SOCIAL COMQUANT

Team 11
Predicting COVID-19 Vaccination Intention in the United States

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IDEA

- What are the driving forces behind people's intention or hesitation to vaccinate against COVID-19 in the US?
- Predicting Vaccination intent search, concern for side effects on Google and vaccine hesitancy
  - *Vaccination intention: Searches related to eligibility, availability, and accessibility of vaccines. For example, "covid vaccine near me" or "safeway covid vaccine".*
  - *Concern for safety and side effect: Searches related to the safety and side effects of the vaccines. For example, "is the covid vaccine safe" or "pfizer vaccine side effects".*
  - *Vaccine hesitancy: Estimate hesitancy rates at the state level using the U.S. Census Bureau's Household Pulse Survey data and utilize the estimated values to predict hesitancy rates at the Public Use Microdata Areas level using the Census Bureau's 2019 American Community Survey 1-year Public Use Microdata Sample*

DATA - DV

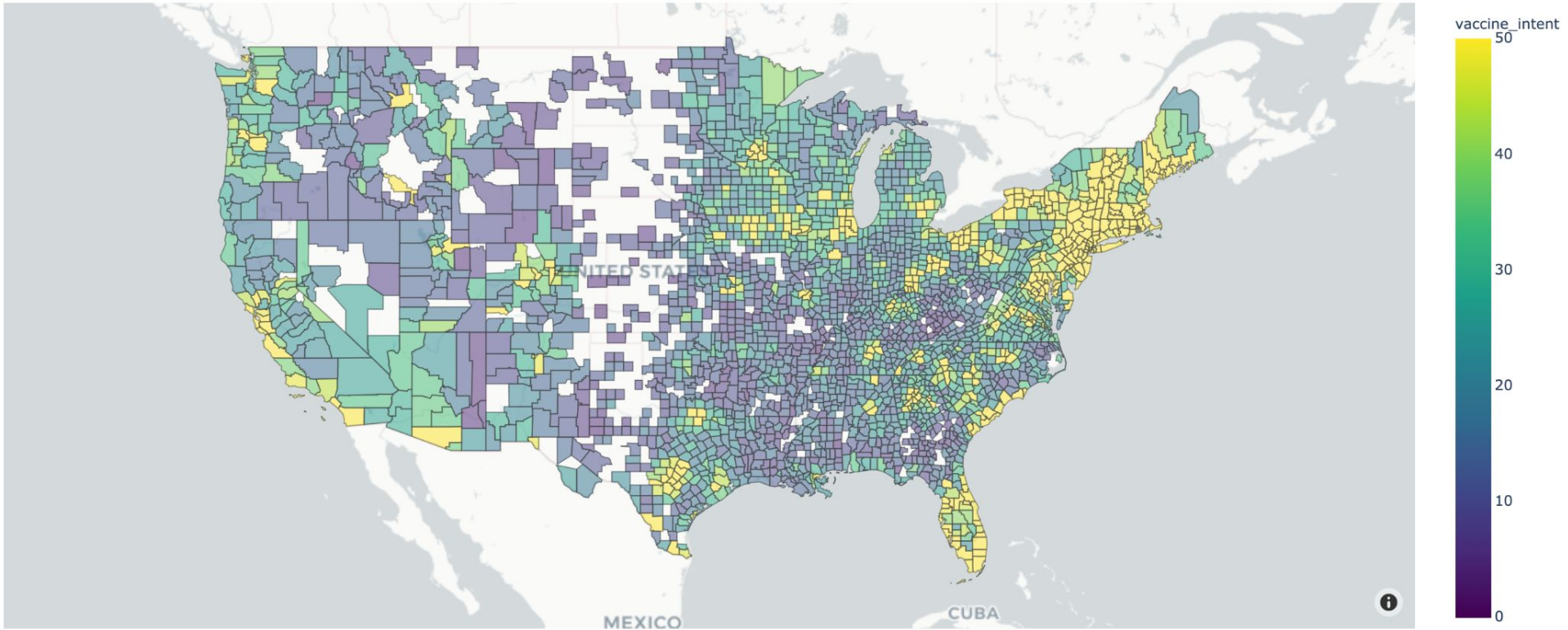
- Google Covid-19 open Data
  - Search for vaccination intention on Google (C)
  - Search for side effects on Google(C)

- CDC vaccine hesitancy
  - Vaccine hesitancy (C)

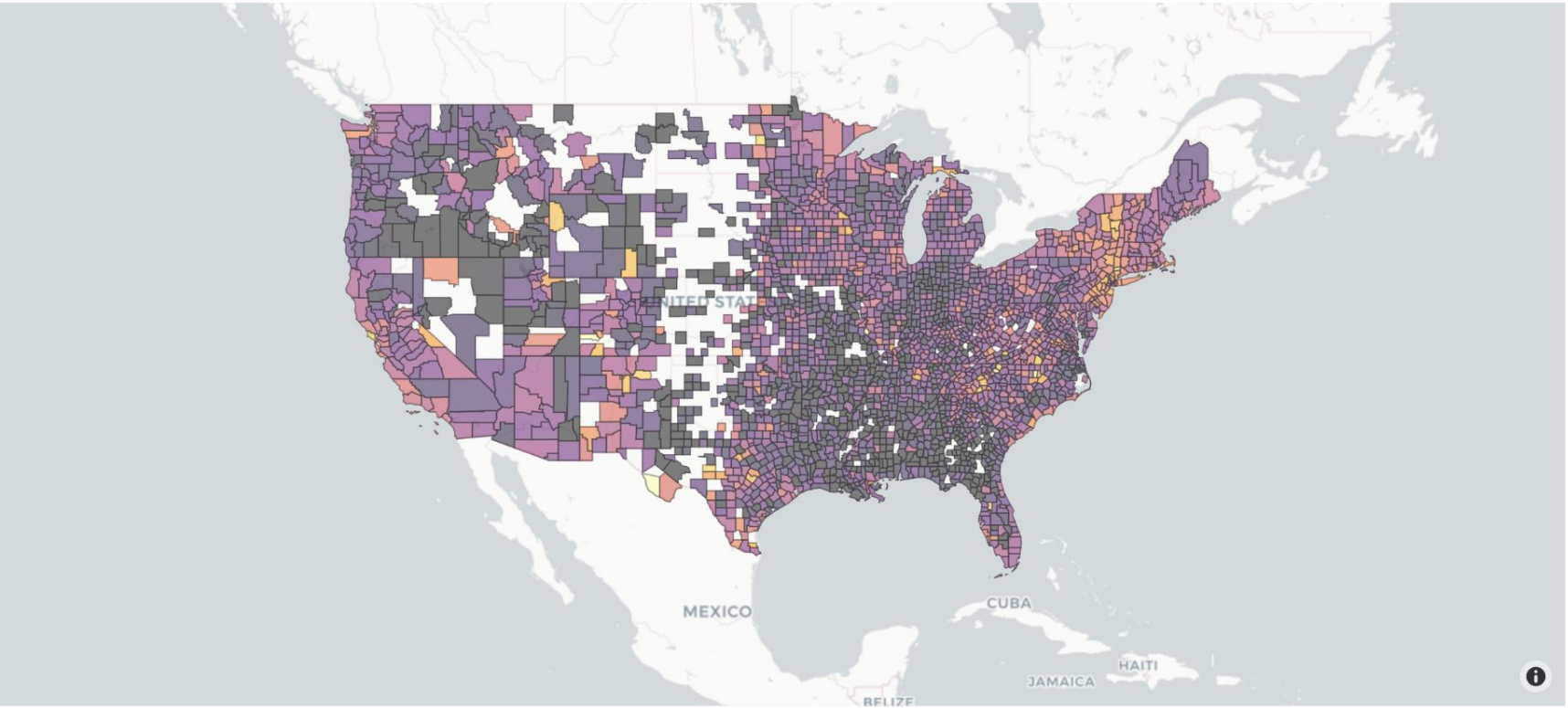
- Predictions for March 8th, 2021 due to (more) missing values in other dates

C: per county; S: per state

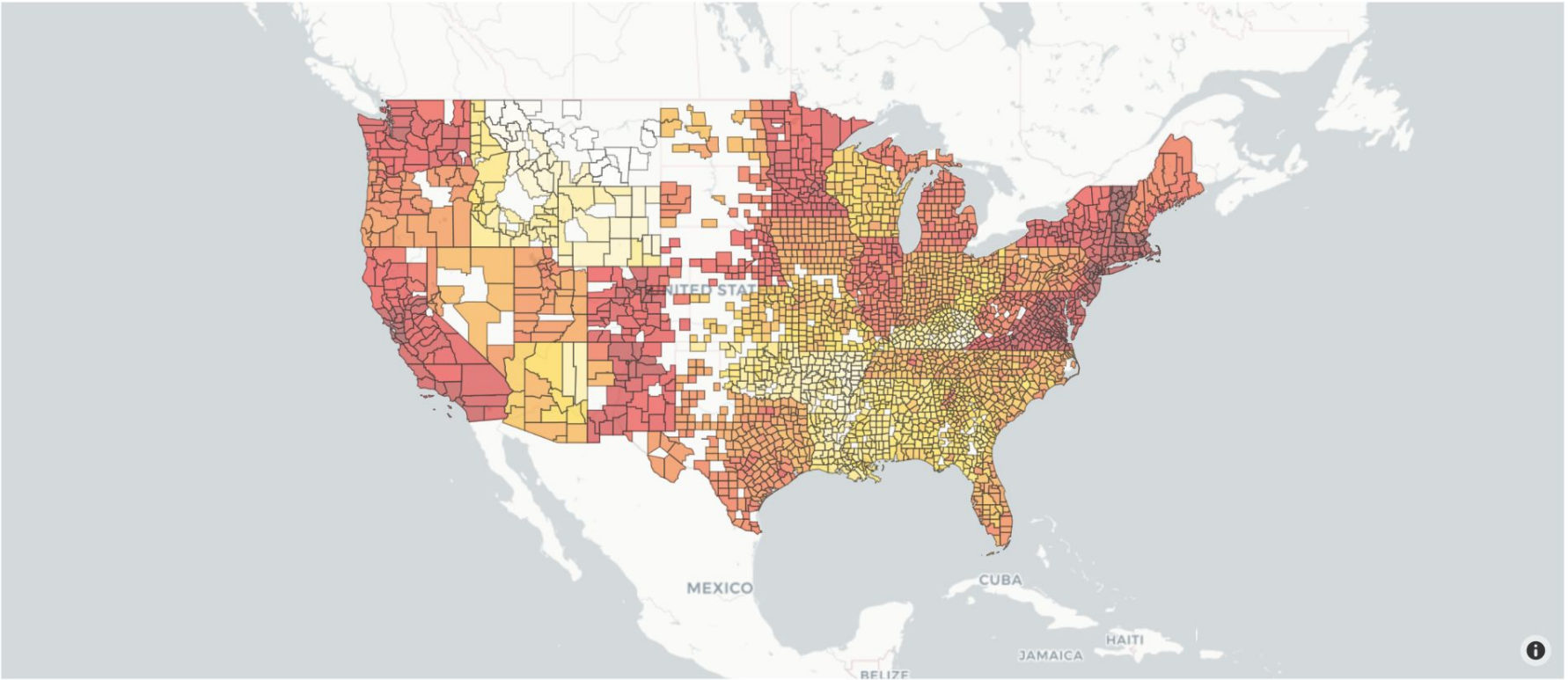
DV: Search for vaccination intention



DV: Search for vaccination safety and side effect



DV: Vaccine hesitancy



DATA - IVs (65 features)

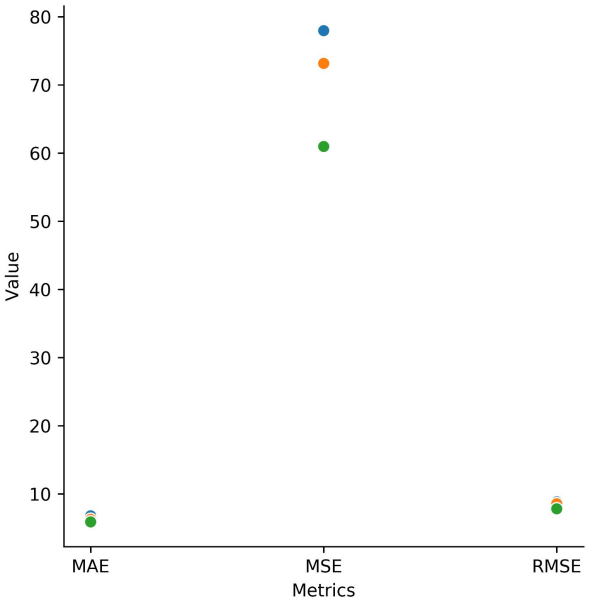
- Precision for Covid
  - CVAC score / vaccine coverage (C)
  - Vaccination barriers (C)
- County presidential election returns
  - Vote share per county (rep/dem) (C)
- American community survey /census data
  - Sociodemographic information (age, race/ethnicity, population, poverty, education, industry/occupation, urban/rural from USDA) (C)
- Government response tracker
  - Response stringency index (S)
- CDC Data
  - Cases and deaths (C)
  - Vaccine rollout (C)

- Data up to 07.03.2021 (depending on actuality)

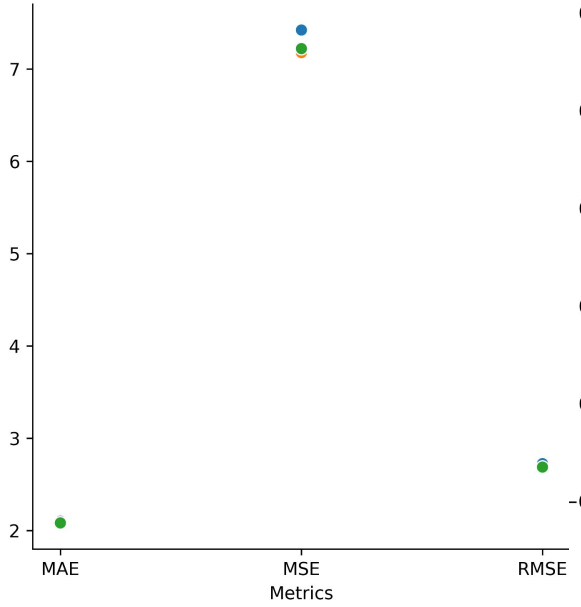
C: per county; S: per state

RESULTS - Model performance comparison

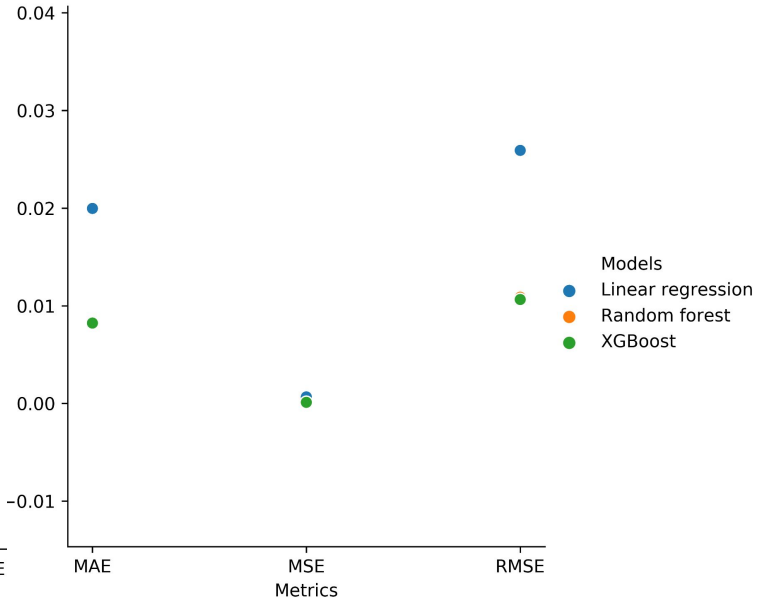
Vaccination intention



Safety and side effect



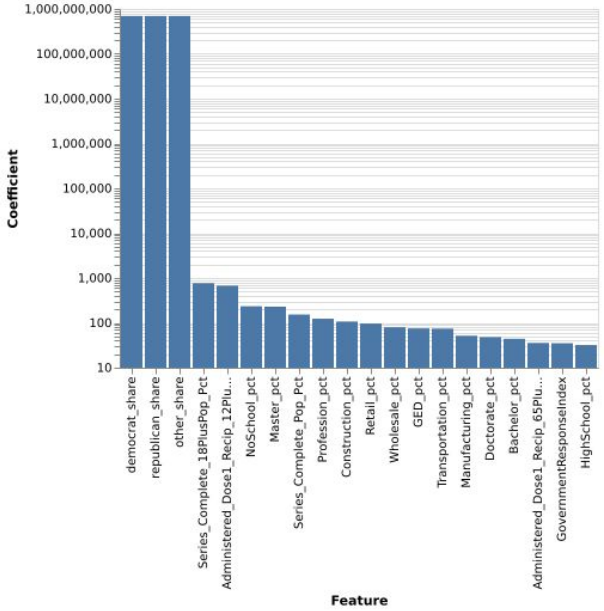
Vaccine hesitancy



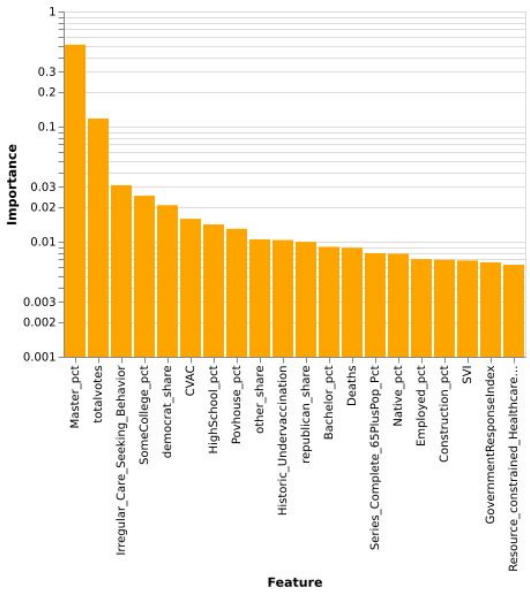
RESULTS - Features

Most important features predicting **vaccination intent** (log scale)

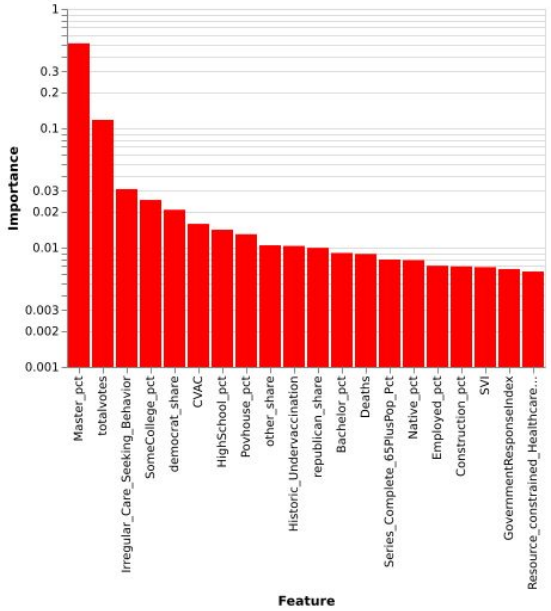
Linear Regression



Random Forest

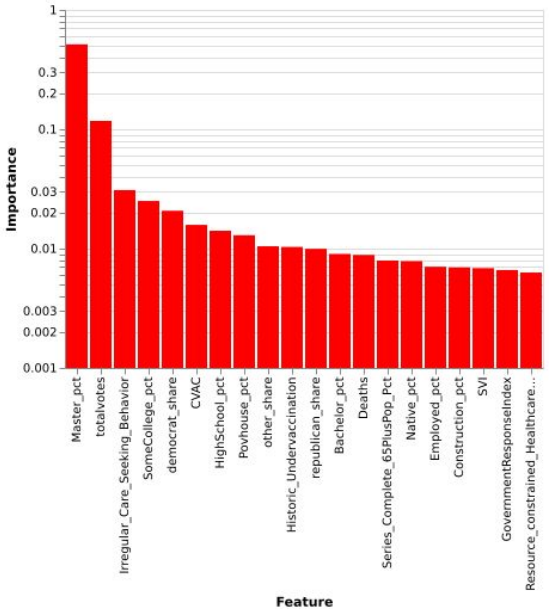


XGBoost



RESULTS - Features

XGBoost



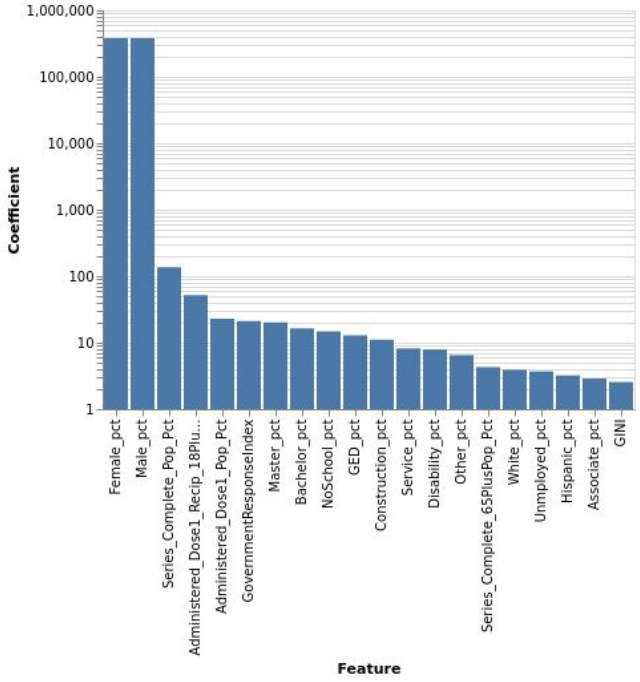
Most important features predicting **vaccination intention**:

- Percentage of population with master's degree
- Total votes
- İrregular care seeking behavior
- Percentage of people with some college degree
- Democratic vote share
- CVAC
- Percentage of people with high school education
- Percentage of household under poverty
- Other parties vote share

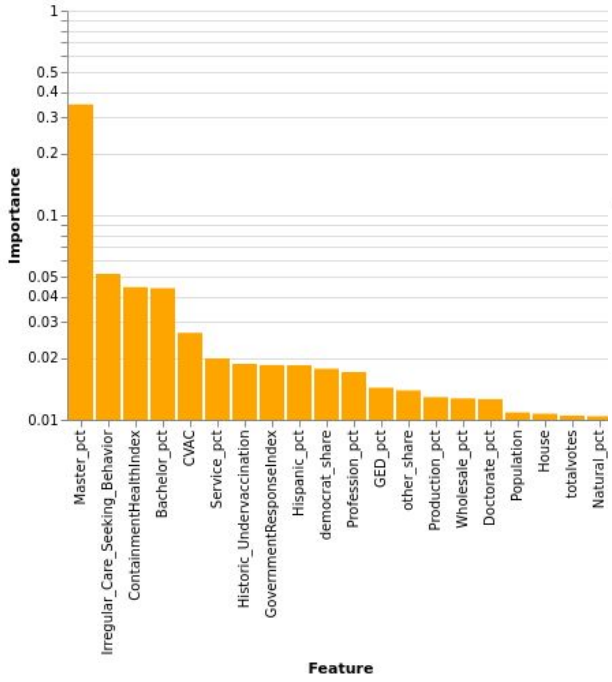
RESULTS - Features

Most important features predicting **safety and side effects** search (log scale)

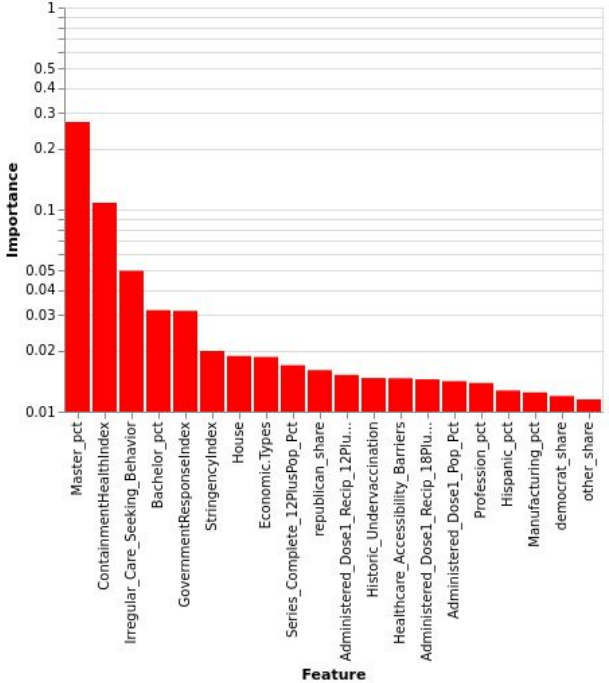
Linear Regression



Random Forest

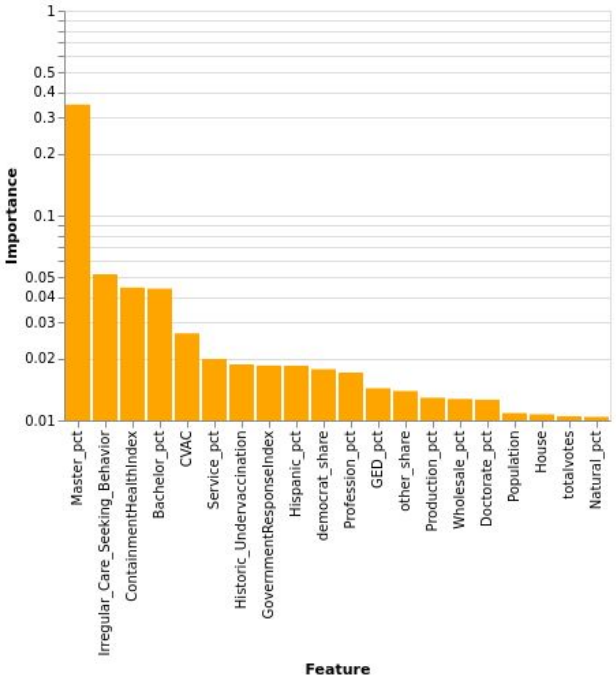


XGBoost



RESULTS - Features

Random forest



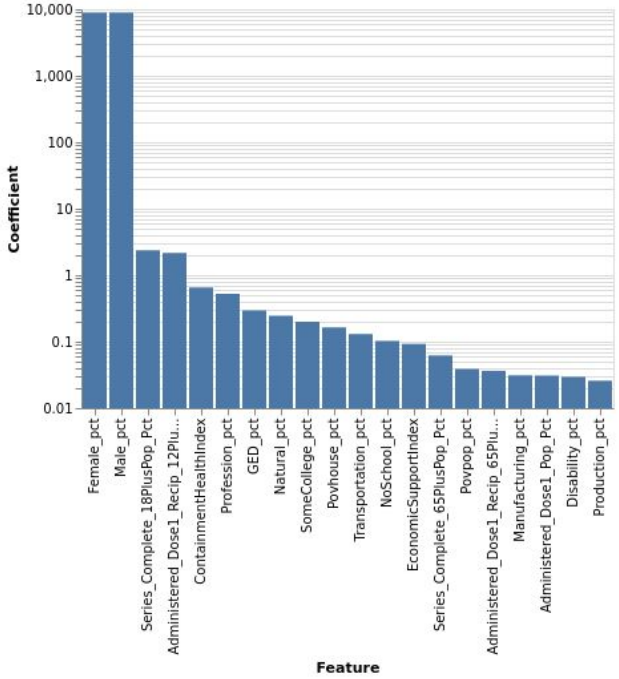
Most important features predicting **safety and side effects:**

- Percentage of population with master’s degree
- İrregular care seeking behavior
- Containment Health Index
- Percentage of people with bachelor's degree
- CVAC
- Percentage of people in service occupation
- Historic Undervaccination
- Government response index
- Percentage of Hipsanic population
- Democratic votes share

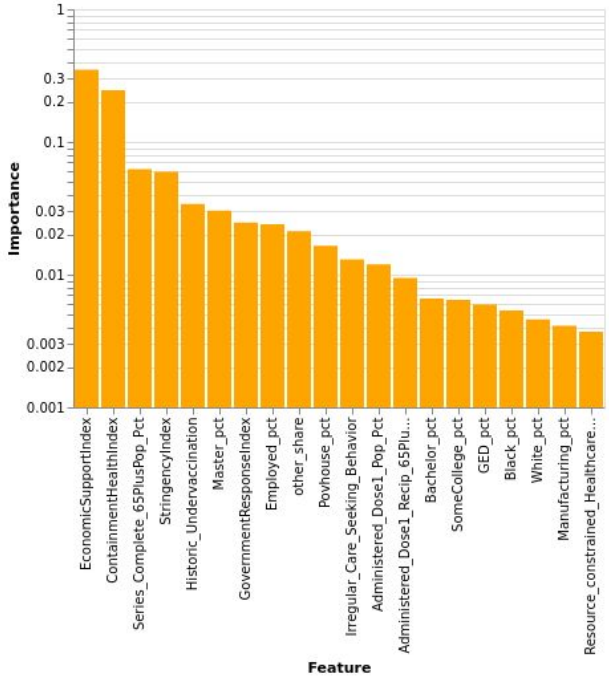
RESULTS - Features

Most important features predicting **vaccine hesitancy** (log scale)

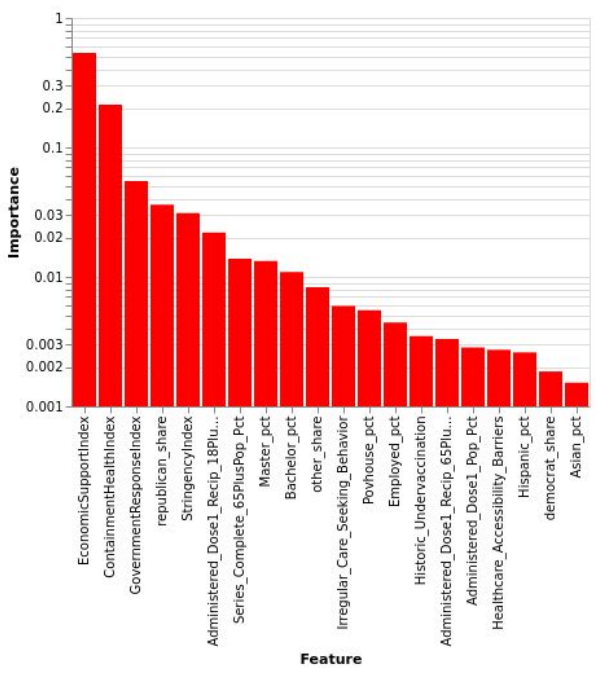
Linear Regression



Random Forest

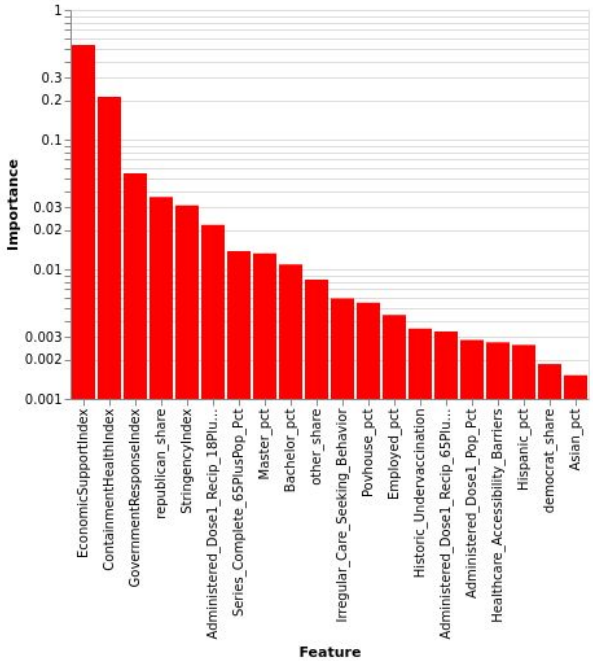


XGBoost



RESULTS - Features

XGBoost



Most important features predicting **vaccine hesitancy:**

- Economic support index
- Containment health index
- Government response index
- Republican votes share
- Stringency index
- Percentage of administered Dose1 recipient population(18 plus)
- Percentage of complete vaccination population (65 plus)
- Percentage of population with master’s degree
- Percentage of population with bachelor’s degree

Thank you!

all the code could be access through:
https://colab.research.google.com/drive/1KMgr87ZbZXFPM8DF75r0_yIxW1uxcap-?usp=sharing