

Patient Health Predictor

Project Type: Development Track

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Functions and Users

The main concept revolves around a web-based application designed to predict high-risk diseases based on a patient's clinical note, including details like family history, weight, and height. This tool is aimed at clinical professionals, offering functionalities to identify the top-5 most likely diseases a patient could have. Optionally, we could implement visualization of an interactive disease network showcasing the association between different types of nodes for each patient, and generate downloadable or shareable reports on these diseases for further consultation with other physicians.

Significance

This tool would allow clinical professionals to provide their patients with insights into potential future medical conditions they are most likely to develop, using a search engine that is powered by statistical models that analyze thousands of clinical notes. By identifying key conditions to monitor, both the clinician and patient can prioritize their health strategies, focusing on preventative measures to mitigate the risk of developing these anticipated medical conditions or diseases.

Approach

Utilizing the MIMIC-IV dataset, this project utilizes Python, HTML, CSS, and Javascript, alongside libraries such as OpenAI, NLTK for natural language processing, Networkx for network analysis, and frameworks like React or Django and Shiny for web development. A significant consideration is the inability to directly process clinical notes with OpenAI due to patient data sensitivity. To address this, we plan to implement Azure as an intermediary layer over OpenAI, ensuring data protection and compliance with privacy standards.

Evaluation

The model's effectiveness will be evaluated through precision, recall, and F1 score metrics across both training and testing phases. Additionally, user experience and functionality will be assessed by inviting a group of 5-10 users to interact with the tool and provide feedback through a survey, with the results compiled into a comprehensive report.

Timeline

The project's timeline outlines key milestones over a span of four weeks, starting with establishing a basic website layout and initial search engine development in the first week. Subsequent weeks focus on refining the search engine, integrating it with the user interface (UI), and adding visualization features. Week four is dedicated to user testing and refinement based on feedback, culminating in a presentation and final report on May 7th.

Task division

For the project's task division, Sreedhar and Gautam are anticipated to focus on crafting the user interface (UI), meanwhile, Dina and Riya are expected to channel their efforts into developing and refining the search engine.