SEASONAL FLU VACCINE PREDICTION

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INTRODUCTION

- In recent decades, the prevention and control of infectious diseases have become paramount concerns in the field of public health.

- Vaccination has emerged as one of the most effective strategies to protect individuals and communities from the threat of highly contagious diseases.

- The occurrence of the flu season repeats annually, and each year people make a choice to either receive the flu shot or not. This attempts to develop a predictive model to forecast individuals ' decision to receive the flu shot or not during the annual flu season.

BUSINESS PROBLEM

- ApexHealth Insurance aims to empower providers with informed decisions during flu season. The model classifies individuals based on flu risk, considering factors like age and gender.

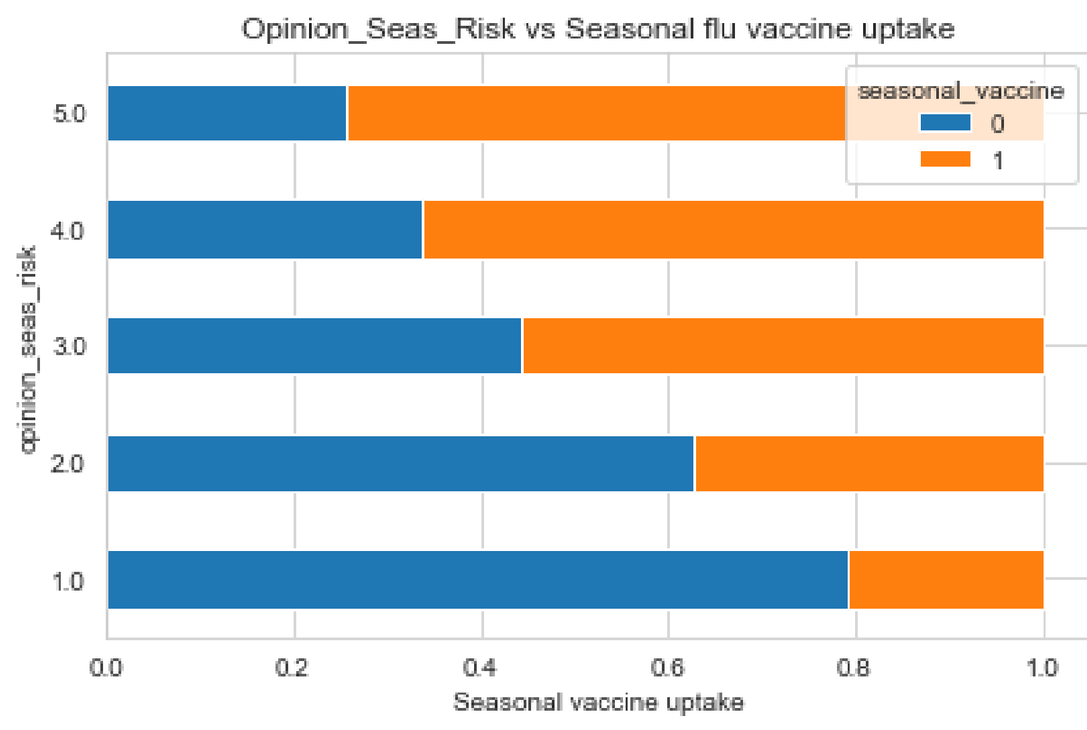
- This enables personalized preventive strategies, reducing flu cases and healthcare costs. It also identifies high-risk individuals and notifies them of early intervention, preventing severe scenarios and reducing expenses for all.

MAIN OBJECTIVE

- **The goal of this project is to develop a predictive model using individual characteristics and behavioral patterns to estimate seasonal flu vaccine uptake**

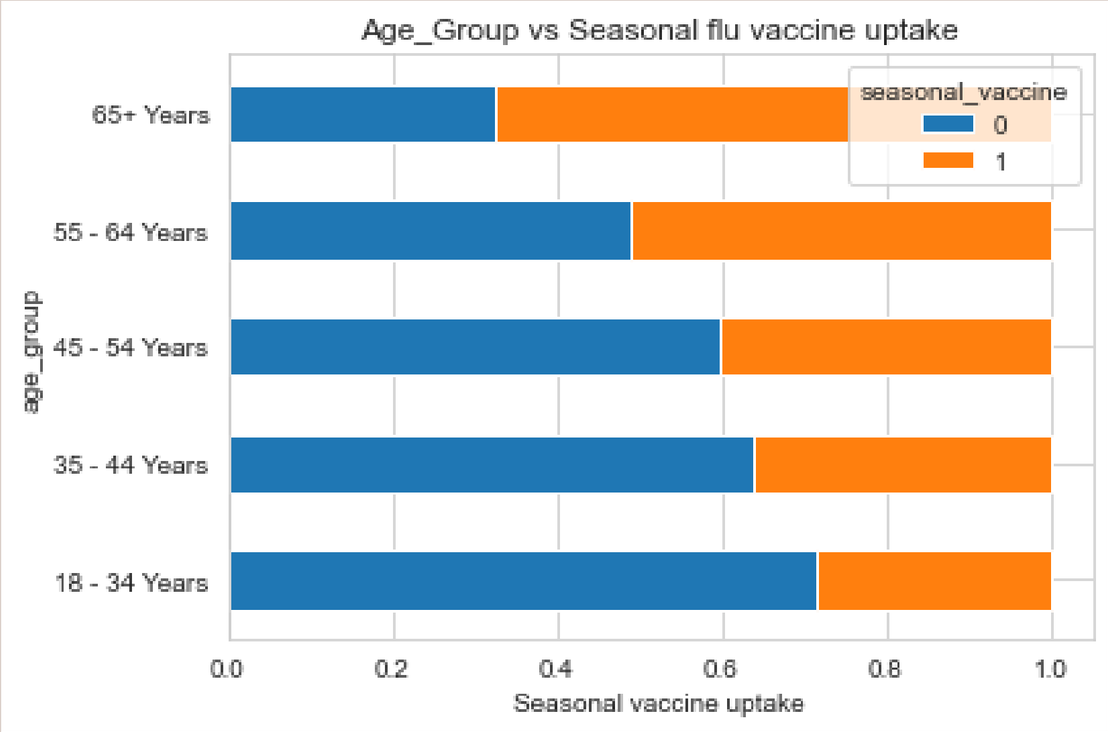
EXPLORATORY DATA ANALYSIS

Relationship between seasonal vaccine intake and opinions regarding the vaccine risk



- **The analysis indicates a strong correlation between individuals' beliefs and their likelihood of taking the seasonal flu vaccine.**
- **Specifically, there is a trend observed among individuals who exhibit higher levels of concern regarding the risk of contracting the flu without the vaccine—they are more likely to take the vaccine.**
- **Additionally, individuals who believe in the effectiveness of the vaccine are more inclined to receive it.**

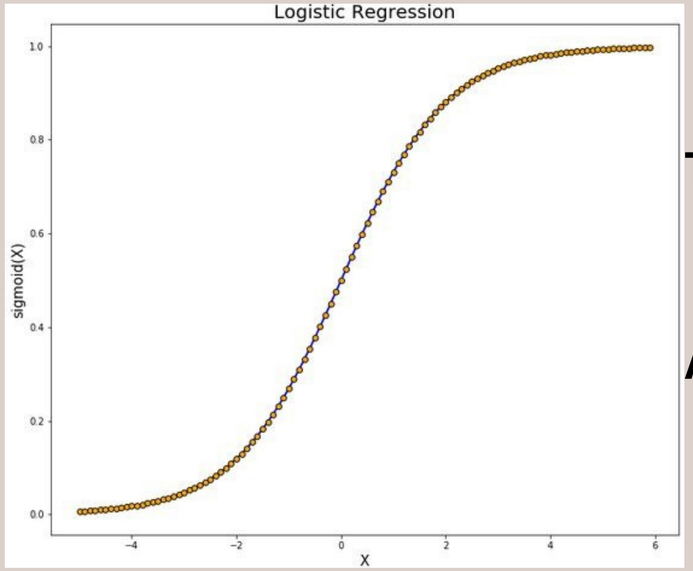
Relationship between seasonal vaccine intake and age-groups



- **The analysis reveals that there is a notable disparity in seasonal vaccine uptake between different age groups.**
- **There is a substantial increase in the number of individuals aged 65 years and above who received the seasonal vaccine compared to younger age groups.**
- **This observation highlights the significance of age as a determining factor in seasonal vaccine acceptance, suggesting that older individuals show a higher propensity to seek and receive the vaccine compared to their younger counterparts.**

MODELING

01 LOGISTIC REGRESSION



Train Accuracy: 76.685%
Test Accuracy: 76.921%
Cross Validation
Accuracy: 76.61%

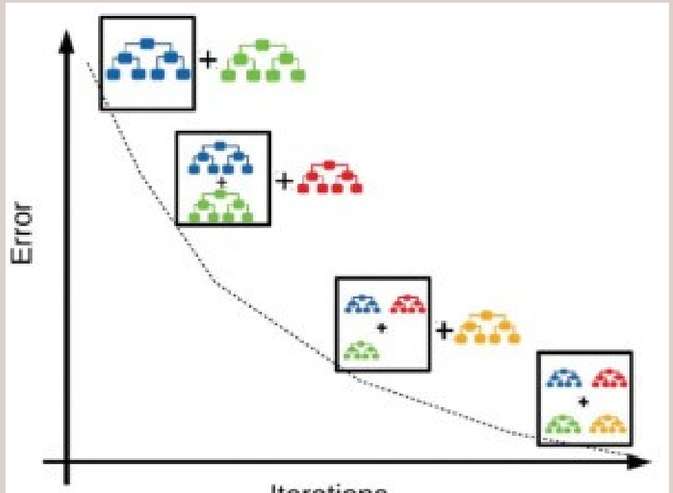
03 RANDOM FOREST

Train Accuracy: 77.429%
Test Accuracy: 76.591%
Cross Validation
Accuracy: 76.585%

02 DECISION TREES

Train Accuracy: 76.935%
Test Accuracy: 75.857%
Cross Validation
Accuracy: 75.686%

04 GRADIENT BOOST

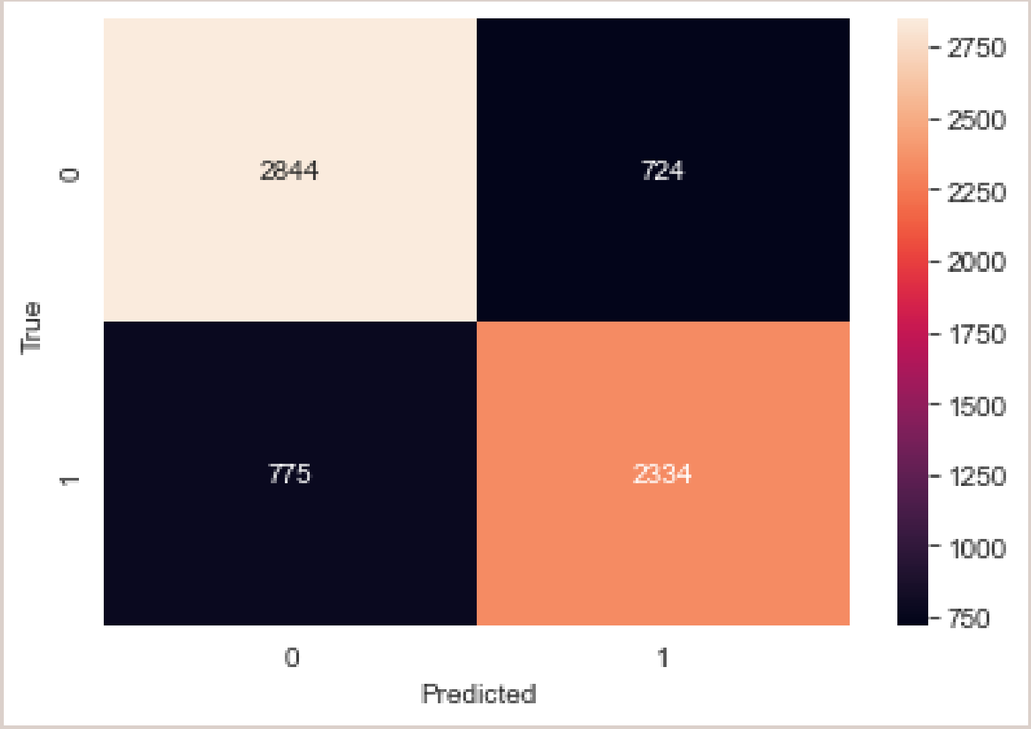


Train Accuracy: 78.198%
Test Accuracy: 77.55%
Cross Validation
Accuracy: 77.324%

BEST MODEL

GRADIENT BOOST

With a test accuracy score of 77.55%, the Gradient Boosting model was selected as the top performer among the models, exhibiting strong predictive capabilities. Its superior performance in accurately predicting the seasonal flu vaccine uptake made it the preferred choice.



RECOMMENDATION

1. Ensure free coverage of seasonal flu vaccines, including the vaccine and administration fees.

2. Personalize outreach based on customer data, segmenting target audience and using multiple channels for effective communication.

3. Collaborate with healthcare providers for widespread access to flu vaccines, sharing in-network providers and promoting accessible locations.

4. Implement incentive programs (e.g., reduced premiums, cash-back, wellness points) to motivate vaccination.

5. Incorporate flu vaccination into existing wellness programs, providing resources, support, and incentives for preventive measures

Thank You