Covid - 19 Analysis Using Power BI and ArcGIS

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***Abstract*—Global health, the economy, and communities have all suffered significantly because of the COVID-19 pandemic. Understanding the propagation of the virus and making sensible decisions depend on the analysis and visualization of COVID-19 data. Using two potent tools for data visualization and geospatial analysis, Power BI and ArcGIS, this study extensively examines COVID-19 data. We show how the incorporation of these techniques can offer insightful information about the virus's spread, its effects on various places, and the efficacy of containment measures. The analysis provides a comprehensive view of the pandemic's development using trend analysis, interactive dashboards, regional mapping, and data preparation.**

***Index Terms*—PowerBI, ArcGIS, geospatial, analytics, visualizations, COVID-19.**

I. Introduction

Considering the COVID-19 pandemic, which has been linked to millions of illnesses and fatalities globally, there has never been such a serious global problem. Understanding the patterns and trends related to the virus is crucial for efficient decision-making and resource allocation. This can be done by analyzing COVID-19 data. The well-known tools Power BI and ArcGIS provide strong capabilities for data visualization and geospatial analysis as shown in "Fig. 1.". This article investigates how Power BI and ArcGIS can work together to analyze COVID-19 data in-depth.

Fig. 1. Basic Analysis of COVID-19 Data.

II. Data Collection and Pre-processing

To enable us to conduct our study, we gathered COVID-19 data from dependable sources, including GitHub, the World Health Organisation (WHO), and national health organizations [3] [4]. Information on confirmed cases, fatalities, recoveries, and other pertinent factors were all included in the data collection. Data cleaning, normalization, and consolidation pre-processing activities were carried out to guarantee data accuracy and consistency [5].

III. Interactive Dashboards using Power BI

For designing dynamic dashboards, Power BI offers a user-friendly, interactive interface. We made use of this feature to create simple visualizations that let people explore and examine COVID-19 data at different granularities [1]. Users can dive down into certain areas, times, and factors of interest using the interactive charts, tables, and filters that are included in our dashboards. This interactivity improves the user experience and makes making decisions based on data easier. "Fig. 2." shows a basic summary analysis of COVID-19 data, like the active cases in each province or state for the region selected and confirmed cases, and daily deaths in a region.

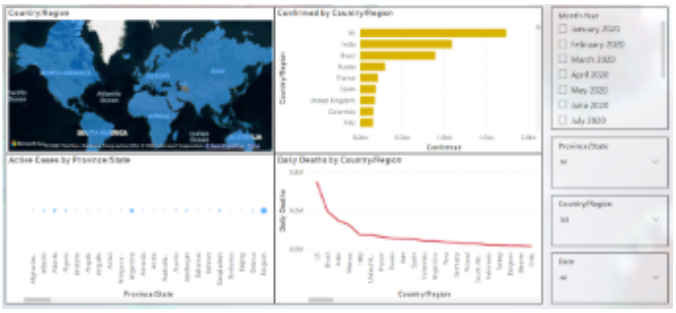

Fig. 2. Trends and Patterns discovered in the data.

IV. Spatial Mapping using ArcGIS

Data may be visualized and analyzed on maps thanks to the potent geospatial analysis tool ArcGIS. With the help of ArcGIS, we were able to spatially map the COVID-19 data and show how the average daily death count varied by location [2]. By adding a second layer of population density, we were able to assess how these parameters affected the virus's spread. Spatial mapping offers important insights into hot spot regions, transmission patterns, and the efficiency of containment measures.B. Tomaszewski and A. MacEachren's article "Geovisual Analytics to Support Crisis Management: Information Foraging for Geo-Historical Context" exhibited

the value of geovisual analytics in crisis management and provided guidance for utilizing related strategies in COVID-19 analysis with Power BI [9]. "Fig. 3." displays a spatial representation of population density and the Average deaths daily in ArcGIS.Approaches to integrating geographic and temporal data into analytics, as described in "Space, Time, and Visual Analytics" by G. Andrienko, N. Andrienko, et al., were pertinent for COVID-19 analysis in Power BI and ArcGIS [8].

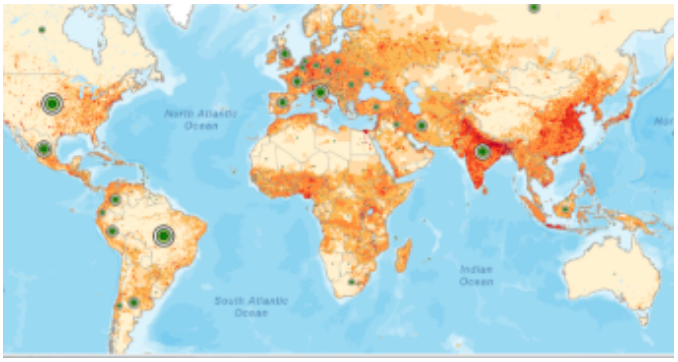

Fig. 3. Spatial representation of population density and the Average deaths daily in ArcGIS

V. Trend Analysis

Understanding how the pandemic has changed over time requires careful analysis of temporal trends. We used Power BI's ability to create dynamic time series visualizations to examine COVID-19's development over time as shown in "Fig. 4.". We looked into COVID-19's evolution over time using Power BI's capacity to produce dynamic time series visualizations, as seen in "Fig. 4." We visualized trends in cases, fatalities, and recoveries to identify the peak times, fluctuations, and broad trajectories of the virus. This information is essential for evaluating the effectiveness of activities and predicting upcoming events.

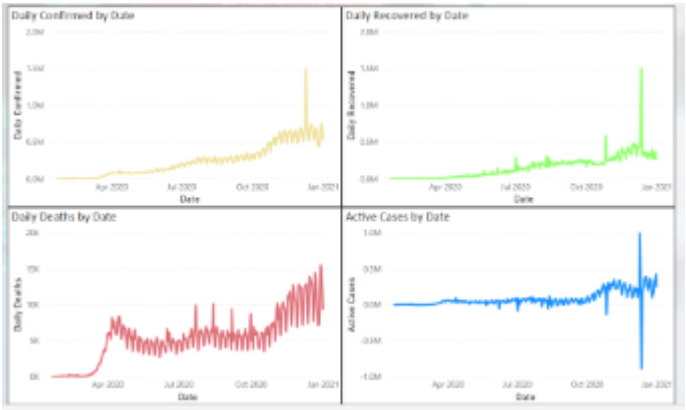

Fig. 4. COVID-19 dashboard for trends and analysis.

VI. Results and Discussion

Our investigation of the COVID-19 epidemic using Power BI and ArcGIS produced insightful results. It was performed using the concepts and examples of good data visualization from Edward R. Tufte's "The Visual Display of Quantitative Information." [7]. Users could study data whenever it suited them because of the interactive dashboards, which improved comprehension and decision-making. Policymakers were able to devote resources and carry out targeted actions after spatial mapping identified areas with high transmission rates. Identification of important times and assessment of containment strategies were made easier by trend analysis. The integration of Power BI and ArcGIS for the COVID-19 research gave a detailed view of the pandemic's effects.

VII. Conclusion

This research illustrated the efficiency of using Power BI and ArcGIS for COVID-19 analysis. The combination of these tools provides a thorough and dynamic method for visualizing and analyzing COVID-19 data. Thanks to this integrated approach, policymakers, healthcare workers, and academics may make data-driven decisions, effectively allocate resources, and execute focused interventions. The study of interaction strategies improved the analysis of COVID-19 data in Power BI, and ArcGIS concludes in "The Science of Interaction" by W. Pike, J. Stasko, et al. [6]. The investigation in this report emphasizes the value of geographical analysis and data visualization in comprehending and controlling the COVID-19 pandemic.

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