

FLU_SHOT LEARNING MODEL

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APPROACH for our Flu Shot Model

- ❖ Overview
- ❖ Business Understanding
- ❖ Data Understanding
- ❖ Modelling
- ❖ Recommendations
- ❖ Conclusions

Overview

Background Information

In recent times, the world has grappled with significant flu outbreaks, notably including COVID-19, Swine Flu (H1N1), and Avian Flu (H5N1). The impact of these outbreaks varies based on the specific type of flu, its variants, and demographic factors such as age and individual health conditions. In the United States, seasonal flu consistently imposes a considerable burden on public health each year. According to the CDC, estimates for flu-related cases between 2010 and 2020 range from 9 million to 41 million illnesses, with hospitalizations ranging from 140,000 to 710,000 and deaths from 12,000 to 52,000 annually. Furthermore, despite the evident threat, vaccination rates have remained suboptimal, with an overall average of 57.8% as of 2022. This underscores the ongoing challenge of effectively addressing and mitigating the impact of flu outbreaks.

BUSINESS UNDERSTANDING

In This Project the objective is to understand how the following factors affect H1N1 and Seasonal Flu Vaccination rates.

- ❖ **Opinions and Perceptions of The Respondents.**

- Personal Opinions or influence from others

- ❖ **Behaviors of the Respondents towards Vaccine Uptake**

- Handwashing, Wearing masks and avoiding large crowds

- ❖ **Recommendations from Doctors**

- ❖ **Demographical Factors**

- Age, Education, Employment and Income Levels

DATA UNDERSTANDING

This Project would give and provide actionable insights that will aid business and healthcare organizations to increase the intake of seasonal flu vaccinations rates. They include:

Key Factors

By Analyzing the provided data. We will be able to obtain influential factors that will help us understand more on Flu Vaccination Intake.

These factors include opinions, behaviors and perceptions

The Target Population

Also Unique segments will also be identified from within the target population based on the opinions, perceptions and behaviors

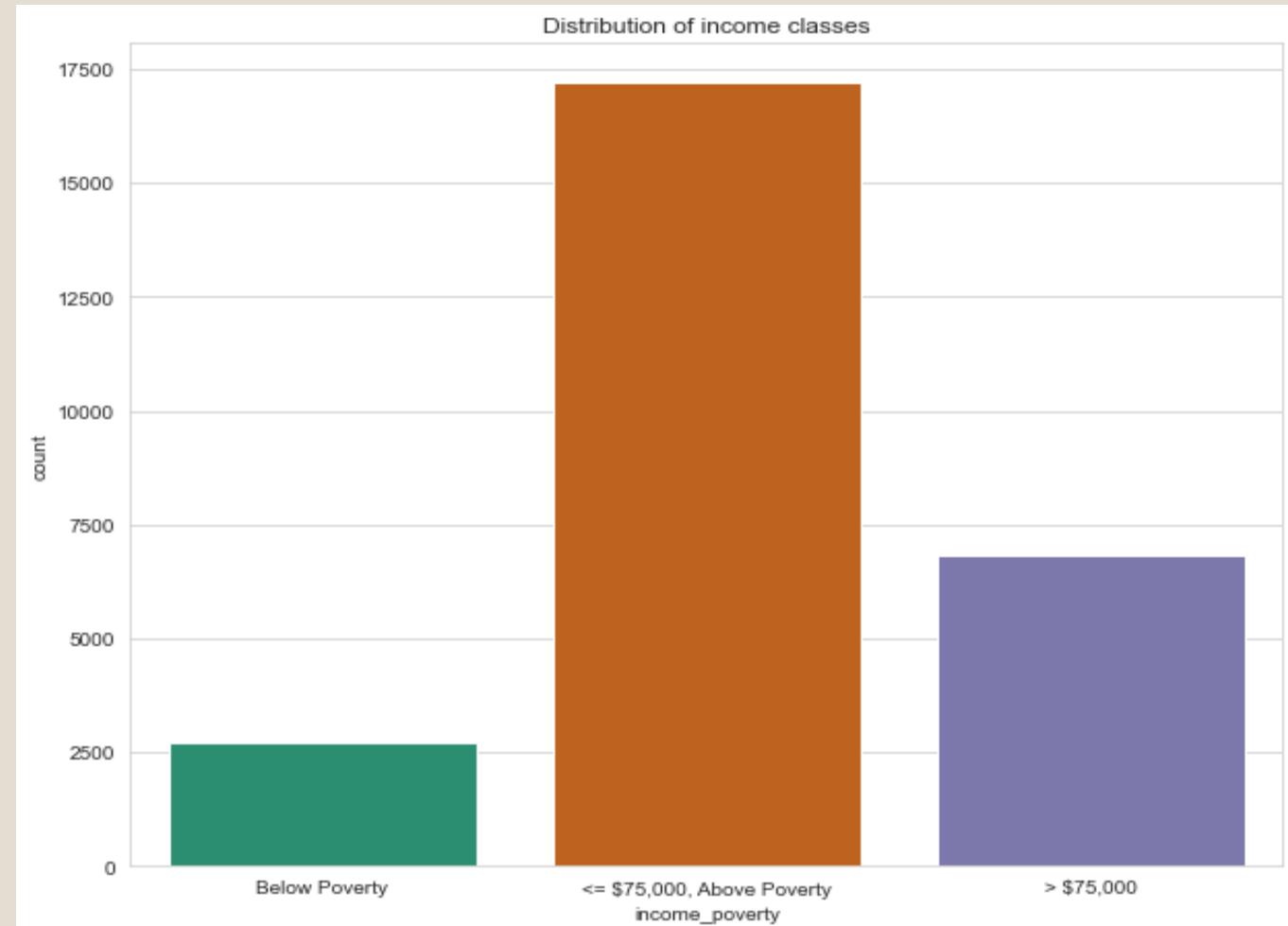
Predicting Models

By using statistical Modelling and Machine Learning algorithms The project will also be able to predict and estimate vaccination uptake based on various key factors

DATA UNDERSTANDING

UNIVARIATE ANALYSIS

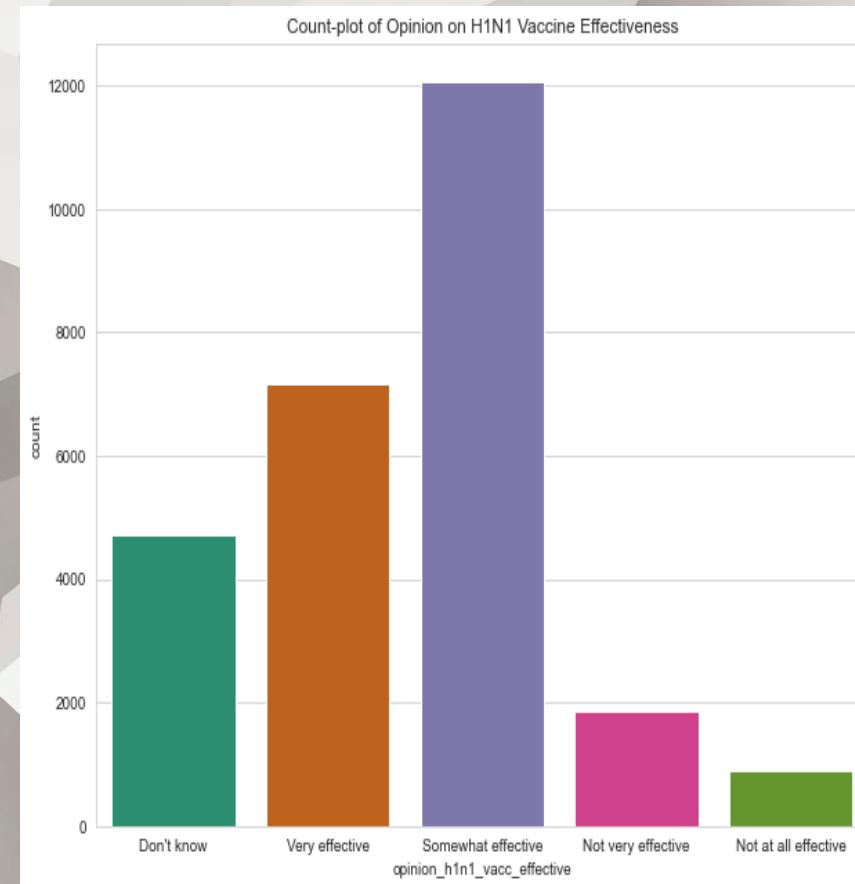
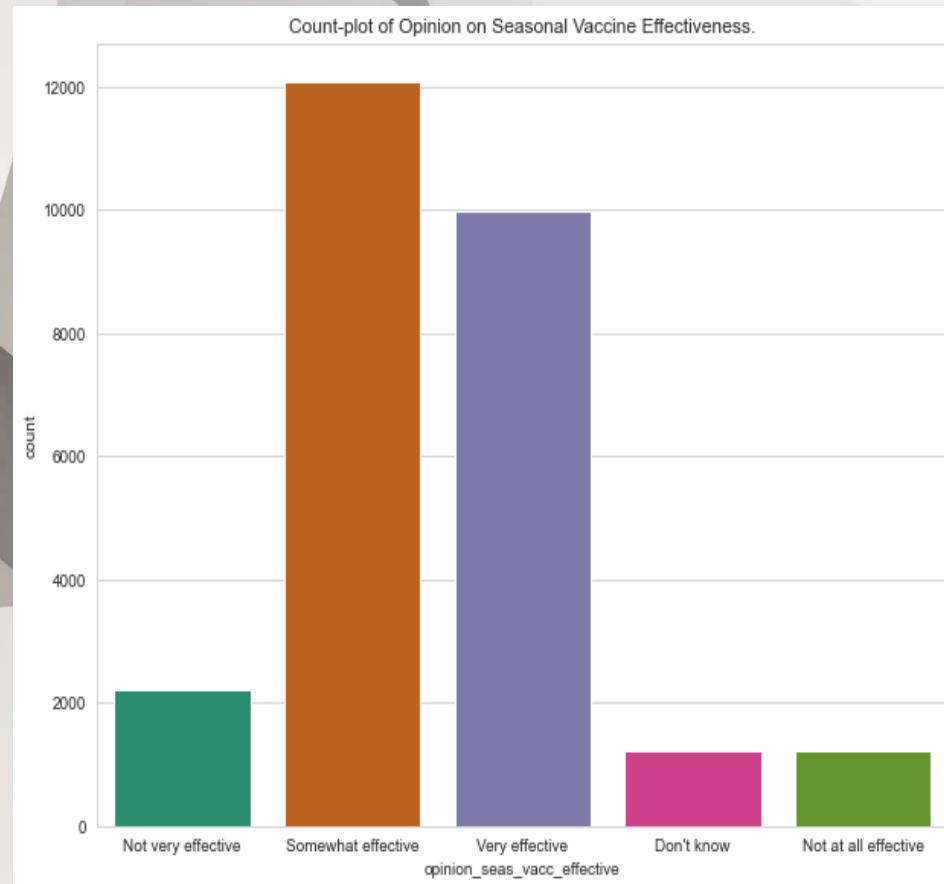
From The visualization, we can deduce that majority of the respondents who took the Vaccine were above the income Poverty line



DATA UNDERSTANDING

UNIVARIATE ANALYSIS

From the two visualizations, we can conclude from the respondents opinions that from both the Two Vaccines Seasonal Vaccine was considered more effective compared to the H1N1 vaccine.

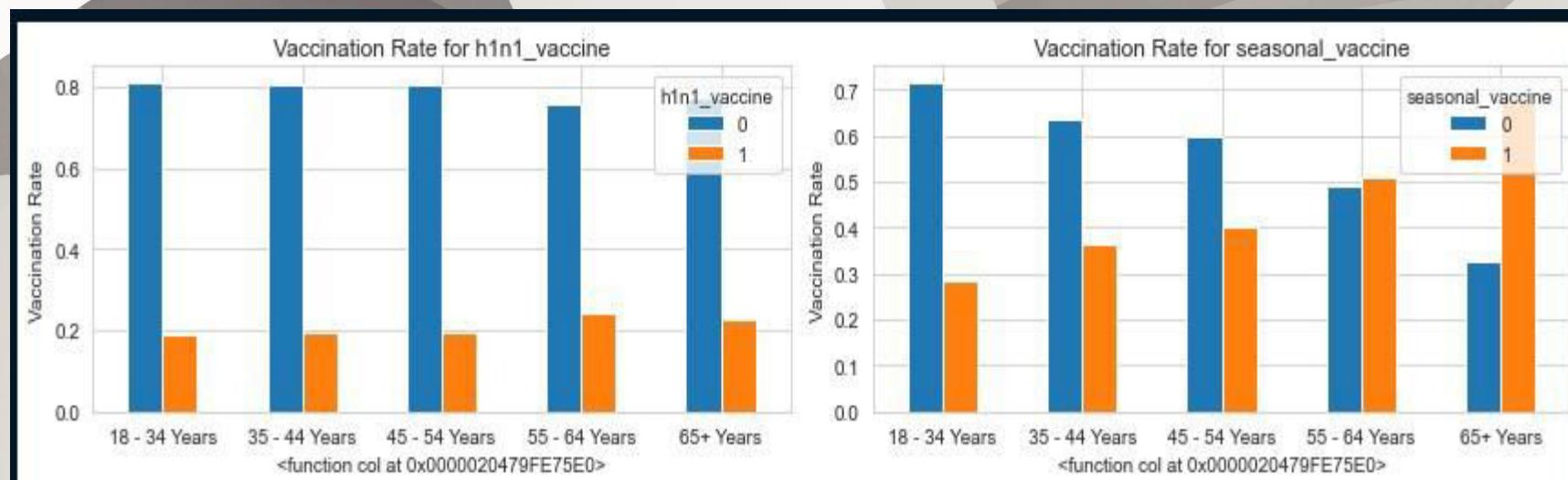


DATA UNDERSTANDING

BIVARIATE ANALYSIS

From the visualization we observe that the majority of respondents who are 65 years + took the seasonal vaccine.

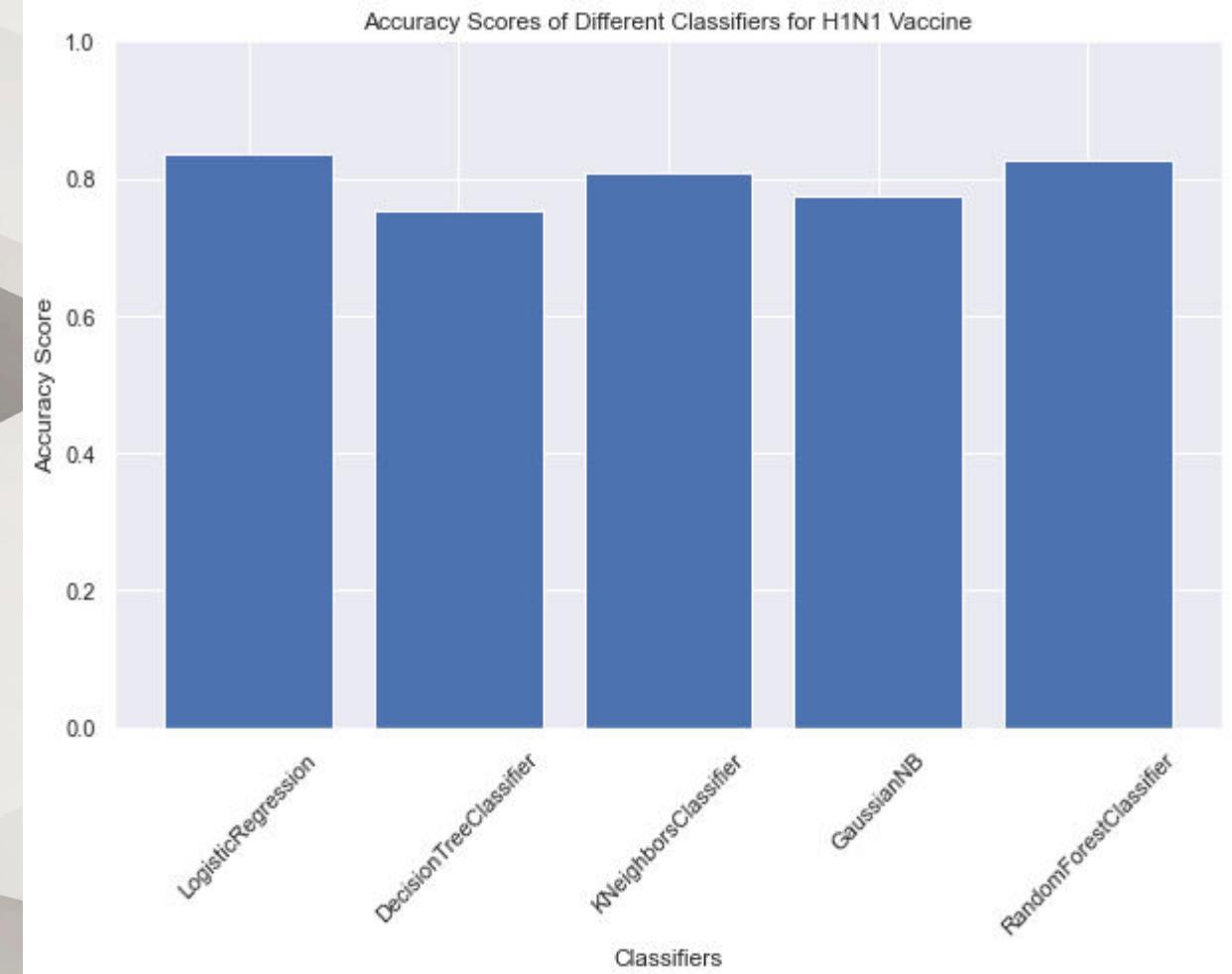
From the H1N1 vaccine, majority of the people who took the seasonal vaccine were in the range 55-64 years.



MODELLING

Modelling Results for H1N1

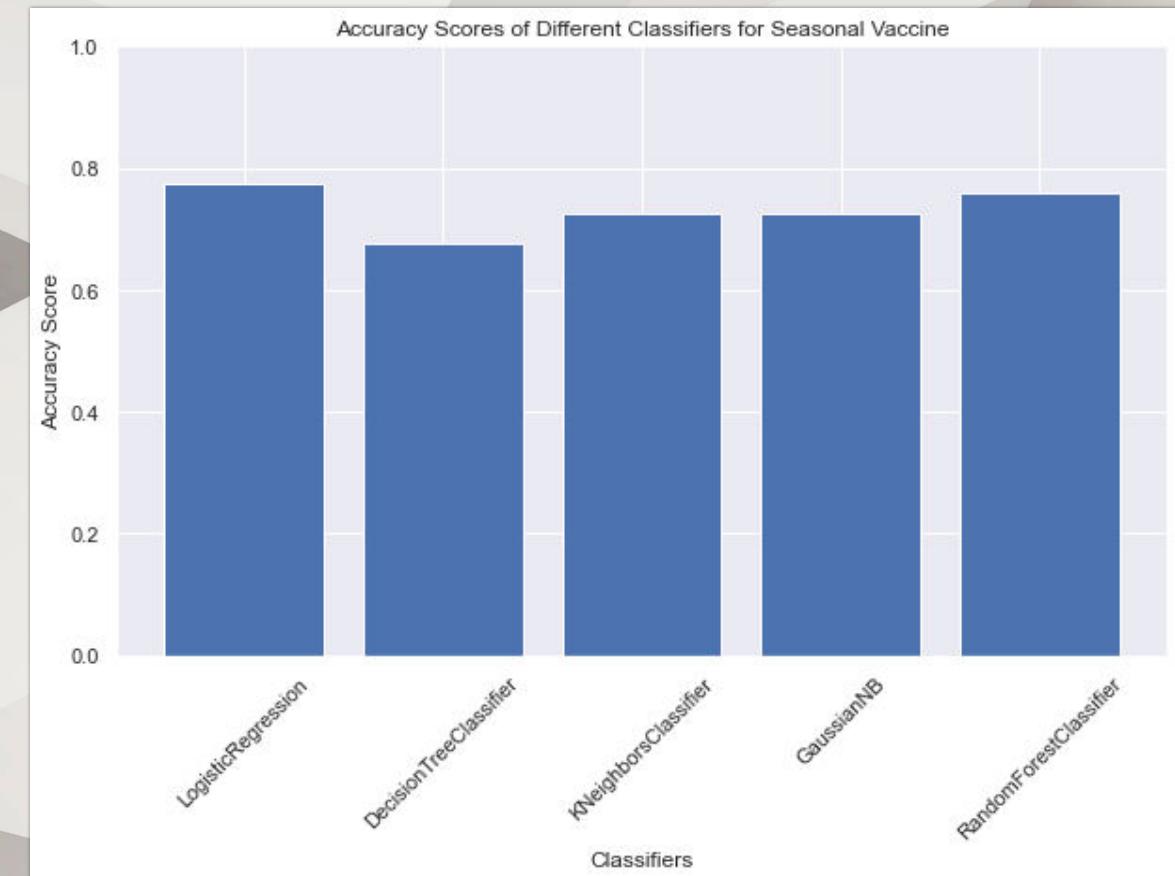
When conducting classification on H1N1 vaccine. From the chart it can be seen that the logistic regression model and random forest classifiers have the highest accuracy scores.



MODELLING

Modelling Results for Seasonal Flu

From The Analysis of the seasonal vaccine we can see that the logistic regression model and the random forest classifiers model have the highest accuracy scores.

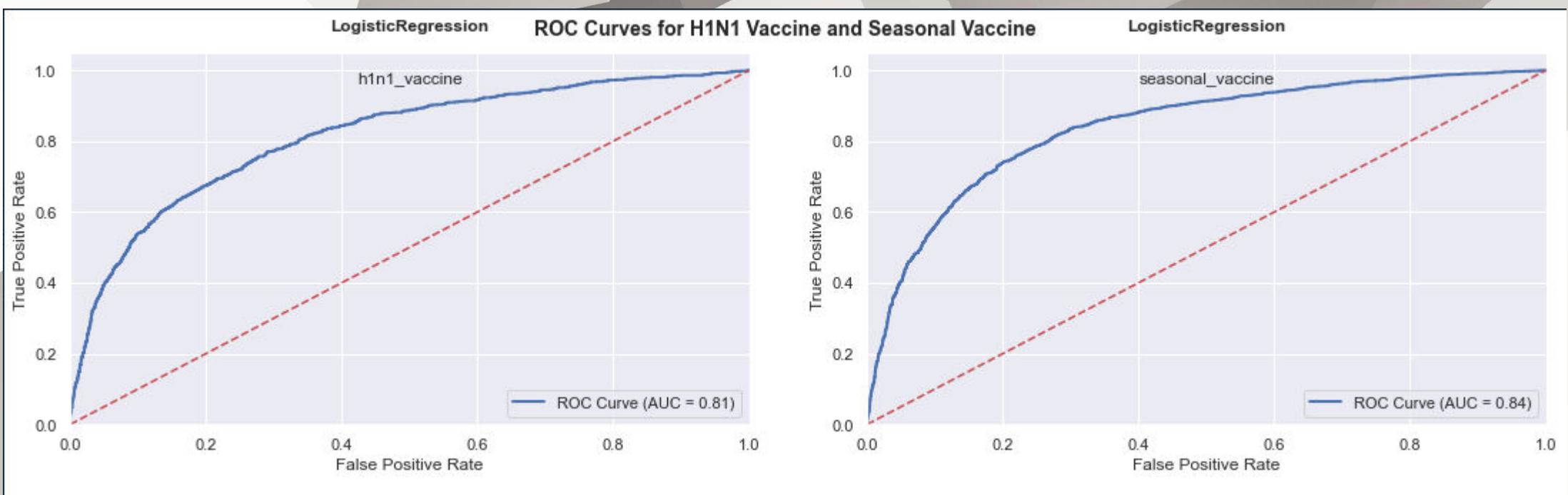


MODELLING

Modelling Results for ROC curves

From the curves it is observed that the logistic regression and the random forest models recorded the highest ROC and Accuracy Scores.

The Logistic Regression had a score of 81% for hin1 while the seasonal flu vaccine had 84%

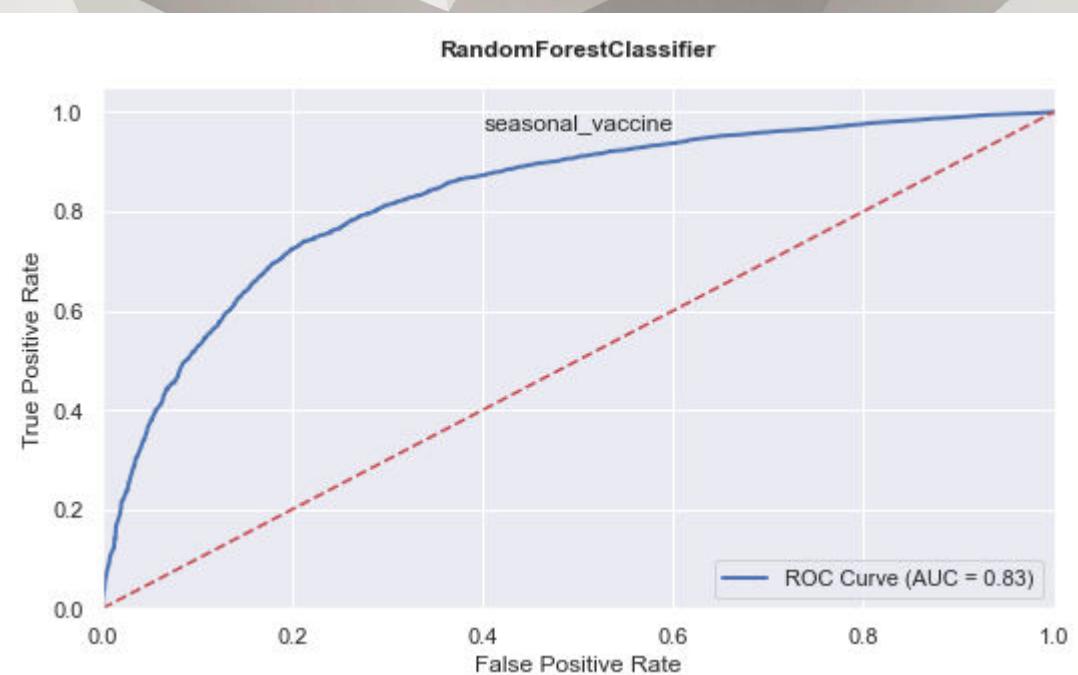
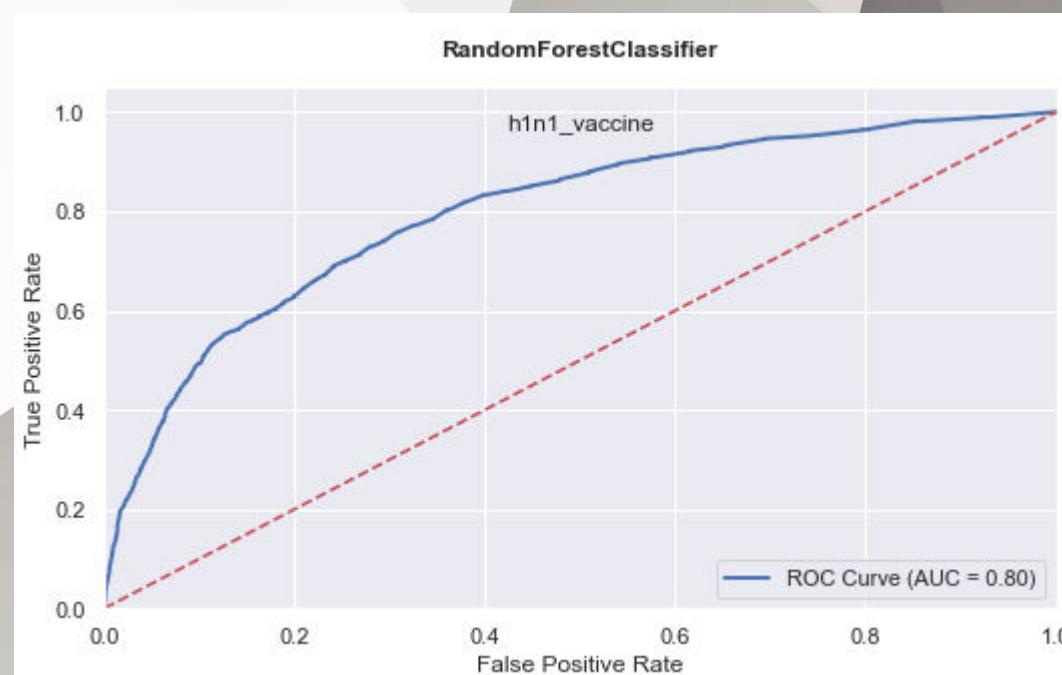


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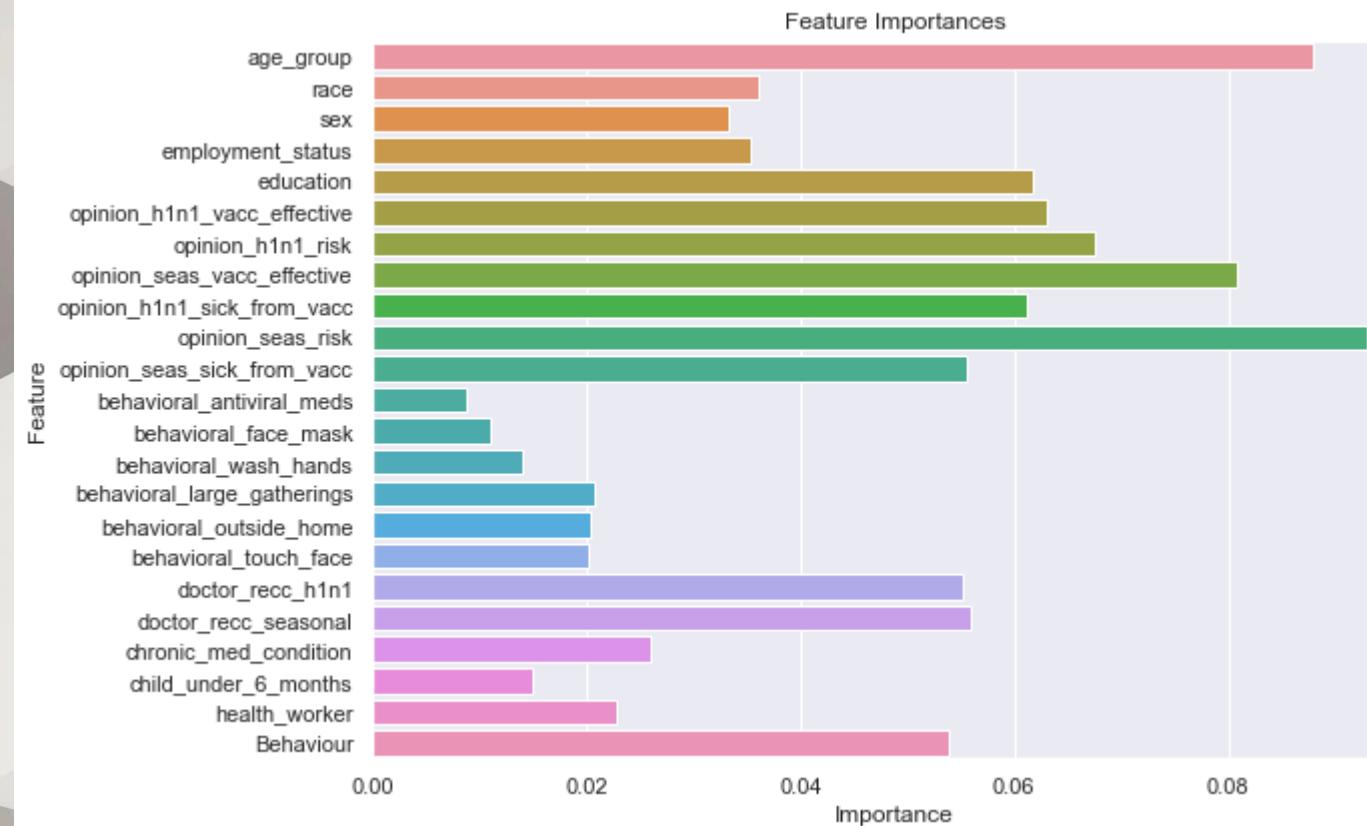


MODELLING

Modelling Results for Features

From The Visualization, the most important features are :

- Age group
- Opinion Seas Risk
- Opinion Seas Vacc Effective
- Opinion h1n1 risk
- Opinion h1n1 vacc effective



CONCLUSION

From the previous charts we could see the top 4 features had the most effect on vaccine uptake.

- ❖ Age Group
- ❖ Respondent's opinion about the risk of getting sick with seasonal flu without vaccine
- ❖ Respondents' opinion about seasonal flu vaccine effectiveness
- ❖ Respondents' opinion about the risk of getting sick with H1N1

RECOMMENDATIONS

The foundation should create more awareness by using multiple channels such as social media and websites in order to reach people below 65 years as well.

The foundation should partner with community organizations to provide education about vaccination

Healthcare Provider Involvement: Encourage healthcare providers to actively recommend and administer vaccinations. Provide training and resources to enhance their knowledge and confidence in promoting vaccine uptake.

They should perform further investigation on what parameters that need to be added to improve model accuracy