived from data. This included plotting scatter plots using provided datasets to visualize relationships and trends.

- **Data Cleaning and Transformation:**

I developed skills in data cleaning by addressing missing values and eliminating duplicates using Python and Pandas. This process ensured data integrity and prepared datasets for further analysis and modeling.

- **Application of Python and Pandas in Data Recoding**

I applied Python and Pandas to recode data, enhancing data quality and compatibility for analytical purposes. This involved transforming data to meet specific requirements and standards.

- **Data Analysis:** Applying statistical software and concepts learned at Luminions Technology, I analyzed real-world data to derive actionable insights.

6.2 Soft Skills Development

In addition to technical skills, my internship at Luminions Technology also honed various soft skills:

- **Teamwork and Leadership:**

Collaborating with interns from diverse backgrounds enhanced my teamwork skills, while leading projects strengthened my leadership abilities.

- **Communication:**

Engaging in discussions, reporting findings, and collaborating with colleagues improved my ability to communicate effectively to different audiences.

- **Problem Solving:**

Tackling diverse projects during my internship sharpened my problem-solving skills, fostering innovative and critical thinking.

- **Networking:**

Building professional relationships with colleagues and collaborators expanded my professional network.

- **Time and Stress Management:**

Meeting project deadlines under pressure improved my time management and stress-handling capabilities.

The skills and experiences gained at Luminions Technology will undoubtedly benefit my academic performance and career growth. This internship not only deepened my understanding of statistics but also fueled my enthusiasm for continuous learning. I am eager to apply and expand upon these skills in future endeavors, building upon the foundation established during this enriching internship.

These experiences have significantly contributed to my personal and professional growth during my time at Luminions Technology.

Chapter 7

Conclusion and Recommendations

7.1 Conclusion

During my internship at Luminions Technology, I had the opportunity to apply my skills in statistics to real-world projects. It was a valuable experience that allowed me to grow both technically and professionally. Collaborating with interns from diverse backgrounds further enriched my learning, helping me develop essential skills needed for my career. This internship has been a significant part of my education and career path. I am thankful to the University of Ibadan for including this internship in our curriculum and to everyone at Luminions Technology for their guidance and support. They have taught me valuable lessons about python and its practical applications in the real world.

Looking forward, I am excited to apply what I have learned in future roles. This internship has provided me with a solid foundation to contribute effectively to projects that use data to solve problems. It has not only enhanced my technical skills but also taught me the importance of collaboration and effective communication in a professional setting. In conclusion, my internship at Luminions Technology has been an enriching experience that has prepared me well for my future career endeavors.

7.2 Recommendations

Based on my internship experience at Luminions Technology and the skills I acquired, I propose the following recommendations:

1. Implement a mandatory 2-month SIWES program for all undergraduate students at the University of Ibadan before they graduate. This program will provide students with practical work experience, helping them develop both technical and soft skills essential for their chosen fields.
2. Establish partnerships with more institutes and organizations to facilitate easier placements for students during the SIWES period. This collaboration will broaden internship opportunities and expose students to diverse professional environments.
3. Provide stipends to interns during the SIWES program to alleviate financial challenges related to transportation and meals. This support will enable students to fully engage in their internships and gain valuable practical experience. At Luminions Technology, for instance, interns were occasionally involved in data-related projects and provided with data for virtual seminars.
4. Require interns to deliver monthly presentations or submit reports at their workplace. This practice ensures interns stay on track with their learning objectives and allows supervisors to provide timely feedback and support.

These recommendations aim to enhance the effectiveness and impact of the SIWES program, ensuring that students acquire practical skills and experiences that prepare them for successful careers after graduation.

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