FLU? GONE!

Prediction of H1N1 and Seasonal Flu Vaccination Uptake Using Machine Learning.

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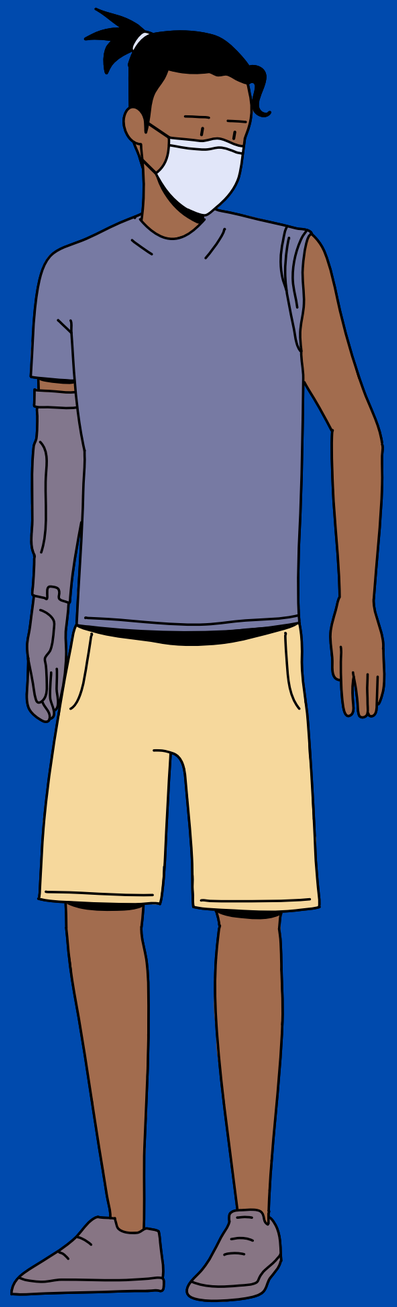

Influenza is a contagious respiratory illness that can cause serious complications.

Individuals most at risk include older adults (65+ years), young children, and individuals with underlying health conditions (WHO, 2024).

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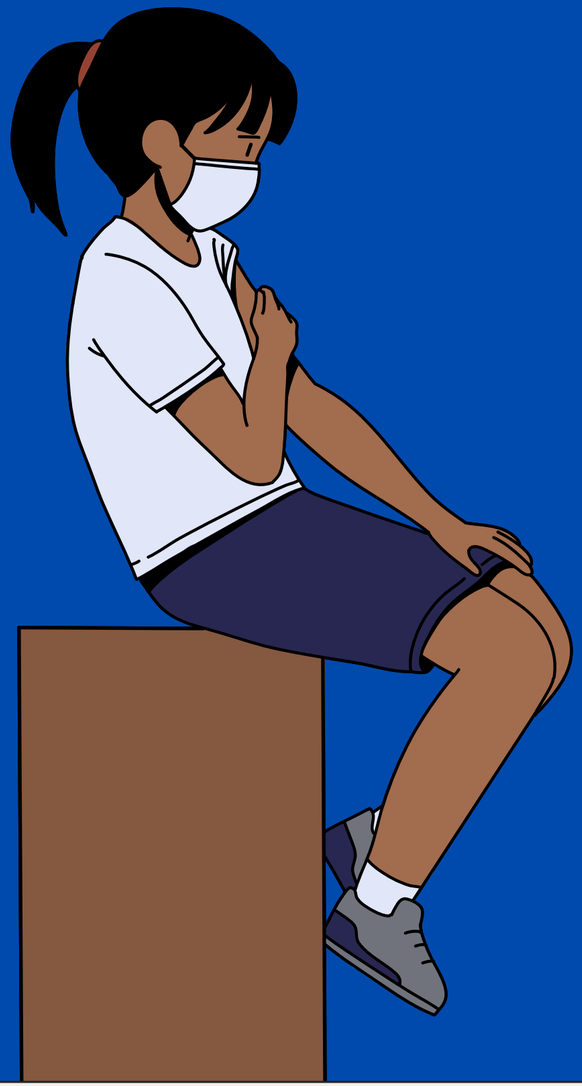
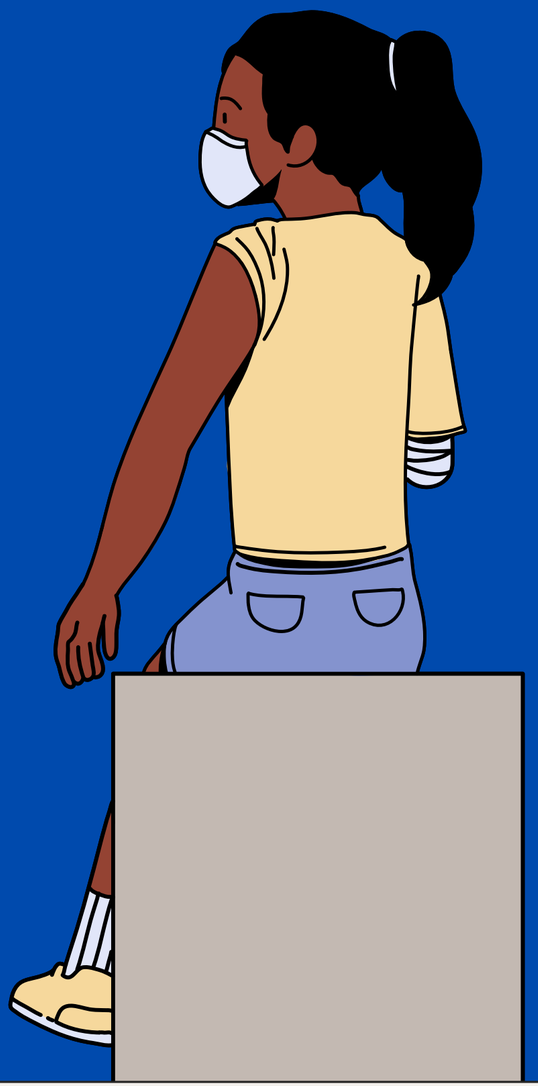


The best way to protect yourself is through an annual flu vaccine.

It works by stimulating your immune system to produce protective antibodies (CDC, 2024).

Health authorities recommend that everyone aged 6 months and older get vaccinated annually.



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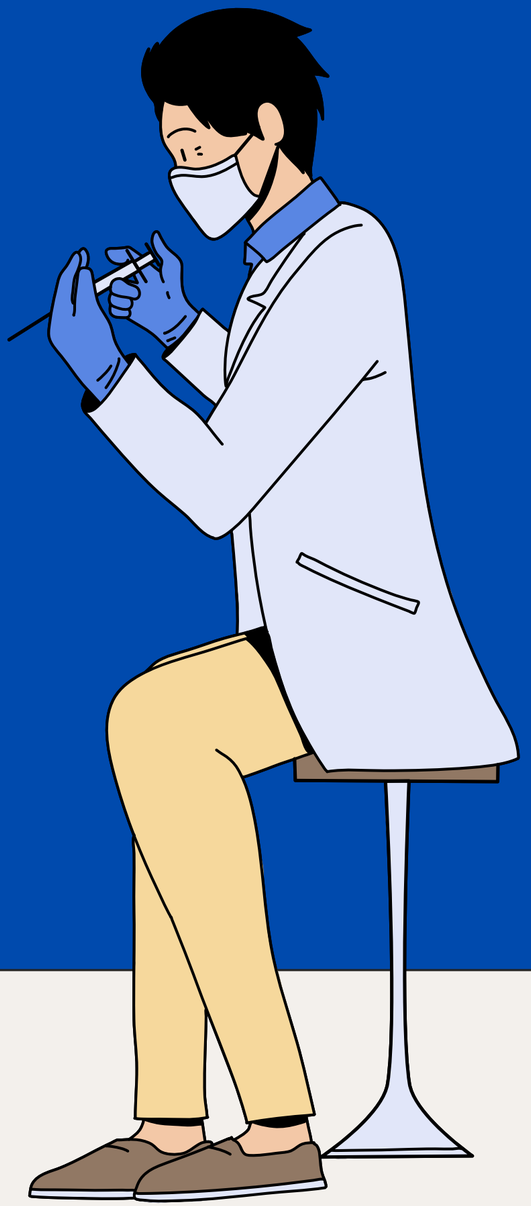
Despite that, vaccine hesitancy persists.

It is shaped by factors such as confidence, complacency, and convenience.

The machine learning model created aims to predict seasonal flu vaccine utilisation based on individual background and behavioural patterns.



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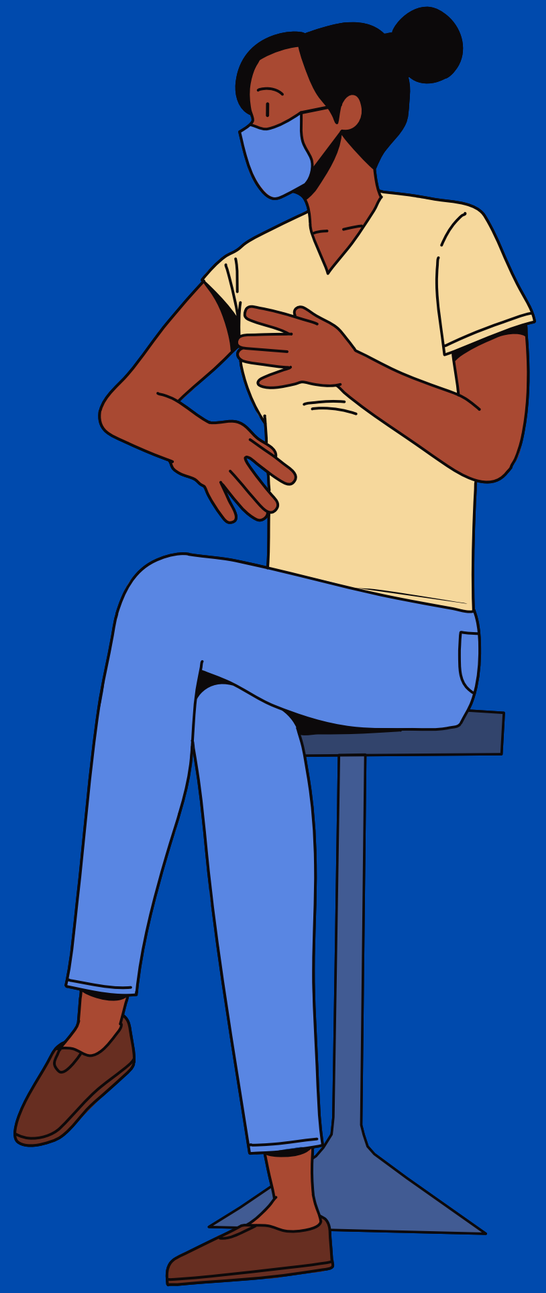
Exploratory Data Analysis



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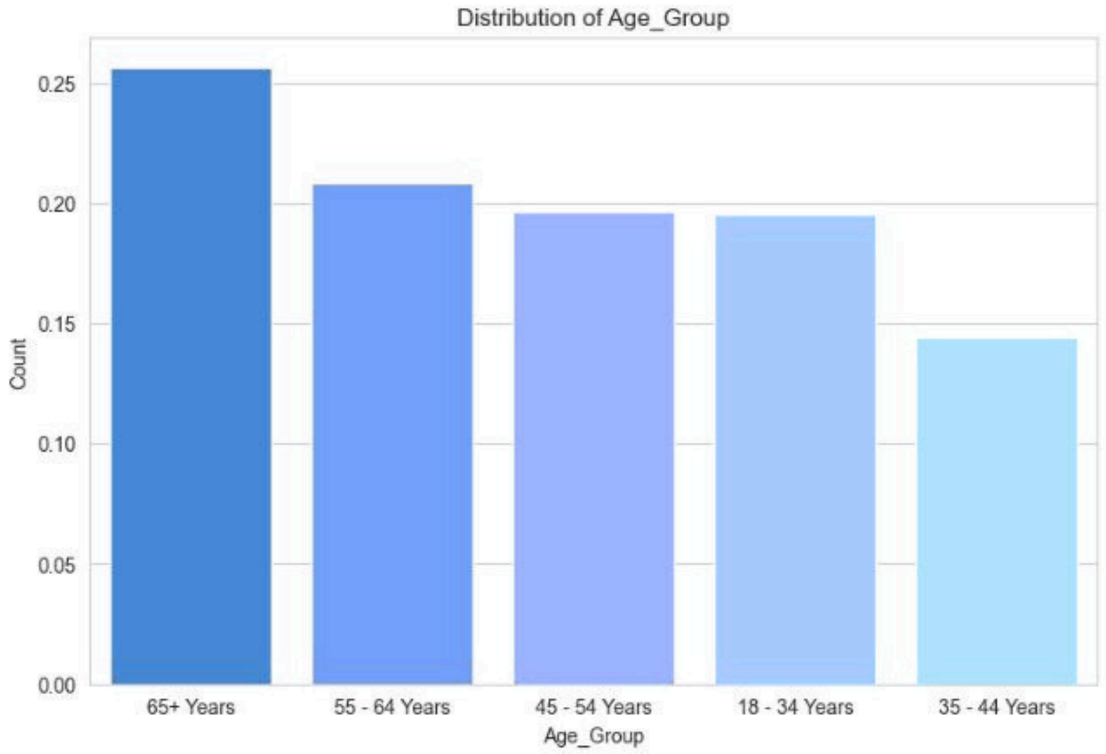

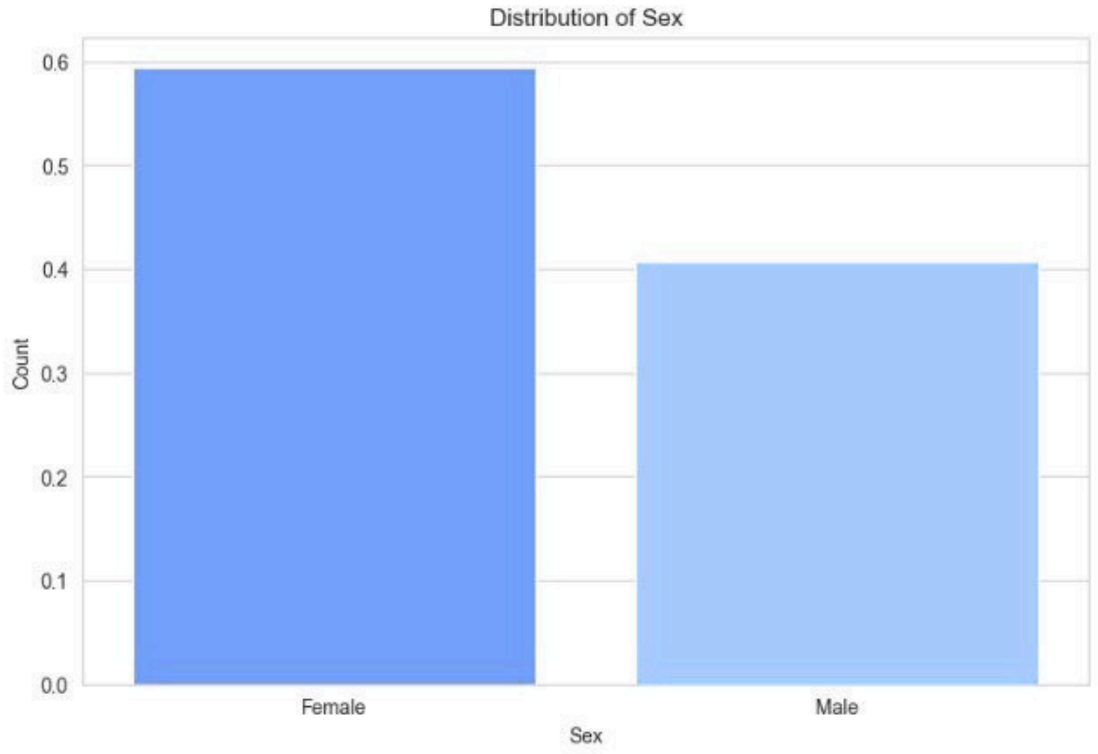

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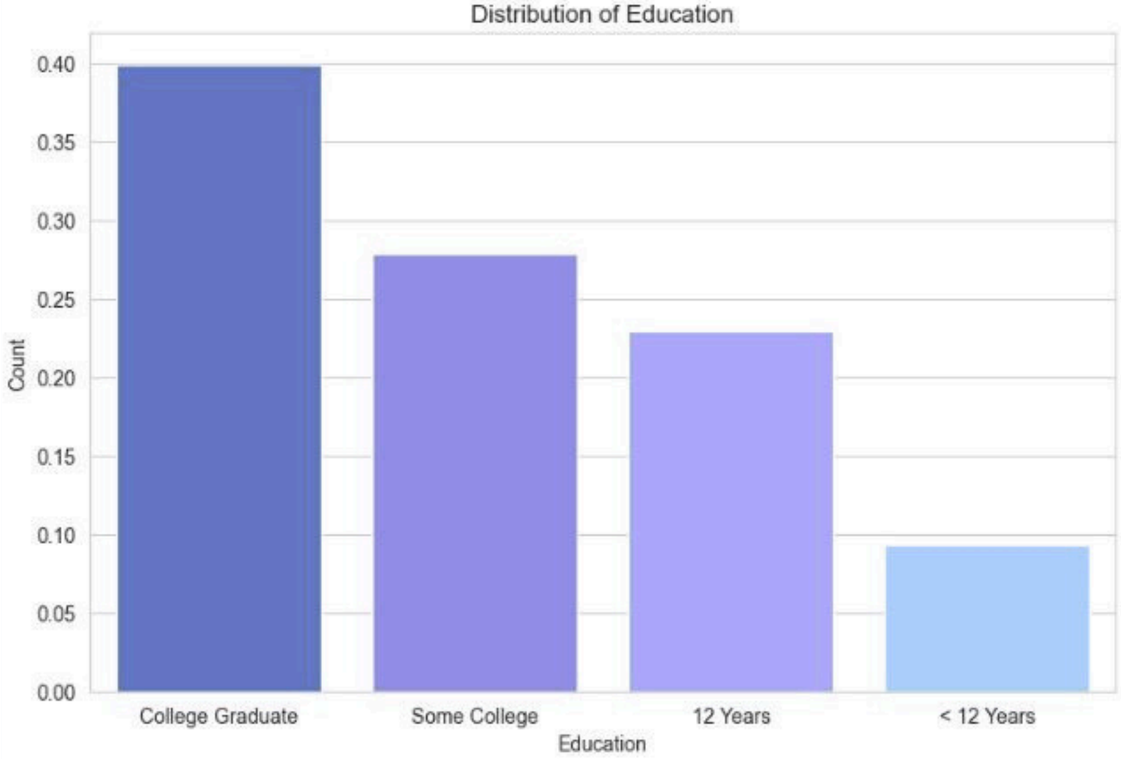

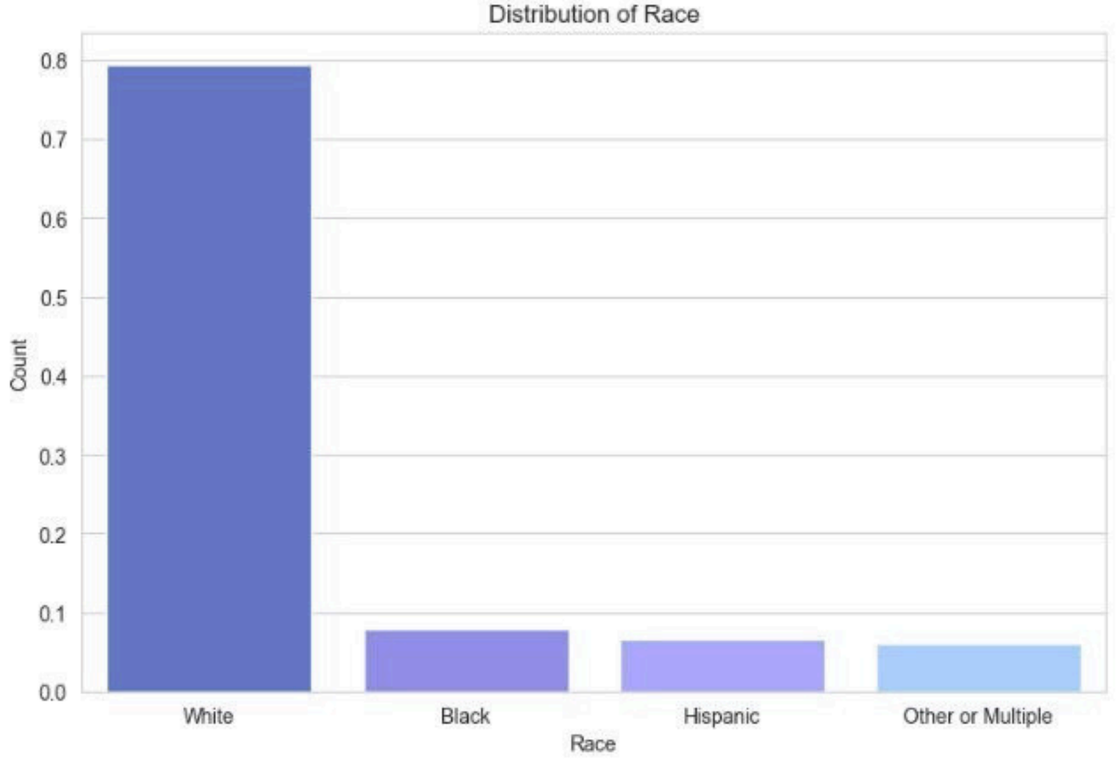

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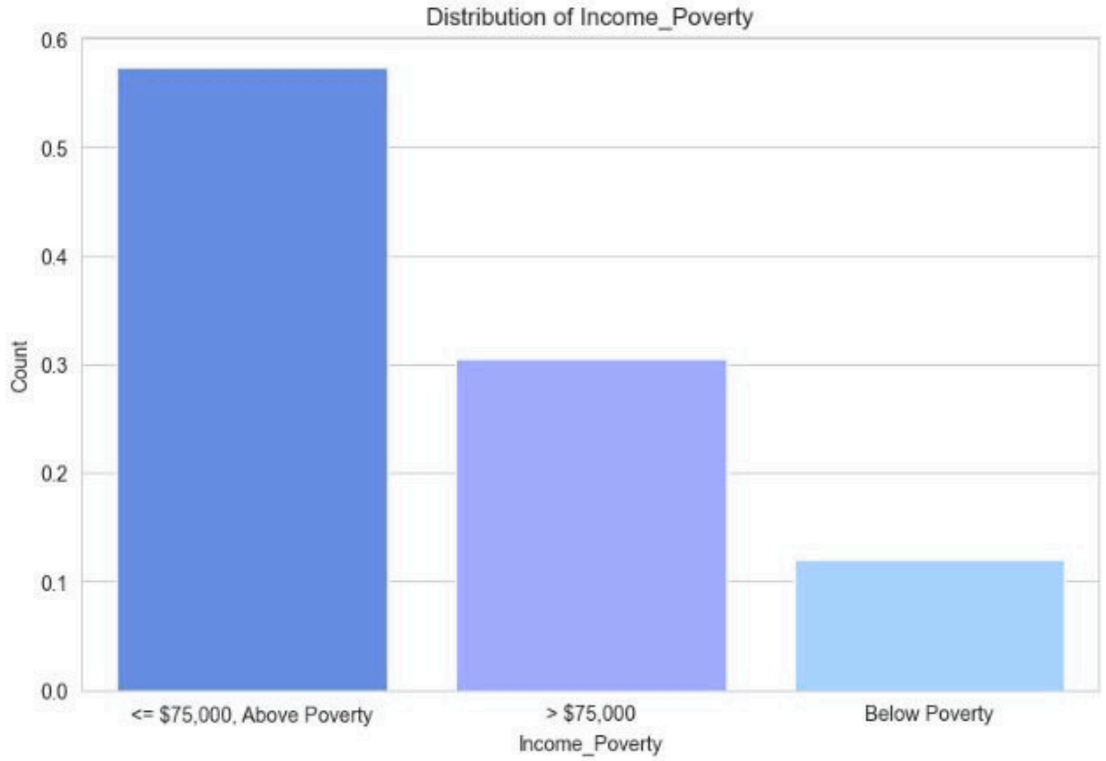

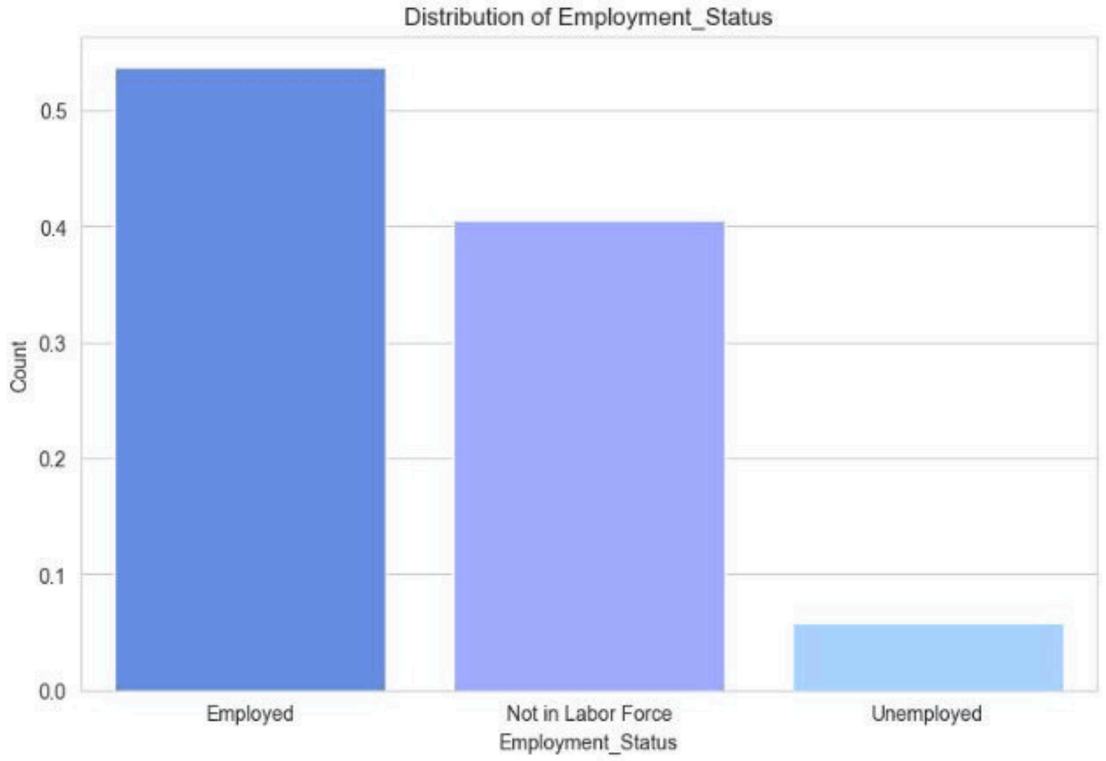

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Modelling

- Logistic Regression
- Random Forest Model

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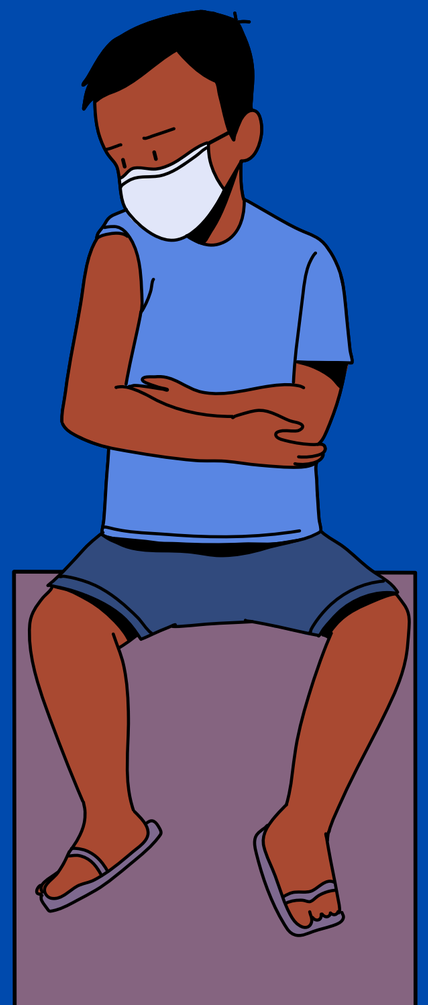
Logistic Regression



Logistic Regression Baseline Model Scores

Train Accuracy: 86.4831%

Test Accuracy: 78.008%

Logistic Regression Model with Feature Selection

Train Accuracy: 79.1049%

Test Accuracy: 77.9657%

The model improves with feature selection.
Overfitting is corrected.

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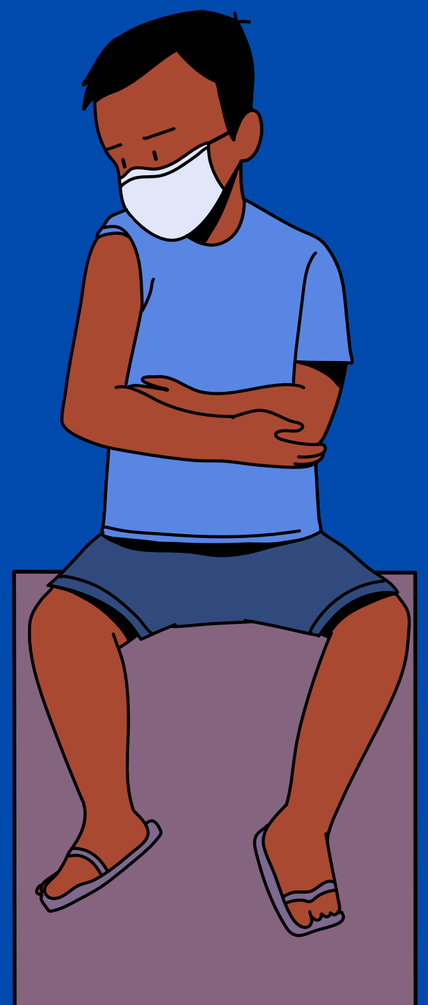
Random Forest Model



Random Forest Model with default hyperparameters:
Train Accuracy: 100.0%
Test Accuracy: 77.2256%

Random Forest Model with tuned hyperparameters:
Train Accuracy: 79.5286%
Test Accuracy: 77.0988%

The model improves with tuning. Overfitting is corrected.

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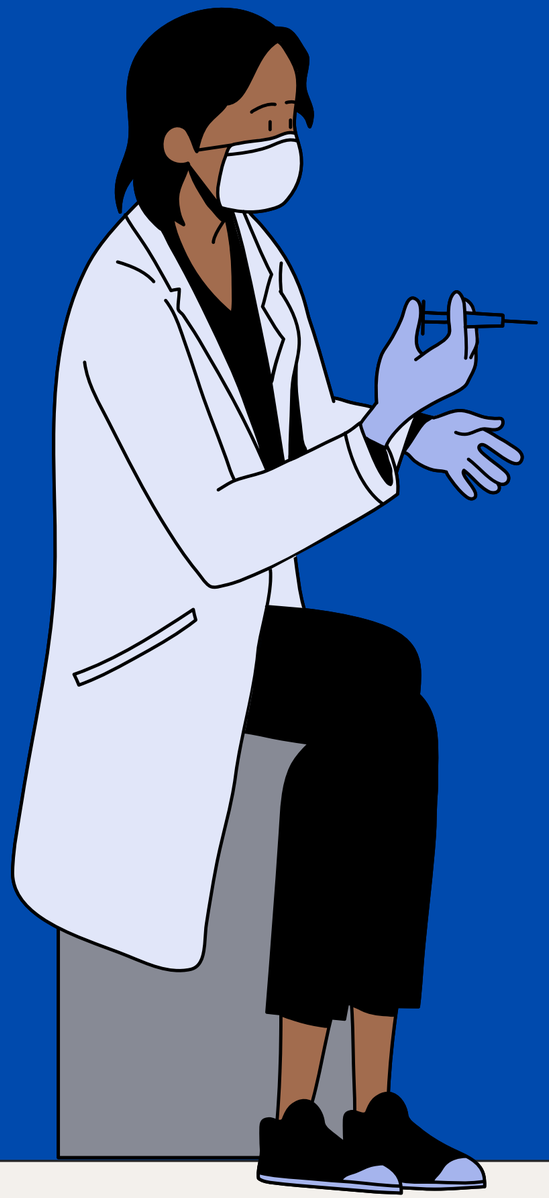

Evaluation

The best model is the logistic regression.

Some features relevant in predicting the utilisation of seasonal flu vaccination:

- The respondents' opinion on the effectiveness of the vaccine.
- Doctor's recommendation to take the vaccine.
- The respondent's opinion on the risks involved with not being vaccinated.
- People older than 65.

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Recommendations

- Public awareness campaigns should be made regarding the effectiveness of the seasonal flu vaccine as well as the risks associated with the flu.
- The younger population should be targeted for such campaigns.
- Emphasis on the safety of the vaccines for use by the public would be useful.

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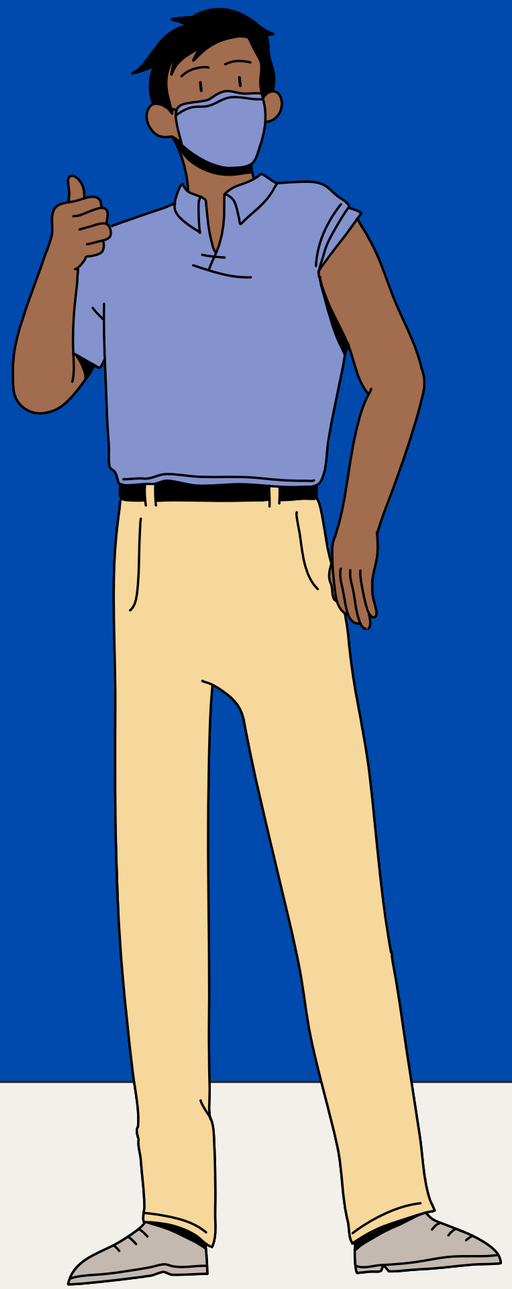
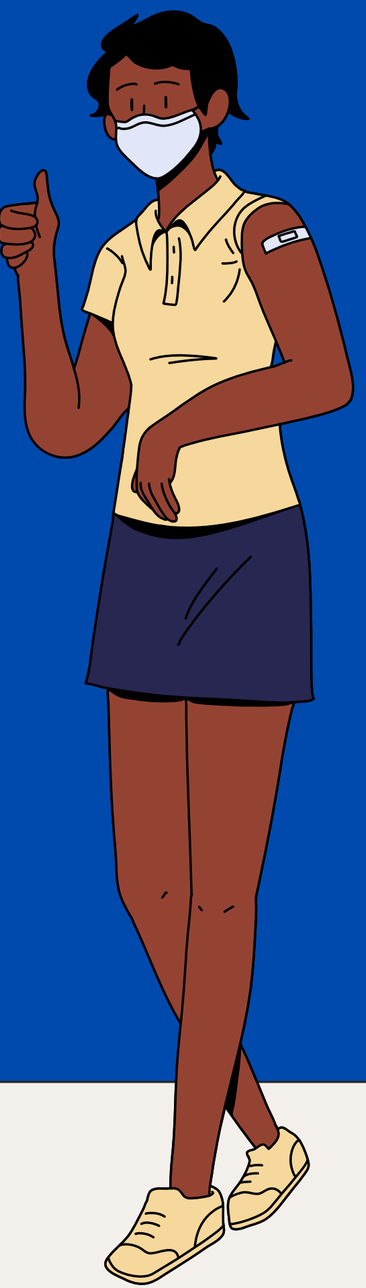


Want to Learn More?

Check out my Github repository:
https://github.com/Tkei-54/Predicting-H1N1-and-Seasonal-Flu-Vaccination-Uptake-Using-Machine-Learning.git



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