**IFT 598: DATA VISUALIZATION AND REPORTING OF IT**

**PROJECT – PHASE II: DISCUSSION**

SUBMITTED BY

SAI TEJA VALLURU

KUMARA RAJA ANKAM

SUHURUTH REDDY CHADA

SWETHA CHENCHALRAO

PROFESSOR ASMAA ELBADRAWY

DUE DATE – 24TH NOVEMBER

**Section 1: Used Visualization Tools**

Tableau is the visualisation application that we will be using in this case. I selected tableau because I believe it can be used for more than just data visualization. Identifying areas that require attention or improvement has become a critical component of any company operation. However, identifying factors that influence consumer behavior and areas for development can be difficult. To uncover new business prospects ahead of the market, companies must act on data faster and more effectively. To gain insights from their data, they must be able to access, analyse, and comprehend it.

Tableau, a data visualization application, provides new ways to dramatically improve the ability to uncover hidden knowledge. Visual analytics are used to allow users to engage with data. Tableau allows people to visually engage with data in order to gain insights faster and make important decisions.

**Tableau makes it simple to engage with your data.**

Tableau is a powerful tool for quickly creating interactive data visualizations. It's incredibly straightforward and user-friendly. Tableau can build complicated graphs that look similar to Excel's pivot table graphs. It can also process a lot more data and perform calculations on datasets quickly.

* Users may quickly build images and move between sorts to get the model thatbest conveys their message.
* Users have the ability to manage a large volume of data.
* The user interface is well-organized, allowing for quick customization of the view.
* It can build visualizations for a vast quantity of data without crashing, and it is exceptionally easy to combine with many data sources.

It allows organizations to execute quite complex data visualization in a very user-friendly, drag-and-drop manner.

Tableau's data visualization is incredibly interactive.

**Mobile support**

Tableau dashboards can be used at the enterprise level and viewed and operated on a variety of devices, including laptops, tablets, and smartphones.

Tableau has a powerful mobile client. To make dashboards mobile-friendly, users do not need to take any additional actions. Visualizations are automatically customized for mobile devices with touch-friendly controls. It detects whether or not users are using the mobile app and adjusts accordingly.

**Analytical data**

Tableau allows users to conduct basic computations and run simple statistics. However, if you need to execute heavy artillery analytics, you can easily run your models in R, import the results into Tableau, and visualize your data.

By integrating R, Tableau enables identifying patterns and building realistic models faster and easier. This ultimate R-Tableau combination magnifies data with visual analytics. The visual analytics interface of Tableau makes data analysis and interaction almost trivial. All you need for ad hoc analysis is the correct query to ask the data. This makes sifting through large amounts of data a breeze.

• Tableau may be used by businesses to investigate and discover trends quickly.

• Users can make many charts to gain relevant insights • It improves the utilization of big data to find previously unknown patterns inside datasets • Users can also embed the visualizations on their website

**Data discovery**

With in-built drill-down and data blending features of Tableau, users are enabled with correlations and trends. It enhances the data discovery by allowing the users to dig down to understand the cause of the data-patterns.

Leveraging Tableau Online and Tableau Server, users can view the most up-to-date data. Users can either maintain a live connection to underlying data, or keep data extracts fresh on a schedule.

Data discovery with Tableau gives users multiple views and angles on integrated data sources. It gives users the option to publish data sources separately or leave them embedded in their workbook.

**Tableau provides a comprehensive solution.**

Finding critical insights in data allows businesses to stay competitive in their respective sectors. Organizations attempt to integrate diverse and complicated information as data volume and velocity grow. Tableau enables these businesses to extract hidden insights from their data in a readily understandable format.

Softweb Solutions, which has vast experience in data visualization, advises businesses on how to use and implement methods to maximize the value of their data.

Section 2: Explanation of Required Data Pre-processing, if any

Yes, we do data pre-processing for our dataset to remove columns that are independent from the rest of the columns that have a p value > 0.05, we removed columns that have more than 50% missing values in the columns, and we filled out the null values as needed, such as if it's a categorical column, it'll use mode to fill out the missing value, and if it's a numerical column, it'll use mean to fill out the missing values. We've also utilized minimax scalar or standard scalar to normalize numerical columns and transform them to values in a specific range, such as -1 to 1 for standard scalar. For categorical columns, we utilize label encoding or one hot encoding to perform the same thing, i.e., to normalize the data, we transform the categories into 0's and 1's in one hot encoding. These are the actions we took to prepare our dataset for analysis.

**Section 3: List of Final Sets of Questions**

1. Which area has had the greatest accidents in relation to a specific year and the number of accidents that occurred?

2. What was the lightning scenario at the time of the incidents, and how many accidents occurred in that situation?

3. What is the accident rate in various areas or communities?

4. Is the number of accidents increasing or reducing year after year in comparison to previous years?

5. Accidents happened under various weather conditions at the time of the accidents, which could be a contributing factor.

6. Identify the surfaces that cause the most accidents and determine the total number of incidents.

7. How many injuries have been sustained in each accident; the severity of the accident is the injury sustained by the person as a result of the accident.

8. How many accidents have occurred on different types of roads, such as highways, national roads, departmental roads, and community roads?

9. Did the user follow any security protocols, and if so, how many mishaps were there?

10. In each weather situation, how many accidents have occurred at that particular infrastructure?

Dashboard

Chart

Description automatically generated

Section 4: Dashboard Plots

1. ACCIDENTS IN VARIOUS SURFACES

Chart

Description automatically generated

This graph depicts the total number of accidents that occurred under a variety of surface situations, such as wet, flooded, normal and so on.

The pre-attentive attributes are color, length

1. CONDITION OF THE PEOPLE AFTER THE ACCIDENT OCCURS

A picture containing text

Description automatically generated

Condition of the types of people such as driver, passengers etc., based on the severity of the accident.The pre-attentive attributes are color, length, width

1. ACCIDENTS AT DIFFERENT ROADS

Chart

Description automatically generated

Occurrence of accidents depending on the type of roads.

The pre-attentive attributes are height, color, width

1. PRECAUTIONS TAKEN BEFORE ACCIDENTS

A picture containing application

Description automatically generated

Type of precautions that has been taken and that helps to avoid accidents

The pre-attentive attributes are height, color, and width

1. ACCIDENTS OCCURED DURING DIFFERENT YEARS 2005-2015

Graphical user interface, chart

Description automatically generated

Rate of change of accidents over the time period

The pre-attentive attributes are length and position

1. LOCALISED ACCIDENTS

Graphical user interface, application

Description automatically generated

Occurrence of accidents based on the location

The pre-attentive attributes are height and color

1. ACCIDENTS DURING DIFFERENT ATMOSPHERIC CONDITIONS

Graphical user interface, text, application

Description automatically generated

Occurrence of accidents based on the atmospheric conditions

The pre-attentive attributes are height and color

1. ACCIDENTS AT DIFFERENT ROADS

Chart

Description automatically generated

Occurrence of accidents based on type of roads

The pre-attentive attributes are height and color

1. VARIOUS TYPES OF ACCIDENTS

Graphical user interface, text, application

Description automatically generated with medium confidence

Depending on the ways in which vehicles travelled and occurrence of accidents

The pre-attentive attributes are height, width and color

1. ACCIDENTS BASED ON THE LOCATIONS & WEATHER

Graphical user interface, application

Description automatically generated with medium confidence

occurrence of accidents based on the location and weather conditions

The pre-attentive attributes are height, width, and color

Section 5: Dashboard interactivity

Graphical user interface, application

Description automatically generated with medium confidence

The interactivity controls for this sheet is based on the atmospheric conditions, here the values will be changed based on the selection of atmospheric conditions.

Many interactive attributes are employed, such as creating a parameter for year and month for each plot so that we can extract data according to the desired year and month.

We've used numerous calculation fields, the majority of which are if-else statements, since the majority of them are encoded, and we've utilized calculated fields to decode them and position them on the x-axis or as columns.

The year and month are the interaction controls in the dashboard, and you can see them clearly in the above dashboard.

The year and month parameters affect all charts except the line graph, which compares accidents across time.