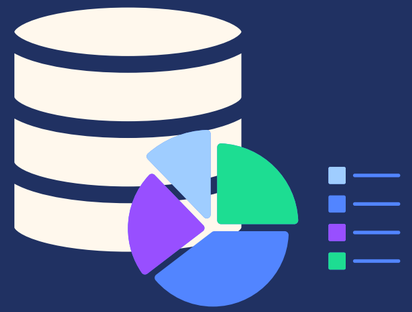
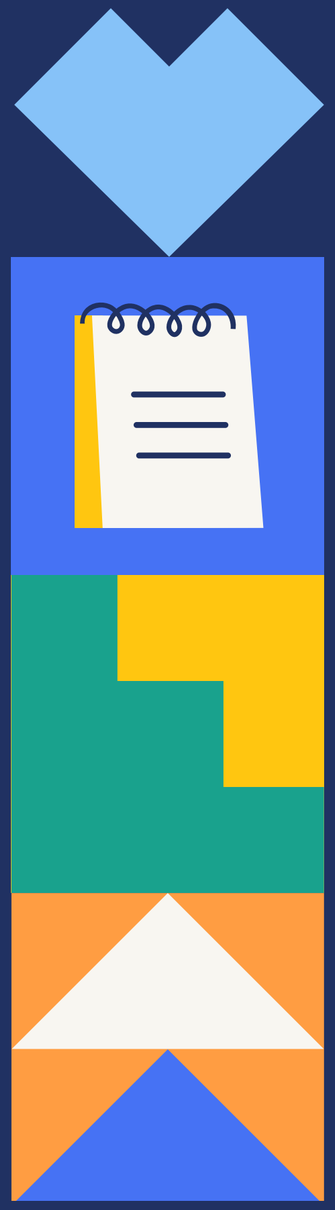
DB Wiz - AI Powered Data Visualiser



Explore how to organize and present data



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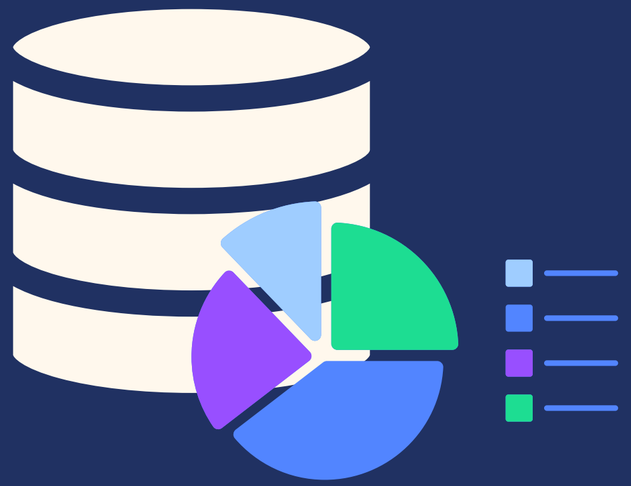
Introduction



DB Wiz : A data visualizer

- Our project, DB Wiz, is a data visualization app with AI integration. It aims to simplify the process of creating visualizations for SQL databases.
- We also provide AI assistance for Natural Language Queries, and a user friendly GUI, to lower the skill threshold for using relational databases.
- This presentation outlines our roadmap to develop this app, and backs the usefulness and validity of this idea.

Problem Definition

Project Title: An AI powered data visualizer with support for natural language Database queries and AI assisted visualization tools.

- **Visualizing data in a relational database may require many intermediate steps (like exporting that data into excel) and may be slow and cumbersome without dedicated tools.**
- **There are usually certain skill thresholds to using such software and such software may not be very accessible (ex. high pricing).**
- **AI is an emerging field and may have applications in this regard, which is also a topic being researched on.**

Objectives

- Making an easy to use no-code SQL database visualizer with GUI.
- Integrating AI into the process to make user experience as well as development process simpler (The exact uses are mentioned in the model section).
- Providing chatbot like NLP features for user to run simple SQL queries in english
- Creating a minimal and free alternative to apps like Tableau or powerBI for students and individuals.
- Acting as proof of concept that AI integration can help in this regard, and that this application of AI is only to become more relevant as AI agents improve at such a rapid pace.

Literature Survey

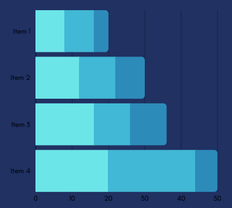
- All Papers cited focus on using data to uncover valuable insights and they also help us to explore AI techniques to create and analyze data visualizations.

- A stark increase in the number of AI related papers about visualizations can be seen after 2018, primarily due to the advent of AI in recent years it’s surge in popularity.

- Papers talk about different ways AI could assist in this domain, like translating queries across languages, providing approximate visualizations using AI to improve performance at the cost of accuracy, etc.

- A stark focus is on Improving existing visualizations with AI techniques.

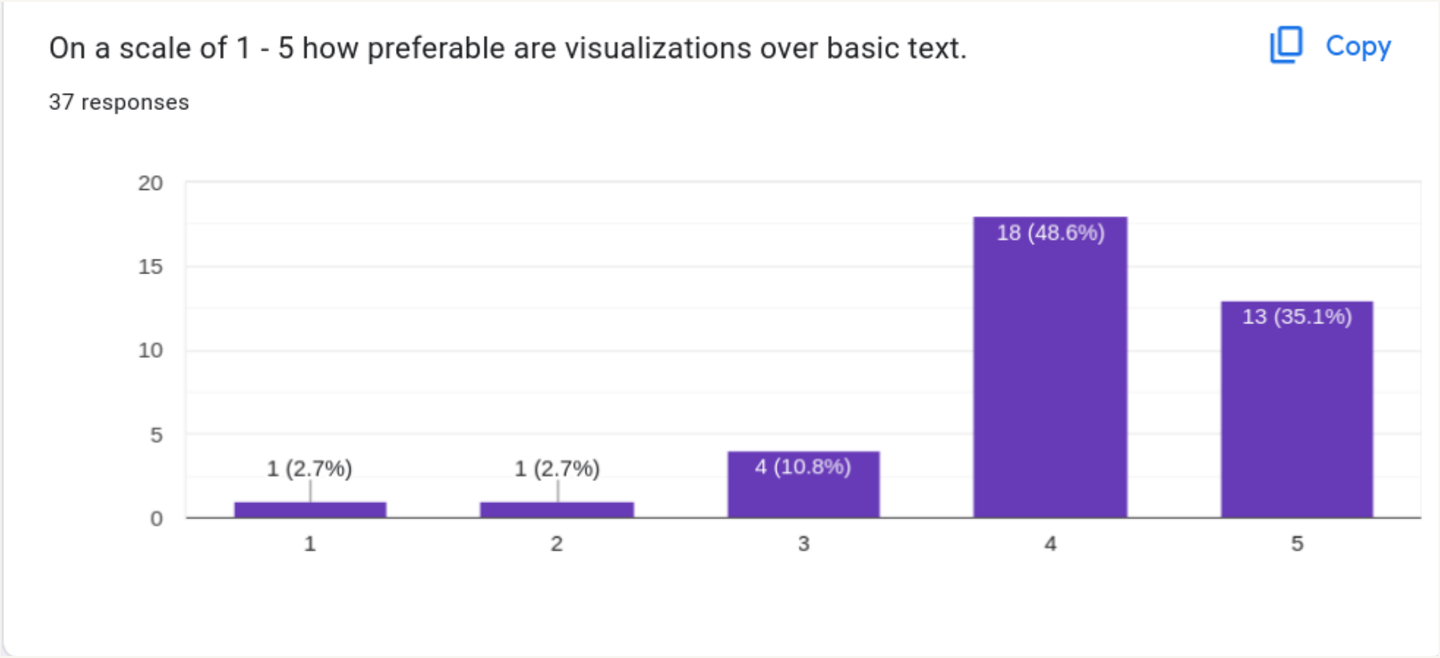
Market Survey

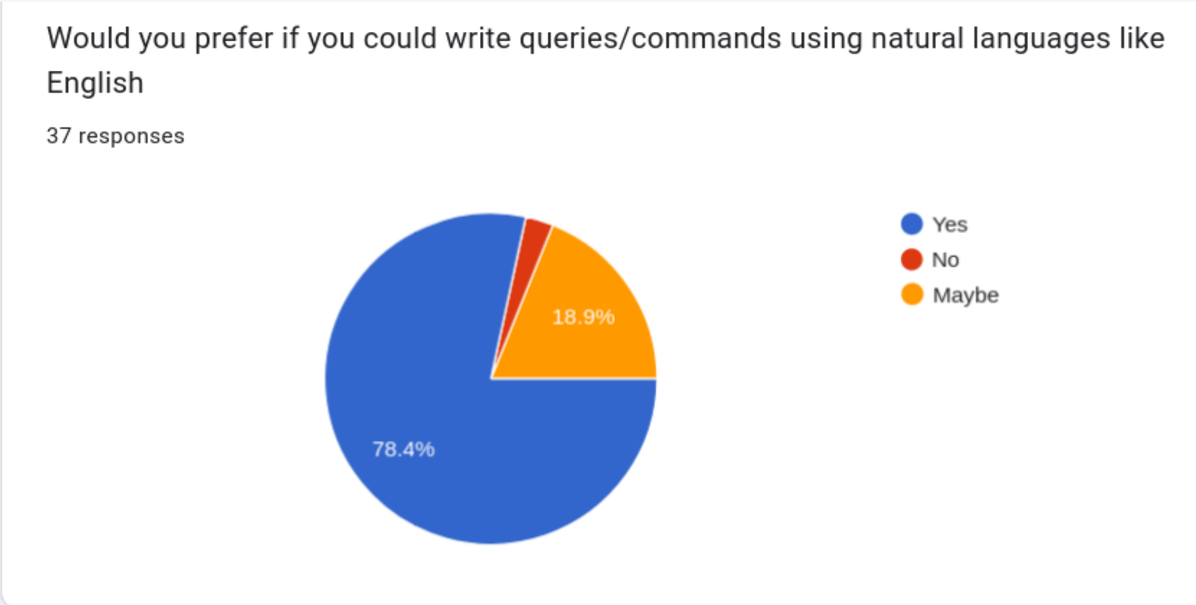


Market survey inferences:

- Most of the students prefered visualization over basic text.

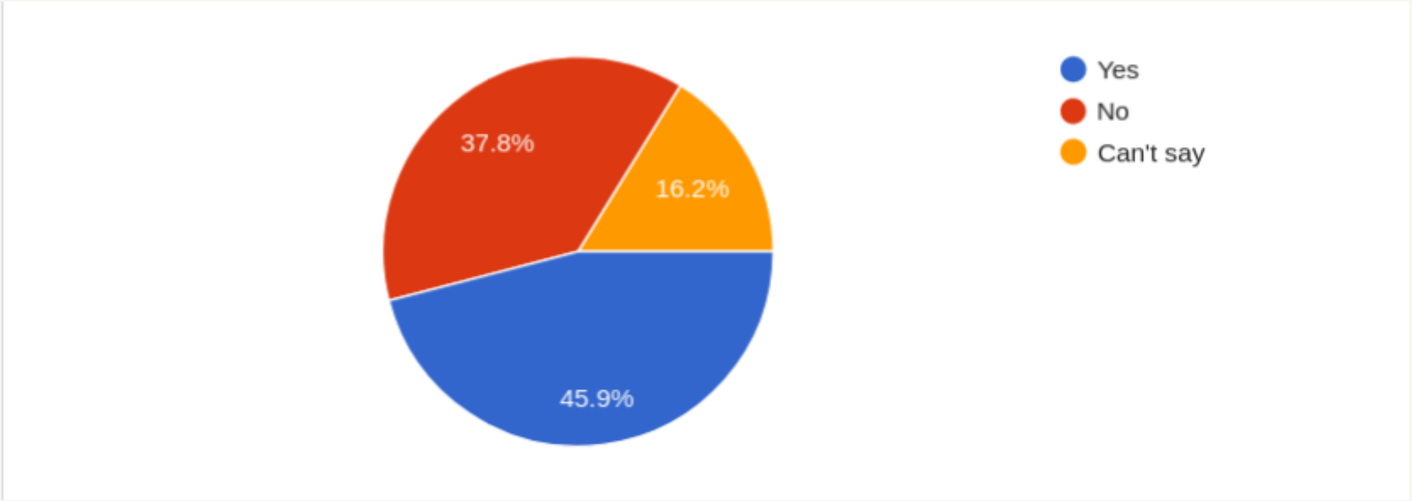
- Most of students feel at ease when writing queries in natural language





- Many students found visualizing SQL databases difficult

- DBWiz provides many features requested by students



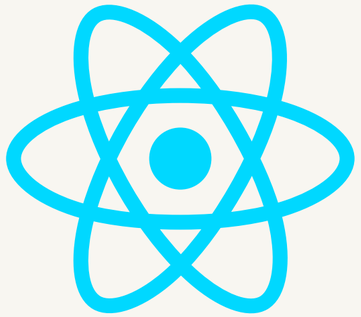
Which Features would you want in a data visualizer

9 responses

Hover
Ease of use and a good amount of options for different kinds of visualizations
voice input
Clean and easy to use GUI
Easy to use, with AI integration, like copilot
Step By Step In Detail Visualisation
Data can be accurate, clear and embeddability of visualizer
Good data visualisation and an appropriate guidance for beginners
Auto complete

Tech Stack

Frontend



React

React JS was the optimal choice for the frontend framework of the application as it has an abundance of libraries for making the development process easier.

It is also preferable to port on desktop and mobile devices using tools like electron and react native

Tech Stack

Frontend

Material UI

Material UI was the optimal choice for the UI library of the application as it is the most modular unlike bare-bones CSS and still customizable unlike options like Bootstrap

Tech Stack

Backend

Node JS

As we are making an app which is powered by React JS in the frontend it was sensible to create the backend in something with the same language as Javascript.

Hence, Node JS was the perfect contender for the job.

It has optimal speed and development ease .

Tech Stack

Backend

Express

For creating https requests over the network and handling routes and middleware in Node JS, express js is by far the fastest and most unopiniated.

Express JS

Tech Stack

Authentication and Security

For secure login and sign up for the users.

OAuth

Non - relational database for user data

For storing user data and saved databases and dashboards.

MongoDB

Tech Stack

APIs

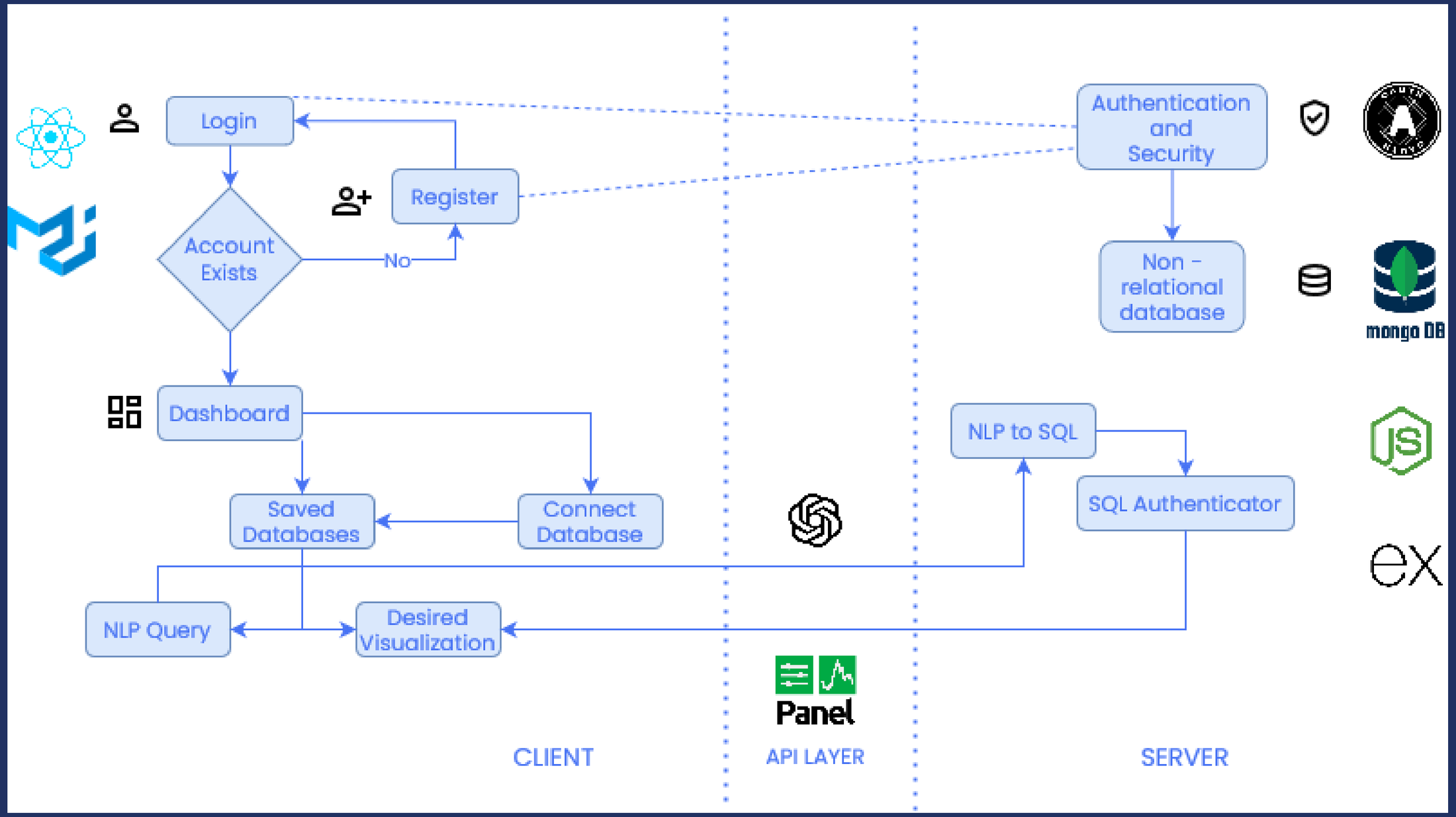
OpenAI API

Powerful language translation tools to break down communication barriers and convert Natural Language to SQL queries

Panel graphing API

Panel's reactive design lets your visualizations and tools respond dynamically to user input. To convert data to graphs and charts

Proposed System model: block diagram



Proposed system model

- We would first generate the schema of the ingested database through pre written logic, then the user would choose the data from the tables for which to make the charts for.

- For this process, we would use Generative AI to write prompts and retrieve data from the database as per the user's selections. The selections can demand pretty complex queries to be written which would be difficult to pre-program, so AI could help us in this case.

- The schema generated by us would be passed on to the AI agent, which would then generate queries to retrieve data as the user chooses. A query validation process should also be incorporated so that the AI agent is prompted with the error message from the SQL server if one is generated, and a new prompt is requested.

- After the data required by the user is read from the database, the visualizations would be then made using the PANEL api in python.

- The app would also have a chatbot like feature wherein the user can write natural language prompts to the AI to retrieve data from the database in question.

- Though this may not be the best way to process data as of now, as AI agents get better with time, and they have been showing an astonishingly high rate of growth, the queries written by the AI would only get more accurate and the response time would only decrease. So this project also acts as a proof of concept in this regard.
- This application of AI also makes development easier as now the developer no longer needs to handle all complex queries which would be required.

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Mentor
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Thank You

Group 1

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