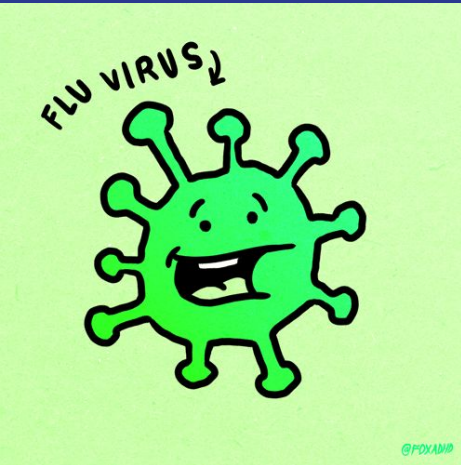


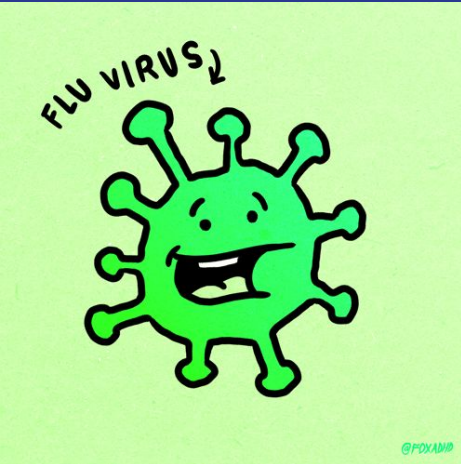
Flu Shot Learning Predict H1N1 and Seasonal Flu Vaccines



Flavian Miano

Outline

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Introduction

Introduction

In this project, machine learning modelling such as classification models, data understanding and data preparation, visualization and model evaluation was used to find the probability of the H1N1 Vaccine and seasonal flu vaccine.

Business Problem

Business Problem

In the awakening of 2020, COVID-19 became a huge dilemma that took the world by storm. Millions ended up dying from the virus. Governments across the globe have started and have already distributed the COVID-19 vaccines. This project will revisit the public health response to a different recent major respiratory disease pandemic and try predict the probability of people taking the COVID-19 vaccine.

In early 2009, Swine Flu (H1N1 virus) became a pandemic and it swept the world and around 150,000 - 500,000 deaths were recorded globally.

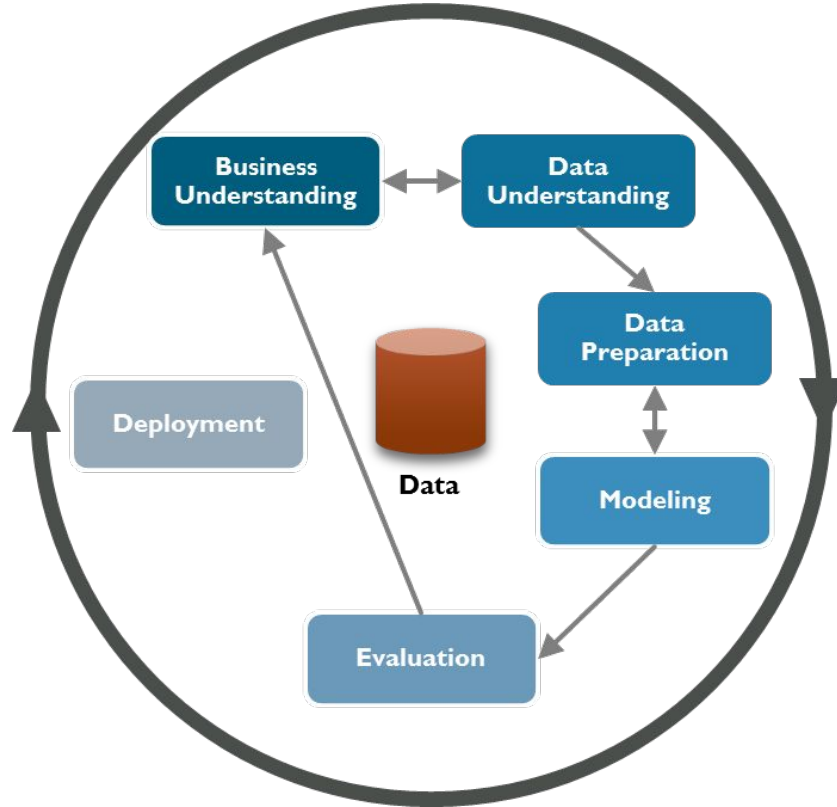
In October 2009, a vaccine against the H1N1 flu virus became widely available. The National 2009 H1N1 Flu Survey was conducted in the United States in late 2009 and early 2010. This phone survey asked respondents if they had received the H1N1 and seasonal flu vaccines, as well as personal questions. These additional questions focused on their social, economic, and demographic backgrounds, perspectives on illness risks and vaccine effectiveness, and behaviors aimed at preventing transmission. A better understanding of how these traits are related to personal vaccination patterns can help guide future public health efforts.

Objectives

Objectives

The main objective of the project is to forecast how likely people are to receive H1N1 and seasonal flu vaccines. You will specifically predict two probabilities: one for h1n1 vaccine and one for seasonal vaccine. Also how social, economic, and demographic backgrounds, perspectives on illness risks and vaccine effectiveness, and behaviors affect the intake of the vaccines.

Methodology

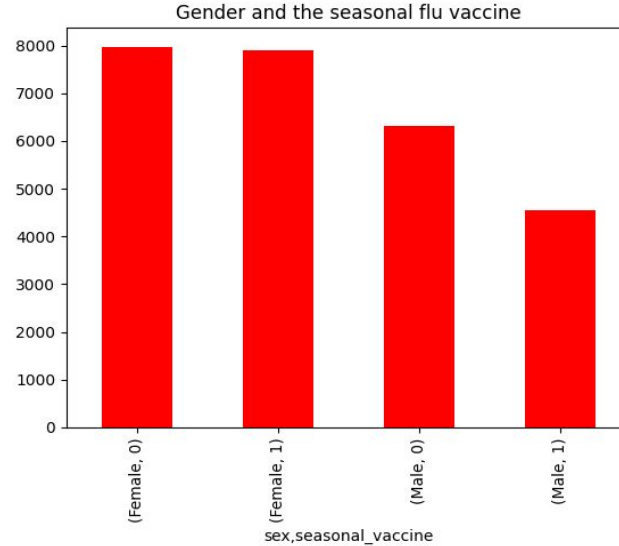
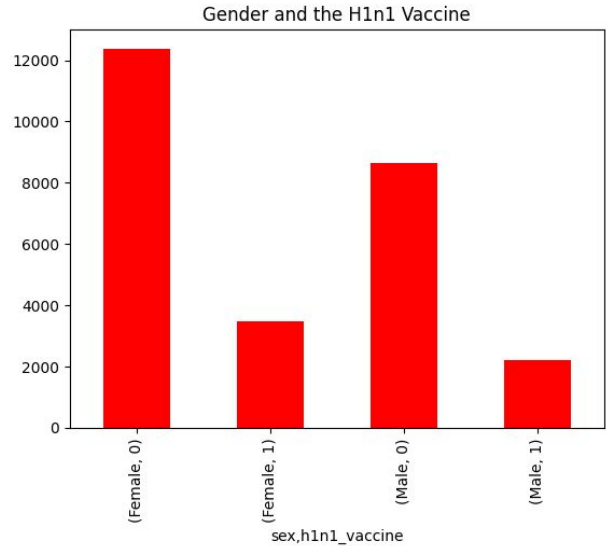


Results

Questions to be answered

- Does sex has affected the distribution of the vaccine?
- Does race affect the distribution of the vaccine?
- Does Education level affect the distribution of the vaccine?
- Does Location affect the distribution of the vaccine?
- Does Homeownership affect the distribution of the vaccine
- How the chronic illnesses has affected the distribution of the vaccine?
- Does Age group affect the distribution of the vaccine?

Does sex has affected the distribution of the vaccine?



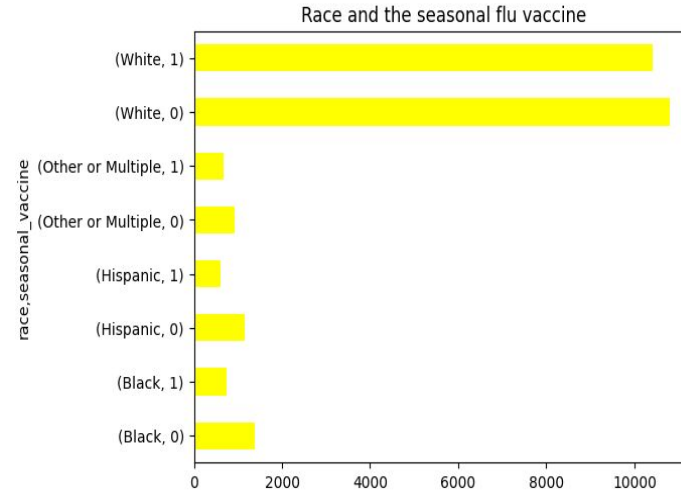
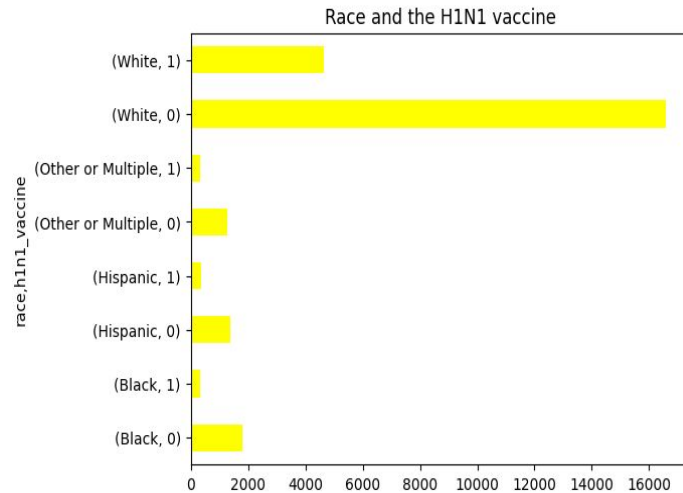
The number of females and males that didnt receive the H1N1 vaccine are higher than those that received the vaccine.

Also the number of females that received the vaccine is higher than that of the male.

The number of females who receive the seasonal flu vaccine and those who didnt receive are the flu vaccine are almost even.

The male who took the seasonal flu vaccine is more than those who took the H1N1 vaccine and also than those who didnt receive the same flu vaccine.

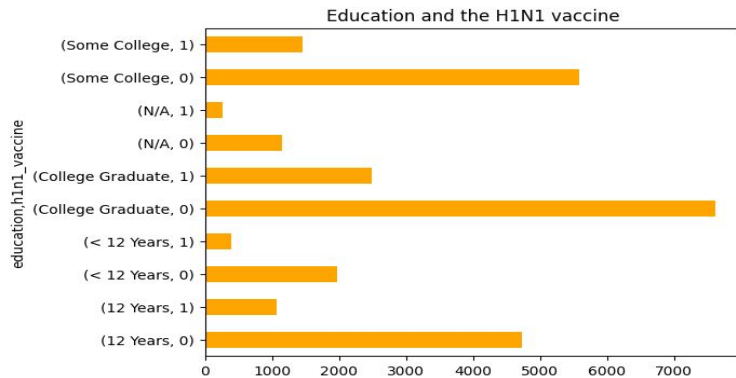
Does race affect the distribution of the vaccine?



In all races the number of people didn't receive H1N1 vaccine is higher than those who received.

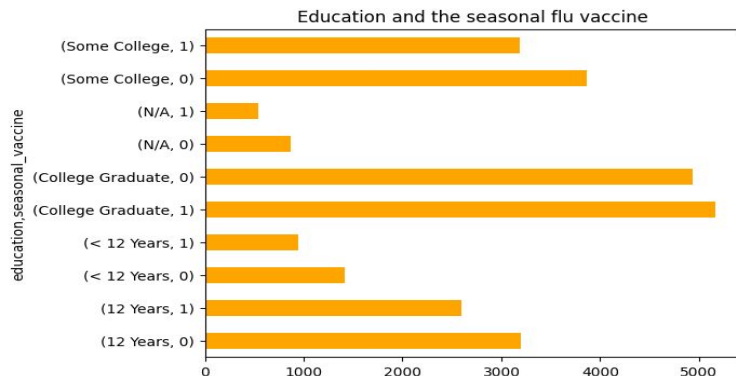
In all races the number of people didn't receive Seasonal Flu vaccine is higher than those who received.

Does Education level affect the distribution of the vaccine?



The college graduate persons received the H1N1 vaccine most and also are the ones who failed to receive the vaccine most.

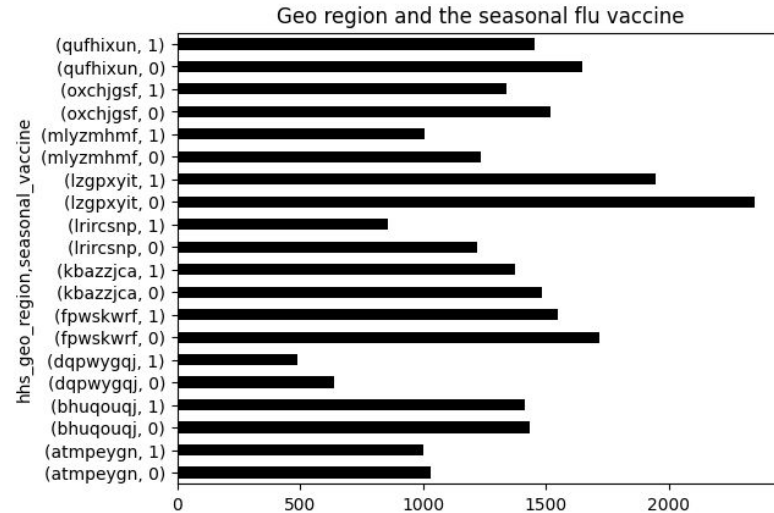
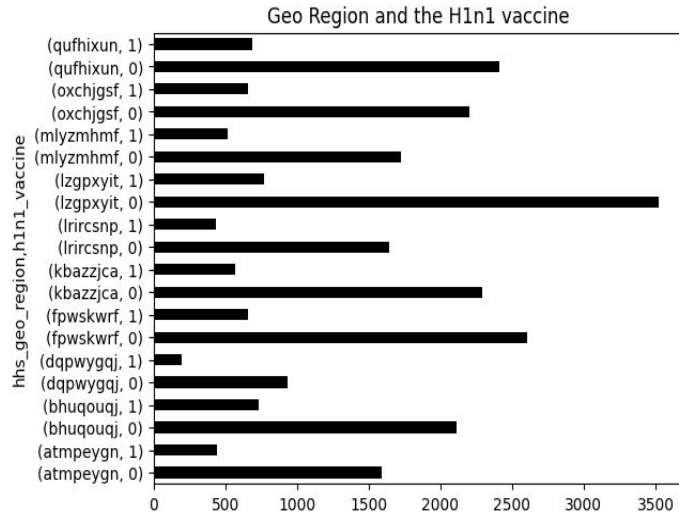
Those under 12 years old are the least to take the vaccine but it would be because few of them knew how to answer the questions asked during the survey.



The amount of those who took the seasonal vaccine are higher than those took the H1N1 vaccine.

In all education levels the difference between those who took the vaccine and those who didnt is significantly small.

Does Location affect the distribution of the vaccine?

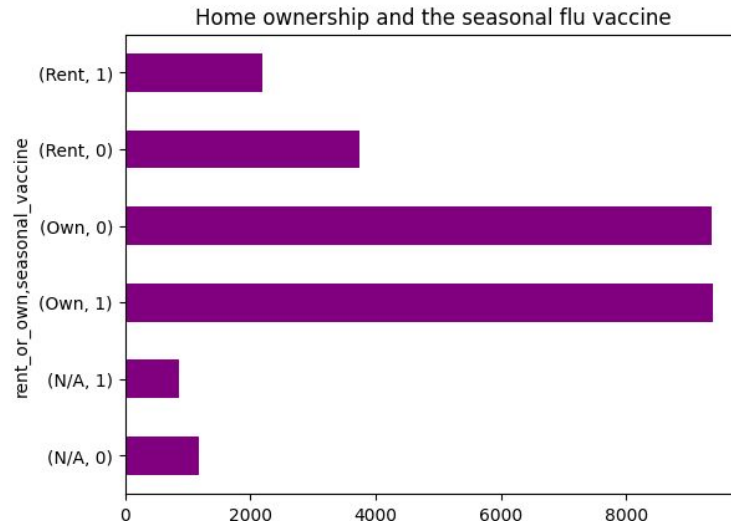
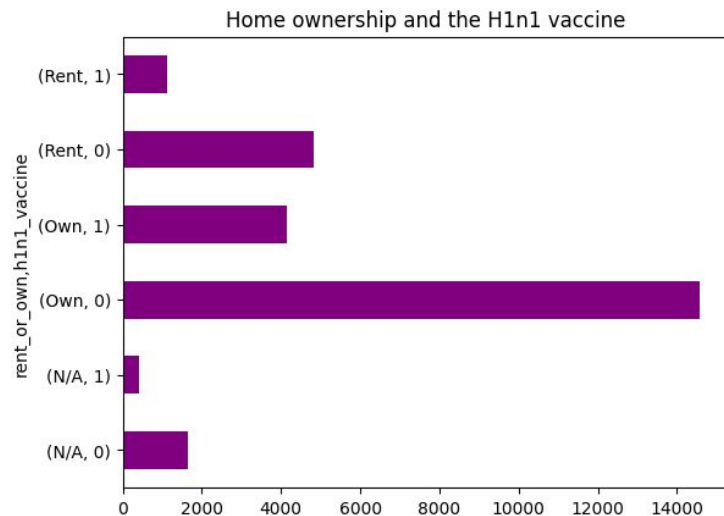


The number of people in all respective areas that didn't receive the vaccine is higher than those who received the vaccine.

The amount of those who took the seasonal vaccine are higher than those who took the H1N1 vaccine per geo location.

In all regions the difference between those who took the vaccine and those who didn't is significantly small.

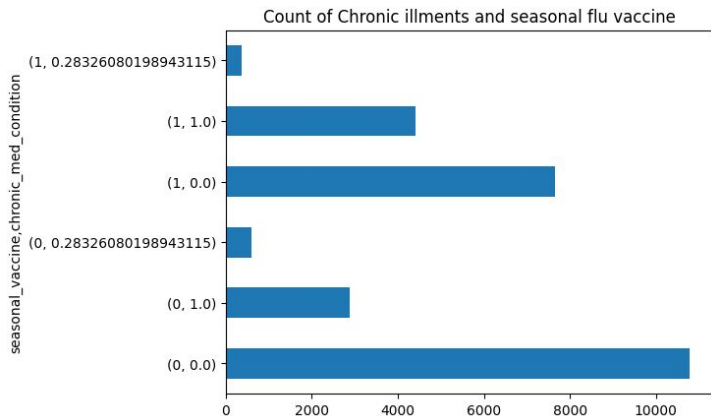
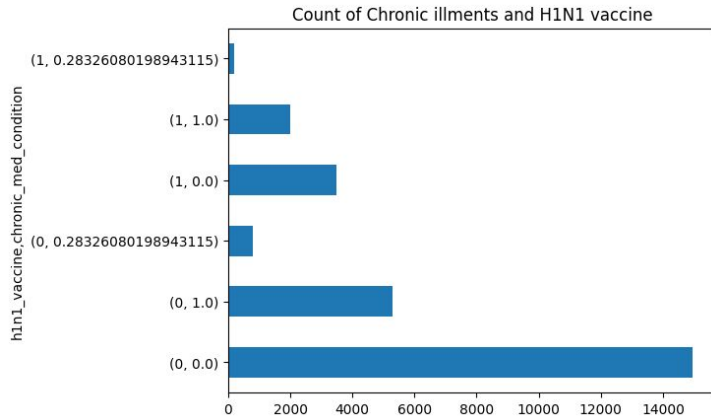
Does Location affect the distribution of the vaccine?



Those who own their own houses received more of the vaccine over those who rented. This was also similar to those who didn't receive the vaccine.

In those who own their own houses and took the survey half received the vaccine and half didn't receive the vaccine. while those have rent had a shorter number of those who took the vaccine.

How the chronic illnesses has affected the distribution of the vaccine?

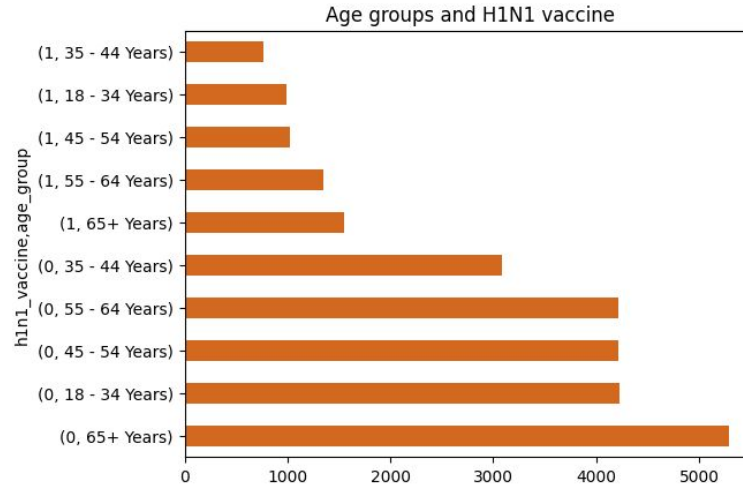
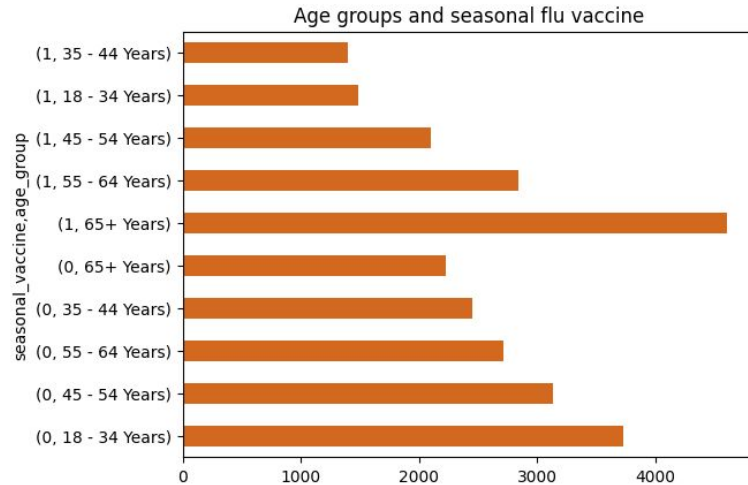


For those who without chronic illnesses and didn't receive the virus take up a huge part of the data followed by those who didn't take the vaccine yet have a chronic illness.

For those who received and had chronic illness summed up to the smallest percentage.

In the seasonal flu vaccine, those who don't have any chronic illness and didn't receive the vaccine were the huge percentage, followed by those who received the vaccine and didn't have any chronic illnesses. The smallest percentage was held by those who didn't receive the vaccine but had a chronic illness.

Does Age group affect the distribution of the vaccine?



The 65+ age group were the biggest percentage of those who took the survey and a huge number of them didnt receive the H1N1 vaccine.

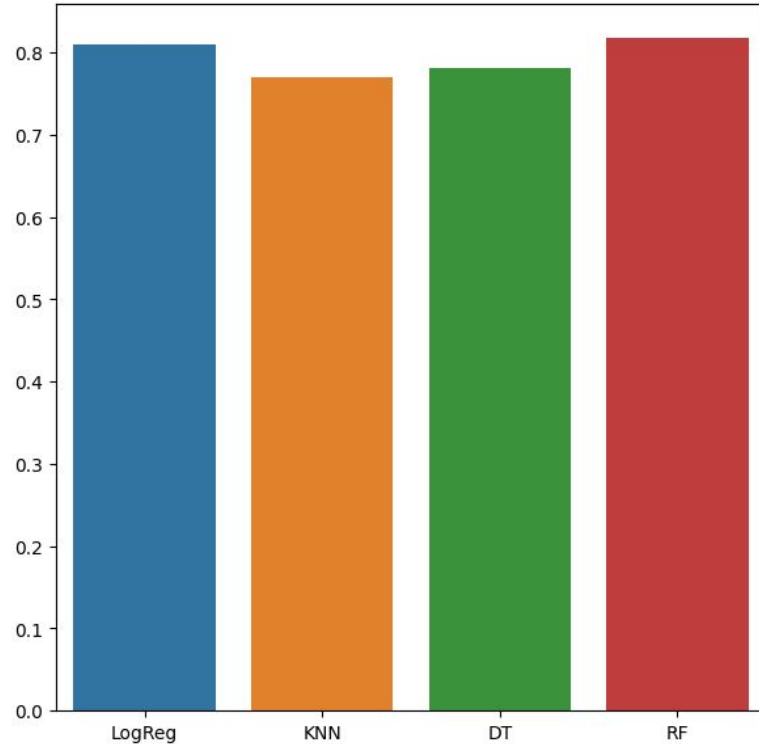
For those between 35 and 44 years, they were the least to take the survey and also least receivers of the vaccine.

Those in their 65+ years took the seasonal flu having the highest percentage.

As in the H1N1 vaccine, those between 35 and 44 years were the least to take the seasonal vaccine.

Most of the youths didnt receive the seasonal drug.

Modelling



Logistic Regression Accuracy score: **80.95%**

KNN Accuracy score: **77.03%**

Decision Trees Accuracy score: **78.00%**

Random Forest Accuracy score: **81.74%**

Conclusions and Recommendation

Conclusion

1. From this project it clear to conclude that:
 - The sex,
 - Age group,
 - Education level,
 - Location,
 - Residence,
 - Chronic illnesses
 - And Race

All affect whether one would receive the vaccines.

2. Most people took the Seasonal Flu vaccine compared to the H1N1 vaccine.
3. Through the model we can clearly predict the intake of the vaccines and with more tuning it can predict the intake more perfectly.

Recommendation

- Through the model predictions we can recommend the governments to do more public education on the importance of the vaccines and mostly focus on the 34-44 years age group.
- The vaccines should be made more available and accessible to all people and most importantly those with chronic illnesses.
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Thank You!

Any Questions?

