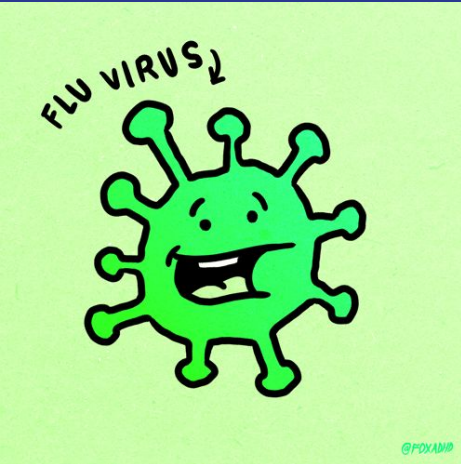


Flu Shot Learning Predict H1N1 and Seasonal Flu Vaccines

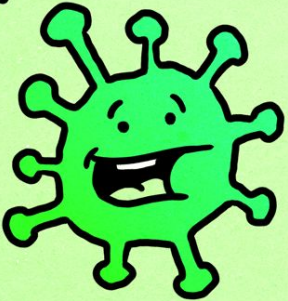
Flavian Miano



Outline

Introduction
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Conclusions

FLU VIRUS



Introduction

Introduction

In this project, machine learning models such as classification, 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.

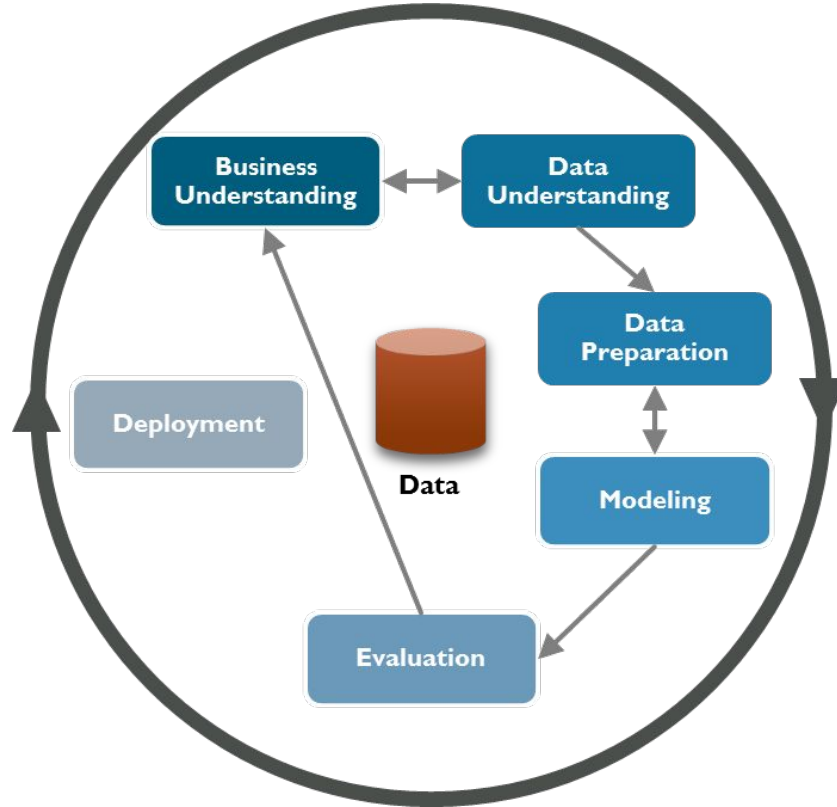
In October 2009, a vaccine against the H1N1 flu virus became widely available. The National 2009 H1N1 Flu Survey was conducted in the United States in late 2009 and early 2010. This phone survey asked respondents if they had received the H1N1 and seasonal flu vaccines, as well as personal questions. 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

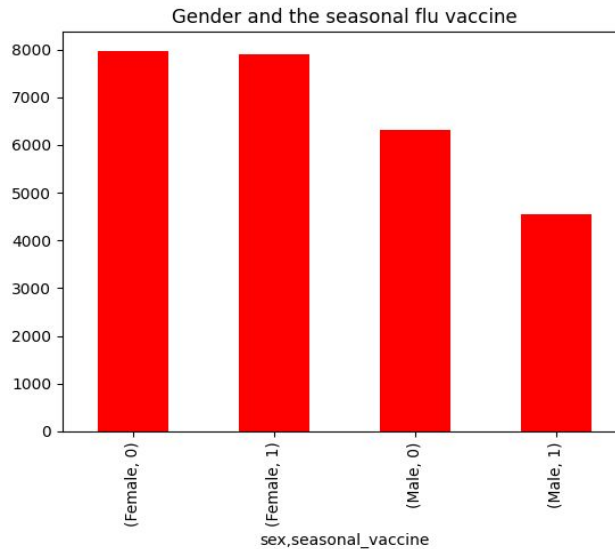
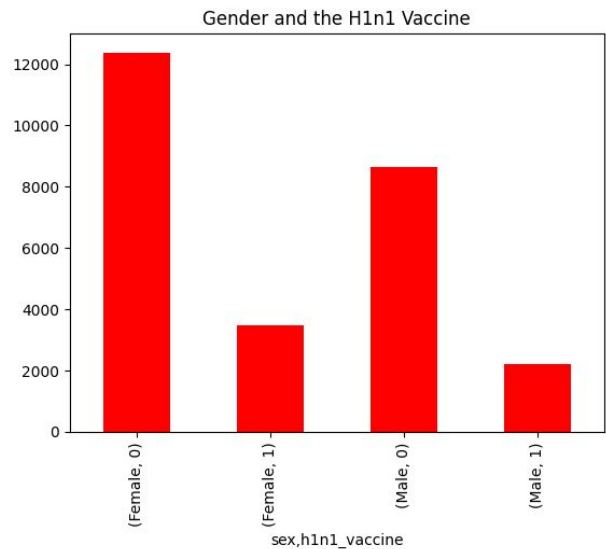


Results

Questions to be answered

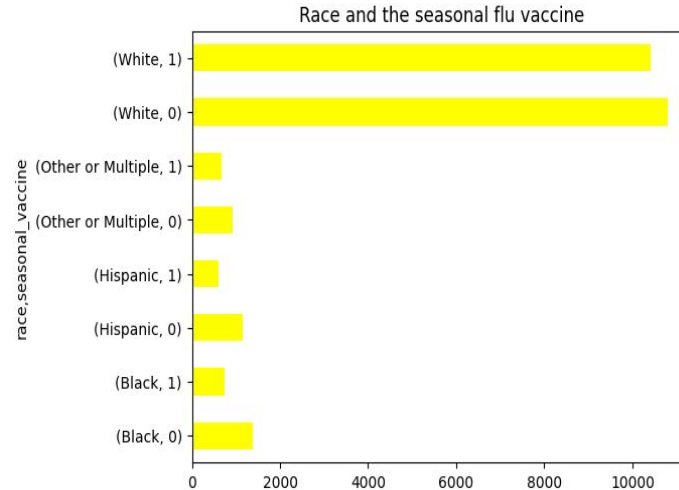
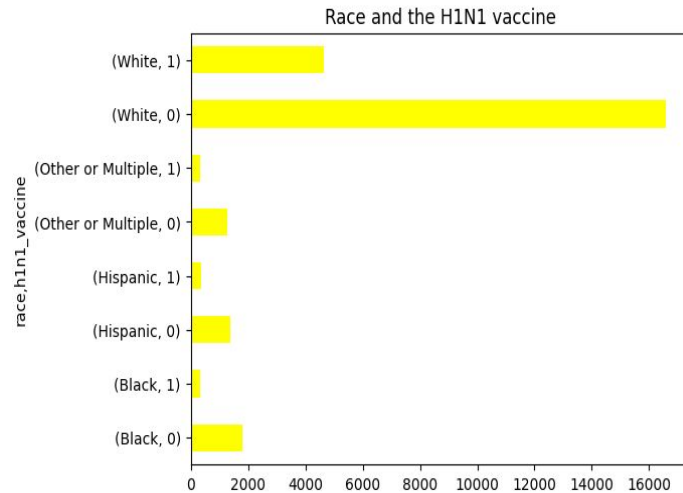
- Does sex has affected the distribution of the vaccine?
- Does race affect the distribution of the vaccine?
- Does Education level affect the distribution of the vaccine?
- Does Location affect the distribution of the vaccine?
- Does Homeownership affect the distribution of the vaccine
- How the chronic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



Females and males who did not receive the H1N1 vaccine outnumber those who did. Females received the vaccine in greater numbers than males. Females who received the seasonal flu vaccine outnumber those who did not. even. Males who received the seasonal flu vaccine received more than those who received the H1N1 vaccine or those who did not receive the same flu vaccine.

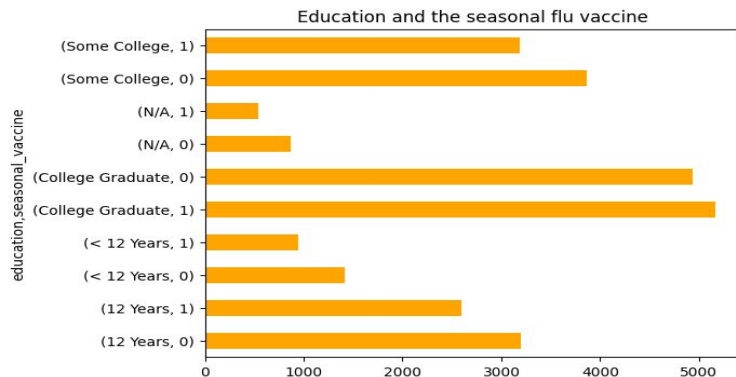
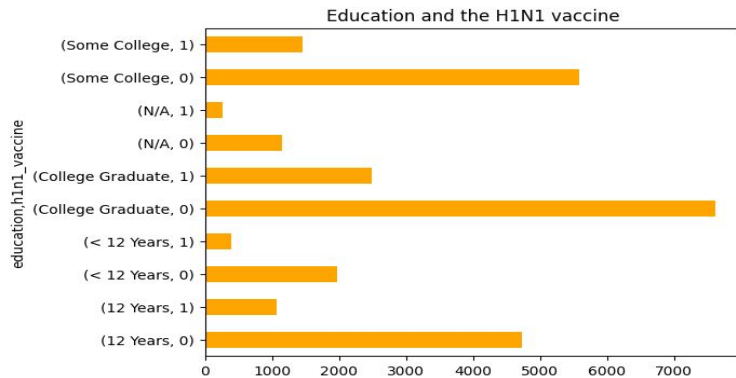
Does race affect the distribution of the vaccine?



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

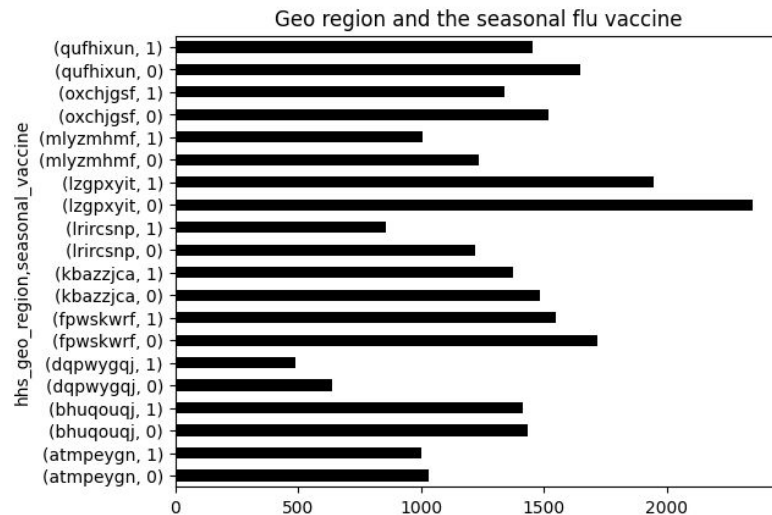
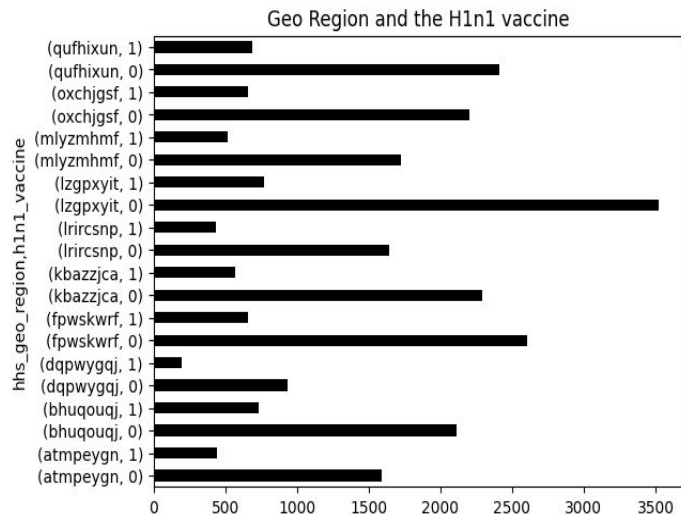
In all races the number of people didn't receive Seasonal Flu vaccine is higher than those who received.

Does Education level affect the distribution of the vaccine?



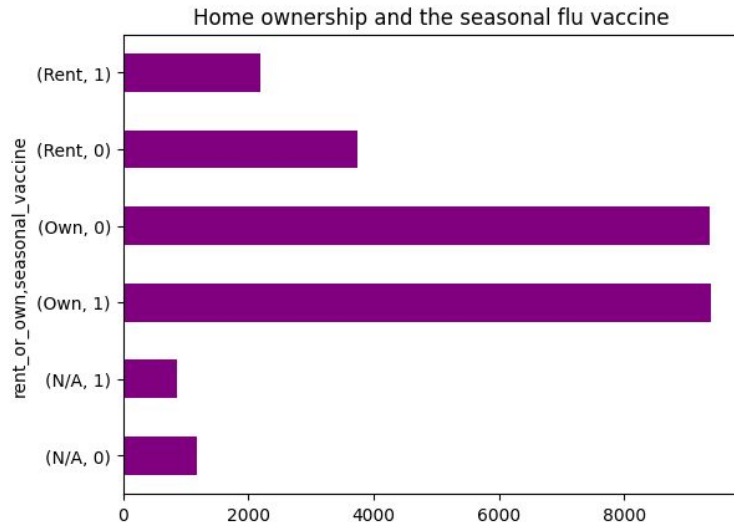
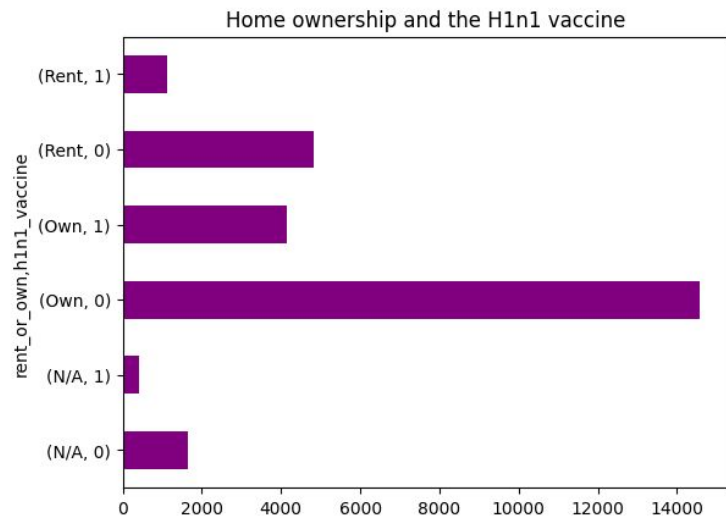
The people with college degrees are both the ones who failed to receive the vaccine the most and those who received the H1N1 vaccine the most. Children under 12 are the least likely to receive the vaccine, although this may be because few of them were able to correctly respond to the survey's questions. More people than those who received the H1N1 vaccine have received the seasonal vaccine. The difference between individuals who received the vaccine and those who did not is negligibly small across all educational levels.

Does Location affect the distribution of the vaccine?



In all relevant places, there are more people who did not obtain the vaccination than there are persons who did. According to geographic area, more people received the seasonal vaccine than the H1N1 vaccine. The difference between those who received the vaccination and those who did not is minimal across all locations.

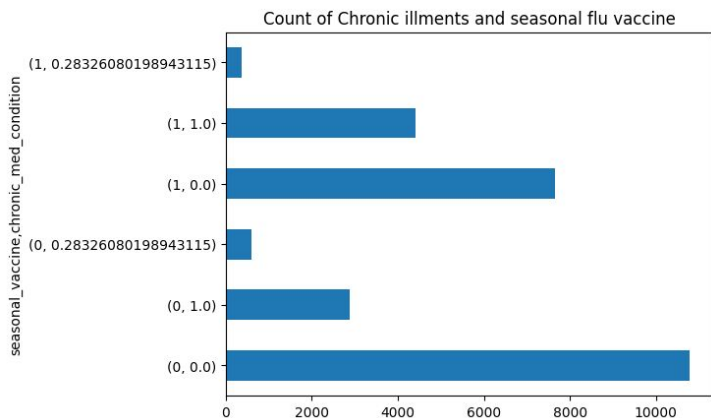
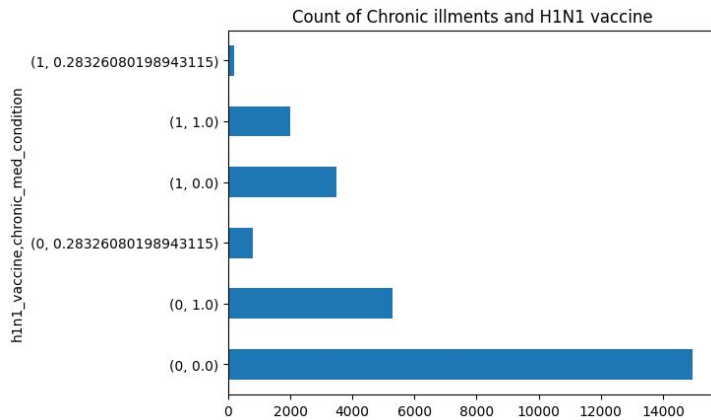
Does homeownership affect the distribution of the vaccine?



Owners in their own homes received a higher dose of the vaccine than renters. This was likewise true for people who didn't get the vaccine. Half of individuals who took the survey who own their own homes received the vaccine, while the other half did not.

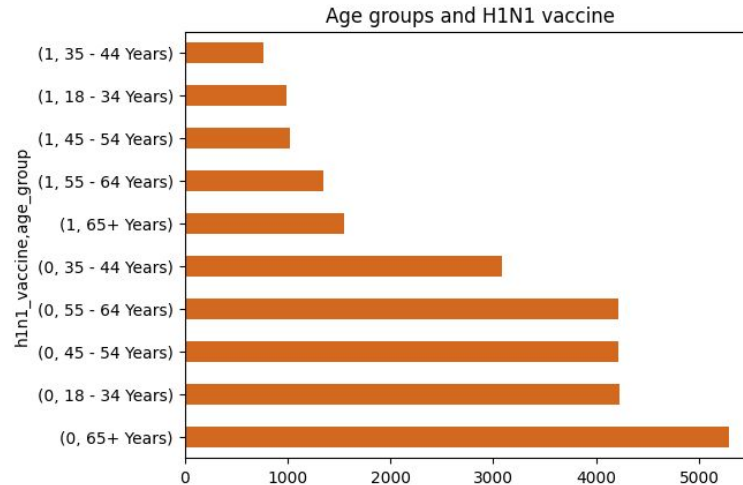
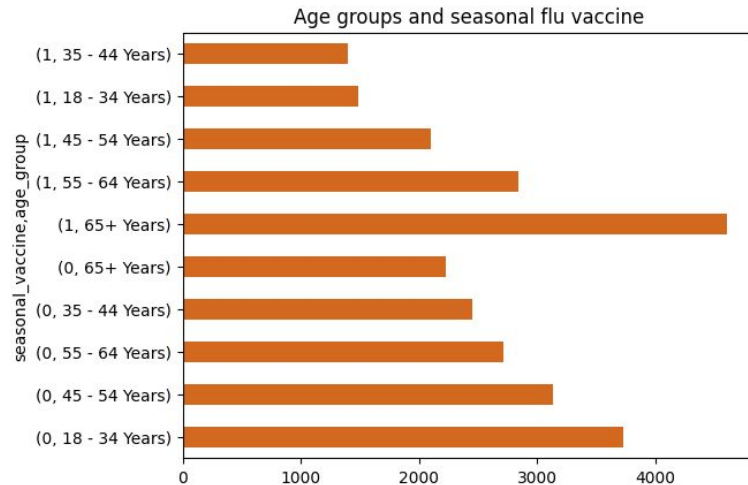
While the number of people who received the immunization was lower for those who had rent.

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



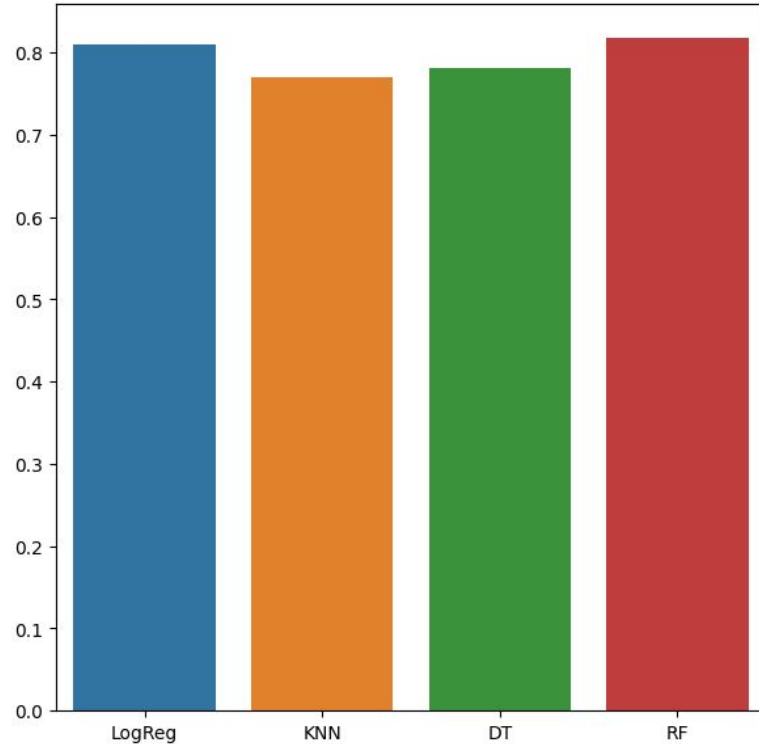
A sizable portion of the data is devoted to those without chronic illnesses who didn't contract the virus, followed by people without chronic illnesses who didn't receive the vaccine. The proportion of those who received and had a chronic illness was the fewest. Those who did not receive the seasonal flu vaccine and do not have any chronic illnesses made up the largest percentage, then those who did.

Does Age group affect the distribution of the vaccine?



The survey's largest percentage of respondents were 65 and older, and a significant portion of them had not received the H1N1 vaccine. The least number of people between the ages of 35 and 44 participated in the survey and received the vaccine. The majority of seasonal flu cases affected people aged 65 and beyond. Similar to the H1N1 vaccine, persons aged 35 to 44 were the least likely to receive the seasonal shot. most of the young people

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?

