Medical Dashboard Development and Visualization for Critical Care Data

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If you have any questions or would like to provide feedback, please contact me: zedd.yuan@utexas.edu
Project Source Code: https://github.com/yngyuan/mimic-demo

Overview

The project aims to design and develop a dashboard of the MIMIC-iii dataset for doctors. With the guidance of my supervisors from Dell Medical School, I developed a dashboard application using Cube.js and designed visualization of the MIMIC-iii demo dataset. The application consists of a playground where doctors can try out different graphs with easy drag-and-drop operations, a demo data visualization of various graphs focusing on Sepsis, and a user account system providing customized dashboard for each account. In conclusion, this is a medical data dashboard application of the doctors, by the doctors, and for the doctors.

Tools and Methods

- Backend: PostgreSQL, Node.js, Cube.js, AWS Cognito
- Frontend: React.js, Recharts, Ant Design

Results

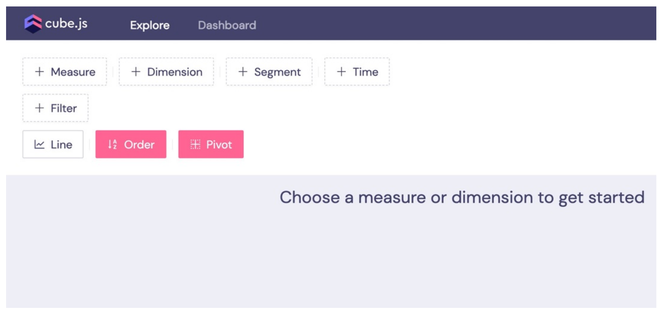

Figure 1. Creating a graph in Playground.

A playground where users can try out different queries and visualization without having to write SQL script.

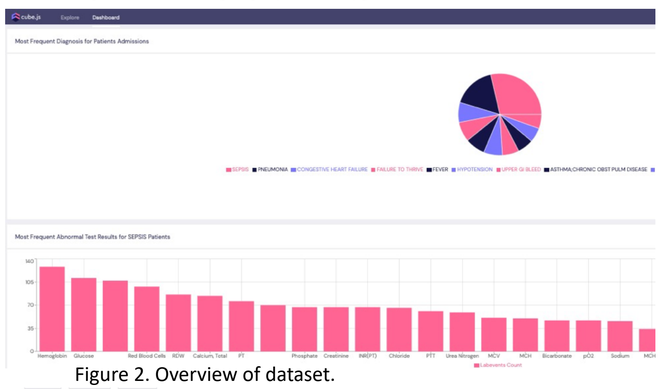

Figure 2. Overview of dataset.

An example of visualization of the aggregated results from the dataset.

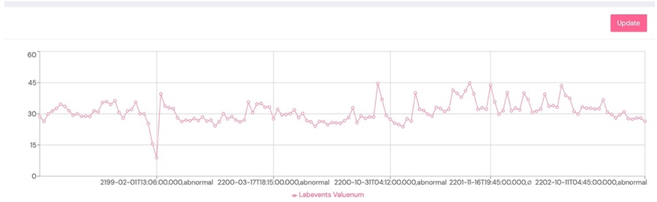

Figure 3. Line graph of metrics for one patient.

An example of visualization of lab test results of one patient.

wbc, hb, hct, plt for PatientID:44212, F

D Labitems Label	Labevents Valueuom	D Labitems Normal Range F	Labevents Charttime 2123-11-24T14:40:00.000 Labevents Valuenum	Labevents Charttime 2123-11-25T05:25:00.000 Labevents Valuenum	Labevents Charttime 2123-11-26T04:31:00.000 Labevents Valuenum
Hematocrit	%	36%-48%	25.9	23.8	22.5
Hemoglobin	g/dL	12.0-15.5	8.5	8	7.9
Platelet Count	K/uL	140-400	71	69	80
White Blood Cells	K/uL	5-10	8.8	11.4	9.8

Figure 4. Chart example.

An example of a chart showing different lab results over time.

Challenges

- Understanding of the mimic-iii dataset.
- Adopting a new technology. Cube.js, though powerful, is a very new tech stack so there are fewer resources online.
- Generalization vs Specification.

User Feedback

- Take into consideration of reliability of the dataset. The mimic dataset contains different kinds of entries.
- It would be great to show normal ranges and be able to edit it.
- Live graphs are not an essential part for this project.

Next Steps

- Customize the normal range on graph.
- Drill down a specific graph to view each row.
- Show the data trends using machine learning algorithms.