DATA MINING FINAL PROJECT

GROUP 2: CLAUDE SHANNON

AUTHORS

- Garri Romzova, Antonio
- Mayol Matos, Sergi
- Medina Perelló, Alejandro
- Palmer Perez, Ruben
- Rodríguez Arguimbau, Alejandro

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DATASET

An exploratory introduction

CONTEXT

Medical data around the US regarding health metrics

OBSERVATIONS

Over 400k

counting duplicated data

VARIABLES

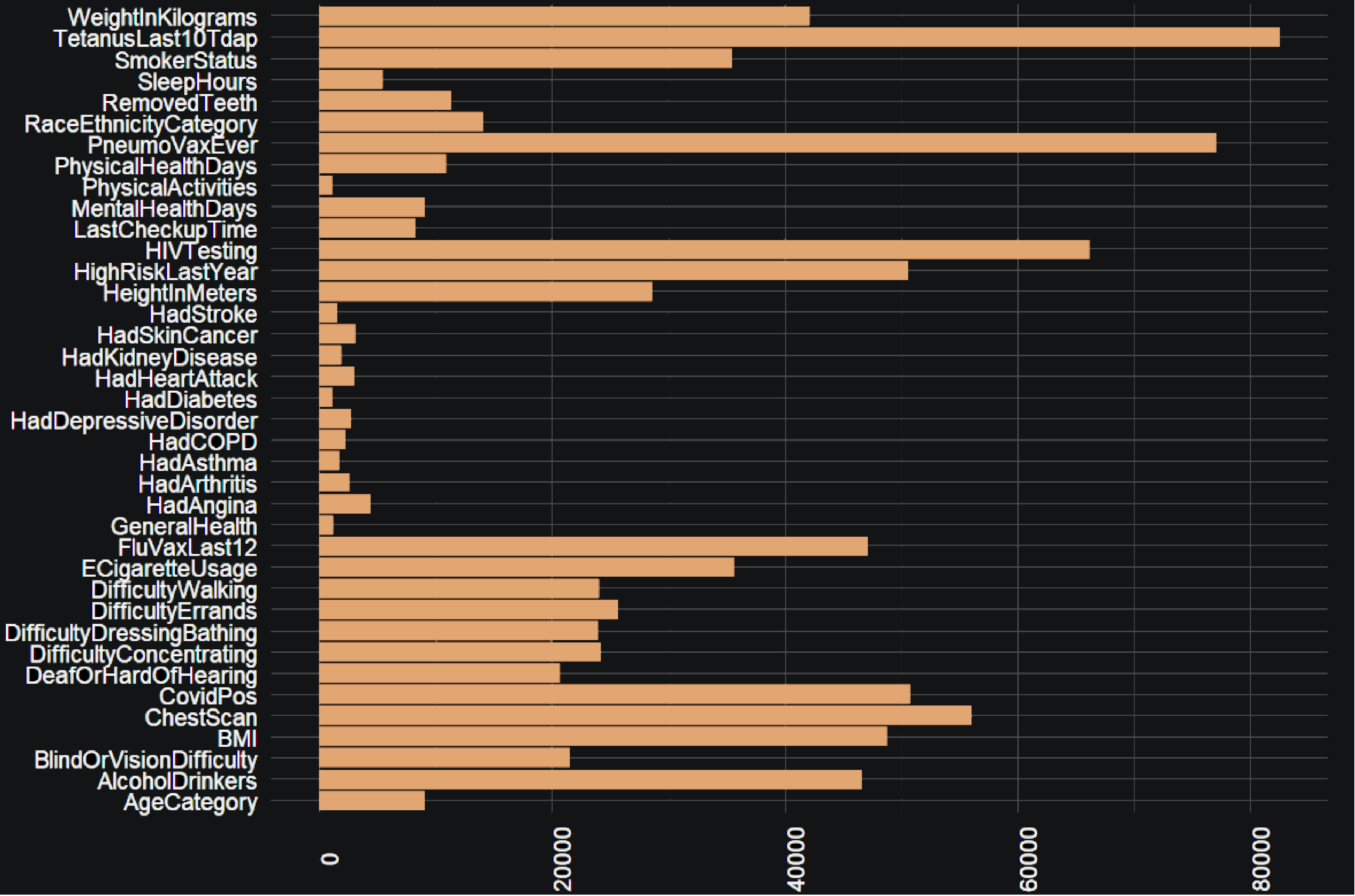
Most of them are categorical or *Boolean*, e.g.

- `HadSkinCancer`
- `HadDepressiveDisorder`
- `SmokerStatus`
- Etc

Only six variables are numeric:

- `PhysicalHealthDays`
- `MentalHealthDays`
- `SleepHours`
- `HeightInMeters`
- `WeightInKilograms`
- `BMI`

MISSING DATA



OBJECTIVE

A common goal

PREDICTIVE MODEL

with `HadHeartAttack` as our target

PROBLEM

Large amount of variables

SOLUTION

DATA MODIFICATIONS

To use the least amount of variables

OBSERVATION REMOVAL LIMIT

15% of the original dataset

~ *66k*

BMI

Remove `Height` and `Weight` variables and fill non-numeric values on BMI applying

$$BMI = \frac{Weight}{Height^2}$$

Classification	BMI Score
Underweight	< 18.5
Normal	18.5 - 24.9
Overweight	25.0 - 29.0
Obese	30.0 - 40.0
Extreme Obese	> 40.0

HOW TO FILL MISSING DATA

- Predictive models
- Median
- Mean
- Remove

OUTLIERS

IQR

$$X < (Q1 - 1.5 \times IQR)$$

Or

$$X > (Q3 + 1.5 \times IQR)$$

best for unknown or non-normal distributed data

Z-score

$$\left|\frac{X - \mathrm{mean}(X)}{\mathrm{sd}(X)}\right| > 3$$

best for normal distributed data

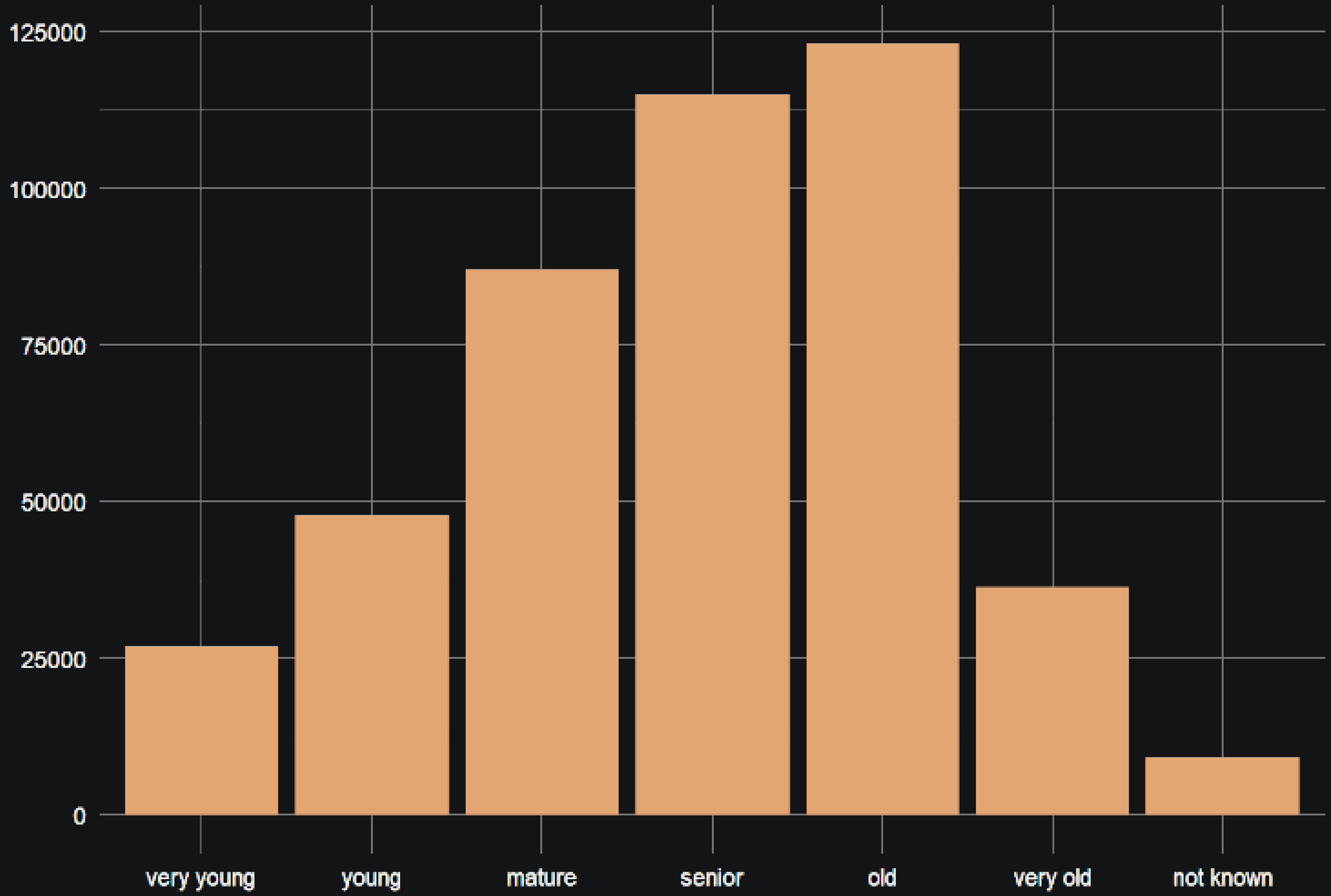
VARIABLE REDUCTION

- Random Forest
- XGBoost

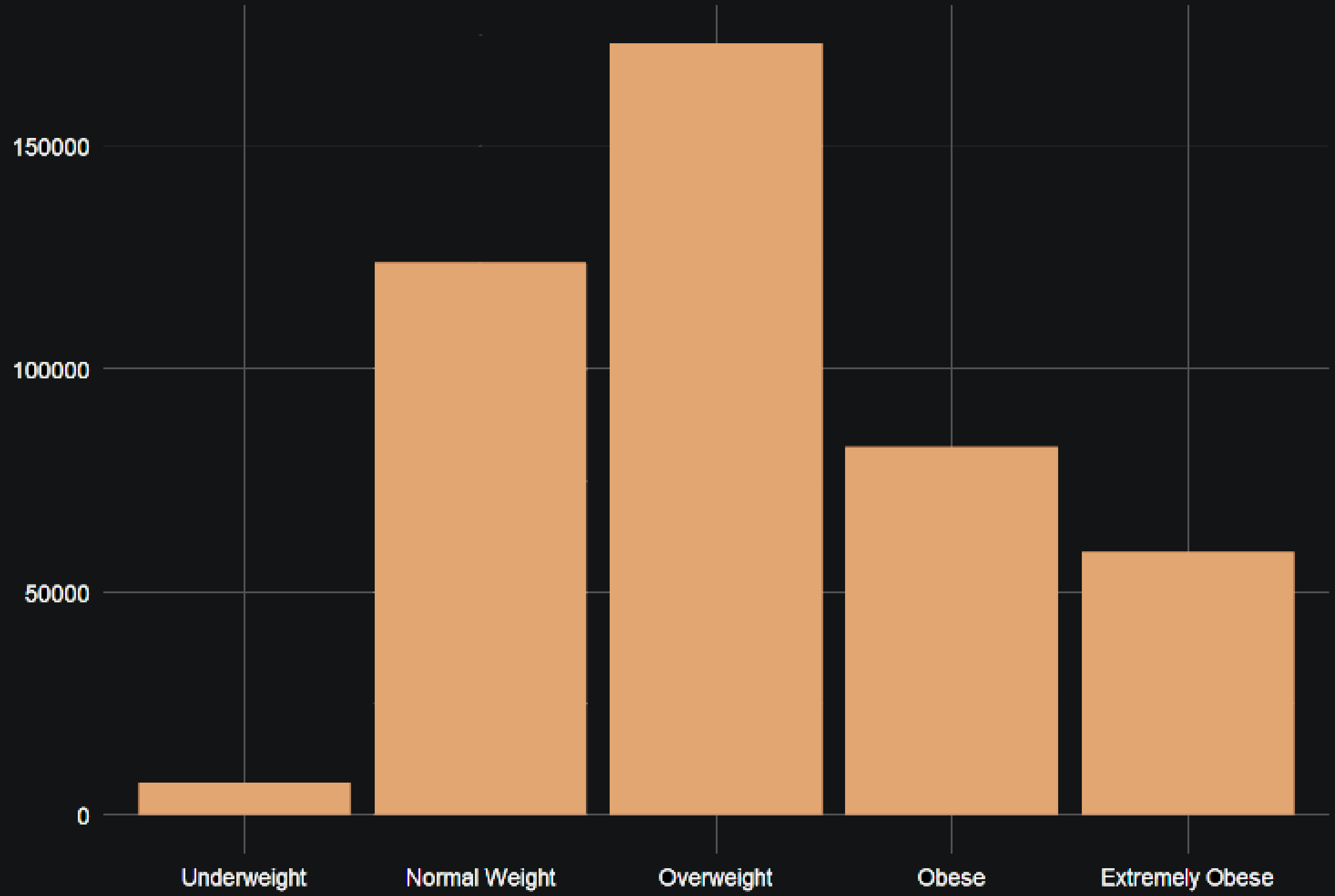
at least explain 95% of the data

SIMPLE QUESTIONS

AGE DISTRIBUTION



BMI


150000
100000
50000
0
Underweight
Normal Weight
Overweight
Obese
Extremely Obese

HEART ATTACK PER STATE

CONCLUSIONS