Predicting Time to Diabetes Onset and Analyzing Diversity, Equity, and Equality in Research

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CHL5230- APPLIED MACHINE LEARNING FOR HEALTH DATA

Fall 2023

University of Toronto

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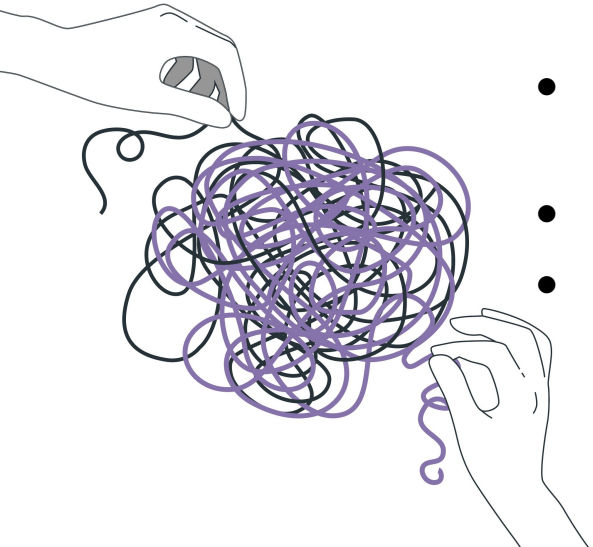
Research Questions and Dataset

- **Main Research Questions**
  - Can we predict the time to a diabetes onset?
  - What does current research about diabetes consist of?
    - How often is diversity and equity discussed in these papers?
    - What are the common methods used in research?
    - What are the common terms used in prevention methods?
- Diabetes prevalence is increasing at a rate of 3.3% per year. Predicting diabetes onset is important for prevention measures.
- Dataset is called Diabetes Study File 10K Dec 14 2017, from CPCSSM, with 10000 observations and 43 features.

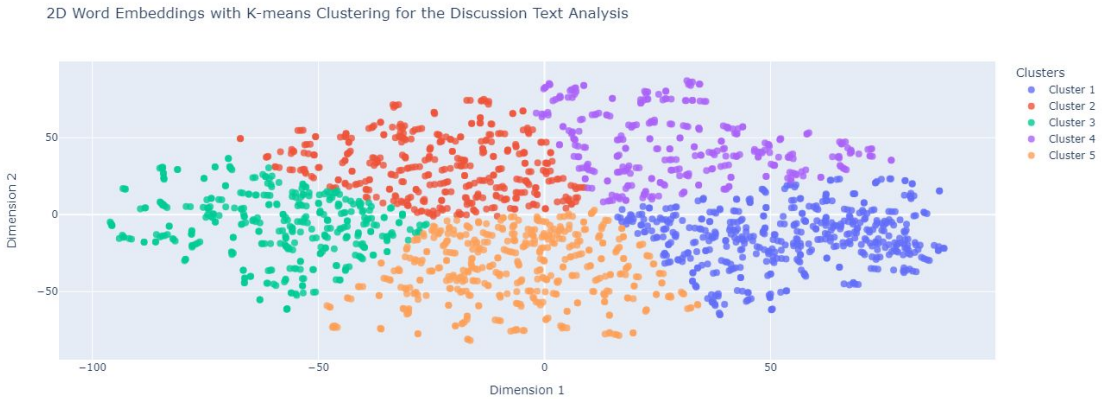
Methodology (Inside the Box)

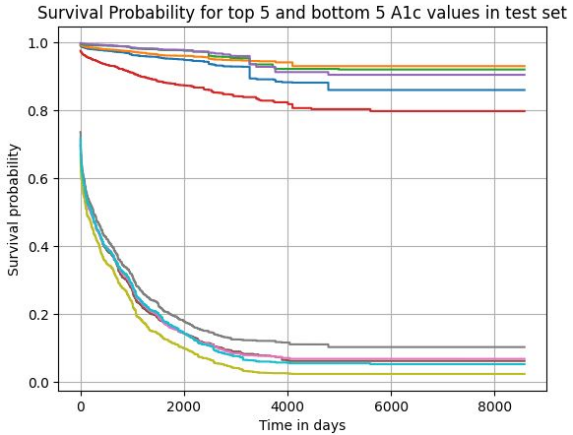
- **Random Survival Forest (RSF)** to predict time to diabetes onset
  - Data is primarily composed date/time features
  - Accommodates right censoring
- **GloVe** and **K-Means Clustering** for analysis of research
  - GloVe chosen for global text context
  - K-Means chosen for unlabeled text data exploration
- **Core features**: Survival Time, Comorbidities, Biomarkers, Manuscript Text.
- **Target variable**: Time to Diabetes onset for RSF
- **Survival analysis methods** and **impacts of bias and diversity** unexplored in current literature.



Results

- 100 trees trained with max depth of 15, min sample split of 150, and min sample leaf of 100
- Random Survival Forest Model resulted in a **high concordance index of 0.83**
- **A1c** and **fasting blood sugar (FBS)** are the most important for prediction
- K-means showed diversity terms were closely related to systems, structures, and institutions





Novel Method for Predicting Time to Diabetes Onset

- RSF model has high performance and potential for diabetes screening and prevention
- **Limitations**
  - Left censored data
  - Computational intensity
- **Findings within text analysis**
  - Stigmatized language did not appear in the word cloud
  - More needs to be done in relating populations to the data analysis