Title: Utilizing Data Mining and Business Intelligence Techniques to Improve Sales and Production Performance:

Introduction:

AdventureWorks management has expressed interest in understanding the sales and production performance of the company over a period of time, with the aim of making better quality decisions and improving overall organizational performance. To achieve this, the company plans to utilize machine learning and data mining techniques to analyze their data and identify patterns that will help them assess sales, production, and employees' performance. The goal of this study is to develop a system that will assist AdventureWorks management in making data-driven decisions that will improve the company's performance and profitability.

Objectives:

The objectives of this study are as follows:

1. To analyze monthly, quarterly, and yearly sales and production performance of AdventureWorks using data mining and machine learning techniques.

2. To identify patterns and trends in the data that can be used to assess sales, production, and employees' performance.

3. To develop predictive models that will help the company think ahead and avoid unforeseen circumstances.

4. To create a dashboard that incorporates the analytics and provides visual representations of the data to allow management to have an easy-to-understand view of the data.

Methodology:

The following steps will be taken to achieve the objectives of the study:

1. Data Collection: The study will use tables grouped under the schemas (HumanResources, Purchasing, Production, and Sales) from AdventureWorks database restored on Ms SQL Server.

2. Data Integration and Processing: The data will be integrated from the schemas listed in Step 1 using Pentaho data integration tool and necessary data processing and transformations will be performed. Pentaho will be used to extract data from AdventureWorks and loaded into a data warehouse named DWAdventureWorks.

3. Data Analysis: Dimension and fact tables will be created in DWAdventureWorks to hold data summaries that were processed and transformed in Step 2. Data mining and machine learning techniques will be used to analyze the data and identify patterns and trends that can be used to assess sales, production, and employees' performance. Predictive models will be developed to help the company think ahead and avoid unforeseen circumstances.

4. Dashboard Development: A business intelligent system will be built to account for reporting and data analysis. This system will provide insight into the data and allow management to have visual representation of data or provide data in an easy way to understand. The analytics will include sales, production, employees’ performance, and any additional informative details. The analytics will be incorporated into a dashboard that is built using Python plotly dash to provide visual information to help the company gain competitive edge.

Expected Outcomes:

The expected outcomes of this study are as follows:

1. A better understanding of the sales and production performance of AdventureWorks.

2. Identification of patterns and trends in the data that can be used to assess sales, production, and employees' performance.

3. Development of predictive models that will help the company think ahead and avoid unforeseen circumstances.

4. Development of a dashboard that incorporates the analytics and provides visual representations of the data to allow management to have an easy-to-understand view of the data.

Conclusion:

This study aims to develop a system that will assist AdventureWorks management in making data-driven decisions that will improve the company's performance and profitability. The use of data mining and business intelligence techniques will help to identify patterns and trends in the data that can be used to assess sales, production, and employees' performance. The development of predictive models and a dashboard that incorporates the analytics will provide a better understanding of the data and help management to make better quality decisions.