AGING CLOCK: PREDICTION OF AGE USING BIOMARKERS

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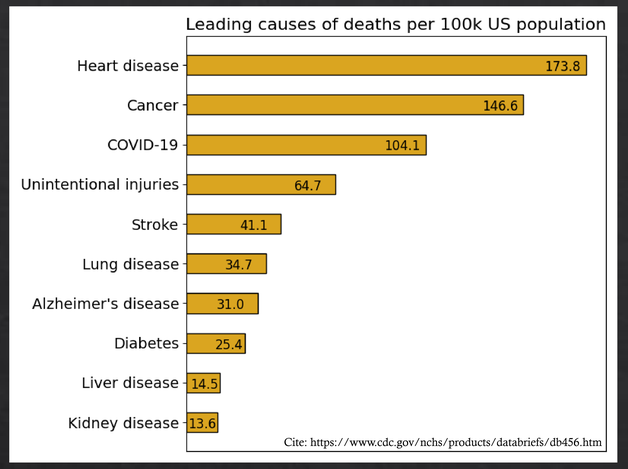


Except for COVID-19 and unintentional injuries, most of the top causes of death in the United States are related to aging.

What is the deal with the aging process?

- Aging is gradual decline in physiological functions. Also, it leads to deterioration of cellular & molecular functions.
- Genetic and environmental factors influence aging.
- Aging increases the risk of age-related disease.
- Identifying the underlying biological mechanisms can improve health and extend lifespan.

Why is identifying age related biomarkers important?

- Better understanding of aging process and disease risk.
- Identifying those at risk of age-related disease.
- Personalized treatments based on biomarkers.
- Potential for interventions to extend health & lifespan.
- Accurate prediction of biological age.

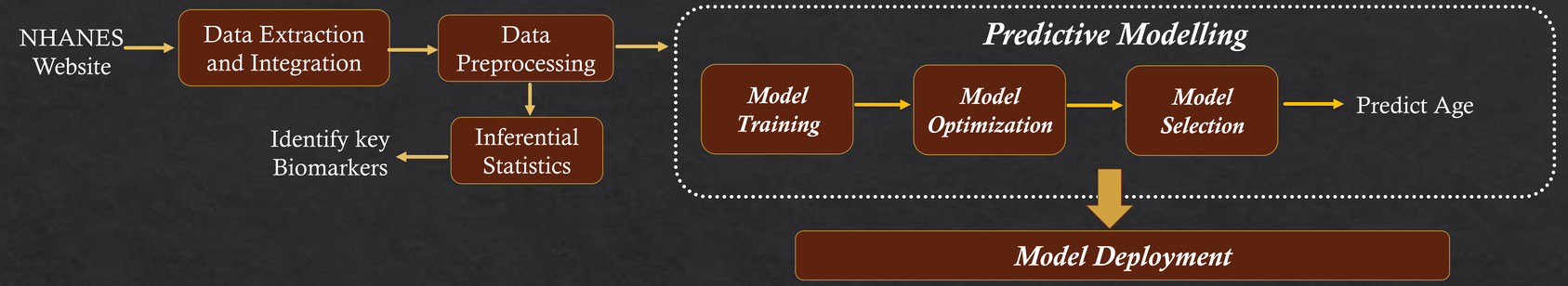
Project Goal

- Identify biomarkers strongly associated with aging.
- Build Machine Learning model to estimating age using biomarkers.

Datasets

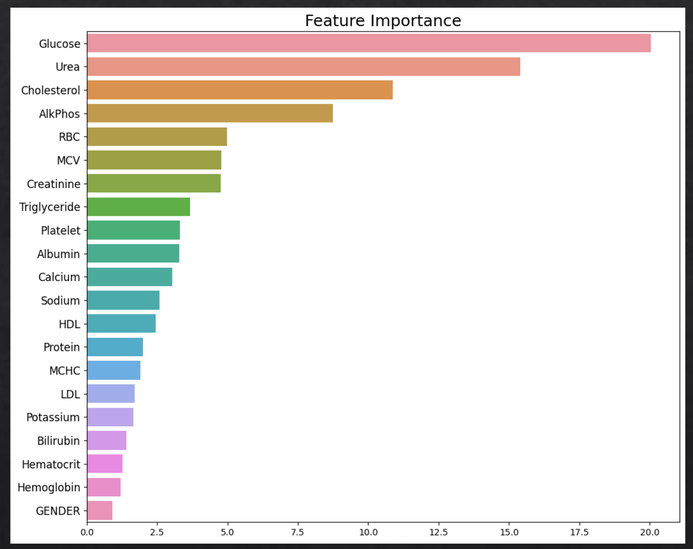
- Number of Biomarkers: 20
- Number of Samples: 101316
- Collected from NHANES website (year 1999 - 2020)

Methodology



Results

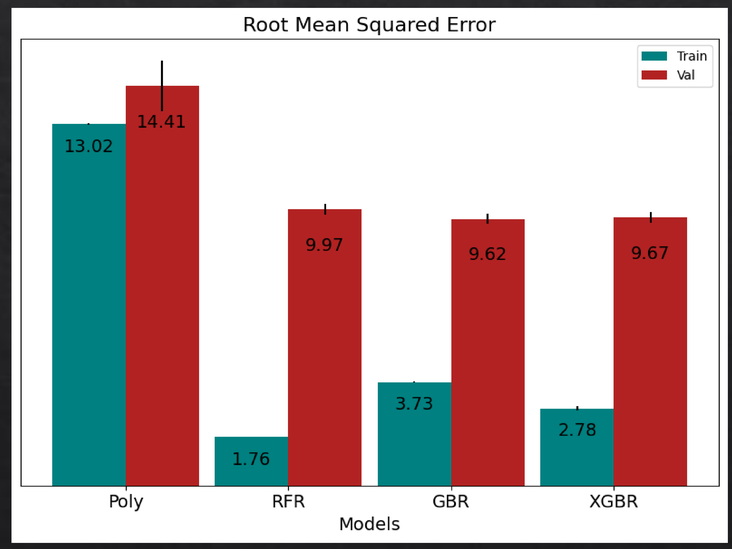
Inferential Statistics

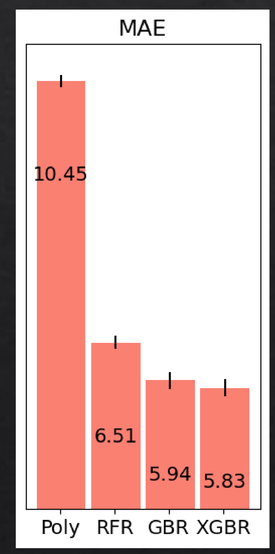


Inference – Significant features & its association with diseases

- ↑ **Glucose** – Diabetes, cardiovascular disease and cognitive decline including Alzheimer's disease.
- ↑ **Urea** – Kidney diseases.
- ↑ **Cholesterol** – Cardiovascular disease, stroke and Alzheimer's.
- ↑ **Alkaline Phosphate** – Liver disease, bone cancer.
- ↑ **MCV** – increased mortality risk in older adults.

Predictive Modelling





Conclusion

- Gradient Boosting Regressor performs better with **9.61 RMSE and 5.93 MAE.**
- The best model is then deployed in the website using Flask, Google Cloud.

Future Scope

- Include other potential biomarkers such as genetic information, ethnicity and lifestyle factors into consideration.
- Assess interventions to improve aging effects through lifestyle modifications based on biochemical profile.