



COVID-19 Vaccines Analysis

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Course Name-Applied data science

Phase-I

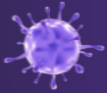
Problem Definition and Design Thinking

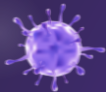


Problem Definition

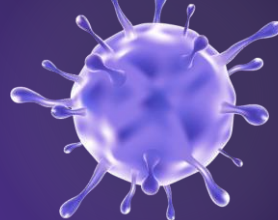


The problem is to conduct an in-depth analysis of Covid-19 vaccine data, focusing on vaccine efficacy, distribution, and adverse effects. The goal is to provide insights that aid policymakers and health organizations in optimizing vaccine deployment strategies. This project involves data collection, data preprocessing, exploratory data analysis, statistical analysis, and visualization.





Design Thinking



Data Collection: Collect Covid-19 vaccine data from reputable sources like health organizations, government databases, and research publications.

Data Preprocessing: Clean and preprocess the data, handle missing values, and convert categorical features into numerical representations.

Exploratory Data Analysis: Explore the data to understand its characteristics, identify trends, and outliers.

Statistical Analysis: Perform statistical tests to analyze vaccine efficacy, adverse effects, and distribution across different populations.

Visualization: Create visualizations (e.g., bar plots, line charts, heatmaps) to present key findings and insights.

Insights and Recommendations: Provide actionable insights and recommendations based on the analysis to assist policymakers and health organizations.

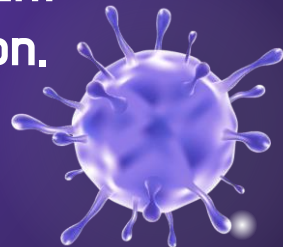




Data collection

COVID-19 continues to highlight a pressing need to use social and behavioural data alongside biomedical data to mount an effective response. Timely data and insights into people's changing knowledge, attitudes and behaviours helps to ensure that the response is tailored and adapted to the needs of the population.

To support countries and response teams capture accurate and up-to-date social and behavioural data, teams across all WHO regions have been producing tools and training to support the management of COVID-19. Please find below globally relevant resources, and links to region-specific tools and information.





WHO Regional Office for Africa

Tool - Social and behavioural insights COVID-19 data collection tool for

Africa

Case study - Pilot implementation in Nigeria and Zambia

Training - SocialNet: Social and behavioural insights COVID-19 data collection

tool for Africa

WHO Regional Office for Europe

WHO Tool for behavioural insights on COVID-19



Global resources

Training - SocialNet: Social and behavioural insights COVID-19 data
collection tool

Outil de collecte des données COVID-19 sur les

observations sociales et comportementales

WHO Information Network for Epidemics

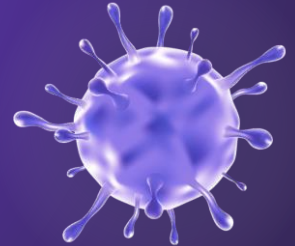
Data Preprocessing

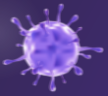


Monitoring the health situation, trends, progress and performance of health systems requires data from multiple sources on a wide variety of health topics. A core component of WHO's support to Member States is to strengthen their capacity to collect, compile, manage, analyze and use health data mainly derived from population-based sources (household surveys, civil registration systems of vital events) and institution-based sources (administrative and operational activities of institutions, such as health facilities).

EU/EEA countries - weekly reporting (TESSy)

EU/EEA countries - daily reporting (collected from official sources)





Exploratory Data Analysis

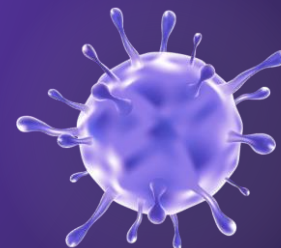
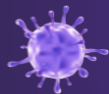
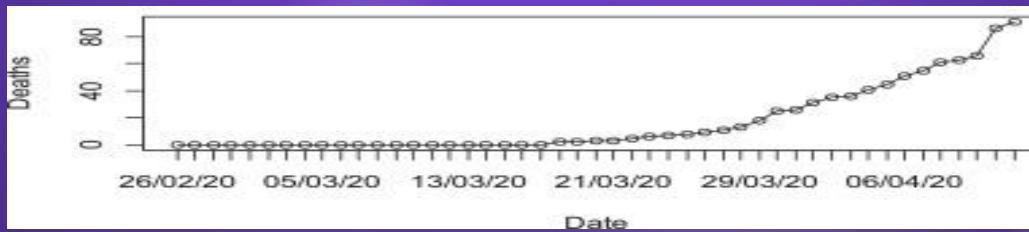
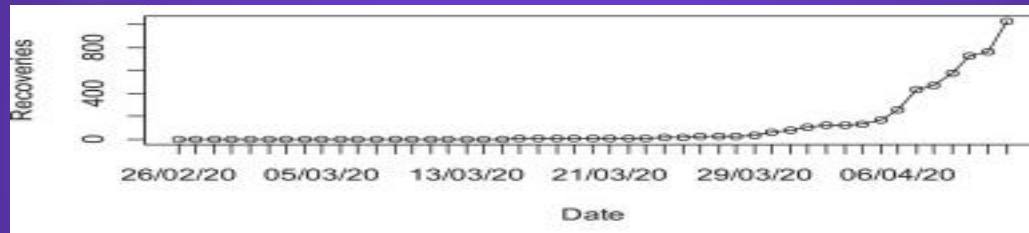
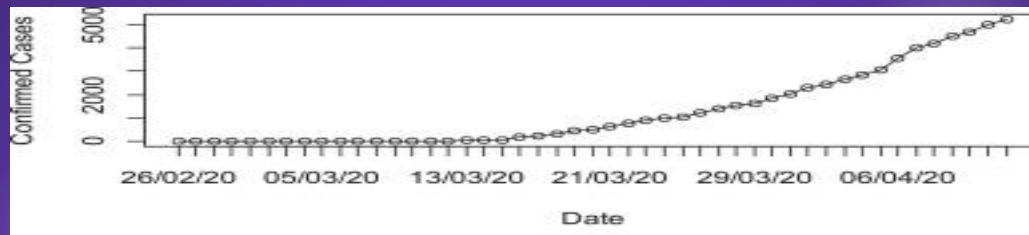
Covid Explorer model's aim is to provide information on Covid 19 like-how you can prevent the Corona Virus, symptoms of Corona Virus or how to book slots for the Corona Virus. You can add the current data related to Covid 19 like a graph indicated the increase or decrease of death rate from this virus, a report is given to show the death rate, the number of vaccines doses given on a particular day, state wise cases are also shown through Application Programming Interface (API) in Covid Explorer model. The model is analyzing and tracking Corona Virus. As per the data analysis this pandemic creates mental health issues but if a model gave up-to date data of the current scenario then stress can be overcome and society can fight against this pandemic.

<https://covid19.who.int/> for Data analysis.



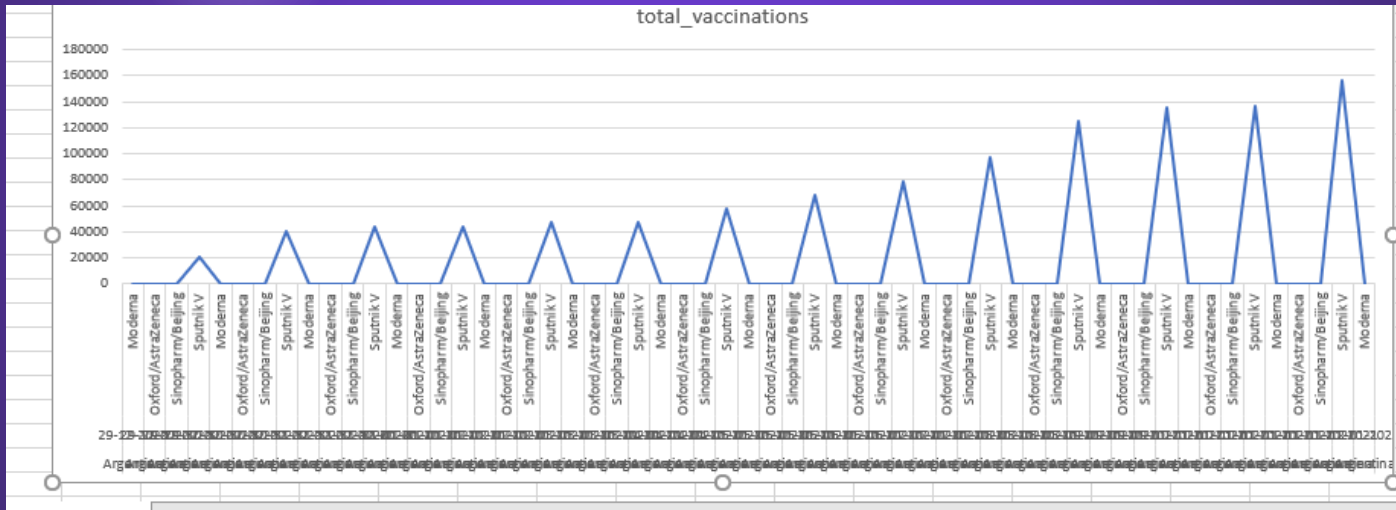
Statistical Analysis:

The available data is limited and is affected by fluctuations i.e. highly variable cases were reported day by day. As a result, Cumulative data is used to predict the number of cases in Pakistan. The cumulative number of COVID-19 confirmed cases, deaths and recoveries are expected to show exponential growth over time. Therefore, we used the simple time series methods of Autoregressive Integrated Moving Average (ARIMA) Model to forecast the number of cases, deaths and recoveries for upcoming month. The ARIMA model has higher fitting and forecasting accuracy than exponential smoothing. It captures both the seasonal and non-seasonal forecasting trends. Due to the limited available data, we simply focus on non-seasonal models to describes the pattern (growth) over time. Hence, we assumed that the pattern of current cases will continue in the near future (at least a month). We believe that the ARIMA model, which is the combination of Autoregressive (AR) and Moving Average (MA) fits well to the nature of the available data and provide good forecasting for the short time series data.



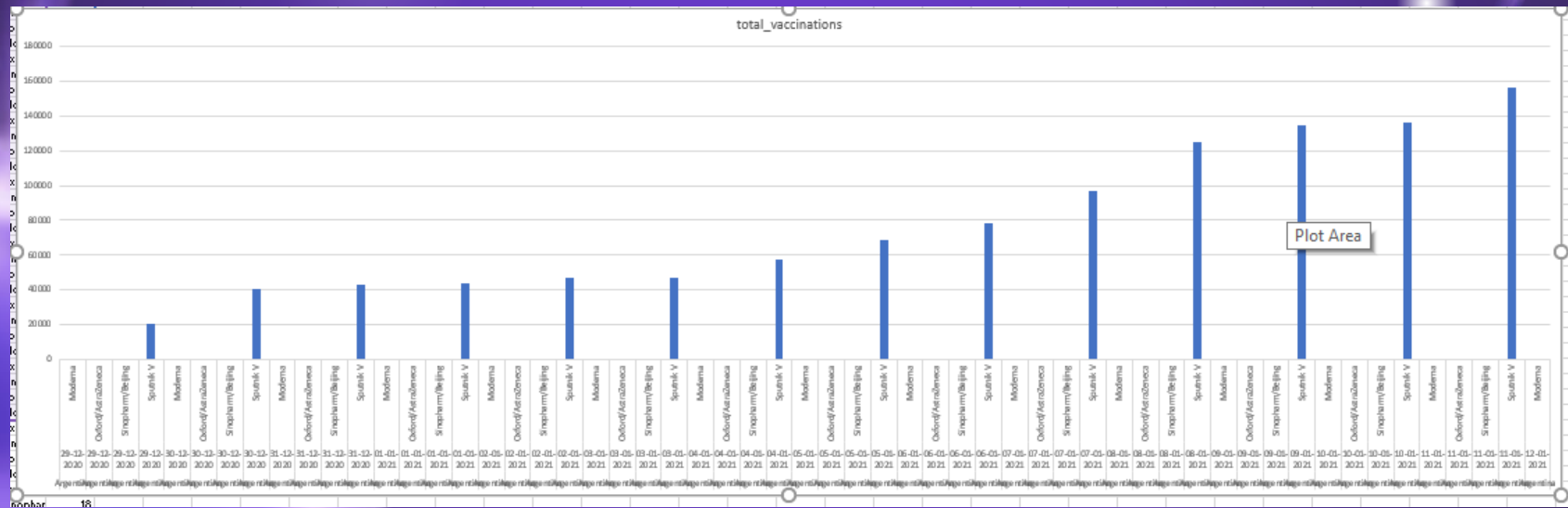
Line Chart

Line Chart





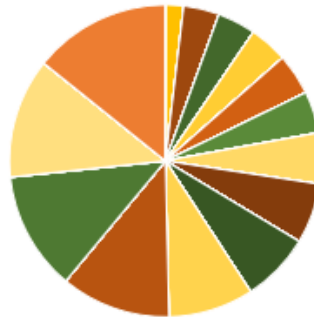
Bar charts



Pie chart



total_vaccinations



- Argentina 29-12-2020 Moderna
- Argentina 30-12-2020 Sinopharm/Beijing
- Argentina 01-01-2021 Moderna
- Argentina 02-01-2021 Sinopharm/Beijing
- Argentina 04-01-2021 Moderna
- Argentina 05-01-2021 Sinopharm/Beijing
- Argentina 07-01-2021 Moderna
- Argentina 08-01-2021 Sinopharm/Beijing
- Argentina 10-01-2021 Moderna
- Argentina 11-01-2021 Sinopharm/Beijing
- Argentina 29-12-2020 Oxford/AstraZeneca
- Argentina 30-12-2020 Sputnik V
- Argentina 01-01-2021 Oxford/AstraZeneca
- Argentina 02-01-2021 Sputnik V
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