

1. INTRODUCTION:

1.1 OVERVIEW:

Sales of a super store is a Machine learning task , here we forecast the super store sales which is an essential task for efficient management of a store . Machine learning can help us discover the related factors that influence sales in a superstore and estimate the sales in advance . we collect data from superstores in the form of datasets and we perform data preprocessing to extract useful data from raw-data then we perform visualization to analyze patterns in our transformed data and predict sales in the near future.

1.2 PURPOSE:

The purpose of this project is to visualize and analyze the superstore sales patterns to get a complete overview of sales and profits of historical sales to predict its sales in advance . we can provide the future demand of products to a superstore or any retail marketing enterprise . we can also help in increasing the supply according to customers demand in future so that there is no shortage of products and surplus of a product.

2. LITERATURE SURVEY:

2.1 EXISTING PROBLEM:

The existing problem in retail marketing (or) superstore sales is that there is no proper analytics , predictions about the sales of products in near future as a whole if demand of a certain product increases then there is a

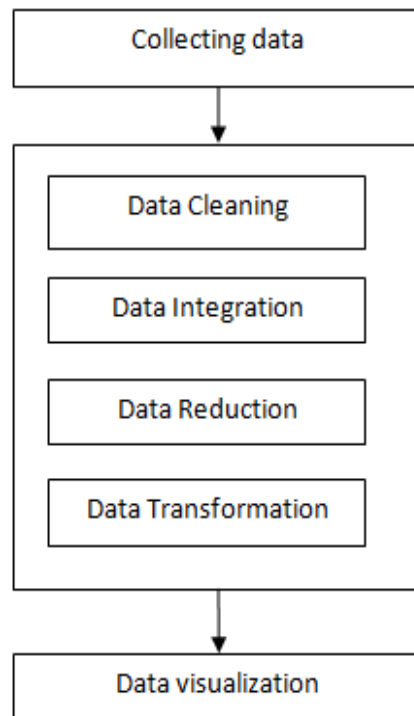
shortage in other case products may be surplus at last which leads to loss and effects us in our marketings.

2.2 PROPOSED SOLUTION:

solution to the above problem can be provided by gathering information about products on which customers invest more or likely to invest more in future along with this we need to study industry trends and the competition to get complete knowledge , analysis and predictions about the supply, demand and competition for a product for this I have gathered the data into a dataset then cleaned the data and extracted useful data for my future predictions . next I performed visualization on basis of types of products , sales ,quantity , discount on products, profits of historical data to get complete analysis about the information of products and predicting future sales accurately.

3. THEORITICAL ANALYSIS:

3.1 BLOCK DIAGRAM



3.2 HARDWARE/ SOFTWARE DESIGNING:

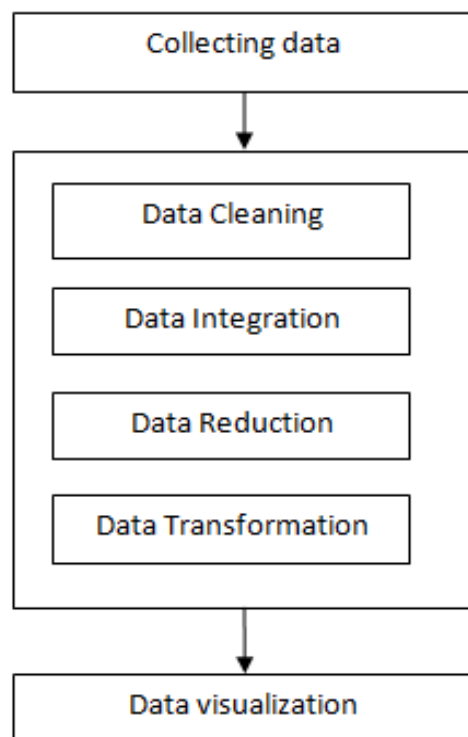
- > Windows 7 and above (64-bit)
- > RAM: 4GB
- > Processor: Minimum Pentium 2 266 MHz processor
- > Browsers: Chrome
- > Software Required:
 - Java JDK 10
 - Weka

- Eclipse IDE

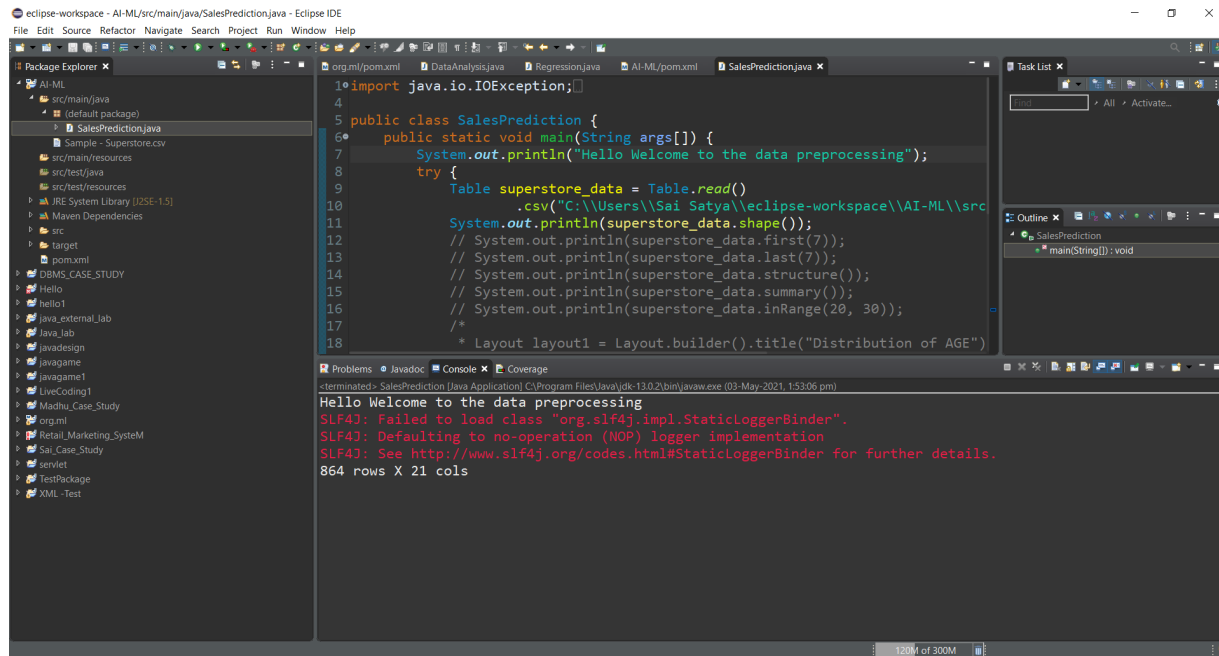
4. EXPERIMENTAL INVESTIGATIONS:

Analysis is done on sales of superstore data using data visualization techniques using tablesaw library . Predictions are done using Histogram plot, Box plot , Bar plot and Scatter plot.

5. FLOW CHART :



6. RESULT :

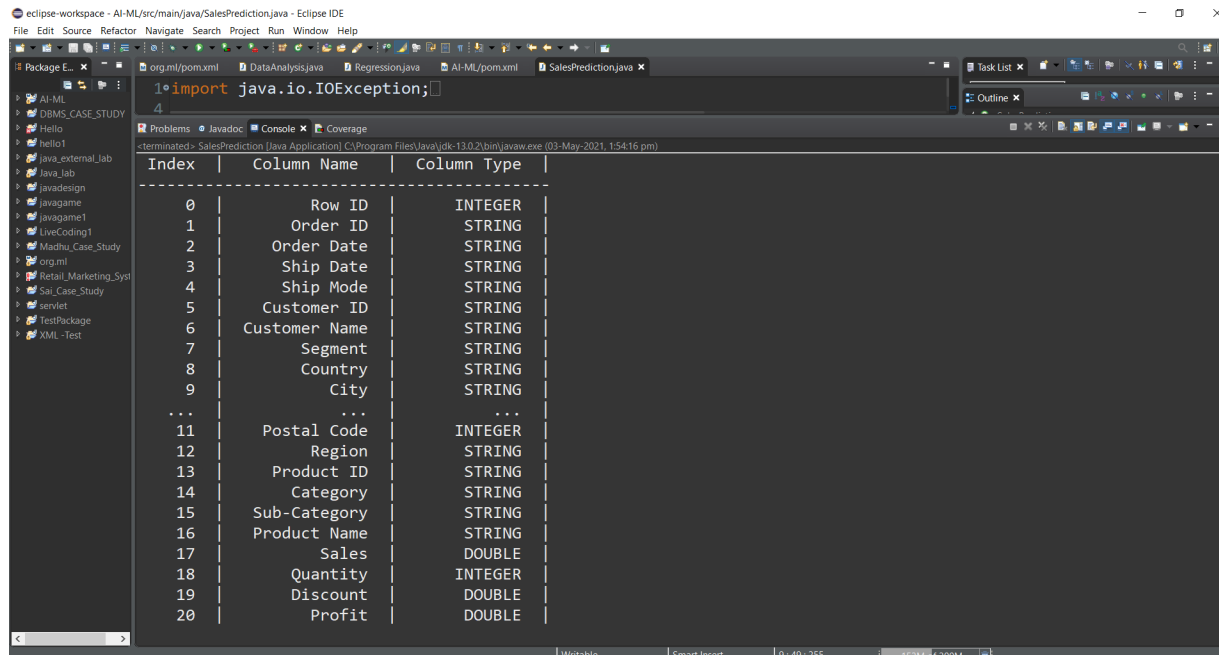


The screenshot shows the Eclipse IDE with the `SalesPrediction.java` file open. The code imports `java.io.IOException` and defines a `main` method that reads a CSV file, prints its shape, and displays a summary. The console output shows the program running successfully, printing the CSV file path, the shape of the data, and a summary of the data.

```
1 import java.io.IOException;
2
3
4
5 public class SalesPrediction {
6     public static void main(String args[]) {
7         System.out.println("Hello Welcome to the data preprocessing");
8         try {
9             Table superstore_data = Table.read()
10                .csv("C:\\Users\\Sai Satya\\eclipse-workspace\\AI-ML\\src\\Sample - Superstore.csv");
11             System.out.println(superstore_data.shape());
12             // System.out.println(superstore_data.first(7));
13             // System.out.println(superstore_data.last(7));
14             // System.out.println(superstore_data.structure());
15             // System.out.println(superstore_data.summary());
16             // System.out.println(superstore_data.inRange(20, 30));
17             /*
18              * Layout layout1 = Layout.builder().title("Distribution of AGE")
19              */
20         } catch (IOException e) {
21             e.printStackTrace();
22         }
23     }
24 }
```

Console Output:

```
<terminated> SalesPrediction (Java Application) C:\Program Files\Java\jdk-13.0.2\bin\javaw.exe (03-May-2021, 1:53:06 pm)
Hello Welcome to the data preprocessing
SLF4J: Failed to load class "org.slf4j.impl.StaticLoggerBinder".
SLF4J: Defaulting to no-operation (NOP) logger implementation
SLF4J: See http://www.slf4j.org/codes.html#StaticLoggerBinder for further details.
864 rows X 21 cols
```



The screenshot shows the Eclipse IDE with the `SalesPrediction.java` file open. The code imports `java.io.IOException` and defines a `main` method that reads a CSV file, prints its shape, and displays a summary. The console output shows the program running successfully, printing the CSV file path, the shape of the data, and a summary of the data.

```
1 import java.io.IOException;
2
3
4
```

Console Output:

```
<terminated> SalesPrediction (Java Application) C:\Program Files\Java\jdk-13.0.2\bin\javaw.exe (03-May-2021, 1:54:16 pm)
```

Index	Column Name	Column Type
0	Row ID	INTEGER
1	Order ID	STRING
2	Order Date	STRING
3	Ship Date	STRING
4	Ship Mode	STRING
5	Customer ID	STRING
6	Customer Name	STRING
7	Segment	STRING
8	Country	STRING
9	City	STRING
...
11	Postal Code	INTEGER
12	Region	STRING
13	Product ID	STRING
14	Category	STRING
15	Sub-Category	STRING
16	Product Name	STRING
17	Sales	DOUBLE
18	Quantity	INTEGER
19	Discount	DOUBLE
20	Profit	DOUBLE

eclipse-workspace - AI-ML/src/main/java/SalesPrediction.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

```
6 public static void main(String args[]) {
7     System.out.println("Hello Welcome to the data Vizualization");
8     try {
9         Table superstore_data = Table.read()
10            .csv("C:\\Users\\Sai Satya\\eclipse-workspace\\AI-ML\\src\\main\\resources\\superstore_data.csv");
11        //System.out.println(superstore_data.shape());
12        // System.out.println(superstore_data.first(7));
13        // System.out.println(superstore_data.last(7));
14        // System.out.println(superstore_data.structure());
15        System.out.println(superstore_data.summary());
16        // System.out.println(superstore_data.inRange(20, 30));
17    }
18 }
```

Problems Javadoc Console Coverage

<terminated> SalesPrediction [Java Application] C:\Program Files\Java\jdk-13.0.2\bin\javaw.exe (03-May-2021, 20:30 pm)

Summary	Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer
Count	864	864	864	864	864	864
sum	1888260					
Mean	2185.486111111111					
Min	1					
Max	9945					
Range	9944					
Variance	4561744.898995752					
Std. Dev	2135.824173239865					
Unique		864	864	864	4	5
Top		CA-2015-129476	15-10-2015	20-10-2015	Standard Class	JE-157
Top Freq.		1	1	1	518	

237M of 300M

eclipse-workspace - AI-ML/src/main/java/SalesPrediction.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

```
6 public static void main(String args[]) {
7     System.out.println("Hello Welcome to the data Vizualization");
8     try {
9         Table superstore_data = Table.read()
10            .csv("C:\\Users\\Sai Satya\\eclipse-workspace\\AI-ML\\src\\main\\resources\\superstore_data.csv");
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14        // System.out.println(superstore_data.structure());
15        // System.out.println(superstore_data.summary());
16        // System.out.println(superstore_data.inRange(20, 30));
17    }
18 }
```

Problems Javadoc Console Coverage

<terminated> SalesPrediction [Java Application] C:\Program Files\Java\jdk-13.0.2\bin\javaw.exe (03-May-2021, 20:10:08 pm)

SLF4J: Defaulting to no-operation (NOP) logger implementation
SLF4J: See <http://www.slf4j.org/codes.html#StaticLoggerBinder> for further details.

Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name
1	CA-2016-152156	08-11-2016	11-11-2016	Second Class	CG-12520	Claire Gute
3	CA-2016-138688	12-06-2016	16-06-2016	Second Class	DV-13045	Darrin Van Huff
4	US-2015-108966	11-10-2015	18-10-2015	Standard Class	SO-20335	Sean O'Donnell
6	CA-2014-115812	09-06-2014	14-06-2014	Standard Class	BH-11710	Brosina Hoffman
13	CA-2017-114412	15-04-2017	20-04-2017	Standard Class	AA-10480	Andrew Allen
14	CA-2016-161389	05-12-2016	10-12-2016	Standard Class	IM-15070	Irene Maddox
15	US-2015-118983	22-11-2015	26-11-2015	Standard Class	HP-14815	Harold Pawlan

SalesPrediction.java - AI-ML/src/main/java

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eclipse-workspace - AI-ML/src/main/java/SalesPrediction.java - Eclipse IDE

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer: AI-ML, src/main/java, SalesPredict, Sample - Super, src/main/resources, src/test/java, src/test/resources, JRE System Library, Maven Dependencies, src, target, pom.xml, DBMS_CASE_STUDY, Hello, hello1, java_external_lab, Java_Lab, javadesign, javagame, javagame1, LiveCoding, Madhu_Case_Study, org.ml, Retail_Marketing_Sys, Sai_Case_Study, servlet, TestPackage, XML-Test

```
6 public static void main(String args[]) {
7     System.out.println("Hello Welcome to the data Vizualization");
8     try {
9         Table superstore_data = Table.read()
10            .csv("C:\\Users\\Sai Satya\\eclipse-workspace\\AI-ML\\src\\ma
11            //System.out.println(superstore_data.shape());
12            // System.out.println(superstore_data.first(7));
13            System.out.println(superstore_data.last(7));
14            // System.out.println(superstore_data.structure());
15            // System.out.println(superstore_data.summary());
16            // System.out.println(superstore_data.inRange(20, 30));
17    }
```

Task List: All, Activate...

Outline: SalesPrediction, main(String ID): void

Problems: Javadoc, Console, Coverage

terminated - SalesPrediction [Java Application] C:\Program Files\Java\jdk-13.0.2\bin\javaw.exe (03-May-2021, 2:02:20 pm)

Hello Welcome to the data Vizualization

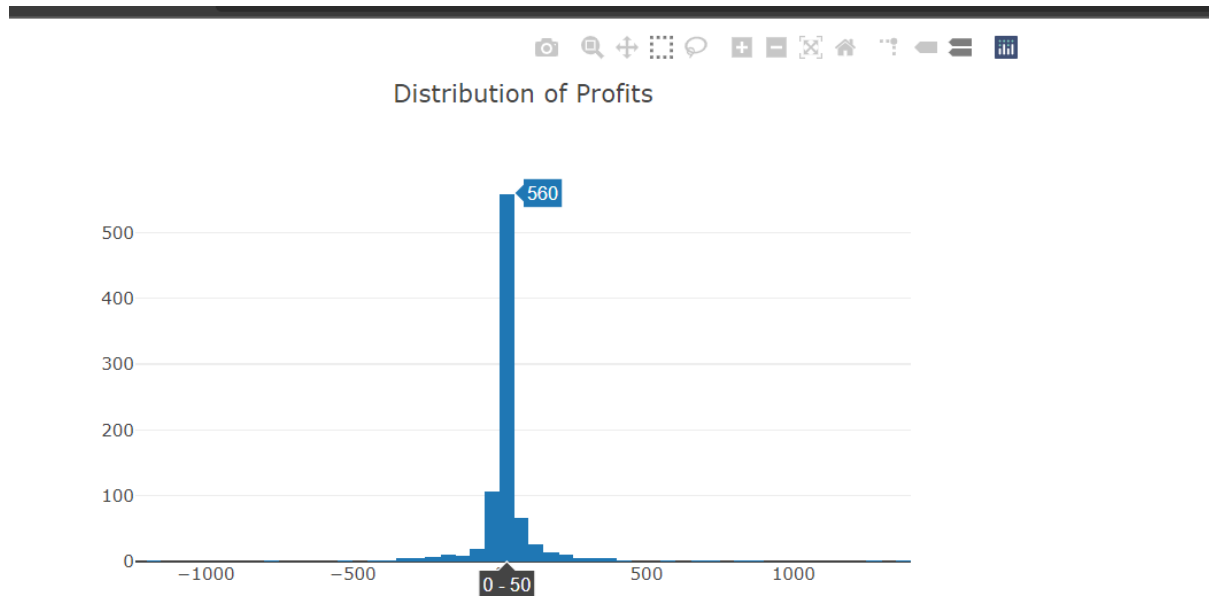
SLF4J: Failed to load class "org.slf4j.impl.StaticLoggerBinder".

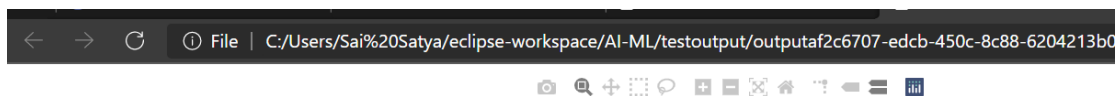
SLF4J: Defaulting to no-operation (NOP) logger implementation

SLF4J: See <http://www.slf4j.org/codes.html#StaticLoggerBinder> for further details.

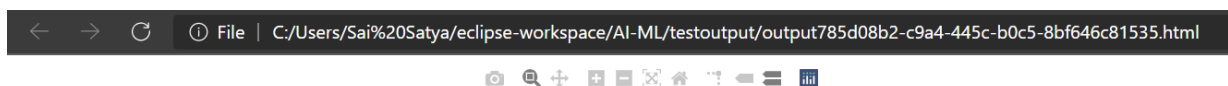
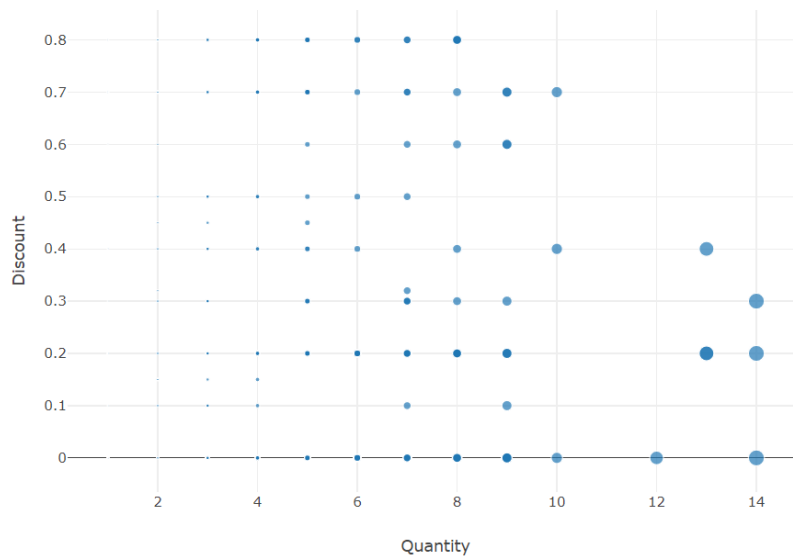
Row ID	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name
9464	CA-2014-156545	27-02-2014	03-03-2014	First Class	JS-16030	Joy Smith
9600	CA-2015-116841	14-04-2015	18-04-2015	Standard Class	TP-21130	Theone Pippenger
9640	CA-2015-116638	28-01-2015	31-01-2015	Second Class	JH-15985	Joseph Holt
9697	CA-2014-144281	10-06-2014	15-06-2014	Second Class	HK-14890	Heather Kirkland
9766	CA-2017-101959	28-02-2017	06-03-2017	Standard Class	DB-13660	Duane Benoit
9786	CA-2015-155635	09-05-2015	13-05-2015	Standard Class	ME-17725	Max Engle
9945	CA-2015-145415	12-04-2015	17-04-2015	Second Class	RD-19660	Robert Dilbeck

SalesPrediction.java - AI-ML/src/main/java 240M of 300M

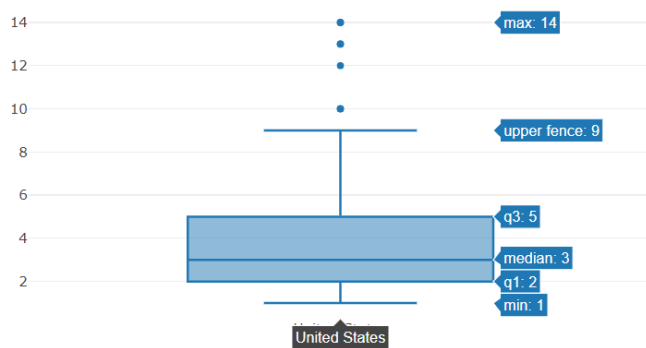




Average Discount for products by Quantity



Quantity By Country



7. ADVANTAGES & DISADVANTAGES :

7.1 ADVANTAGES:

1. **Alignment of Strategy and Results** - When utilizing sales Prediction and having it align with a company's business strategy, it enables for the right resources to be allocated at the right time. A company with a goal of increasing its customer base through 10 percent, may be basing this on extensive sales Prediction and allocates the necessary resources to salespeople to generate prospects. It is also important to note a business that utilizes aggressive sales Prediction will also invest more time and money in training salespeople for performance optimization.

2. **Opportunities Adjustments** - A key advantage of sales Prediction is the opportunity to make adjustments based off of expectations. This is especially important to manufacturing, considering that without making adjustments, the facility will more than likely either generate too much or too little product and produce waste. Adjusting your sales Prediction is absolutely essential when attempting to maximize efficiency within your operation and eliminate any inventory.

7.2 DISADVANTAGES:

1. **Involvement of Time** - Time involvement is one of the key drawbacks pertaining to sales prediction. Like any prediction, developing the most adequate and suitable one takes a period of time - and it is still more than likely incorrect. Companies will utilize various departments to develop a forecast, which may rely on salespeople, sales managers, or marketers to carry out extra tasks.

2. **Uncertain Environment** - Uncertainty is almost always prevalent within prediction. How can anyone be able to 100% predict the future? As salespeople become active in ,prediction accuracy can be affected through excessive optimism, sandbagging to minimize risk of underperformance, or may just be downright incorrect. With any prediction methods, environmental or industry uncertainty isn't taken into account either.

8. APPLICATIONS:

- A sales prediction helps every business make better business decisions. It helps in overall business planning, budgeting, and risk management.
- Sales prediction allows companies to efficiently allocate resources for future growth and manage its cash flow.
- Sales prediction help sales teams achieve their goals by identifying early warning signals in their sales pipeline and course-correct before it's too late
- Sales prediction also helps businesses to estimate their costs and revenue accurately based on which they are able to predict their short-term and long-term performance.

9. CONCLUSION:

The Present Project is to visualize the data of a superstore, where we want to predict the sales of a superstore using the previous data.

All the outputs of a data visualization are been presented in this document , which clearly helps us to predict the sales of the superstore for the next month.

10. FUTURE SCOPE:

Any of the data visualization would not not be limited, we can visualize in many ways to achieve the accuracy in the prediction.

so, to achieve the accuracy in prediction we have to visualize as much as data possible.

11. BIBILOGRAPHY:

REFERENCES:

Data Set : <https://www.kaggle.com/juhi1994/superstore>

Data Preprocessing : <https://youtu.be/WRk9t5yo5Zs>

Data Visualization:

https://jtablesaw.github.io/tablesaw/userguide/Introduction_to_Plotting.html

APPENDIX:

JAVA Source Code:

```
1 import java.io.IOException;
2
3 import tech.tablesaw.api.Table;
4 import tech.tablesaw.plotly.Plot;
5 import
```

```
tech.tablesaw.plotly.api.BubblePlot;
6 import
tech.tablesaw.plotly.components.Figure;
7 import
tech.tablesaw.plotly.components.Layout;
8 import
tech.tablesaw.plotly.traces.BoxTrace;
9
10 public class SalesPrediction {
11
12     public static void main(String args[]) {
13         System.out.println("Hello Welcome to the data Vizualization");
14         try {
15             Table superstore_data = Table.read()
16                 .csv("C:\\Users\\Sai
Satya\\eclipse-workspace\\AI-ML\\src\\main\\java\\Sample - Superstore.csv");
17             //System.out.println(superstore_data.shape());
18             System.out.println(superstore_data.first(7));
19             System.out.println(superstore_data.last(7));
20             System.out.println(superstore_data.structure());
21             System.out.println(superstore_data.summary());
22             System.out.println(superstore_data.inRange(20, 30));
23
24             Layout layout1 = Layout.builder().title("Distribution of
Sales").build();
```

```

25         HistogramTrace trace1 =
26         HistogramTrace.builder(superstore_data.nCol("Sales")).build();
        Plot.show(new
27         Figure(layout1, trace1));
28
29         Layout layout1 = Layout.builder().title("Distribution of
        Profits").build();
30         HistogramTrace trace1 =
31         HistogramTrace.builder(superstore_data.nCol("Profit")).build();
        Plot.show(new
32         Figure(layout1, trace1));
33
34         Layout layout1 = Layout.builder().title("Distribution of
        Discounts").build();
35         HistogramTrace trace1 =
36         HistogramTrace.builder(superstore_data.nCol("Discount")).build();
37         Plot.show(new Figure(layout1, trace1));
38
39
40         Figure fig = BubblePlot.create("Average Discount for products by
        Quantity ",
41         superstore_data,// table name
42         "Quantity",// x variable column name
43         "Discount",// y variable column name
44         "Quantity"// bubble size
45         );

```

```
46         Plot.show(fig);
47
48
49         Layout layout2 = Layout.builder().title("Quantity By Country").build();
50         BoxTrace trace2 =
51         BoxTrace.builder(superstore_data.categoricalColumn("Country"),
52         superstore_data.nCol("Quantity")).build(); Plot.show(new
53         Figure(layout2,
54         trace2));
55
56         Layout layout2 = Layout.builder().title("Discount for Product
57         id").build();
58         BoxTrace trace2 =
59         BoxTrace.builder(superstore_data.categoricalColumn("Product
60         ID"),
61         superstore_data.nCol("Discount")).build(); Plot.show(new
62         Figure(layout2,
63         trace2));
64
65     } catch (IOException e) {
66         // TODO Auto-generated catch block
67         e.printStackTrace();
68     }
```

```
67     }
68
69     private static Table categoricalColumn(String string) {
70         // TODO Auto-generated method stub
71         return null;
72     }
73 }
```