BUSINESS INTELLIGENCE SYSTEMS USING CLOUD ENVIRONMENT

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Abstract- This project focus on effectively exploring and analysing the integration of Business Intelligence systems using a Cloud environment. Business Intelligence is a computer technology that helps in identification, obtaining, and analysing the business data. In spite of its shortcomings, Business Intelligence has been able to create fast data that could take a long time to analyse , making it an best tool for analysing trends and making business decisions easily . Integration of business intelligence with cloud computing has made it easier to recognise trends through the data more effectively. The data sets are being cleaned to get more accurate trends and to study fluctuations in the data . and now we train various algorithms to make the predictions on the data. Mainly two algorithms are being used Decision tree and random forest Then we compare tem with the root mean square errors and check which algorithm is more presise.

Index terms – Business Intelligence, Cloud environment, Decision trees, Random Forest algorithms.

I. INTRODUCTION

In the fast-paced and dynamic landscape of modern business, the effective utilization of data has become more important for informed decision-making and strategic planning. At the forefront of this data-driven revolution is the realm of Business Intelligence (BI), a multifaceted discipline encompassing technology, practices, and methodologies geared towards extracting meaningful insights from vast datasets. This process involves the collection, compilation, analysis, and presentation of historical business information, serving as a foundation for enhancing decision-making processes within organizations.

The core back ground of BI can be retraced to the development of Decision Support Systems (DSS) that took shape in the 1960s and underwent significant progress in the subsequent decades, particularly in the period of mid-1980s. DSS, essentially computer-assisted models designed to make decision-making and planning, made the groundwork for BI by providing tools to process and interpret data in a more systematic and efficient manner. The term "Business Intelligence" gained importance in 1989, as Howard Dresner introduced it as an umbrella concept, encapsulating the content and methods that help inimproving business decisions through real-time support systems and results-driven approaches.

Critics and enthusiasts alike perceive BI as a evolutionary force in the realm of business data reporting, offering user-friendly analytical frameworks that empower firms to make strategic decisions based on historical trends and patterns. The use of BI has improved , becoming a important marketing buzzword in the surroundings of harnessing vast and technologically advanced datasets. John Mashey, a notable figure in this

domain, highlights the management and analysis of data-intensive datasets, capturing information within specific timelines and making possible predictions of outcomes and behaviors with the help of robust mathematical models.

Fig.1.0 Business Intelligence Framework

The advent of BI has also witnessed the rise of Big Data, a term encapsulating dataset characterized by their sheer volume, constant updates, and diverse formats, ranging from text and numbers to multimedia content like photos and videos. This diverse array of data types allows organizations to glean valuable insights and predict future outcomes by leveraging sophisticated mathematical concepts within increasingly complex diagnostic systems. As we delve deeper into this narrative, the profound impact of BI on contemporary business landscapes becomes apparent, transcending traditional decision-making approaches and propelling organizations towards data-driven success.

II. LITERATURE SURVEY

A Kaplan and M Haenlein [4] Their proposed system points to address the complexity and ambiguity surrounding Artificial Intelligence (AI). By categorizing AI into stages (narrow, general, super intelligence) and types (analytical, human-inspired, humanized), the system offers a nuanced perspective. It analyzes AI's potential and risks through case studies involving universities, corporations, and governments. There are Three C's involved in this model they are Confidence, Change, and Control these provide a framework for firms to consider the internal and external implications of AI, fostering a understanding and strategic approach.

Z Jian [3] Their proposed system finds to address ethical concerns in information systems by examining principles of conduct for best decision-making. Pointing on privacy, security, and system quality, the paper references research from developed countries and relevant firms It extends its analysis to the present ethical landscape in China . This comprehensive approach focuses to serve as a valuable reference for IT/IS/IM engineers and managers, fostering awareness of ethical issues and promoting the enhancement of information system quality.

DJ Power [4] The objective of their suggested system is to offer a succinct historical synopsis of Decision Support Systems (DSS) covering more than 35 years. It begins with the development of model-oriented DSS in the late 1960s and follows its evolution via financial planning systems, theory developments, and Group DSS in the 1970s and 1980s. The story goes on to discuss the beginnings of OLAP, Business Intelligence, and Executive Information Systems, and ends with the introduction of Web-based DSS in the mid-1990s. This system aims to provide information about the evolving DSS technology.

J. Ranjan [11] By adding business intelligence (BI), their suggested solution seeks to address the difficulties faced by enterprises in using their large data for strategic decision-making. In addition to providing insights into a checklist for successfully implementing BI, the article examines the importance of BI and its expanding potential. It highlights how business management is changing and stresses the importance of knowledge-based networks and metrics-driven initiatives. The method emphasizes how important it is to integrate large amounts of data and make sense of it utilizing BI components including ETL, data warehousing, OLAP, data mining, and visualization.

Yeoh, W. et al., [13] In order to execute business intelligence (BI) systems effectively, their suggested system focuses on identifying and addressing critical success factors (CSFs). Utilizing case studies and the Delphi technique, the research takes a two-stage qualitative approach to bridge the gap between academia and practitioners. The resulting CSFs framework underscores the need of a business-oriented approach and shows that firms that address these variables have a higher chance of implementing BI systems successfully. In order to help management navigate the challenges of BI system deployment, this solution seeks to offer insightful information.

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Verkooij Kim [14] Their The suggested solution introduces a Mobile BI Implementation (MOBII) framework in order to tackle the rapidly growing trend of Mobile Business Intelligence (BI). This study emphasizes important issues including value generation, application deployment, information security, workforce mobilization, information distribution, and device management in response to the dearth of approved mobile BI implementation strategies. The framework incorporates twenty essential factors that are obtained via conversations with experts. By modifying current BI implementation techniques, the MOBII framework exhibits practical applicability through a successful evaluation in a single case study.

1. APPLICATION

1. Real-time Analytics for Sales and Revenue:
• Use cloud-based BI tools to evaluate real-time sales data, allowing companies to quickly spot patterns, monitor income, and adjust pricing policies.

2. Market Trend Analysis:
• Analyze consumer behavior, market trends, and competitor actions in real-time with BI tools on cloud infrastructure to support quick decision-making and market adaptability.

3. Supply Chain Optimization:
• BI systems in the cloud are being implemented to optimize supply chain operations, identify any bottlenecks, and monitor inventory levels in order to increase overall efficiency.

4. Predictive Analytics for Customer Behavior:
• Using cloud-based BI systems to analyze past customer data and forecast future behavior, which enables companies to target marketing campaigns and increase customer happiness.

5. Financial Planning and Cost Analysis:
• Bi infrastructure can be used for net financial management improvement, cost analysis, financial planning, and overall financial estimation. It can also serve as a basis for cost-effective strategy development.

6. Performance Dashboards and KPI Monitoring:
• Use cloud-based BI dashboards to track key performance indicators (KPIs) and give stakeholders a visual depiction of important metrics so they can make decisions quickly.

7. Scalable Data Storage and Processing:
• Making use of the cloud infrastructure's scalability to store and handle massive amounts of raw data, ensuring that BI systems are capable of meeting the increasing demand for data analysis.

8. Enhanced Collaboration and Reporting:
• Promote a more informed and cooperative work environment by utilizing cloud-based BI tools to enable collaborative decision-making. These systems allow teams to access and analyze data from any location.

9. Data Security and Compliance:
• Put strong security measures in place for cloud-based BI systems to guarantee the integrity and confidentiality of critical corporate data, including issues related to data governance and compliance.

10. Disaster Recovery and Business Continuity:
• Increase the resilience of BI systems by utilizing cloud infrastructure. This will ensure data continuity in the event of a disaster and speed up recovery through automated backup and recovery processes.

Businesses may access a multitude of apps that can improve decision-making, streamline processes, and stimulate creativity by fusing cloud infrastructure with Business Intelligence tools. Businesses can easily navigate the challenges of contemporary data analytics thanks to the synergy between BI and cloud technologies, making critical decisions quickly and assuring scalability, security, and teamwork.

III.   IMPLEMENTATION

Steps for implementation:

1. Upload Dataset into Cloud Environment
2. Importing Dataset
3. Performing EDA
4. Data Visualization
5. Model Building
6. Training Decision Tree Algorithm
7. Training Random Forest Algorithm
8. Accuracy Comparison Graph

1. Upload Dataset into Cloud Environment

   Gather the required datasets and upload them into the cloud environment.

2. Importing Dataset

   Import the dataset from the cloud into Jupyter notebook.

3. Performing EDA

   Now we perform data pre-processing on the imported datasets.

4. Data Visualization

   We then visualize the cleaned dataset and perform various analysis on the dataset to understand the data more efficiently.

5. Training Decision Tree Algorithm

   We first train the decision tree algorithm with 80% of the dataset and predict the test data. And then check the difference between original test sales and the predicted test sale values.

6. Training Random Forest Algorithm

   We train the random forest algorithm with 80% of the dataset and predict the test data. And then check the difference between original test sales and the predicted test sale values.
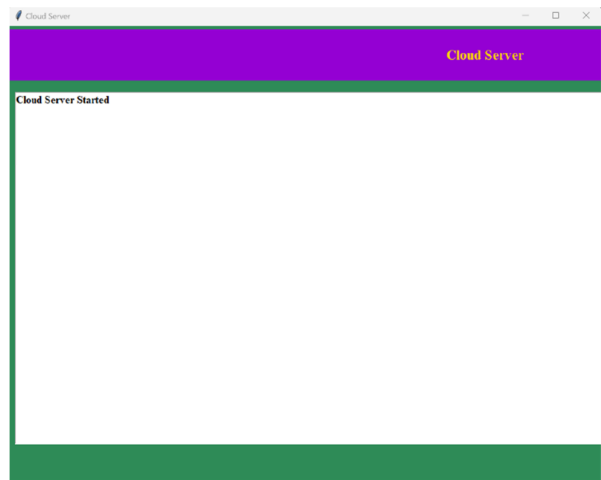
7. Accuracy Comparison Graph

   Create measures for accuracy and use a comparison graph to know which algorithm is much efficient and carry out the further analysis with the following trained model.

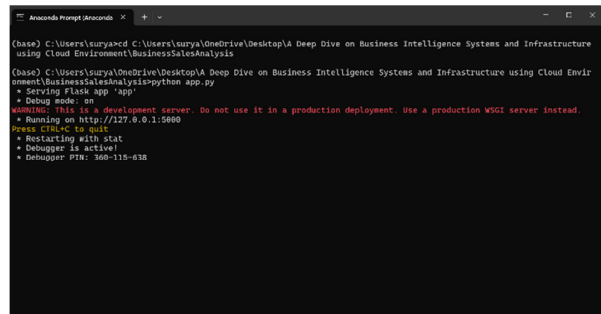### IV.   EXPERIEMNTAL RESULTS

To run the project first we need to start the cloud server using anaconda prompt
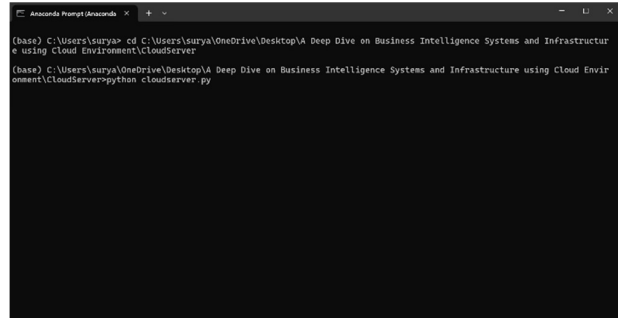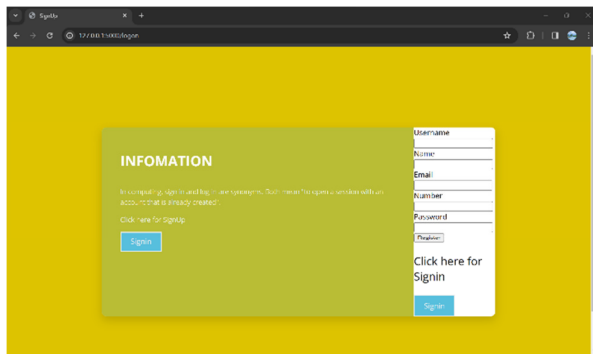

Now the cloud is initiated

After initiating the cloud now, we have to run the application server
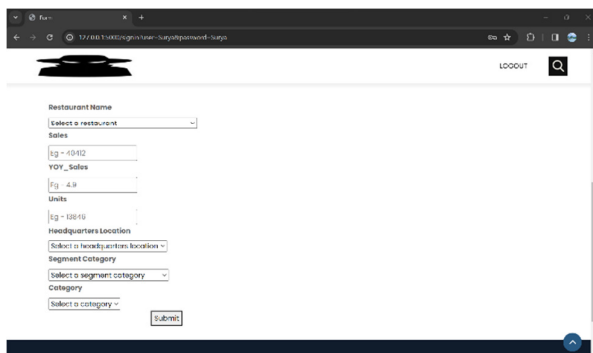

Now we copy the running http link and copy it in browser. And the website will be initialized
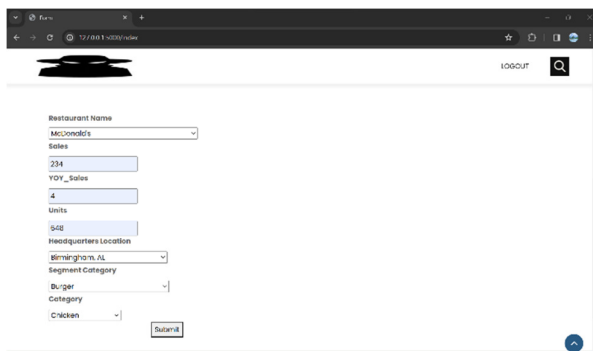
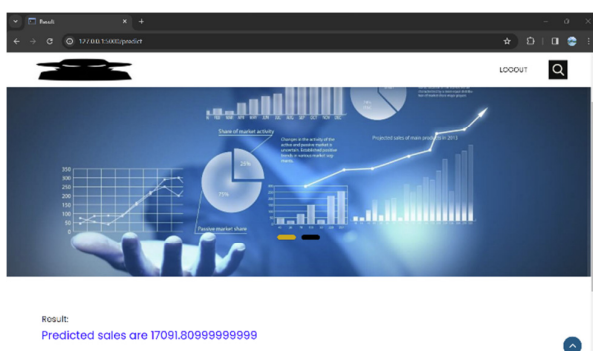Now we have to sign up to create an account to proceed with the analysis

Once the sign-up process is done procced with sign in to perform prediction sales analysis

Now enter the following fields to continue further with the analysis

Once after entering all fields press Submit button to get the output. Now we get the required result of the prediction sales

V.   SUMMARY

Business Intelligence (BI) proves vital in emerging markets, offering timely insights for swift decision-making. Its impact, surpassing traditional timelines, accelerates goal attainment. Despite procurement costs, BI fosters adaptive business strategies, meeting evolving customer needs daily. As a contemporary technology-driven tool, BI stands as a pivotal asset in navigating the dynamic landscape of emerging markets, facilitating agility and strategic responsiveness.

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