

# [H1N1 & SEASONAL FLU VACCINE]

BUSINESS  
UNDERSTANDING

DATA UNDERSTANDING

DATA PREPARATION

MODELING

RECOMMENDATION

i

# OVERVIEW

Influenza, commonly known as "the flu", is an infectious disease caused by influenza viruses.

According to the World Health Organization, people such as those aged 65 years and older, young children and people with certain health conditions are at a higher risk of serious flu complications.

SYMPOMS



PREVENTION

BUSINESS  
OBJECTIVES

SUCCESS  
CRITERIA

GOALS

# SYMPTOMS

Symptoms may include



Fever



Respiratory problems



Cough



Fatigue



These symptoms begin from one to four days after exposure to the virus (typically two days) and last for about 2-8 days.

## A few tips to prevent infection

	Wash your hands with soap and water
	Avoid touching your face
	Stay home if you're sick
	Clean and disinfect surfaces
	Cover your mouth and nose with a mask if you are coughing/sneezing

# PREVENTION

# Ways To Help The Public Curb The Flu:



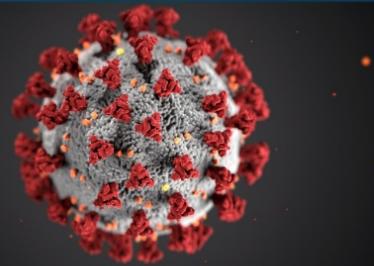
1. Get Vaccinated



3. Take flu antiviral drugs if your doctor prescribes them.

2. Take everyday preventive actions to stop the spread of germs.





# Project Goals:

To Determine how the following factors affect decisions in taking a vaccine.

1. People's Backgrounds
2. Opinions on H1N1 vaccine and seasonal flu vaccine.
3. Health behaviours

## PROJECT SUCCESS CRITERIA:



We are going to use the following algorithms to come up with our predictive models.

1. Using binary relevance(Naive bayes, Logistic regression)
2. XG boost
3. Random forest
4. Multioutput classifier

The success metrics for the mentioned algorithms are:

Accuracy score of above 65%

DATA  
UNDERSTANDING



Data  
Collection

Description  
of the Data

# Data Collection

This dataset is part of an active competition until March 31, 2022!

This data was collected during the national 2009 H1N1 survey.

# Description of the Data

**Labels:**

h1n1\_vaccine, seasonal vaccine

**People's Backgrounds:**

age\_group, education, race, sex, employment\_status

**Opinions on H1N1 vaccine and seasonal flu vaccine:**

opinion\_h1n1\_vacc\_effective, opinion\_h1n1\_risk, opinion\_seas\_vacc\_effective,  
opinion\_h1n1\_sick\_from\_vacc, opinion\_seas\_risk,  
opinion\_seas\_sick\_from\_vacc

**Health behaviours:**

behavioral\_avoidance, behavioral\_antiviral\_meds, behavioral\_face\_mask,  
behavioral\_wash\_hands, behavioral\_large\_gatherings,  
behavioral\_outside\_home, behavioral\_touch\_face,

# EXPLORATORY DATA ANALYSIS



BIVARIATE  
ANALYSIS

UNIVARIATE  
ANALYSIS



# UNIVARIATE ANALYSIS

Backgrounds

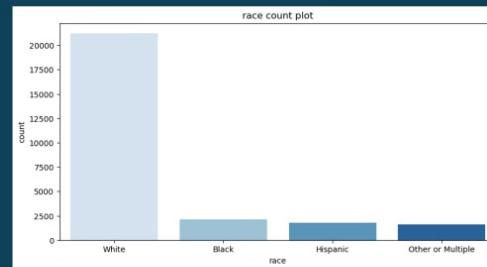
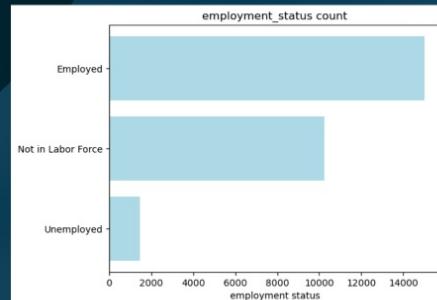
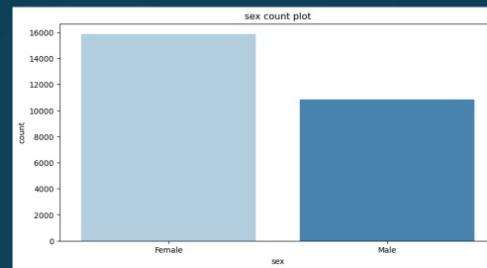
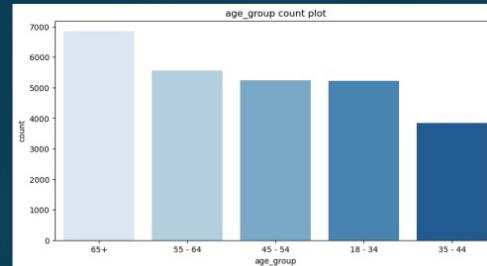
Opinions

HEALTH  
BEHAVIOUR

# PEOPLE'S BACKGROUND

The highest numbers in this data set are of:

1. Elderly people
2. Female
3. Employed
4. White people



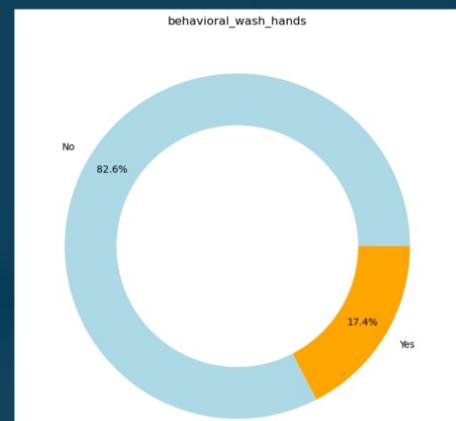
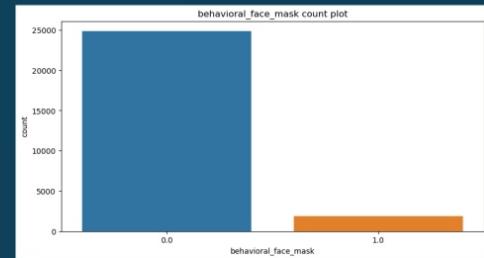
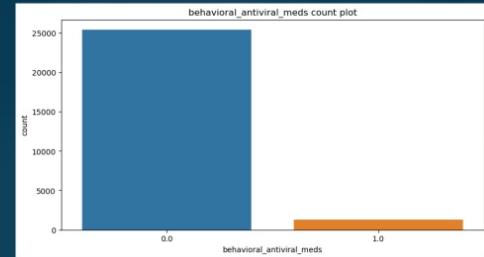
# Popular Opinions:

These were the most popular Opinions for Both the Vaccines:

1. The Vaccine is Somewhat Effective
2. They will not get sick if they do not get the H1N1 and Seasonal Flu vaccine
3. They are not worried at all about being sick from the vaccine.

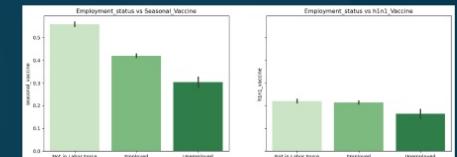
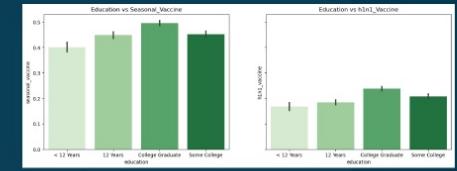
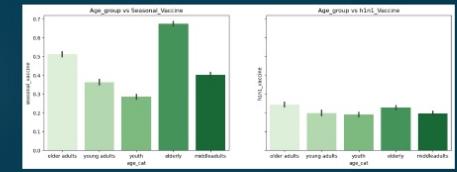
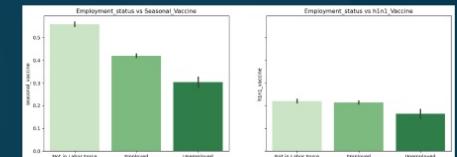
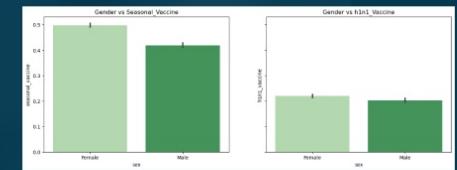
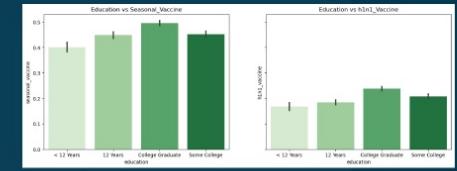
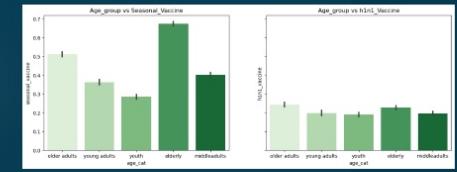
# HEALTH BEHAVIOUR

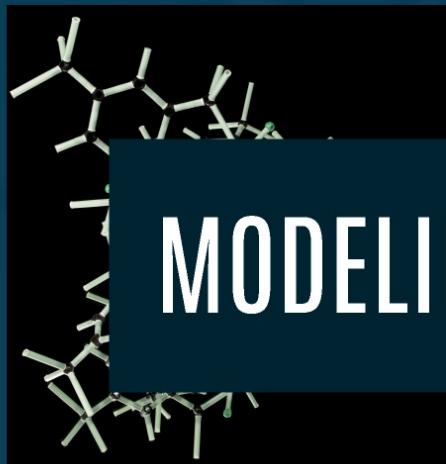
1. Most people don't wash their hands
2. Most people don't buy face masks
3. Most people don't buy antiviral meds
4. Most people have not reduced their time in large gatherings.



# BIVARIATE ANALYSIS

1. The elderly and older adults seem to have taken the h1n1 and seasonal flu vaccine more than other age groups
2. College graduates seem to have taken the vaccines more than other groups
3. Females tend to get more vaccines compared to the males
4. Those not in the labour force have had a huge turnout of taking the vaccines compared to those who are employed.





We used different models to come up with a succesfull predictions, our succes metrics was based on the accuracy score of above 65% or an A\_U\_C score of above 70%.

Listed below are the various models that we used and their accuracy score

KNeighborsClassifier with an accuracy score of 56.59%

Random forest classifier with an accuracy score of 64.00%

XG boost with an accuracy score of 66%

BinaryRelevance(LogisticRegression) classifier with an accuracy score of 67%

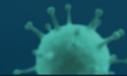
BinaryRelevance guassian naive bayes with an accuracy score of 58..75%

Multioutput classifier with an average auc of 83.73%

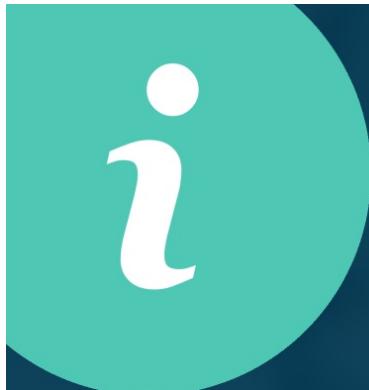
Hence we decided that the best model ,was the multioutput classifier with an average AUC of 83.73 %



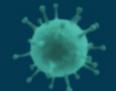
# RECOMMENDATION



Since vaccination is the main preventive strategy for influenza, optimizing formations and identifying factors that interfere with the administration of the vaccine is vital. Identifying factors that produce a priming effect and enhance response is important in understanding how to improve efficiency of influenza vaccine. Prospective safety monitoring followed by rigorous signal refinement is critical to inform decision making by regulatory and public health agencies.



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