

AN INTERNSHIP REPORT
On
Microsoft Business Intelligence/ Power bi

BACHELOR OF TECHNOLOGY

By
DEPARTMENT OF DATA SCIENCE

VENNA CHANDANA

21KP1A44C5

Under the esteemed Guidance of

MR. AYUD MOHHAMED

EXCELR



**RAISING EXCELLENCE
EXCELR
HYDERABAD – 500 018, TELANGANA., INDIA**

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NRI INSTITUTE OF TECHNOLOGY



CERTIFICATE

This is to certify that dissertation entitled "**Microsoft Business Intelligence/ Power bi**" submitted by **VENNA CHANDANA (21KP1A44C5)** in the **BACHELOR OF TECHNOLOGY** from **EXCELR** is a record of Bonafide work carried out them under my guidance and supervision during the year **2023-2024**.

Signature of the Internal Guide

Signature of the HOD
D. KOTESWARA RAO, MTech
Assistant professor & HOD
Data science, NRIIT

Signature of External

Certificate of Completion

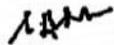


ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION
(A Statutory Body of Government of A.P.)

Certificate of Completion

This is to certify **Venna Chandana**
under of **NRI Institute Of Technology** of JNTUK has successfully
completed 6 weeks Short -Term Internship on
Microsoft Business Intelligence/ Power BI
Organized by ExcelR Edtech Pvt. Ltd. in collaboration with
Andhra Pradesh State Council of Higher Education

Cert No: EXCELR-74955
Presented on July 20th 2024


Ram Tavva
CEO,
ExcelR EdTech Pvt. Ltd.



1/1

DECLARATION

I, **VENNA CHANDANA**, Roll No: **21KP1A44C5**, hereby declare that the project titled "**COVID-19 Tracking Dashboard using Power BI**" was completed by me during my internship. While utilizing external templates and datasets, I have customized and analyzed them as part of my work, ensuring appropriate credit to the original sources.

Roll No	Name	Signature
21KP1A44C5	VENNA CHANDANA	_____

Date:

Place:

ACKNOWLEDGEMENT

This report dissertation could not have been written without the support of our guide

Mr. AYUD MOHEMMED, EXCELR who not only served as our superior but also encouraged and challenged us throughout our academic program our foremost thanks goes to his. Without his this dissertation would not have been possible. We appreciate him vast knowledge in many areas, and his insights, suggestions and guidance that helped to shape our research skills

It is needed with a great sense of pleasure and immense sense of gratitude that we acknowledge the help of these individuals. We owe many thanks to many people who helped and supported us during the writing of this report

We are thankful to our project coordinator **Mr. AYUD MOHAMMED, EXCELR**, for his continuous support

We express our sincere thanks to our respected for bet valuable suggestion and constant motivation that greatly helped us in successful completion of project We also take the privilege to express our heartfelt gratitude to **Mr. AYUD MOHAMMED, EXCELR**

We are thankful to all faculty members for extending their kind cooperation and assistance Finally, we are extremely thankful to our parents and friends for their constant helped moral support

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ABSTRACT

This internship project focuses on analysing COVID-19 cases using Microsoft Power BI to transform raw data into insightful visualizations and reports. The project involves gathering COVID-19 data from various sources, cleaning and transforming it for analysis, and creating interactive dashboards to track the progression of cases across different regions. The goal of the project was to provide clear, actionable insights for policymakers and healthcare organizations to make informed decisions. By the end of the internship, a comprehensive Power BI dashboard was developed to showcase the impact of COVID-19 and trends over time.

REQUIREMENTS

HARDWARE REQUIREMENTS

- Personal Computer / Laptop with minimum RAM (8 GB), ROM (128 GB)
- Processor(i5)
- Good latency internet access
- Graphics Processing Unit (GPU)
- Operating System, Monitor
- Internet Connection

SOFTWARE REQUIREMENTS

- Python installation
- Data Manipulation and Analysis, Statistical Analysis
- Data Visualization

FUNCTIONAL REQUIREMENTS

- Data Cleaning and Preprocessing
- Exploratory Data Analysis (EDA)
- Data Visualization
- Model Evaluation and Interpretation
- Feature Engineering
- Power bi tools

DESCRIPTION

During my internship with ExcelR Edtech Pvt. Ltd., I worked extensively on Power BI, mastering its capabilities in data visualization, modelling, and analysis to derive meaningful insights from complex datasets. As part of the internship, I developed an interactive **COVID-19 Tracking Dashboard** to analyse and visualize pandemic-related data across various states in the United States. The project involved collecting data from credible sources like the Johns Hopkins CSSE, cleaning and transforming it using Power Query, and creating dynamic visualizations such as heatmaps, trend charts, and summary panels. The dashboard offered insights into confirmed cases, total deaths, and fatality rates, enabling stakeholders to filter data by region and time period for informed decision-making. This project showcased my proficiency in building intuitive, data-driven solutions that addressed real-world challenges, highlighting the role of Power BI as a powerful tool for public health communication and strategic planning.

****Overview of Microsoft Business Intelligence (MS BI)****

Microsoft Business Intelligence (MS BI) is a comprehensive suite of tools and services developed by Microsoft to enable organizations to collect, store, analyze, and visualize data effectively. It provides the foundation for data-driven decision-making by leveraging components of SQL Server, Power BI, Excel, and Azure Data Services.

****Key Components of MS BI:**

1. **SQL Server Integration Services (SSIS):** For data integration, extraction, transformation, and loading (ETL).
2. **SQL Server Analysis Services (SSAS):** For data analysis and building multidimensional models (OLAP cubes).
3. **SQL Server Reporting Services (SSRS):** For paginated reports and visualizations.
4. **Power BI:** A modern analytics tool for creating interactive reports and dashboards.
5. **Excel:** A familiar interface for basic analytics and data exploration.
6. **Azure Synapse Analytics:** Cloud-based analytics for big data and real-time reporting.

**** Power BI: An Overview**

Power BI is a powerful business analytics tool by Microsoft that enables users to connect to data sources, transform data, and build interactive visualizations and reports. It is part of the larger MS BI ecosystem and supports data analysis through self-service and enterprise-grade BI solutions.

****Key Features of Power BI:**

- **Data Connectivity:** Connects to hundreds of data sources, including SQL databases, cloud services, Excel files, and APIs.
- **Data Transformation:** Built-in Power Query editor to clean and reshape data.
- **Interactive Reports:** Allows drag-and-drop visualizations and dashboards.
- **AI-Powered Insights:** Provides automated data analysis and anomaly detection.
- **Collaboration:** Publish reports to the Power BI Service for sharing and collaboration.

- **Mobile Access:** Access reports on smartphones and tablets.
- **Security:** Offers robust data governance, row-level security (RLS), and role-based access.

****Power BI Components**

Power BI consists of the following core components:

3.1 Power BI Desktop

- A Windows-based application used for building reports and dashboards.
- Allows data connection, transformation, modelling, and visualization.
- Key Tools: Power Query, Data Model, DAX (Data Analysis Expressions).

3.2 Power BI Service

- A cloud-based service for hosting, sharing, and collaborating on Power BI reports.
- Allows users to schedule data refresh, create workspaces, and manage datasets.

3.3 Power BI Mobile

- Native apps for iOS, Android, and Windows devices for accessing reports on the go.

3.4 Power BI Report Server

- An on-premises report server for organizations that prefer local hosting.
- Allows users to host Power BI reports, paginated reports, and KPIs.

3.5 Power BI Gateway

- A bridge that connects on-premises data sources with the Power BI Service.
- Supports both personal and enterprise gateways.

Home in Power BI Desktop

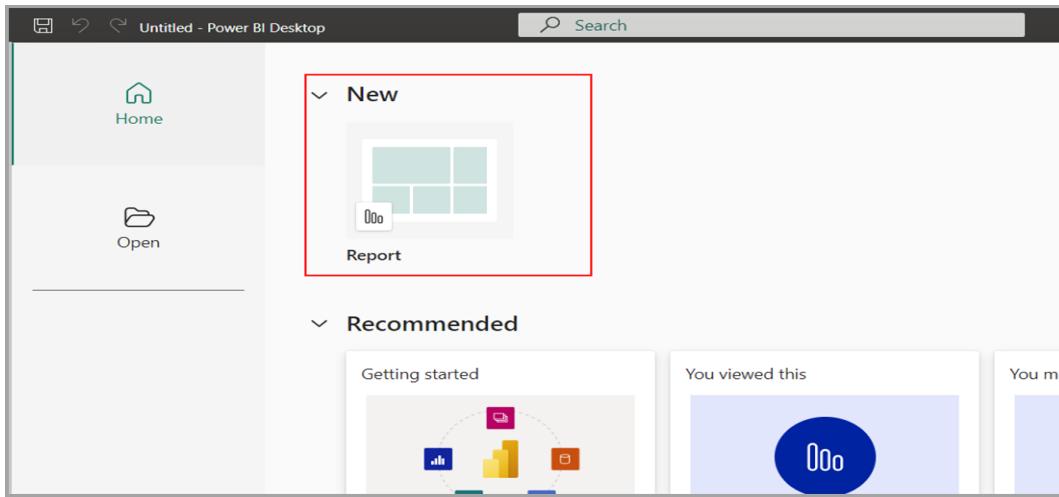
1. Open a new report
2. Open a recommended report
3. Quick access list
4. Viewing reports in Power BI Desktop Home

Power BI Home is a central location for your Power BI content, and is designed to consolidate your Power BI tasks into a single location, eliminating the need to navigate through multiple menus.

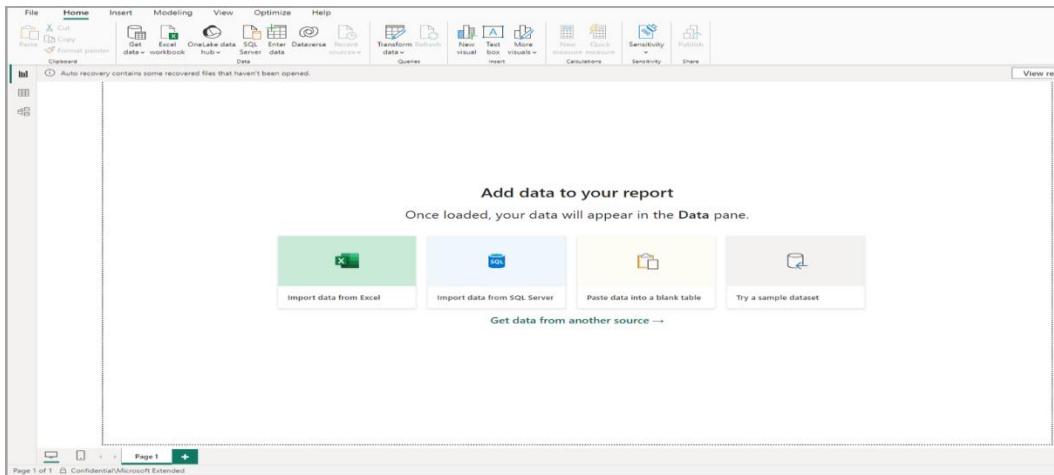
The following sections describe the areas and functionality of Power BI Home.

**** Open a new report****

You can open a new report by expanding the New section in Power BI Desktop Home, and selecting Report.

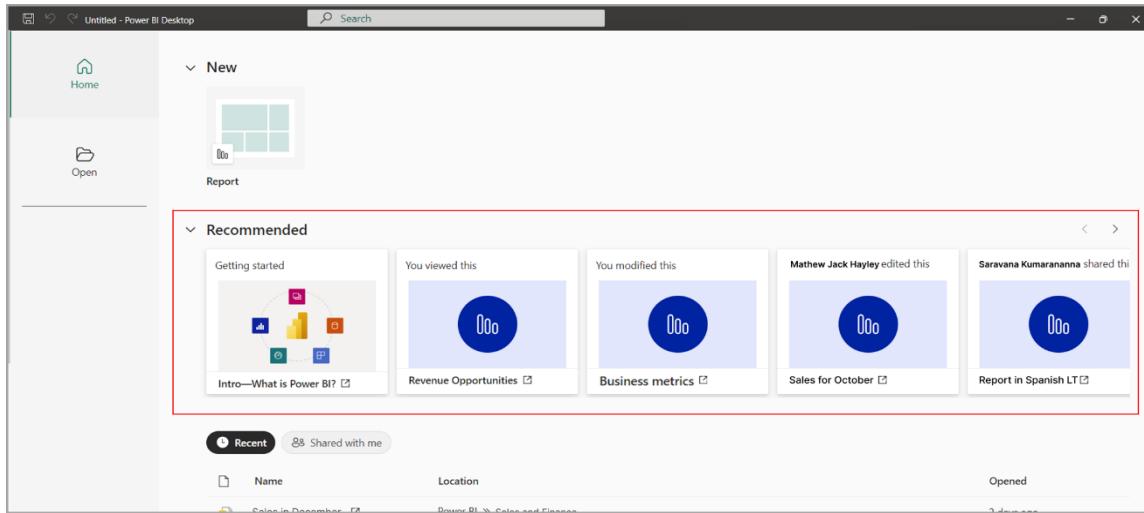


Selecting Report button creates a new report, and opens a blank canvas on which you can add data and begin building your report.



****Open a recommended report****

You can open existing reports from the Recommended section of Power BI Home. Files are recommended if they've been recently viewed, edited, edited by someone else, or shared with you.

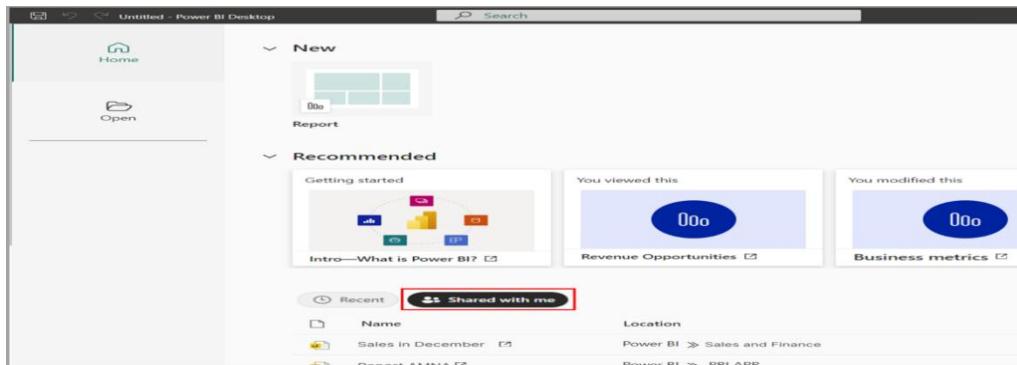


You can collapse the New and Recommended sections by selecting the small arrow next to their titles.

****Quick access list****

In Power BI Home, a list of reports you've recently accessed is displayed below the Recent section. Each item shows the file name, its location, and the last time you opened the file.

When you select the Shared with Me button at the top of the quick access list, the quick access list displays files that are shared by people in the same organization. Providing a central location for shared files makes it easier to work together in Power BI.



****Viewing reports in Power BI Desktop Home***

To view a report in Power BI Desktop Home, you must meet the following requirements:

- Have access to the file being displayed
- Have a Power BI Pro, Power BI Premium Per User, or E5 license.

From Excel workbook to stunning report in Power BI Desktop

In this tutorial, you build a beautiful report from start to finish in 20 minutes!



Your manager wants to see a report on your latest sales figures. They've requested an executive summary of:

- Which month and year had the most profit?
- Where is the company seeing the most success (by country/region)?
- Which product and segment should the company continue to invest in?

Using our sample finance workbook, we can build this report in no time. Here's what the final report will look like. Let's get started!

In this tutorial, you'll learn how to:

- Download sample data two different ways
- Prepare your data with a few transformations
- Build a report with a title, three visuals, and a slicer

PROJECT

*****COVID-19 tracking sample for US state and local governments****

The Power BI team has created a COVID-19 tracking sample that enables US state and local governments to publish or customize an interactive report about COVID-19. The Power BI file contains the data model and interactive graphics in a Power BI template (.pbix) file format you can edit in Power BI Desktop. When you open it in Power BI Desktop, you can analyze and visualize COVID-19 data to keep your community informed at the city, county, state, and national/regional levels. A typical customization is to filter the report to a specific state, and then to create your own publish-to-web embed code to share the report publicly and inform citizens.

Problem Description

The COVID-19 pandemic has been a global health crisis with severe implications on public health, economies, and daily life. Tracking the progression of the pandemic, analyzing its impact, and disseminating relevant information are critical for effective response and decision-making. However, raw data alone is insufficient for decision-makers, as it lacks context and accessibility for broader audiences. Challenges include interpreting vast amounts of data, identifying hotspots, and visualizing trends to inform policy, allocate resources, and engage the public effectively.

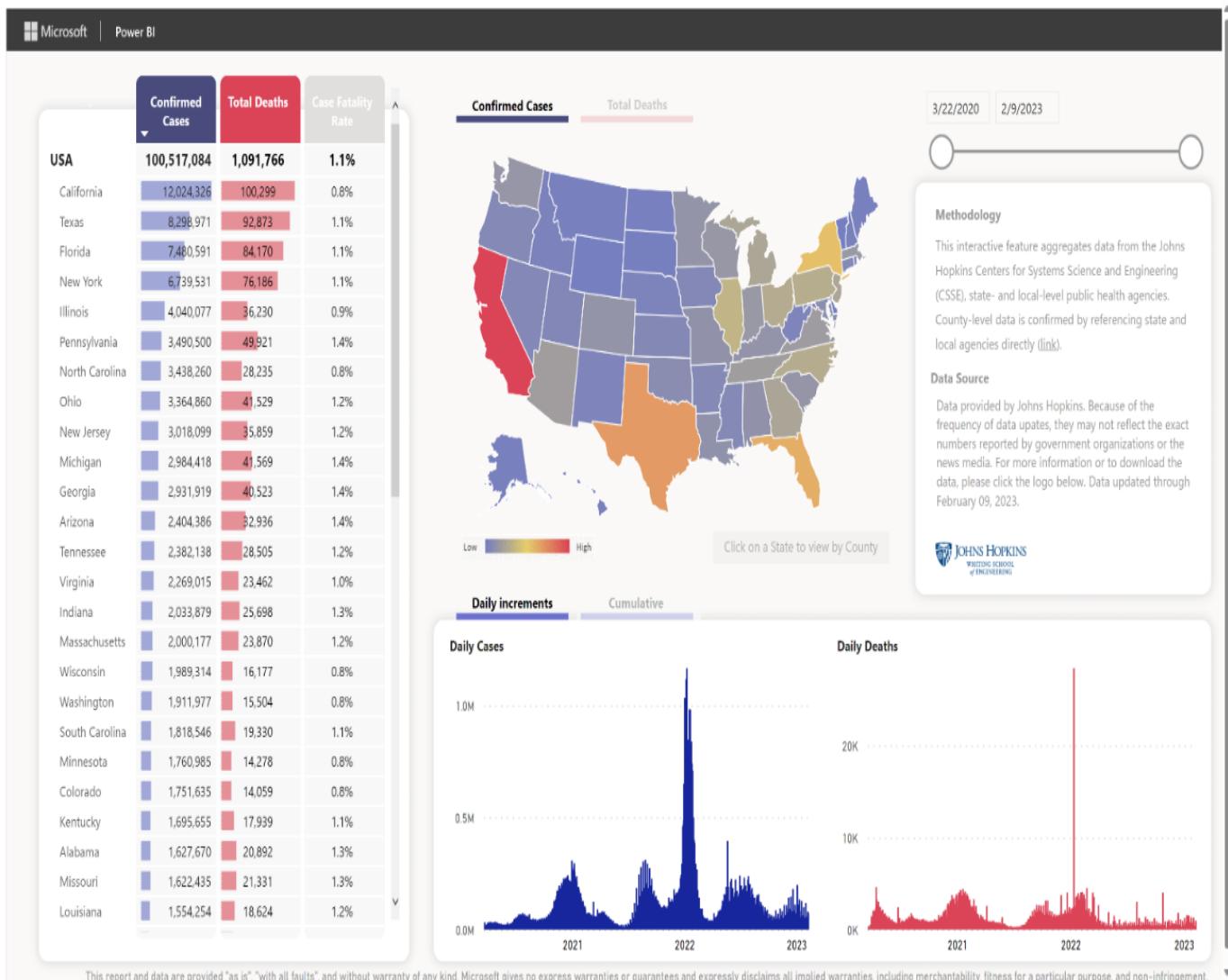
In the United States, this problem is exacerbated by the sheer size of the country and the diverse impact of the pandemic across states and counties. There is a need for a solution that integrates data from multiple levels—national, state, and county—to provide a clear, cohesive picture of the pandemic's progression. This requires an interactive and user-friendly platform that allows users to explore the data dynamically and gain actionable insights.

Visualizing COVID-19 Data with Power BI

To address this problem, an interactive Power BI dashboard has been created, offering a comprehensive solution to visualize and analyze COVID-19 data. The dashboard aggregates data from reliable sources, such as Johns Hopkins University, and transforms it into an intuitive visual format. It includes a variety of charts, maps, and tables that allow users to explore the pandemic's impact at national, state, and county levels.

The dashboard is designed to provide actionable insights through interactive visualizations. At the national level, it highlights key metrics such as total cases, deaths, and case fatality rates while showcasing trends over time. At the state level, users can dive deeper into localized data, including demographic breakdowns and testing metrics. For more granular insights, county-level analysis identifies specific areas of concern and trends. Through this visualization tool, the problem of inaccessible and fragmented data is addressed effectively, creating a platform for transparent communication, effective resource allocation, and proactive response to the pandemic.

PowerBi Dashboard



Here is the powerbi dashboard of the covid -19 cases in us state and local government

Introduction and Objective

The COVID-19 Tracking Dashboard in Power BI is an interactive tool designed to empower state and local governments in the United States to monitor and analyze the pandemic's progression. Developed by the Power BI team, this customizable template provides a centralized platform for visualizing COVID-19 data and communicating it effectively to citizens.

Primary Objective: To provide actionable insights into the spread and impact of COVID-19 across different geographic levels, including city, county, state, and national levels.

Ease of Use: The dashboard's interactive nature allows users to filter data, customize views, and publish results, making it accessible for both technical and non-technical users.

Analysis of COVID-19 Data Across States:

****Confirmed Cases****

The table highlights the total confirmed cases of COVID-19 across various states in the U.S., showing significant variation in infection rates. California reports the highest number of confirmed cases at 12,024,688, followed by Texas (9,612,641) and Florida (7,897,391). These states, due to their large populations and urban density, experienced a higher spread of the virus. On the lower end, states like Louisiana (1,545,012) and Kentucky (1,853,453) had relatively fewer cases, reflecting differences in population, testing rates, or mitigation measures.

****Total Deaths****

The total deaths data provides insight into the severity and healthcare burden across states. California again leads with the highest number of deaths at 100,239, reflecting its large number of confirmed cases. Florida and Texas also reported high death tolls of 84,710 and 90,129, respectively. In contrast, states like Minnesota (14,690) and Colorado (14,320) had significantly fewer deaths, potentially indicating effective healthcare responses or lower population densities.

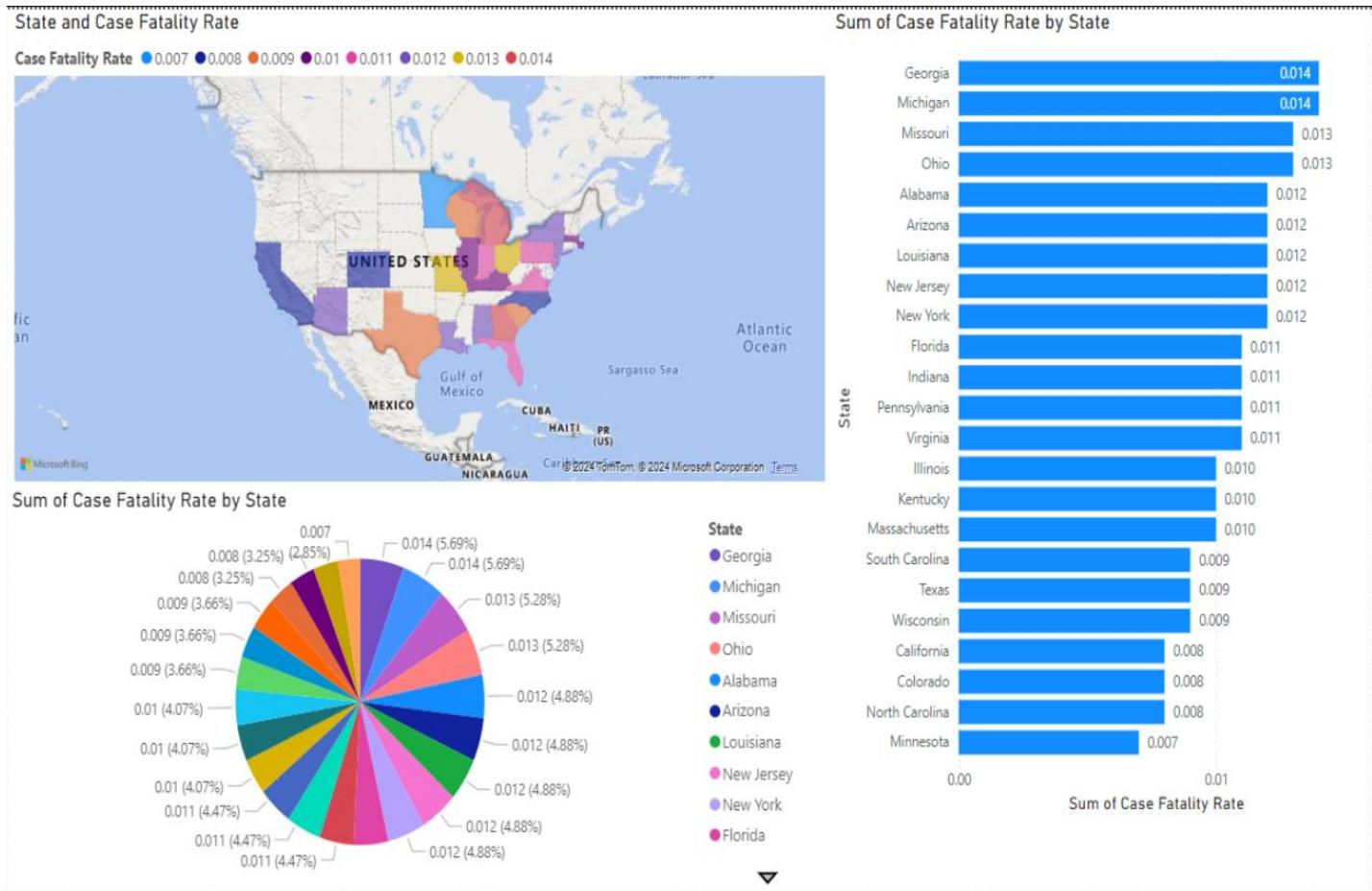
****Case Fatality Rate (CFR)****

The Case Fatality Rate, expressed as a percentage, illustrates the proportion of confirmed cases that resulted in death. Michigan and Georgia reported the highest CFR at 1.4%, highlighting potential challenges in healthcare systems or populations with high vulnerability. States like Minnesota (0.7%) and North Carolina (0.8%) had lower CFRs, suggesting better healthcare outcomes or effective early interventions. This metric is essential for understanding the lethality of the virus and the efficiency of medical care across states.

Dataset Used: Here is the data as shown in the image, which I will include in an Excel file:

State	Confirmed Cases	Total Deaths	Case Fatality Rate
California	12,024,688	100,239	0.8%
Texas	9,612,641	90,129	0.9%
Florida	7,897,391	84,710	1.1%
New York	6,578,186	76,134	1.2%
Illinois	4,002,071	40,587	1.0%
Pennsylvania	3,490,580	38,255	1.1%
North Carolina	3,405,068	28,402	0.8%
Ohio	3,274,031	42,337	1.3%
New Jersey	3,049,812	37,330	1.2%
Michigan	2,984,419	41,896	1.4%
Georgia	2,937,418	40,390	1.4%
Arizona	2,863,689	34,561	1.2%
Indiana	2,303,225	25,888	1.1%
Virginia	2,286,497	24,788	1.1%
Massachusetts	2,283,936	23,602	1.0%
Wisconsin	2,079,814	18,574	0.9%
South Carolina	2,056,686	19,130	0.9%
Minnesota	2,054,545	14,690	0.7%
Colorado	1,898,366	14,320	0.8%
Kentucky	1,853,453	17,830	1.0%
Alabama	1,803,621	21,840	1.2%
Missouri	1,802,013	23,220	1.3%

1. Case Fatality Rate (CFR):



State and Case Fatality Rate: A Multi-Visual Analysis

Overview of the Dashboard

This dashboard visualizes the Case Fatality Rate (CFR) across various U.S. states using a combination of maps, bar charts, and pie charts. The CFR represents the percentage of deaths relative to the number of confirmed cases, providing insight into the severity and healthcare response in different regions. By integrating multiple visualizations, this dashboard enables a comprehensive understanding of geographic and statistical trends.

Geographical Distribution of Case Fatality Rate

The map highlights the distribution of the CFR across states, with varying shades indicating differences in fatality rates. States like Georgia and Michigan are represented with darker shades, reflecting their higher CFR values of 1.4%. This map allows users to quickly identify regions with more severe impacts, emphasizing areas that may have faced healthcare challenges or high-risk populations.

Top States with High Case Fatality Rates

The bar chart ranks states by their CFR, with Georgia and Michigan leading at 1.4%, followed by Missouri and Ohio at 1.3%. These states likely experienced higher fatality rates due to factors such as healthcare access, pre-existing conditions in the population, or delays in early intervention. The clear ranking in the bar chart provides a focused comparison of state-level outcomes.

State Contributions to Case Fatality Rates

The pie chart presents the proportional contribution of each state's CFR to the overall dataset. Georgia and Michigan, each contributing 5.69%, are the most significant contributors. This visualization emphasizes how specific states disproportionately affect the national CFR, providing a detailed perspective on the relative impact of different regions.

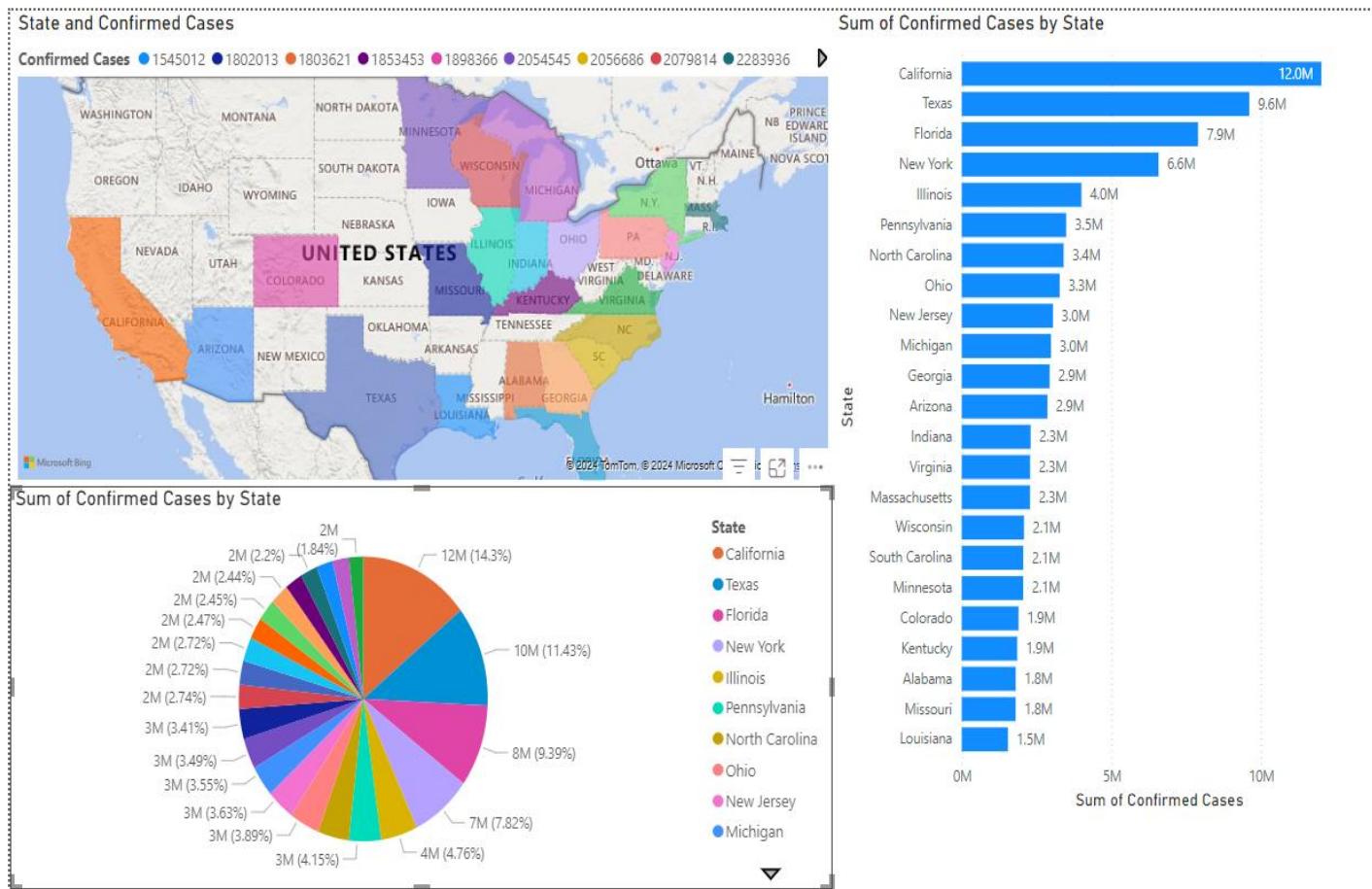
Regional Trends and Observations

States in the southern and midwestern U.S., including Georgia, Alabama, and Missouri, demonstrate relatively high CFRs. In contrast, western states like California and Colorado report lower fatality rates, possibly due to differences in healthcare infrastructure, policy implementation, or population health profiles. These regional patterns highlight the variability in outcomes across the country.

Conclusion

The dashboard effectively combines geographical, categorical, and proportional data to deliver an in-depth analysis of the Case Fatality Rate across states. By identifying high-impact regions and their contributions, this visualization aids policymakers and healthcare professionals in targeting resources and interventions where they are most needed. The multi-visual approach enhances decision-making by offering diverse perspectives on the data.

2.Confrimed Cases:



Overview of State-wise COVID-19 Confirmed Cases

This Power BI dashboard presents a detailed visualization of COVID-19 confirmed cases distributed across various U.S. states. The combination of a geographical map, a bar chart, and a pie chart provides insights into the spread of cases, highlighting states with the highest and lowest infection counts.

Geographical Representation of Cases

The map segment of the dashboard uses color-coded regions to depict the number of confirmed cases in each state. States with higher case counts, such as California, Texas, and Florida, are prominently highlighted, allowing for a clear visual understanding of the regional spread of COVID-19.

Bar Chart of Confirmed Cases by State

The bar chart ranks states based on their total number of confirmed cases. California leads with 12 million cases, followed by Texas with 9.6 million and Florida with 7.9 million. This chart effectively identifies states that contributed significantly to the overall case count.

Proportional Analysis Using the Pie Chart

The pie chart illustrates the proportion of confirmed cases contributed by each state. California accounts for 14.3% of the total, with Texas and Florida together comprising an additional 20.82%. The chart provides a quick comparison of states' relative case burdens.

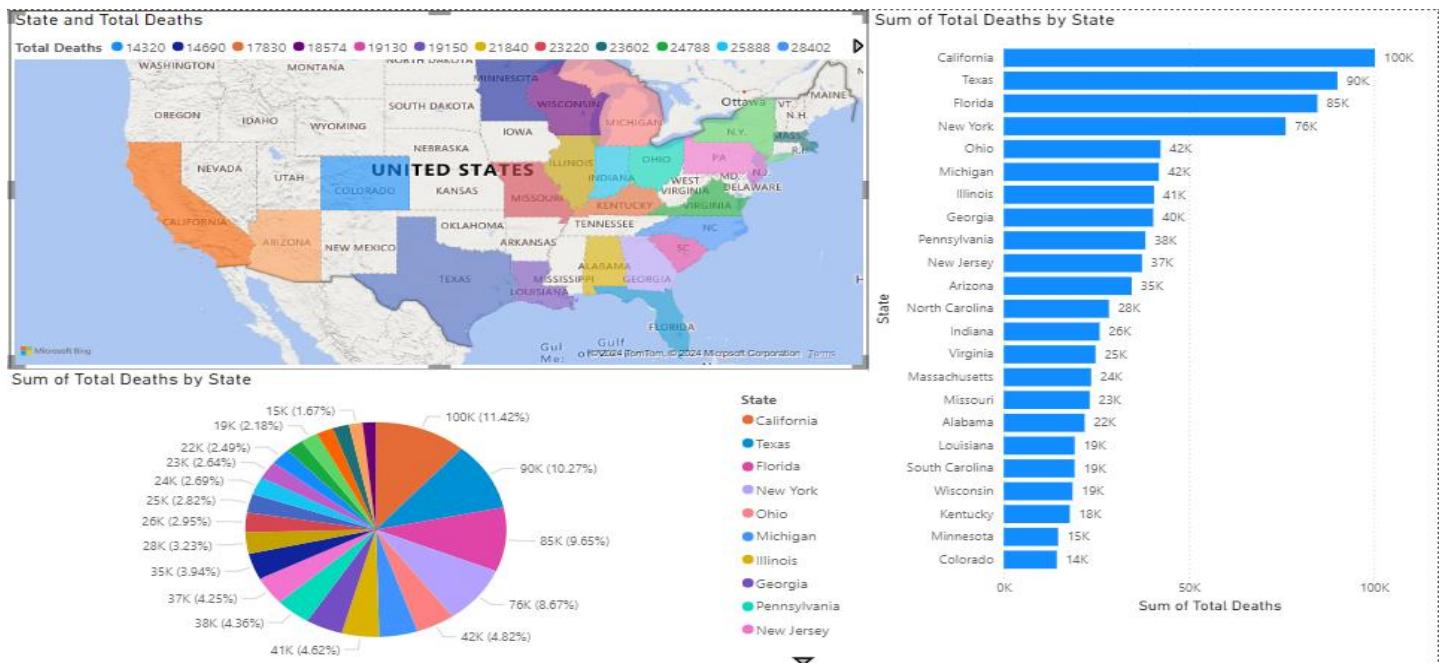
Mid-range States in Case Distribution

States such as Illinois, Pennsylvania, and North Carolina fall in the mid-range category, with confirmed cases between 3 and 4 million. These states contribute approximately 2.5% to 4% of the total cases, reflecting moderate infection levels compared to the highest-ranking states.

States with Lower Case Counts

The bottom tier includes states like Minnesota, Colorado, and Louisiana, each reporting fewer than 2 million confirmed cases. These states have a smaller contribution to the overall total, likely influenced by factors such as population density and effective public health measures.

3. Overview of State-wise COVID-19 Death Statistics



Overview of State-wise COVID-19 Death Statistics

This Power BI dashboard highlights the total deaths attributed to COVID-19 across various states in the United States. By using a geographical map, a bar chart, and a pie chart, it provides a clear and concise visualization of the data, enabling users to understand the death toll and its distribution.

Geographical Visualization of Total Deaths

The geographical map divides the U.S. into color-coded states based on total death counts. States like California, Texas, and Florida, which have the highest numbers of fatalities, stand out on the map. This visual representation makes it easy to identify regions most impacted by COVID-19 fatalities.

Ranking States by Total Deaths

The bar chart on the right ranks states in descending order of total deaths. California leads with 100,000 deaths, followed by Texas with 90,000 and Florida with 85,000. This ranking offers a straightforward comparison of the impact of COVID-19 on different states.

Proportional Breakdown Using the Pie Chart

The pie chart provides a percentage-based distribution of total deaths by state. California accounts for 11.4% of the total fatalities, while Texas and Florida contribute 10.2% and 9.6%, respectively. This visualization effectively shows the relative contribution of each state to the overall death toll.

Middle Tier States in Fatalities

States like Michigan, Ohio, and Illinois form the middle tier, with death counts ranging between 40,000 and 42,000. These states contribute approximately 4% each to the total number of fatalities, showcasing a significant yet moderate impact compared to the leading states.

States with Fewer Fatalities

The states with fewer fatalities, such as Colorado, Minnesota, and Wisconsin, have death counts below 20,000. These states, despite their lower numbers, represent critical data points for understanding regional differences and the overall trends of the pandemic's severity.

Insights and Practical Applications of the Dashboard

This dashboard provides an invaluable tool for health officials and policymakers to evaluate the severity of the pandemic across states. By identifying the hardest-hit regions, it aids in the allocation of resources, the implementation of public health strategies, and the prioritization of vaccination and healthcare interventions. The combination of diverse visuals ensures clarity and enhances decision-making.

Functional Capabilities and Usability

Interactive Filtering:

**Filters can be applied to focus on specific states, counties, or time ranges.

**All visualizations on the dashboard automatically update to reflect applied filters

Customization Options:

**Users can modify the data model and visual design to suit their specific requirements.

**Reports can be tailored for public or internal use, enabling targeted communication.

Embedding and Sharing:

**Governments can generate embed codes for sharing the dashboard on websites, blogs, or social media platforms.

**Publish-to-web functionality ensures citizens have access to the most recent data.

Data Export:

**Data from the dashboard can be exported for additional analysis in external tools like Excel or Python.

Accessibility:

**The intuitive design ensures that both technical and non-technical users can navigate and utilize the dashboard effectively.

Benefits and Future Scope

Benefits:

Transparency and Trust:

By sharing real-time data with citizens, governments can foster transparency and build trust.

Interactive visualizations make complex data easier to understand for the general public.

Improved Decision-Making:

Detailed insights enable policymakers to make informed decisions regarding resource allocation, lockdown measures, and vaccination campaigns.

Ease of Communication:

A single platform for data visualization reduces the need for multiple tools, streamlining communication processes.

Potential Enhancements:

Integration with Additional Data Sets:

Incorporating vaccination rates, hospitalizations, and demographic data for deeper insights.

Adding predictive models to forecast future trends and aid in proactive decision-making.

Real-Time Data Updates:

Connecting the dashboard to live data streams for continuous updates.

Enhanced Visualizations:

Incorporating advanced visual elements like scatter plots or animated charts to better represent time-based trends.

Conclusion:

In conclusion, the COVID-19 Tracking Dashboard project undertaken during my internship demonstrated the critical role of data visualization and analysis in addressing real-world challenges. By leveraging Power BI's robust features, I successfully created an intuitive and interactive dashboard that provided actionable insights into the pandemic's progression. This project not only enhanced my technical skills in data cleaning, modeling, and visualization but also reinforced the importance of effective communication of complex data to aid decision-making. The experience underscored my ability to adapt analytical tools to solve pressing issues, contributing to informed strategies in public health management and fostering transparency and trust among stakeholders.

Use Cases of Power BI

Sales Analytics:

Monitor sales performance, revenue trends, and regional analysis.

Financial Reporting:

Generate profit/loss statements, budget vs. actuals, and KPIs.

Marketing Analytics:

Analyse campaign performance and customer engagement.

Operational Efficiency:

Track production, inventory, and resource management.

Human Resources:

Analyse employee performance, retention, and recruitment trends.

Customer Insights:

Visualize customer behaviour, satisfaction scores, and feedback.

SUMMARY

Microsoft Business Intelligence, with Power BI as its centrepieces, offers a robust and scalable solution for modern analytics. Power BI seamlessly connects to various data sources, transforms raw data into meaningful insights, and enables users to create interactive and actionable reports. It bridges the gap between data and decision-making, empowering businesses of all sizes to become data-driven.

Power BI is a versatile and user-friendly tool that empowers organizations to make data-driven decisions efficiently. With its intuitive interface, powerful features like DAX and Power Query, and strong collaboration capabilities, Power BI has become a leader in the analytics and BI space. By adopting best practices and leveraging the full potential of Power BI, businesses can enhance their operations, improve decision-making, and achieve measurable growth.