**PHASE -1**

**PROBLEM DEFINITION AND DESIGN THINKING**

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| **DATE** | 26 SEPTEMBER 2023 |
| **TEAM ID** | 715 |
| **DOMAIN NAME** | DATA ANALYTICS |
| **PROJECT NAME** | PRODUCT SALES ANALYSIS |
| **MAXIMUM MARKS** |  |

**INTRODUCTION:**

Product sales analysis is the process of collecting, cleaning, and analysing data about product sales to identify trends, patterns, and insights. This information can be used to make better business decisions about product development, pricing, marketing, and sales strategies.

**PROBLEM STATEMENT:**

Predict future sales performance for each product, region depending on top-selling products, peak sales analysis and customer preferences.

**KEY CHALLENGES:**

Quality of Data:

* Cleaning and analysing data will be difficult due to complex sales data.

Customer preferences:

* Customer preferences will be changing over time and intractable.

Seasonality:

* Data regarding sales will be depending seasonally directly or indirectly which makes intricate in understanding and analysing.

Identifying patterns and trends:

* It is difficult in analysing patterns and trends without machine learning algorithms and visualization tools.

**DESIGN THINKING APPROACH:**

**Empathize:**

Understanding users plays a vital role while empathizing the problem. Preferences of customers will be changing time to time. So it is important to perform different tasks on customers to get a better result.

Actions to be performed:

* Keen observation
* Interviews
* Survey
* Questionnaries
* Active Listening

**Define:**

Defining a particular problem for the issue after analysing the customers through the tasks/actions performed during empathizing process.

The problem that our team is trying to focus on the prediction of future sales performance, since this is the main problem faced by the sales department due to inaccuracy and incompletion. The problem should be framed according to customer’s perspective.

Objectives:

* Pain Points
* Identify challenges
* Identify obstacles

**Ideate:**

Since the problem faced by department of sales is due to inaccuracy, the ideation comes with new ways to collect, analyse and using datasets.

Brainstorming among team members can bring out better solutions and open a new path for predicting data. Brainstorming on top selling products, peak sales periods, customer preferences and inventory management will be focussed by our team members and comes out with better solution.

Focussing on machine learning algorithms that gives better accuracy and using more data sources to gain more insights.

**Prototype:**

Prototyping the problem will help in identifying the best solution. Since the problem the predicting the future sales analysis, it is important to try out the identified machine learning algorithms for identifying better accuracy and best solution.

Actions to be performed:

* Collect historical sales data. This data should include information on product sales, region, channel, and time period.
* Clean and prepare the data. This involves removing errors and inconsistencies from the data, and formatting the data in a way that can be easily analysed.
* Choose a machine learning algorithm. There are a variety of machine learning algorithms that can be used for sales forecasting. Some popular algorithms include time series models, regression models, and machine learning ensembles.
* Train the model. The machine learning algorithm will need to be trained on the historical sales data. This will allow the model to learn the patterns and trends in your data.
* Generate forecasts. Once the model is trained, you can generate forecasts for future sales performance. The machine learning algorithm will be able to predict future sales based on the patterns and trends that it has learned from the historical data.

**Test:**

Since our team will provide some of the data for training and use remaining for testing, any type of machine learning algorithms will provide better accuracy and the best machine learning algorithm will be chosen.

Visualization tools like Power BI, Tableau in order to produce charts, graphs and other visualizations that makes future predictions to be realized easier.

Actions:

Use reliable tools and software for better solution

Conduct statistical analysis

Iterate and refine based on the findings to enhanced accuracy and effectiveness.

**Conclusion:**

Overall, predictions of future sales analysis can be a valuable tool for businesses to improve their planning and decision-making. By using a variety of data sources and forecasting methods, businesses can develop accurate forecasts that can help them to achieve their business goals.