

Predicting Covid Cases in Mexico City

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Problem Statement

The Ministry of Health is struggling to manage the escalating COVID-19 pandemic amid rising cases and limited resources in Mexico. Predictive analysis is urgently needed to inform public health interventions optimize hospital management strategies and ensure early detection of the virus to provide containment and isolations to the affected.

Data

Source:

The primary source of COVID-19 data is Mexico's Ministry of Health .Their data was often shared on platforms like the Dirección General de Epidemiología (General Directorate of Epidemiology) website

Description

The dataset contains 10,000 entries (rows) and 23 columns.This dataset contains information about COVID-19 patients.

Objectives

- Identify key factors influencing the rise in Covid-19 cases.
- Develop a predictive machine learning model to identify factors that may contribute to an increase in positive Covid-19 cases.
- Provide insights and recommendation



Methodology

1

EDA

Exploratory Data
Analysis to gain
insights into the
data

2

Modelling

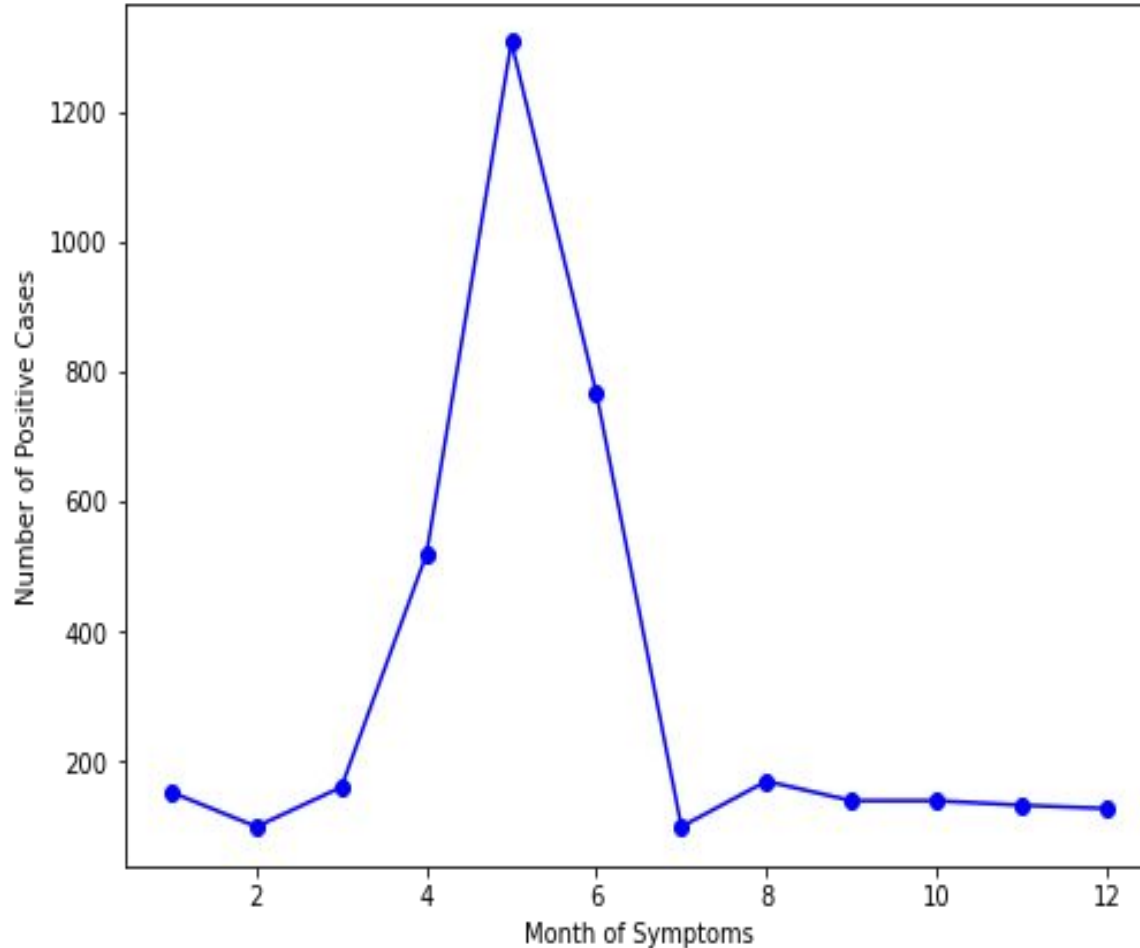
Predictive
Modelling using
variety of machine
learning algorithms

3

Model Evaluation

Gauging the
performance of
models using
metrics such as
accuracy

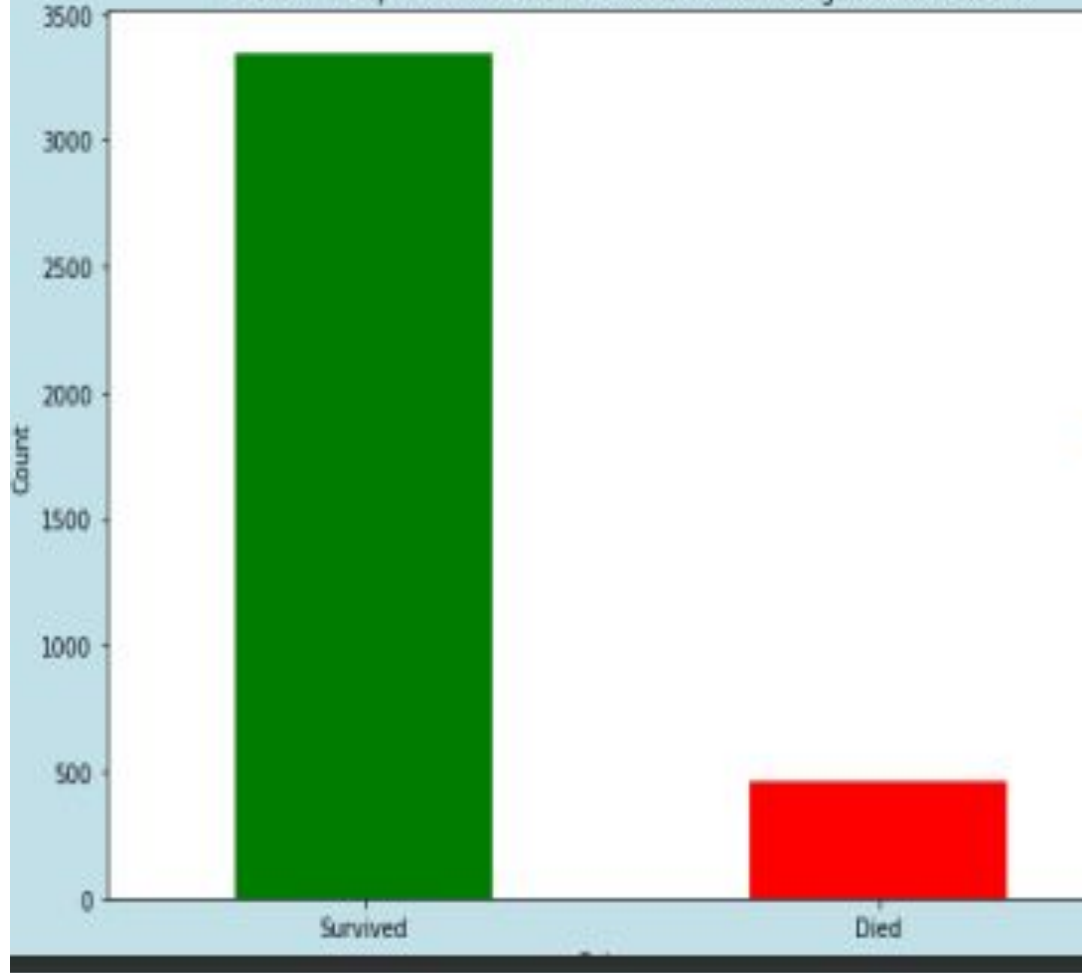
Trend Analysis of Positive COVID-19 Cases



Observations:

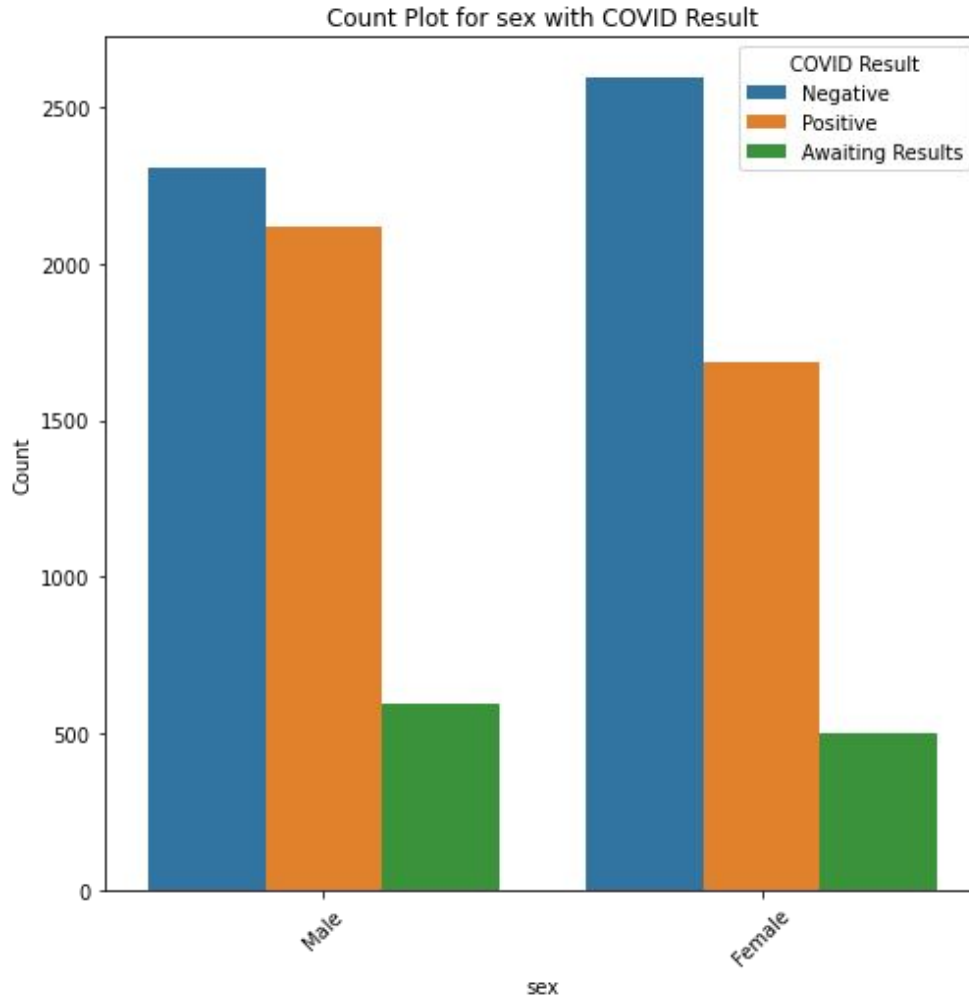
The 5th month (May) had the highest number of positive covid results and the cases dropped significantly during the month of July

Count of People Who Died and Did Not Die Among Positive Cases



Observations:

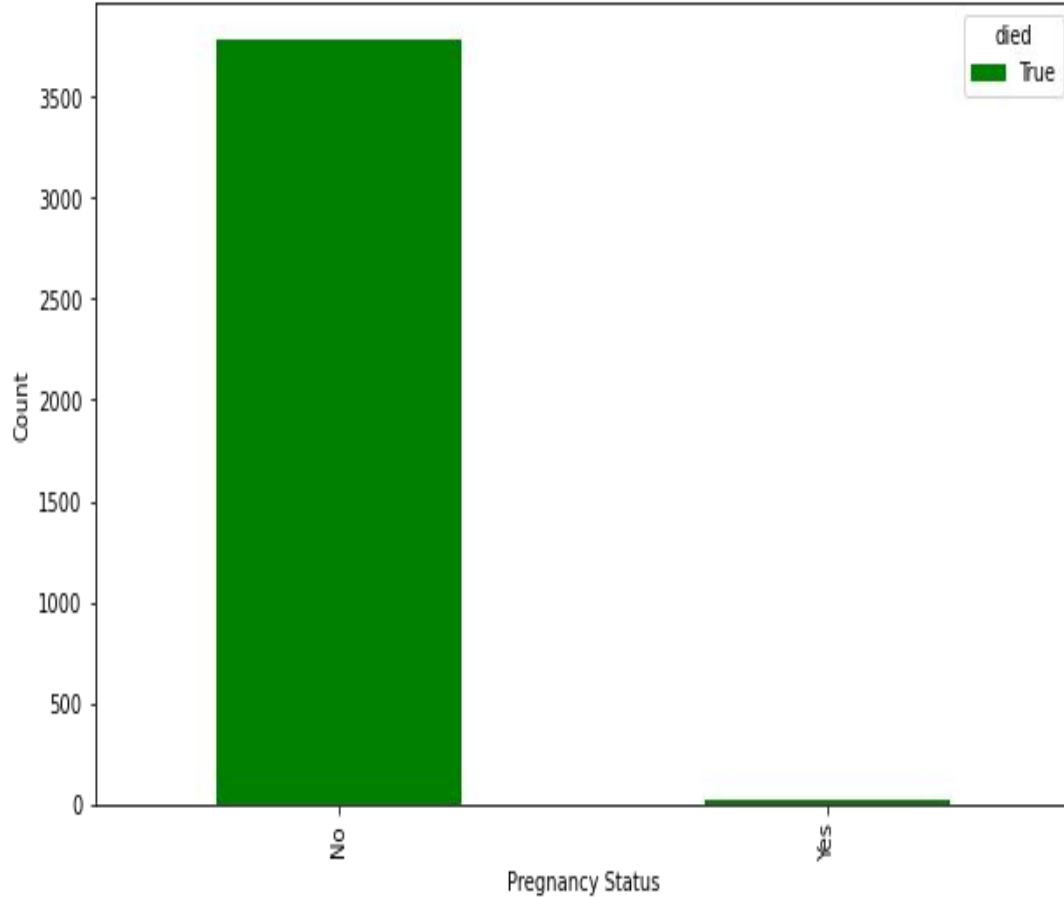
Most of the people that had tested positive survived while those that died were few approximately 400.



Observations:

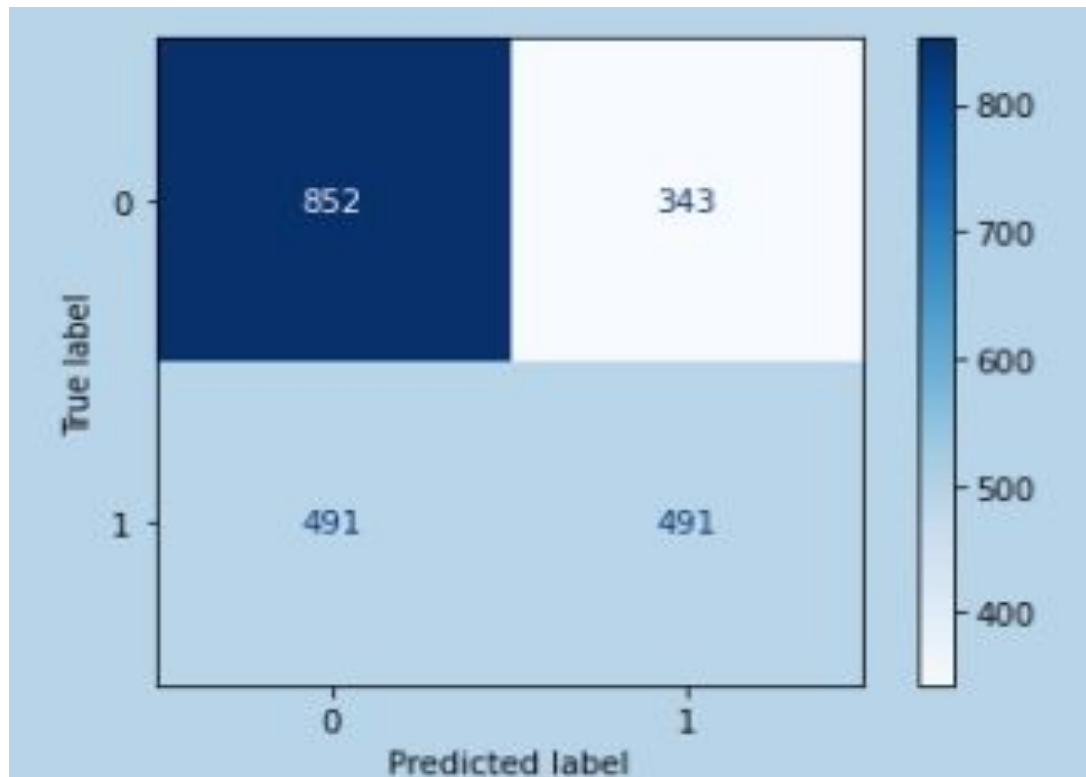
More females tested negative while more males tested positive. In both categories: Negative cases were higher

Positive COVID-19 Outcome and Mortality by Pregnancy Status



Observations:
Most of the
people that
were not
pregnant and
tested positive
died.

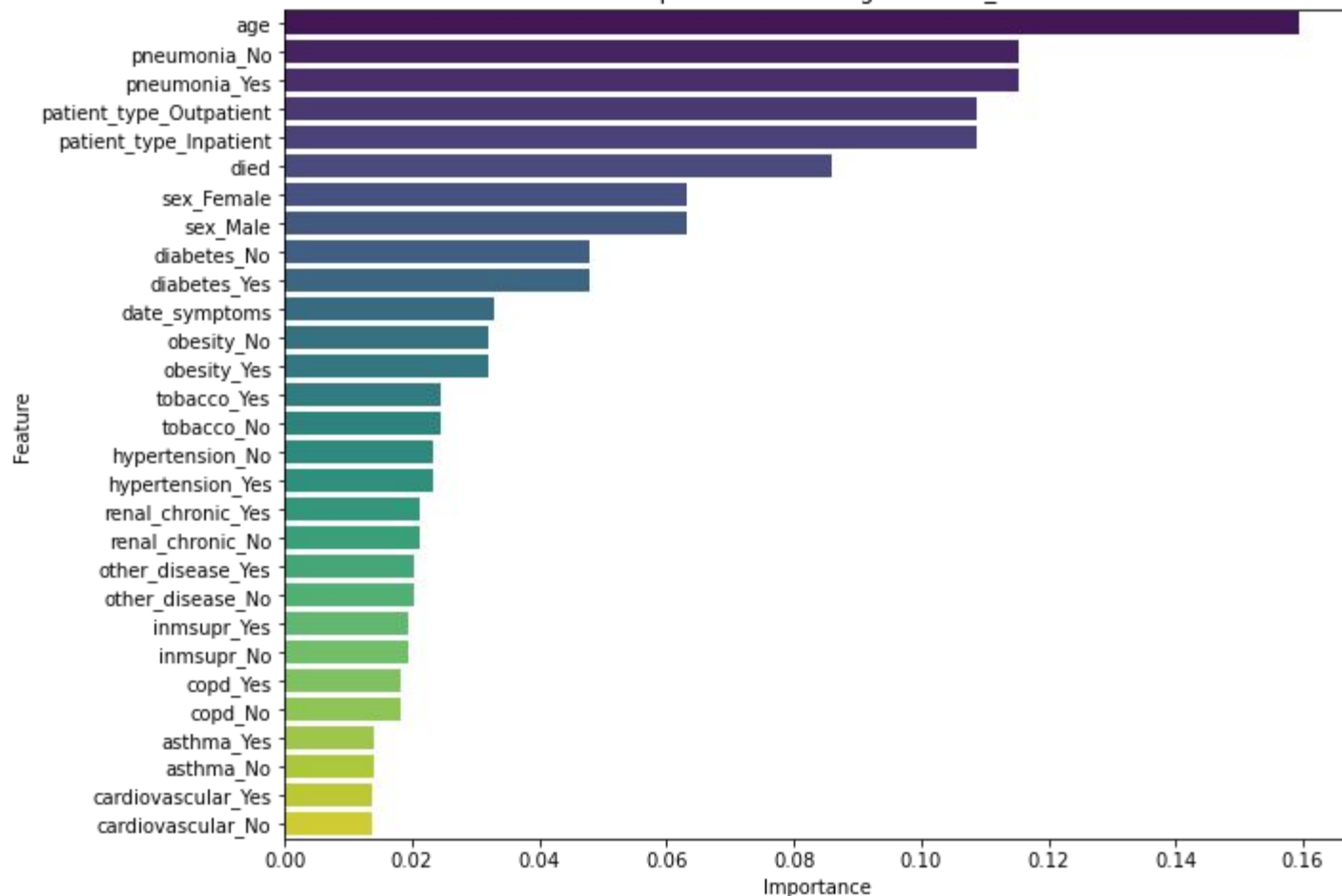
Best Performing Model



Model Evaluation

- Accuracy: The model's accuracy is 62%, meaning that 62% of the total predictions (both positive and negative) are correct
- True Negatives (TN): 849 instances where the model correctly predicted negative cases.
- False Positives (FP): 346 instances where the model incorrectly predicted positive cases (individuals do not have COVID-19 but were predicted as positive).
- False Negatives (FN): 491 instances where the model incorrectly predicted negative cases (individuals have COVID-19 but were predicted as negative).
- True Positives (TP): 491 instances where the model predicted the test result as positive, and the individual does have COVID-19

Feature Importances Ranking for Covid_19 cases



Observations

The Most important features for predicting Covid19 positive results are:

- age
- patient_type_Inpatient
- patient_type_Outpatient
- died
- Pneumonia_yes
- pneumonia_no

Recommendations

- Prioritize vaccination for older adults, as age is a significant predictor of severe COVID-19 outcomes.
- Implement aggressive testing and contact tracing strategies for individuals who report early onset of symptoms to quickly identify and isolate positive cases.
- Prioritize allocation of hospital beds and ventilators to facilities handling a higher proportion of inpatients, as these patients are more likely to have severe cases..

Recommendations

- Ensure that hospitals with a high number of inpatients are adequately staffed with specialized healthcare professionals.
- **Mortality:** Conduct thorough reviews of mortality cases to identify factors leading to severe outcomes and improve treatment protocols.
- Provide adequate respiratory support, including supplemental oxygen and ventilators, for patients with pneumonia

Limitations

The dataset used in the case study was constrained by limited information. Key factors like vaccination status, geographic location, behavioral aspects such as mask-wearing, symptom severity, and genetic history could significantly enhance accuracy and predictive capabilities.

Thank you.