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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



IBM Naan Mudhalvan Phase 3 Submission

**Development Part-I**

**Title**: Covid 19 Vaccine Analysis

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Covid 19 Vaccine Analysis

**Objective:**

COVID 19 pandemic caused due to the Corona virus devastated the world by causing several fatalities around the world. This virus originated in Wuhan, China in 2019 and was later spread throughout the world due to human contact in one way or the other. The disease showed symptoms as basic as mild fever and cold but also caused life threatening symptoms like breathing problems caused by damage to the lungs. As this virus was new to the world and there was no vaccine or cure to it at the initial period there were several deaths around the world. The countries around the world were forced to shut themselves to others in order to avoid the further spread of the virus and people were stuck inside their houses and faced many issues with their finances, mental health etc., and felt like animals in a cage. An effort was made to find a cure or vaccine by several health organizations to bring a stop to this pandemic.

**Description of dataset:**

The link for the chosen dataset is mentioned below,

<https://www.kaggle.com/datasets/gpreda/covid-world-vaccination-progress>

The above dataset contains Covid 19 Vaccine Analysis.

The Google Health COVID-19 Open Data Repository is one of the most comprehensive collections of up-to-date COVID-19-related information. Comprising data from more than 20,000 locations worldwide, it contains a rich variety of data types to help public health professionals, researchers, policymakers and others in understanding and managing the virus.

**1.Data Importing**

In power BI desktop with the help of the get data option import the CSV data which is named as country\_vaccinations and clicked load option.

**2.Data Cleaning**

After loading the data and after analyzing the data | understood that there are 86512 rows and 15 columns. And in that some of the columns contained null values I have replaced the null values by 0 with the use of replace functions and started working on the data.

**3.Visualizations**

In visualization part with the help of power BI desktop software I have used different kinds of charts, graphs, cards and table to display the data in the format which will be easy to understand.

**4.Insights**

Here we analyzed the top 10 fully vaccinated countries in which India tops the list which indicates that people in the country where showing lots of interests to get vaccinated.

* And also analyzed top 5 vaccinated countries here also India tops the list.
* And then analyzed top 5 daily vaccinating countries and here China tops the list.
* And also we analyse the sum of daily vaccinating details, fully vaccinating and vaccinating people details.
* And our year wise analyse shows that 2021 was the peak year for every vaccination details.

**5.DNA vaccines**

DNA vaccines can enter cells like viral infections and use the host protein translation system to generate target antigens. As an endogenous immunogen, it can induce humoral and cellular immune responses at the same time. Given the advantages of nucleic acid vaccines, DNA vaccines do not require live viruses, so safety is improved. DNA vaccines insert genes encoding foreign antigens into plasmids containing eukaryotic expression elements and then directly introduce the plasmids into humans or animals, allowing them to express antigen proteins in host cells and induce immune responses to prevent diseases.

**6.Inactivated vaccines**

Inactivated vaccines are the most classic form of vaccines. They are easy to prepare and can efficiently cause humoral immune responses. They are often the first choice for new infectious diseases. Inactivated vaccines are mainly obtained through three inactivation methods, such as formaldehyde, β-propiolactone, and ultraviolet. SARS and MERS inactivated vaccines can cause mice, hamsters, ferrets, and monkeys to produce high-titer neutralizing antibodies. The SARS-inactivated vaccine has completed phase I clinical trials, proving that it is safe in humans and can induce neutralizing antibodies’ production.

**7.Subunit vaccines**

Subunit vaccines are composed of purified recombinant proteins and are considered to be the safest vaccines. There are currently several subunit vaccines on the market, including hepatitis B, hepatitis E, and human papillomavirus vaccines. SARS and MERS subunit vaccines can produce high-titer neutralizing antibodies in mice, and nasal or oral vaccination can also induce a mucosal immune response, thereby more effectively blocking the virus transmission through the respiratory tract. The data also prove the protective efficacy of mucosal vaccination better than intramuscular inoculation.

**8.Travel immunization**

If the epidemic situation is well controlled, and the future epidemic situation is mainly imported, entry and exit personnel should be the target of implementing the immunization strategy, and close contacts of entry personnel should be used as vaccinations.

**9.Pre-exposure immunization**

For subjects who may be exposed to COVID-19 patients or high-risk infections, such as medical staff in fever clinics, COVID-19 pathogen testing personnel, contact persons from COVID-19 endemic countries, etc., should take exposure pre-immune prevention strategies.

Program:

**#importing files**

from sklearn.model\_selection import train\_test\_split

import pandas as pd

from sklearn.impute import SimpleImputer

from sklearn.preprocessing import StandardScaler

import matplotlib.pyplot as plt

import seaborn as sns

from sklearn import datasets

from sklearn.preprocessing import LabelBinarizer

**#read file**

covid\_df=pd.read\_csv("/content/country\_vaccinations\_by\_manufacturer.csv")

covid\_df

**#pivot table**

data=pd.pivot\_table(covid\_df,values=['date','vaccine','total\_vaccinations'],index='location',aggfunc=max)

data.style.background\_gradient()

**#one\_hot\_encoding**

one\_hot=LabelBinarizer()

one\_hot.fit\_transform(x)

**#train\_test**

x=covid\_df['vaccine']

y=covid\_df['total\_vaccinations']

xtrain,xtest,ytrain,ytest=train\_test\_split(x,y)

**#display**

sns.barplot(data=covid\_df,x='vaccine',y='total\_vaccinations')

## **CONCLUSION**

In short, the successful development of the COVID-19 vaccine concerns almost all countries and people in the world. We must do an excellent job of researching the immunogenicity and immune reactivity of the vaccines.