Data Mining on Sesenal Flu Vaccination

Presented by
Maryam Ghaffari

Outline

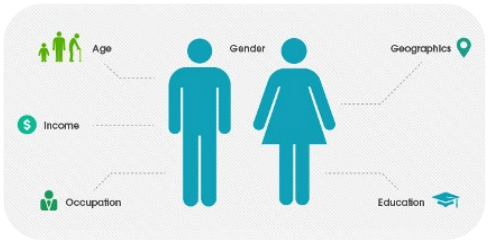
- Problem statement
- Methodology
  - Obtain Data
  - Scrub Data
  - Explore Data
  - Model Data
  - Interpret Dodle
- Conclusion

Problem Statement & Mission

- As the world struggles to vaccinate the global population against COVID-19, understanding how people's backgrounds, opinions, and health behaviors are related to their personal vaccination patterns can provide guidance for future public health efforts.

- Increase vaccination coverage by analyzing people's behavior in similar situations.

Methadology: Optain & Scrub Data



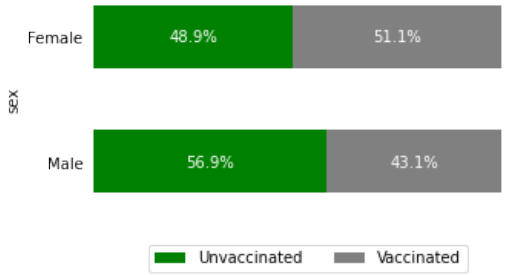
Demographic Information

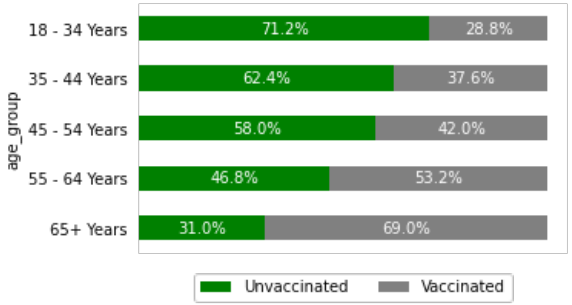
Health Behaviors

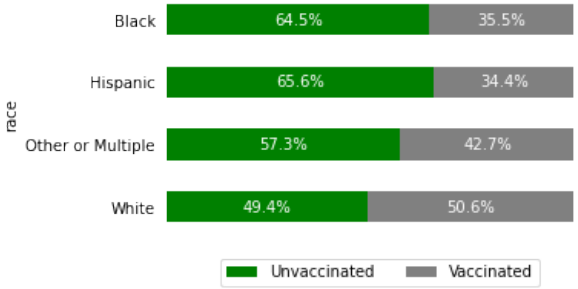
Mindset

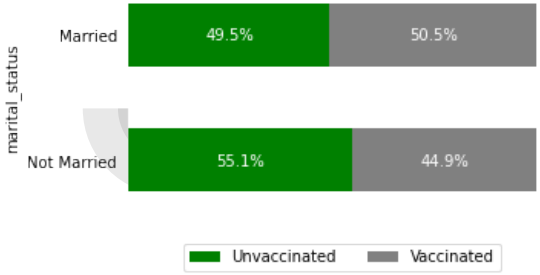
Methodology: Explore Data

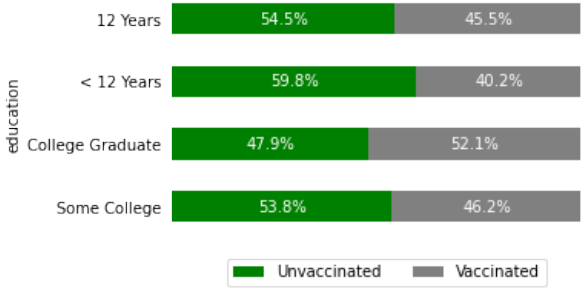
Question 1. What is the relationship between demographic information and receiving vaccine?

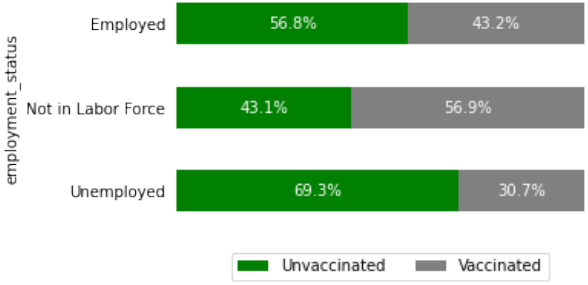






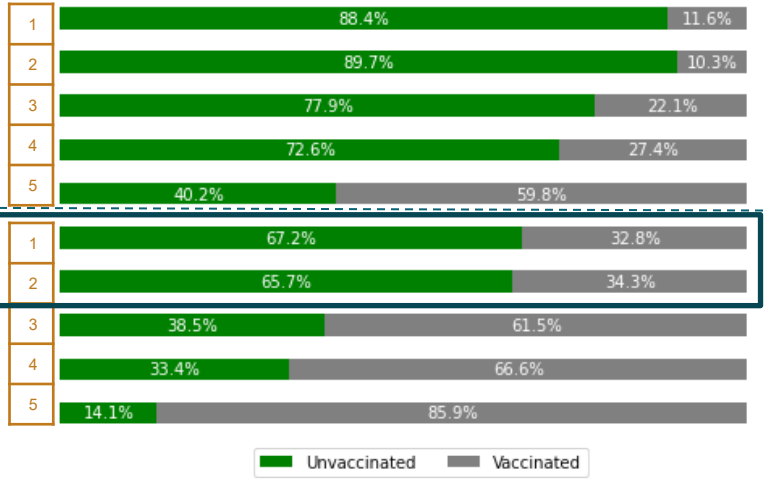






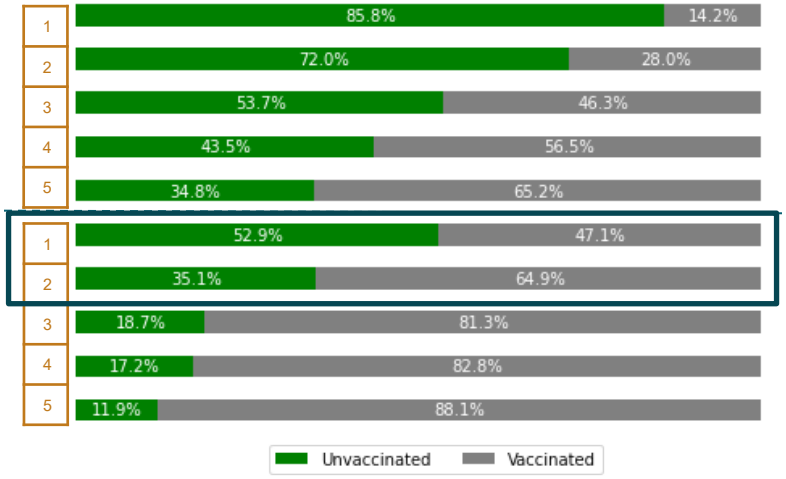
Question 3. How could Dr.'s recommendations change people's attitudes to vaccination?

Opinion on vaccine efficacy



1	Disagree
2	Somewhat disagree
3	Neither agree or disagree
4	Somewhat agree
5	Agree

Opinion on Vaccine Risk

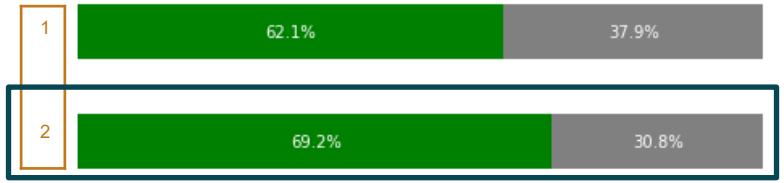


1	Agree
2	Somewhat agree
3	Neither agree or disagree
4	Somewhat disagree
5	Disagree

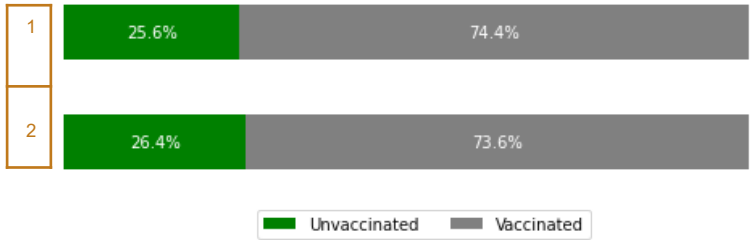
Question 2. How might doctor's recommendations change people's attitudes towards vaccination?

Gender group

Not Recommended

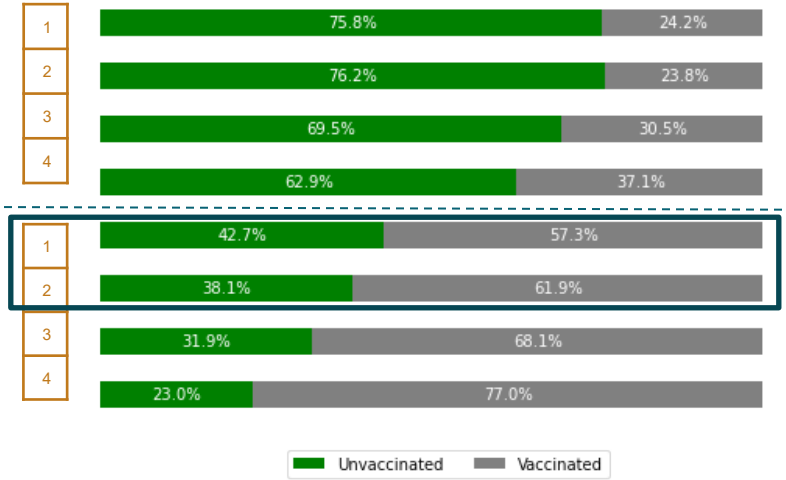


Recommended



1	Female
2	Male

Race group



1	Black
2	Hispanic
3	Other or Multiple
4	Withe

Methadology: Model Interpretation

Sci-Kit learn pipeline on several models [1]

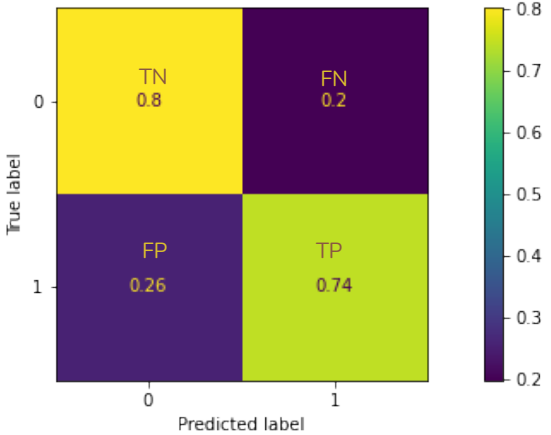
Model	Accuracy	Precision	Recall	F1
Logistic Regression	0.7814	0.7814	0.7814	0.7814
Linear Discriminant Analysis	0.7807	0.7807	0.7807	0.7807
K-Nearest Neighbors	0.6874	0.6874	0.6874	0.6874
Decision Trees	0.6787	0.6780	0.6781	0.6795
Ada Boost	0.7842	0.7842	0.7842	0.7842
Gradient Boosting	0.7883	0.7883	0.7883	0.7883
Random Forest	0.7760	0.7775	0.7772	0.7768
Extra Trees	0.7703	0.7702	0.7697	0.7681

Extreme Gradient Boosting (XGBoost)

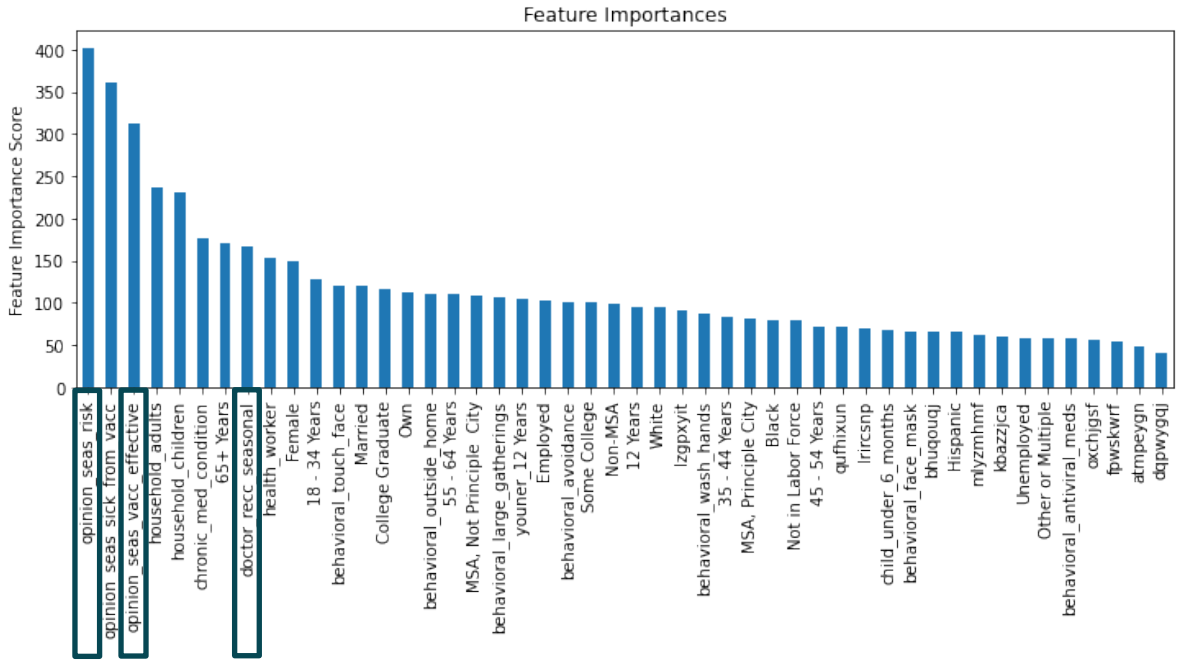
	Accuracy(%)	Precision(%)	Recall(%)	F1(%)	AUC
Traing set	83.37	82.93	81.77	82.35	0.91
Test set	77.40	78.51	74.49	76.45	0.85

[1] https://github.com/MoJoMoon/Assessing-Tanzanian-Waterpoint-Systems-with-Logistic-Regression

Methadology: Interpret Model



TN	True Negative
FN	False Negative
TP	True Positive
FP	False Positive



Recommendation & Conclusion

Recommendation:

- Put more effort into groups that are more likely to be unvaccinated, such as men, blacks and Hispanics.
- Ask doctors for advice about immunizations during the patients' routine check-up.

Conclusion

- People's opinions about vaccination are an important predictor of vaccination patterns in societies. Raising public awareness of the benefits of vaccination is key to increasing vaccination coverage. Physician recommendations, on the other hand, can make a big difference in people's attitudes toward vaccination.

Thank You!

Email: mar.ghaffari@gmail.com
GitHub : https://github.com/MarGhaf/Predict-Seasonal-Flu-Vaccine