Tableau Insight: Unleashing Industrial Safety and Health Analytics for Actionable Insights

A collaborative endeavour aimed at leveraging data-driven insights to enhance workplace safety within manufacturing plants. Our project focuses on analysing a comprehensive dataset sourced from 12 major plants across three different countries, including Brazil. By sharing this valuable dataset with the community, we aim to drive proactive interventions, mitigate risks, and ultimately save lives in industrial environments.

Real-Time Scenarios:

Scenario 1: Monitoring Critical Risks:

In a real-time scenario, imagine receiving an alert indicating a critical risk situation unfolding in one of the manufacturing plants. Using ISHAD data, we can quickly assess the nature and severity of the risk, identify contributing factors, and deploy immediate interventions to mitigate potential hazards. Whether it's a machinery malfunction, hazardous material spill, or unsafe working conditions, real-time analysis enables rapid decision-making and proactive measures to ensure employee safety.

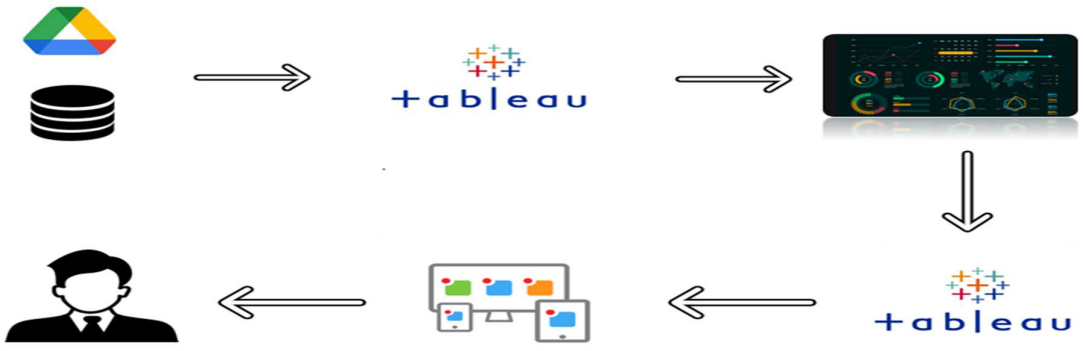
Scenario 2: Incident Response and Crisis Management:

In the event of an industrial accident or emergency, real-time access to ISHAD data enables swift incident response and crisis management. Plant managers and safety officers can utilize the database to gather crucial information about the incident, including its severity, location, and potential impact on personnel and operations. By leveraging real-time analytics, they can coordinate emergency response efforts, allocate resources effectively, and implement contingency plans to minimize disruptions and ensure the safety of all individuals involved.

Scenario 3: Predictive Maintenance and Risk Mitigation:

Leveraging predictive analytics capabilities, ISHAD empowers manufacturing plants to anticipate and prevent potential safety hazards before they occur. By analysing historical accident data and identifying predictive indicators, plant managers can proactively address equipment failures, structural weaknesses, and other risk factors that could lead to accidents. Real-time monitoring of machinery performance, environmental conditions, and operational parameters enables timely maintenance interventions, reducing the likelihood of workplace accidents and ensuring the long-term integrity of plant infrastructure.

Technical Architecture:



Project Flow

To accomplish this, we have to complete all the activities listed below,

- Data Collection & Extraction from Database
  - Collect the dataset,
  - Connect data with Tableau
- Data Preparation
  - Prepare the Data for Visualization
- Data Visualizations
  - No of Unique Visualizations
- Dashboard
  - Responsive and Design of Dashboard
- Story
  - No of Scenes of Story
- Performance Testing
  - Amount of Data Loaded
  - Utilization of Data Filters
  - No of Calculation Fields
  - No of Visualizations/ Graphs
- Web Integration
  - Dashboard and Story embed with UI With Flask
- Project Demonstration & Documentation
  - Record explanation Video for project end to end solution
  - Project Documentation-Step by step project development procedure

Milestone 1: Data Collection & Extraction from Database

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes and generate insights from the data.

Activity 1: Collect the dataset

Please use the link to download the dataset: Link

Activity 1.1: Understand the data

Data contains all the meta information regarding the columns described in the CSV files.

Column Description of the Dataset:

- Data: timestamp or time/date information
- Countries: which country the accident occurred (anonymized)
- Local: the city where the manufacturing plant is located (anonymized)
- Industry sector: which sector the plant belongs to
- Accident level: from I to VI, it registers how severe was the accident (I means not severe but VI means very severe)
- Potential Accident Level: Depending on the Accident Level, the database also registers how severe the accident could have been (due to other factors involved in the accident)
- Genre: if the person is male of female
- Employee or Third Party: if the injured person is an employee or a third party
- Critical Risk: some description of the risk involved in the accident
- Description: Detailed description of how the accident happened.

Milestone 2: Data Preparation

Activity 1: Prepare the Data for Visualization

Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualizations to gain insights into the performance and efficiency.

Explanation video link 1: Data Loading

https://drive.google.com/file/d/1ocpWstZKgfw0J0pKYJ7MKiPetMygy7Ll/view?usp=sharing

Explanation video link 2: Data Cleaning

https://drive.google.com/file/d/1gclTiQbjU6BPCIEs0atwklbm5136llEP/view?usp=sharing

Milestone 3: Data Visualization

Data visualization is the process of creating graphical representations of data in order to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data.

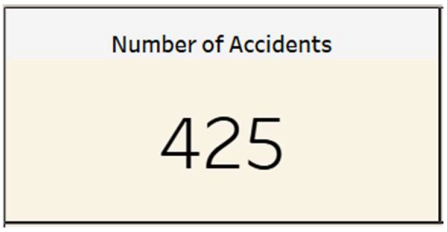
Activity 1: No of Unique Visualizations

The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyse the performance and efficiency of Radisson Hotels include bar charts, line charts, heat maps, scatter plots, pie charts, Maps etc. These visualizations can be used to compare performance, track changes over time, show distribution, and relationships between variables, breakdown of revenue and customer demographics, workload, resource allocation and location of hotels.

Activity 1.1: Number of Accidents

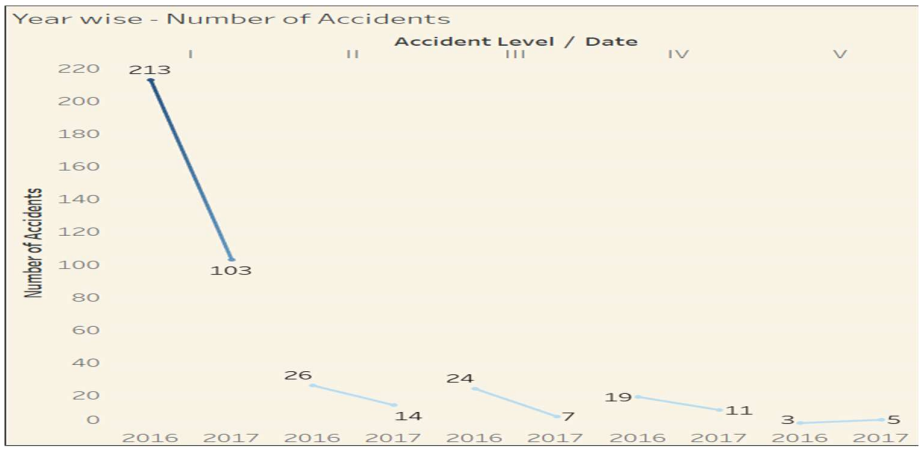
Explanation video link:

https://drive.google.com/file/d/1yti6FDOzMfw3dgYD20G3Lwc_2Lje7xOq/view?usp=sharing



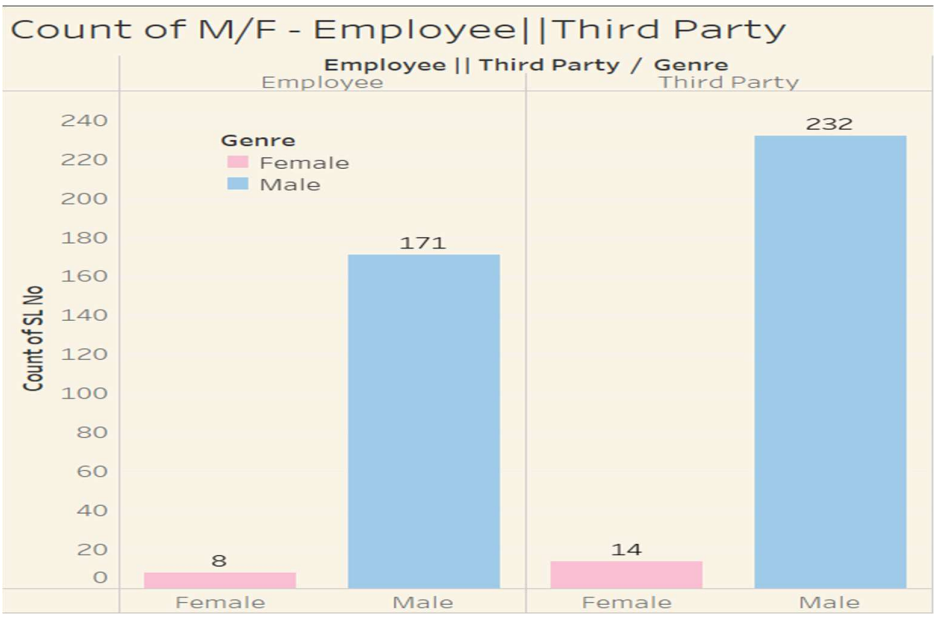
Activity 1.2: Number of Accidents – Year Wise

Explanation video link:
https://drive.google.com/file/d/1PRkXCOgB9BuXqLG_ENKPekhWuPNkHMnD/view?usp=sharing



Activity 1.3: Gender Count – Employee or Third Party

Explanation video link:
https://drive.google.com/file/d/1PRkXCOgB9BuXqLG_ENKPekhWuPNkHMnD/view?usp=sharing



Activity 1.4: Gender Count – Accident Level

Explanation video link:

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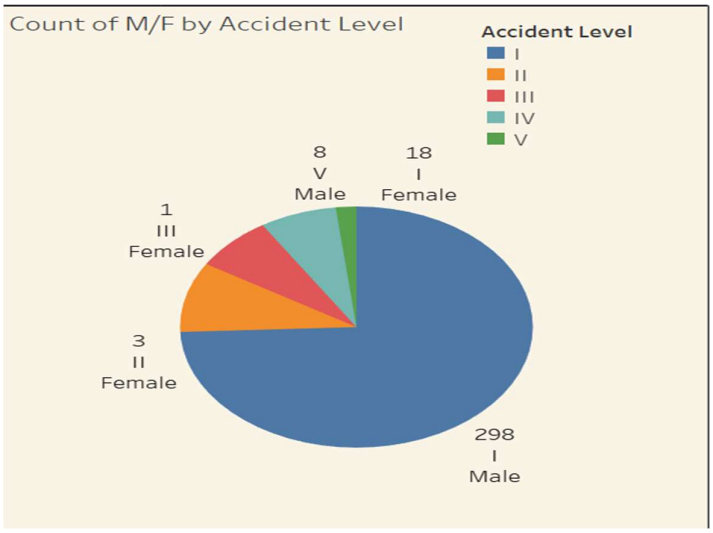

Activity 1.5: Top 3 Accident Problems

Explanation video link:

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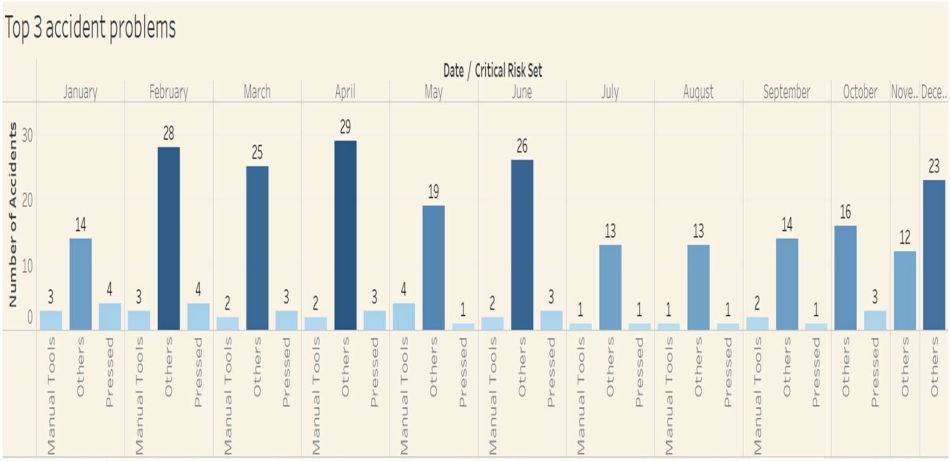

Activity 1.6: Sector Wise – Number of Accidents

Explanation video link:

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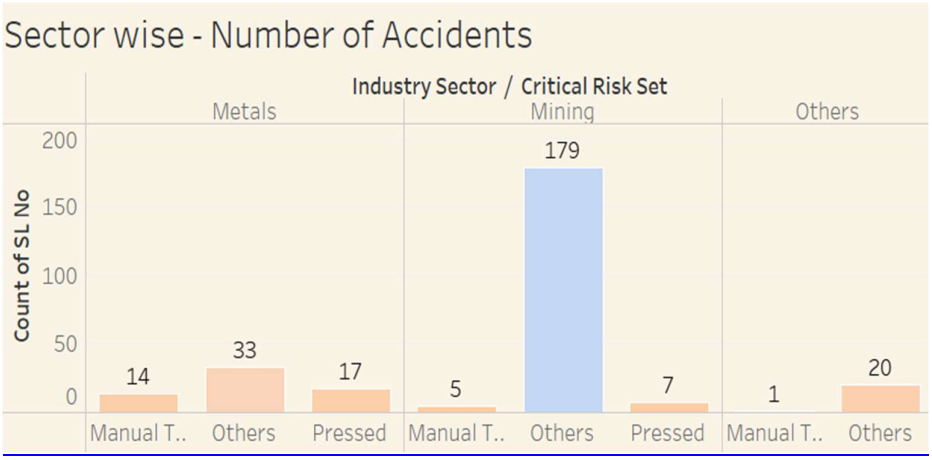
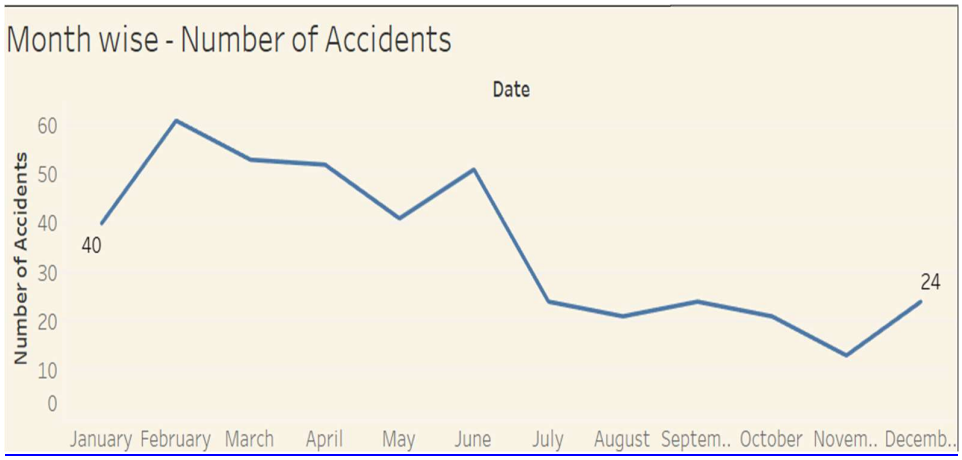


Activity 1.7: Month Wise – Number of Accidents

Explanation video link:

https://drive.google.com/file/d/1rz42a2bdY57NFX23I_agzKjg5LcxLD60/view?usp=sharing



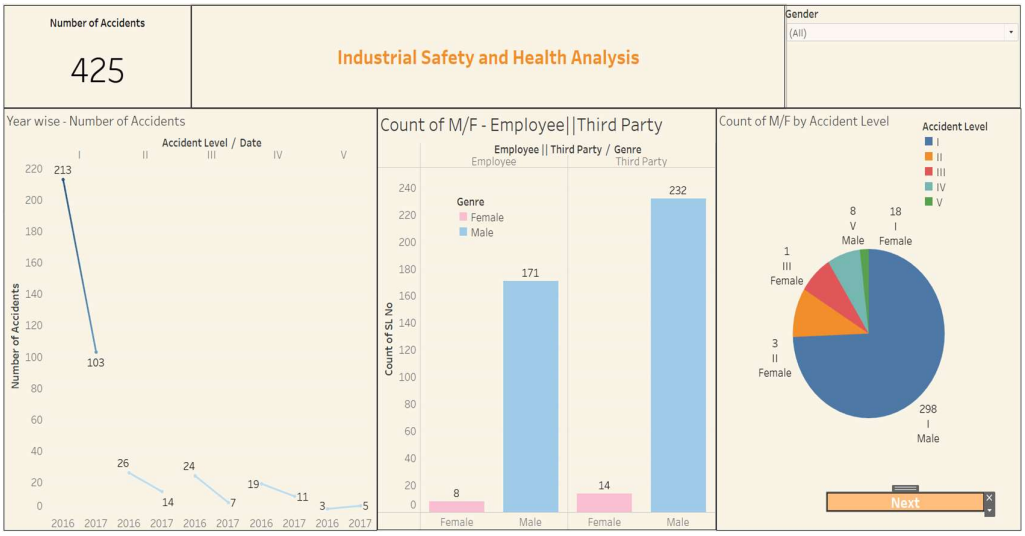
Milestone 4: Dashboard

A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data, and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

Activity :1- Responsive and Design of Dashboard

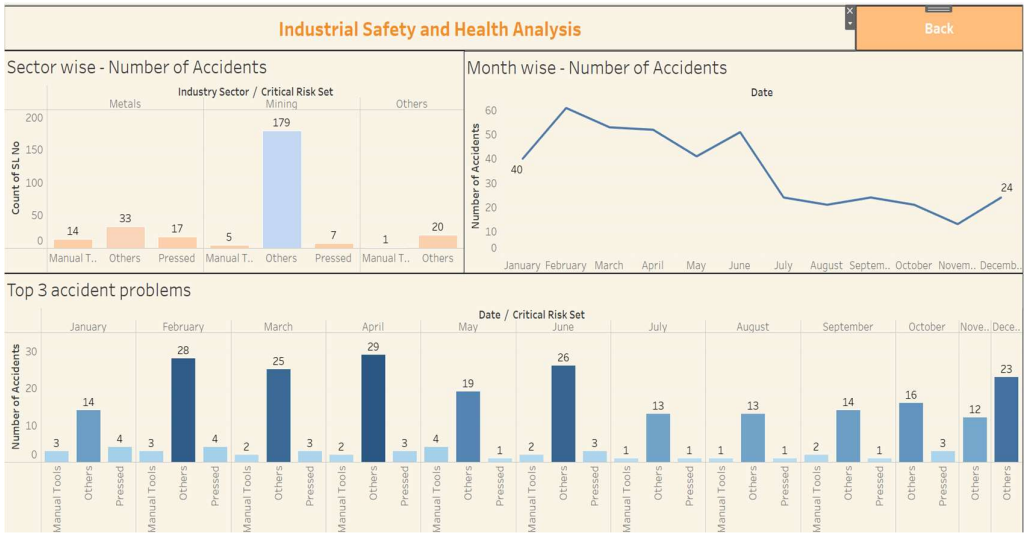
Explanation video link:

https://drive.google.com/file/d/1-vleHwFcOUon9H_8hQjxor2y8AYSGHTv/view?usp=sharing



Explanation video link 2:

https://drive.google.com/file/d/17RI_cthM5Hgl2zXqjYUKOS664OzqxCT4/view?usp=sharing



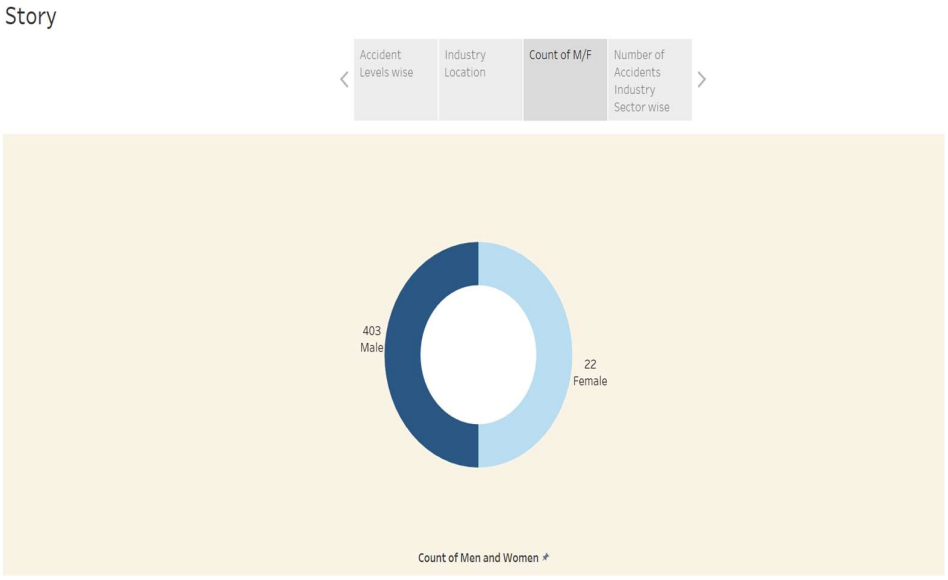
Milestone 5: Story

A data story is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way, and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of mediums, such as reports, presentations, interactive visualizations, and videos.

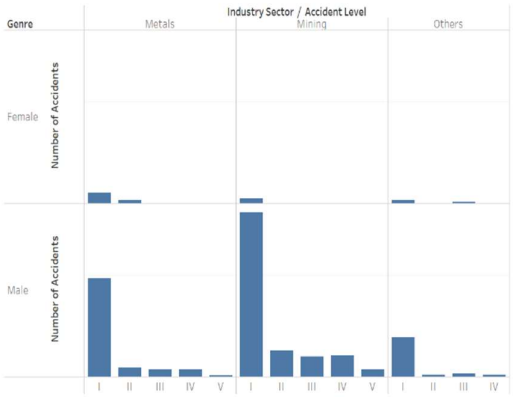
Activity 1: No of Scenes of Story

Explanation video link:

https://drive.google.com/file/d/13B2QpirGI7pPGSuXmYSyxjT_DJaHAIfc/view?usp=sharing



Story


Genre
Industry Sector / Accident Level
Metals
Mining
Others
Female
Male
Number of Accidents
Number of Accidents
I
II
III
IV
V

Milestone 6: Performance Testing

Activity 1: Amount of Data Loaded

"Amount of Data Loaded" refers to the quantity or volume of data that has been imported, retrieved, or loaded into a system, software application, database, or any other data storage or processing environment. It's a measure of how much data has been successfully processed and made available for analysis, manipulation, or use within the system.

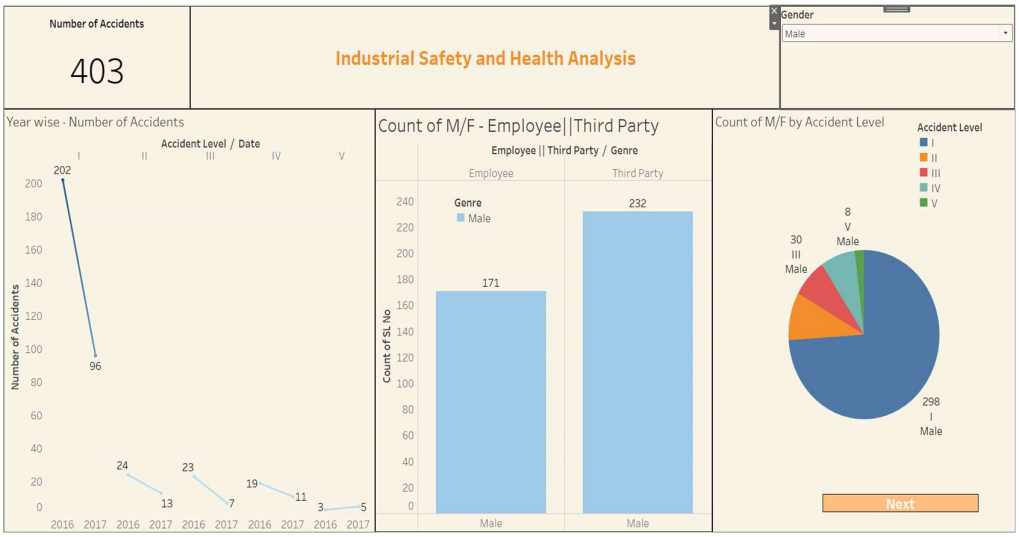
Fields

Type	Field Name	Physical Ta...	Rem...
#	SL No	IHMStefanin...	F1
📅	Date	IHMStefanin...	Data
🌐	Countries	IHMStefanin...	Count...
Abc	Local	IHMStefanin...	Local
Abc	Industry Sector	IHMStefanin...	Indust...
Abc	Accident Level	IHMStefanin...	Accid...
Abc	Potential Accident Level	IHMStefanin...	Poten...
Abc	Genre	IHMStefanin...	Genre
Abc	Critical Risk	IHMStefanin...	Critic...
=Abc	Employee || Third Party	Calculation	Emplo...

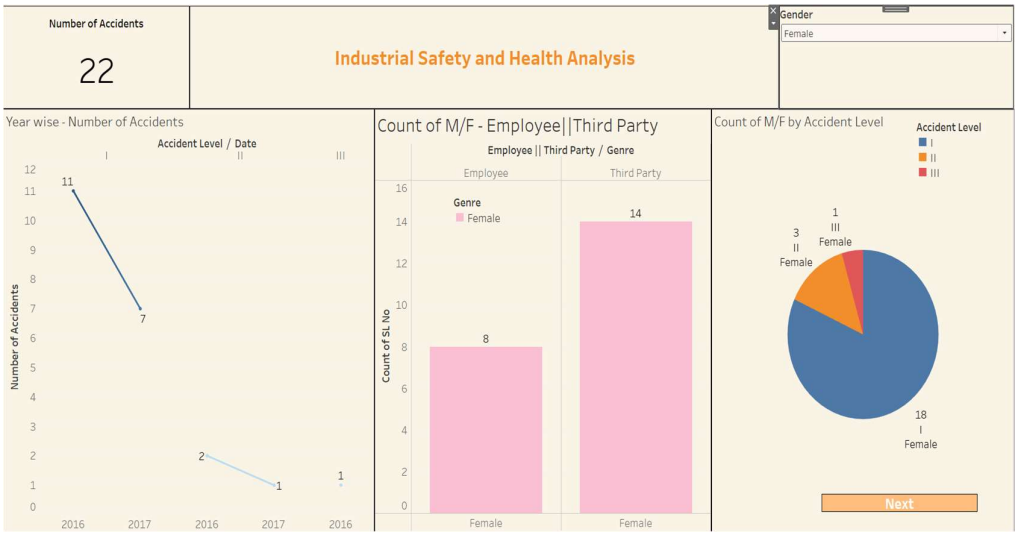
Activity 2: Utilization of Data Filters

"Utilization of Filters" refers to the application or use of filters within a system, software application, or data processing pipeline to selectively extract, manipulate, or analyse data based on specified criteria or conditions.

Activity 2.1: Selected “Male” as a Filter



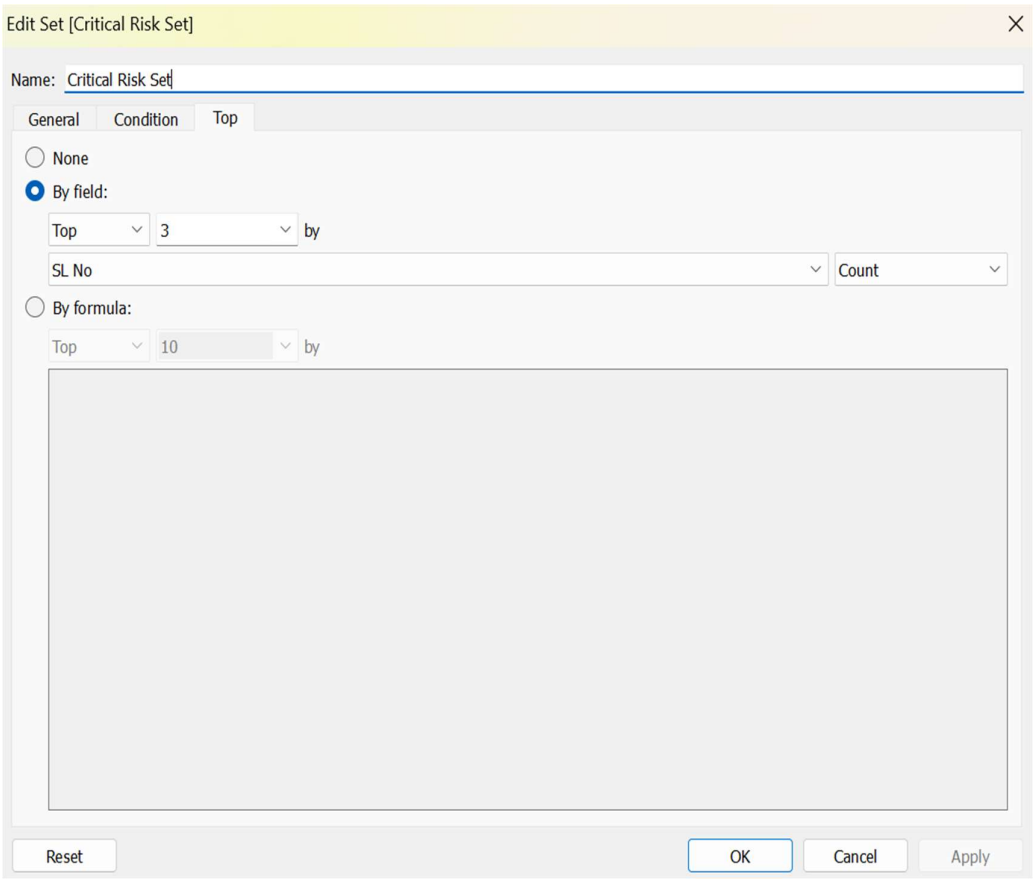
Activity 2.2: Selected “Female” as a Filter



Activity 3: No of Calculation Fields

Activity 3.1: Set

In Tableau, a set is a subset of data based on specific conditions or criteria. Sets allow you to group related data points together for analysis, comparison, or visualization. Sets can be created dynamically or manually and can be based on dimensions or measures in your dataset.



Activity 4: No of Visualizations/ Graphs

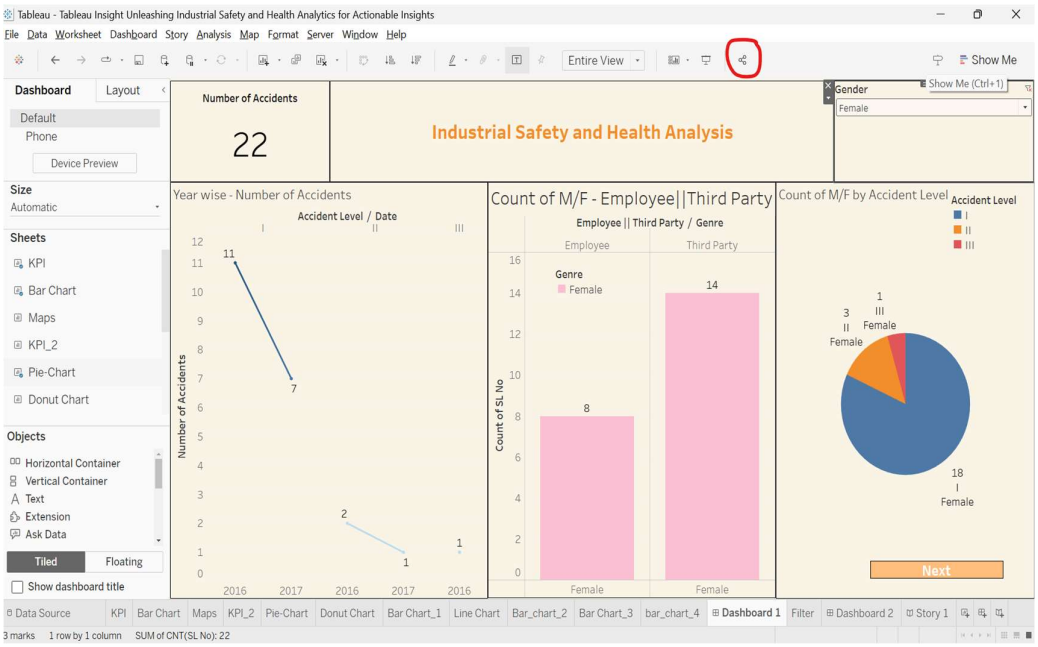
1. Number of Accidents
2. Number of Accidents – Year Wise
3. Gender Count – Employee or Third Party
4. Gender Count – Accident Level
5. Top 3 Accident Problems
6. Sector Wise – Number of Accidents
7. Month Wise – Number of Accidents

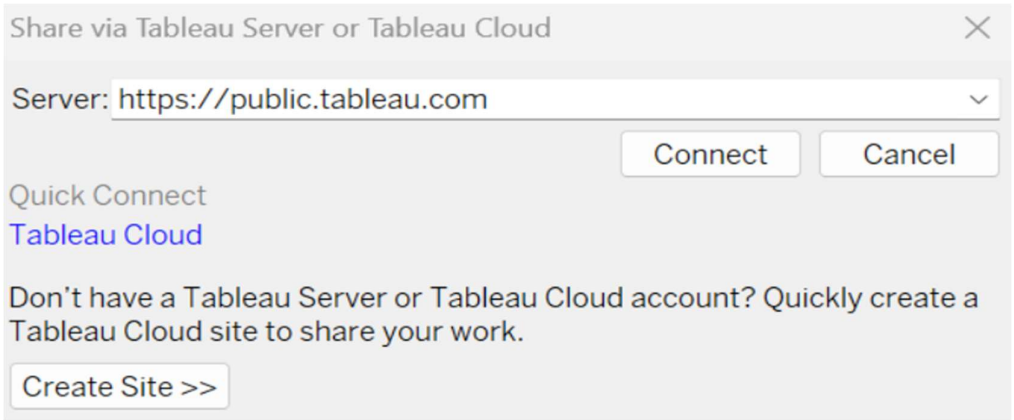
Milestone 7: Web integration

Publishing helps us to track and monitor key performance metrics, to communicate results and progress. help a publisher stay informed, make better decisions, and communicate their performance to others.

Publishing dashboard and reports to tableau public

Step 1: Go to Dashboard/story, click on share button on the top ribbon



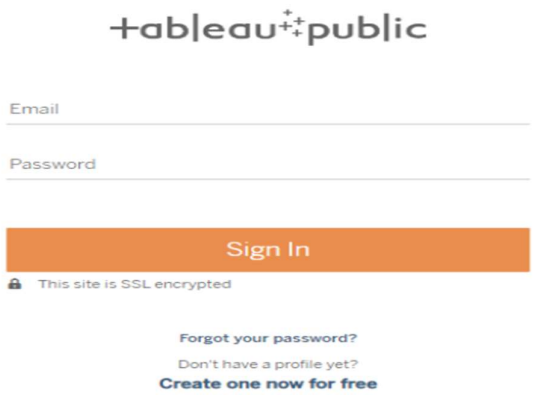


Give the server address of your tableau public account and click on connect.

Explanation Video: -

https://drive.google.com/file/d/1eDAbcF-RYOcvnqlSP-5IId3X1fHTalYG/view?usp=sharing

Step 2: Once you click on connect it will ask you for tableau public user name and password



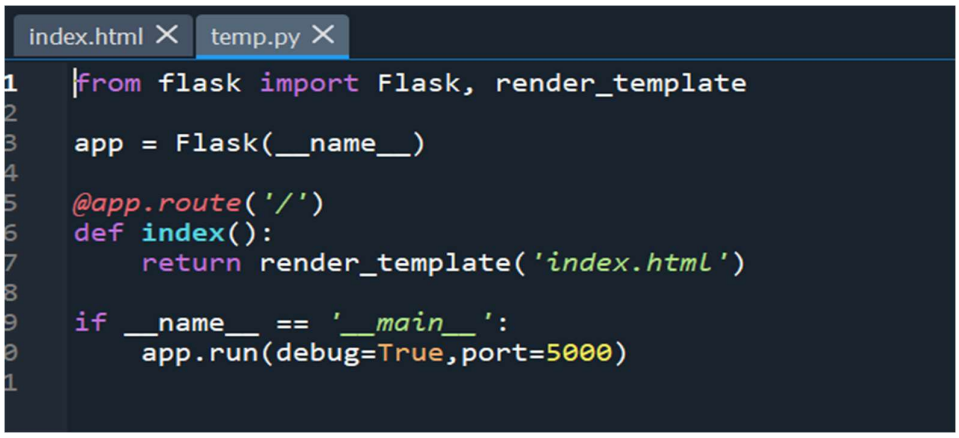
Once you login into your tableau public using the credentials, the particular visualization will be published into tableau public

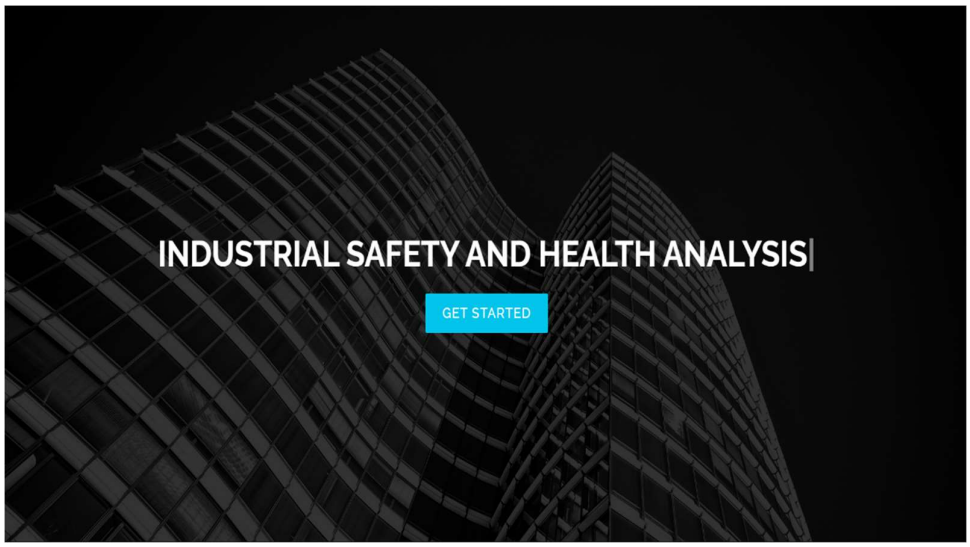
Note: While publishing the visualization to the public, the respective sheet will get published when you click on share option.

Activity 1: Dashboard and Story embed with UI With Flask

Explanation video link:

https://drive.google.com/file/d/1DN6iY1dm7vsz3Phdm9iu2OPmQLu73pF3/view?usp=sharing



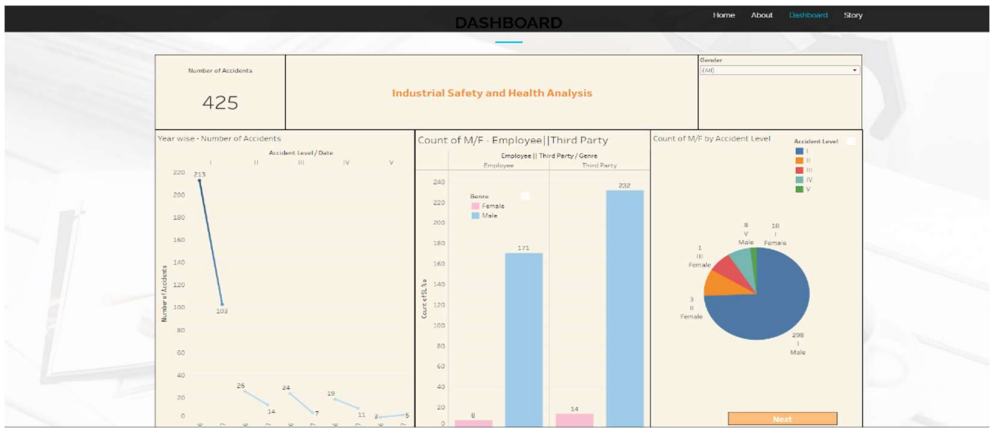


ABOUT

TableauInsights:Unleashing Industrial Safety and Health Analytics for Actionable Insights

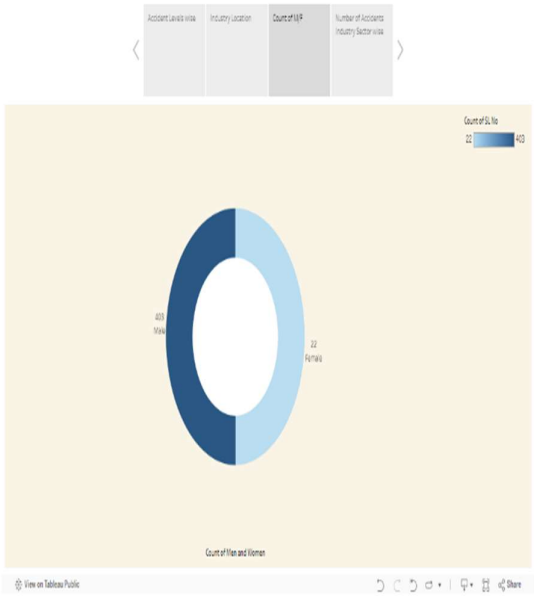
Industrial Safety and Health Analytics

To leverage a comprehensive database sourced from major manufacturing plants across three different countries, including Brazil, to analyze and mitigate workplace accidents. With a focus on promoting industrial safety and health, the database provides insights into the occurrence, severity, and potential risks associated with accidents within these plants. Objective is to delve into this data to uncover meaningful insights that can guide strategic decision-making and intervention strategies.



STORY

Story


Accident Levels wise
Industry Location
Count of M/F
Number of Accidents Industry Sector wise
Count of Sl. No
22
403
403
Male
22
Female
Count of Man and Women
View on Tableau Public
Share

Milestone 8: Project Demonstration & Documentation

Below mentioned deliverables to be submitted along with other deliverables

Activity 1:- Record explanation Video for project end to end solution

Activity 2:- Project Documentation-Step by step project development procedure

Create document as per the template provided