Departmental Data Analysis

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Abstract*— The effective analysis of data is crucial for informed decision-making in any department. It is necessary to follow a structured approach to develop a robust system for departmental data analysis. This abstract outline the steps to be taken for proposing a new system for departmental data analysis. The first step is to define the goals and objectives that are set for the data analysis system which includes the type of data that is to be collected and its expected insights. Next, identifying the data sources, including internal and external sources, is critical. Choosing a suitable data analysis tool, such as a software package or custom-built solution, is essential for efficient analysis of the data. Developing a data analysis process that is flexible and adaptable is the next step, which should guide data collection, cleaning, analysis, and reporting. Setting up a data governance framework is crucial to ensure data integrity and security, including who can access the data, how it can be used, and how it will be protected. Finally, providing adequate training and support to staff who will be using the data analysis system is essential for optimal utilization of its capabilities. By following these steps, a department can develop an effective and reliable system for data analysis, enabling them to make informed decisions and gain valuable insights from the collected data. Other than the above steps, we can use PowerBi/Tableau to analyze and work on the departmental data and get rid of the traditional methods that are used for taking attendance and analyzing the absence.

Keywords: Data analysis, decision-making, internal sources, external sources, data analysis tool, data collection, data cleaning, data reporting, data integrity, departmental data analysis, Power BI.

I. Introduction

Many organizations have large amounts of departmental data that could be used to inform decision-making and drive business growth. However, analyzing and then interpreting this data can turn out as a complex as well as time-consuming task, especially in the case where we are dealing with multiple departments within an organization or company. The lack of an efficient data analysis process can lead to misleading opportunities, ineffective decision-making, and ultimately, a decrease in productivity and revenue.

Therefore, the problem statement is how to develop an efficient and effective departmental data analysis process that enables organizations to leverage their data to make informed decisions, improve performance, and achieve their analysis goals. This process should consider the various data sources, the complexity of the data, and the different departmental needs while also ensuring data accuracy, consistency, and privacy.

II. LITERATURE SURVEY

A. Existing System

Many existing systems for departmental data analysis work on Android/web. They have many features including registrations/logins-logouts. The complexity of these systems makes it difficult to work on them and simply perform analytical operations using them.

Some of them are:

• Online Student Attendance Management Information System: Preventing time theft, enhancing productivity, and raising output were some of its features. The database, object-oriented programming, and networking methodologies form the foundation of UTB-SAMIS. This system connects to MySQL, the back-end application, and utilizes PHP, an object-oriented programming language, as the front-end software in addition to certain cutting-edge client-side technology [5]. The given figure displays Student-side DFD:

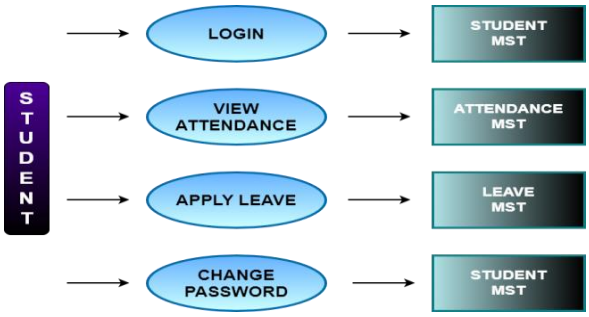

Figure1. Student-Data flow Diagram

• Attendance Management System: It used an Android app as the standard means and a database with GUI, and an API with Microsoft SQL as a query language and ASP.NET framework for the backend for the reasons and its capability of handling web applications as well as dynamic websites. It even served effectively with mobile applications. In this system, the users were classified into non-managerial employees; Managers; HR admins. The check-in and check-out times instances of employees were tracked using a fingerprint scanner and then that data was used in the proposed system. Using that data, the working hours of the employees were calculated. The proposed system allowed every employee to view their respective attendance for each day. The Managers and HR admins could also view the attendance of all the employees. By analyzing this data, reports were generated. The employees were allowed to apply for duty leaves, medical leaves, etc using the data collected in this system. Here leaves were classified and employees could view their respective leave balances for each category [8].

• Attendance System Based on Fingerprint and Arduino Board: The main modules for the proposed system included: The attendance module; Report module; Fingerprint module; Schedule module; Lecturer module; Student module. The designed block diagram for the proposed system of portable attendance system is shown in Figure 1. The fingerprint scanner and SD card were both connected to an Arduino Mega for the hardware implementation. In terms of the software, the Arduino compiler IDE was used to compile the code [4].

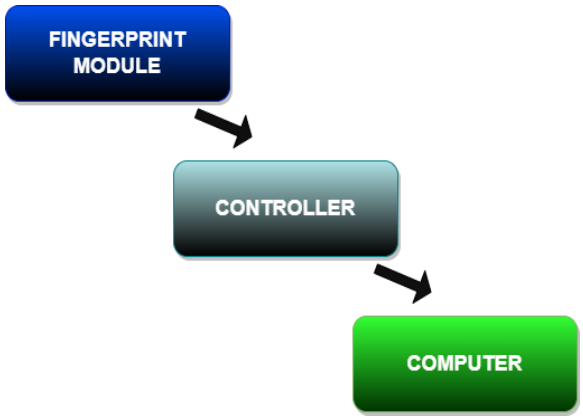

Figure2. Overall Block Diagram

• Attendance Management System from Islamic University of Technology (IUT): This system had concrete functionalities, efficiency and accuracy, framework, web services, and availability of both computer and Android

versions. The purpose for the development of this attendance management system was to remove the barriers posed by the traditional method of marking attendance. The software's automatic report generation at the end of the semester is another reason for its development [1].

III. PROPOSED SYSTEM

The Departmental Data Analysis System is a software tool that enables the collection, analysis, and reporting of data from various sources to support informed decision-making within an organization. This system aims to provide valuable insights that can help improve business processes, optimize resource allocation, and enhance overall performance. This system will help in the management and analysis of departmental data and the conventional on-paper methods shall not be used and so making it easy for managers, heads, employers to keep track of the data and get useful insights. The proposed system will also provide analytical reports of the data collected from attendance to users, with various access rights depending on the post of the user (Take an example of faculties, they will be able to view the data of students along with the reports). The system will keep a record of Time-Tables for departmental divisions. The faculty members will be able to initiate a communication session with students using the system and its insights.

Data Sources: The data sources for the Departmental Data Analysis System may include:

- University datasets,
- School datasets, or
- Simulated datasets.

Data Analysis Tool: The Departmental Data Analysis System will utilize a data analysis tool to analyze and visualize data effectively. The chosen tool should be user-friendly, scalable, and able to integrate with various data sources. Here, we may be using Tableau for analyzing purpose on this data.

Data Analysis Process: The Departmental Data Analysis System will follow a normally defined data analysis process that includes:

- Data collection and cleansing,
- Data analysis and modeling,
- Data visualization and reporting,
- Ongoing monitoring and optimization.

Data Governance Framework: To ensure the security and integrity of the data, a data governance framework may or may not be established. This framework might define:

- Access control policies,
- Data storage and encryption standards,
- Data usage guidelines,
- Data backup and recovery procedures.

Training and Support: The Departmental Data Analysis System may provide the users with training and support with tutorials to ensure the effective use of the proposed system. This might include:

- User manuals and documentation,
- Training sessions and tutorials,
- Technical support for system issues.

Overall, this proposed system may combine the benefits of a computerized attendance system with a robust data analysis system. The system will also help circulate circulars and will also work as a notice board for important notices.

IV. METHODOLOGY

A general methodology for conducting departmental data analysis:

A. Defining the objective

Start by identifying the objective of the analysis. Ask yourself what problem you are trying to solve or what question you are trying to answer. This will help you stay focused throughout the analysis.

B. *Identify the data sources*

Next, identify the data sources that you will need to collect or access. This may include internal databases, external sources, or surveys that need to be conducted.

C. *Collect the data*

Once you have identified the data sources, collect the data needed for the analysis. This may involve cleaning and transforming the data, such as removing duplicates or missing values.

D. *Analyse the data*

Use statistical techniques, charts, and other tools to analyze the data. You may want to segment the data by different categories, such as periods, customer segments, or products.

E. *Interpret the results*

Once you have analyzed the data, interpret the results to draw conclusions and make recommendations. This may involve identifying patterns, trends, or relationships in the data.

F. *Communicate the findings*

Finally, communicate the findings to stakeholders clearly and concisely. This may include creating visualizations or reports that highlight the key insights and recommendations.

G. *Take action*

After communicating the findings, act based on the insights and recommendations. This can entail putting new plans into action or altering current procedures. As you keep an eye on the results of these actions, you can iterate and refine the analysis as necessary.

V. RESULTS

The proposed system for departmental data analysis will provide the following results: A clear definition of goals and objectives for the data analysis system, which will help align business goals with data analysis efforts. Identification of various data sources that can provide valuable insights for decision-making. Selection of an appropriate data analysis tool that can effectively analyze and visualize the collected data. Development of a data analysis process that can be adapted to changing needs and requirements, enabling continuous improvement. Establishment of a data governance framework that ensures the security and integrity of the data, which is essential for compliance and risk management. Training and support for staff who will be using the data analysis system, ensuring that they can effectively use the system to make informed decisions. Overall, the proposed system will enable better decision-making by providing valuable insights that can help improve business processes, optimize resource allocation, and enhance overall performance. This can lead to increased efficiency, productivity, and profitability for the organization.

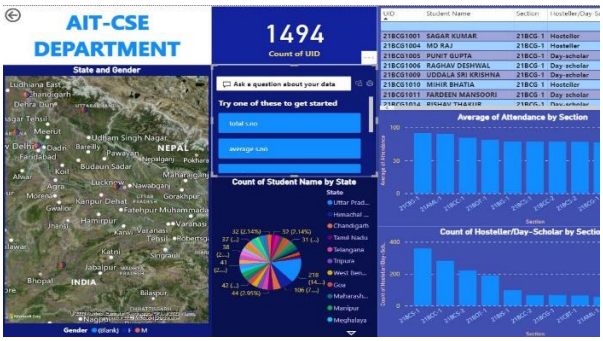

Figure3. Dashboard (Result)

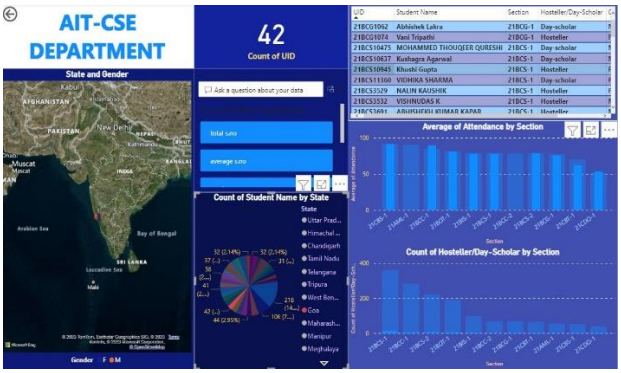

Figure4. Interactive Dashboard

VI. CONCLUSION

The departmental Data Analysis System is designed to support informed decision-making by providing valuable insights from various data sources. By following a defined data analysis process and implementing a data governance framework, this system can ensure the security and integrity of the data while providing accurate and timely information to support business goals.

We proposed a departmental data analysis system that includes the following features.

- Attendance Management System,
- Analysis of the departmental data,
- PowerBI Dashboard.

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