

Team Hack-o-holics

# noSQL not obligatory SQL

A Natural Language Interface for SQL

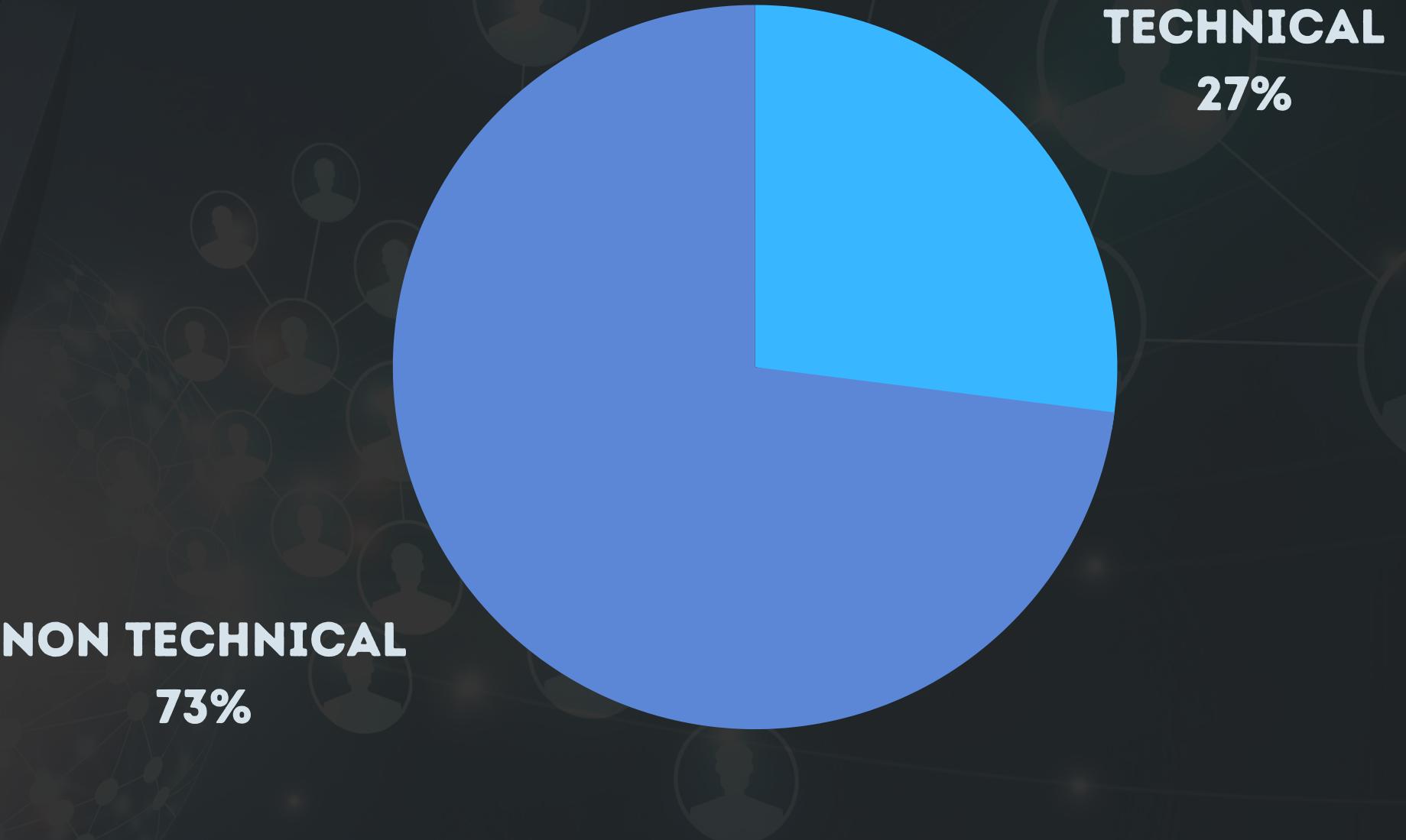
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PASCKATHON  
2020

# Need

Most institutions have their data in the digital format. It becomes difficult for people with no technical background to access data and find insightful information from it.

Companies have a compulsive need to invest in a team of technical professionals for these purposes.

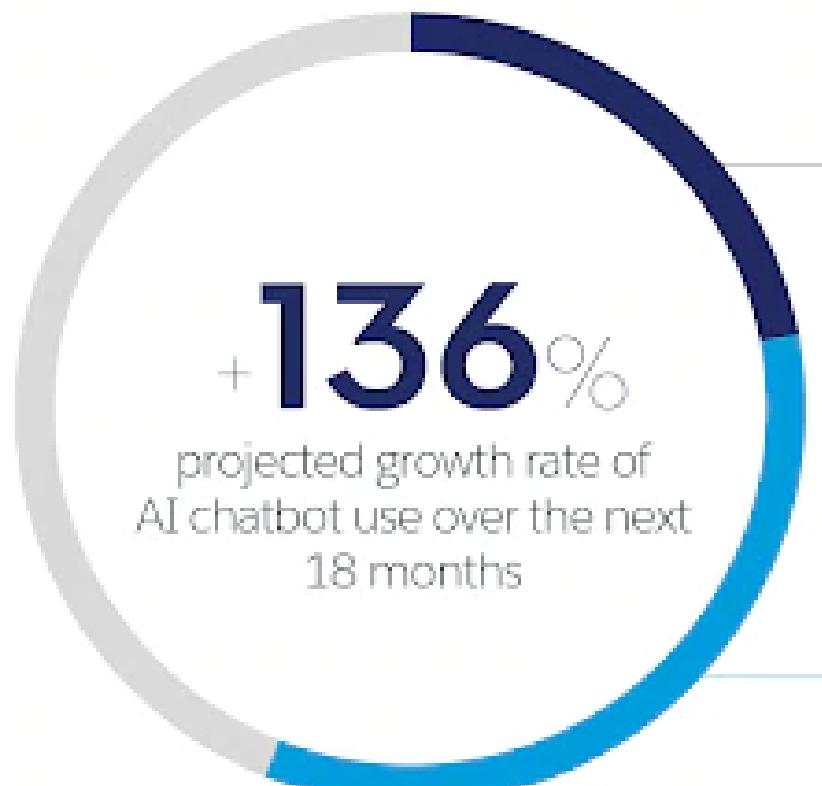


This graph shows the distribution of professional crowd with respect to their technical background.

# Chatbots

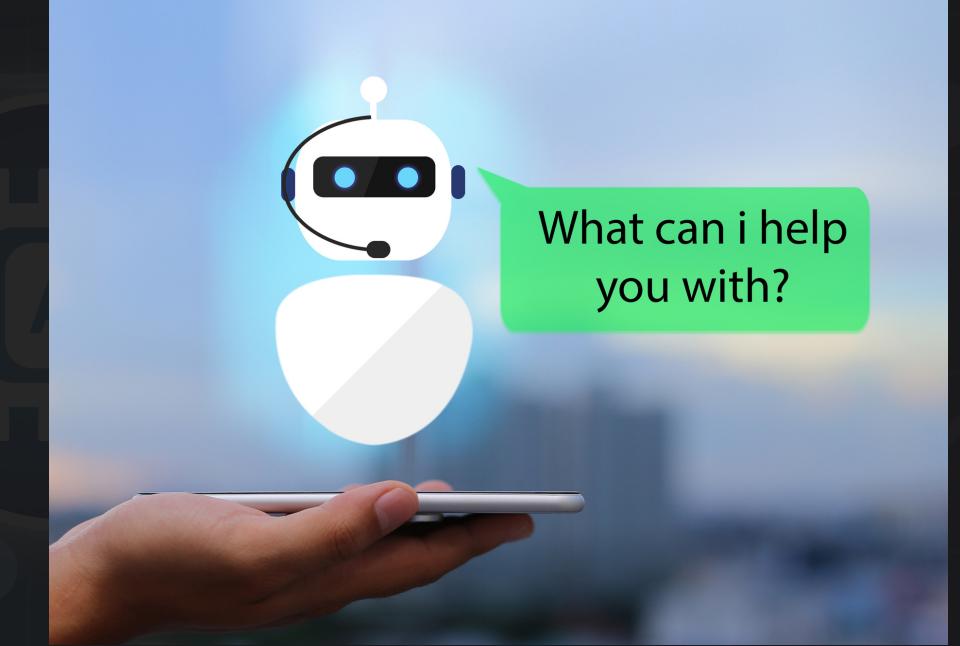
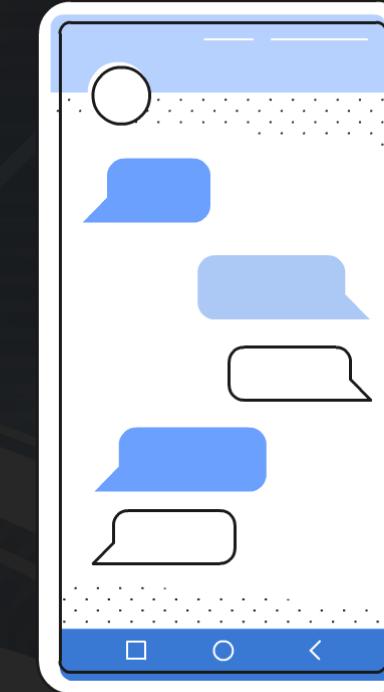
Chatbots are revolutionizing the way people interact with technology.

Use or Planned Use of AI Chatbots Among Service Organizations



**23%**  
currently use AI chatbots

**31%**  
plan to use AI chatbots  
within 18 months

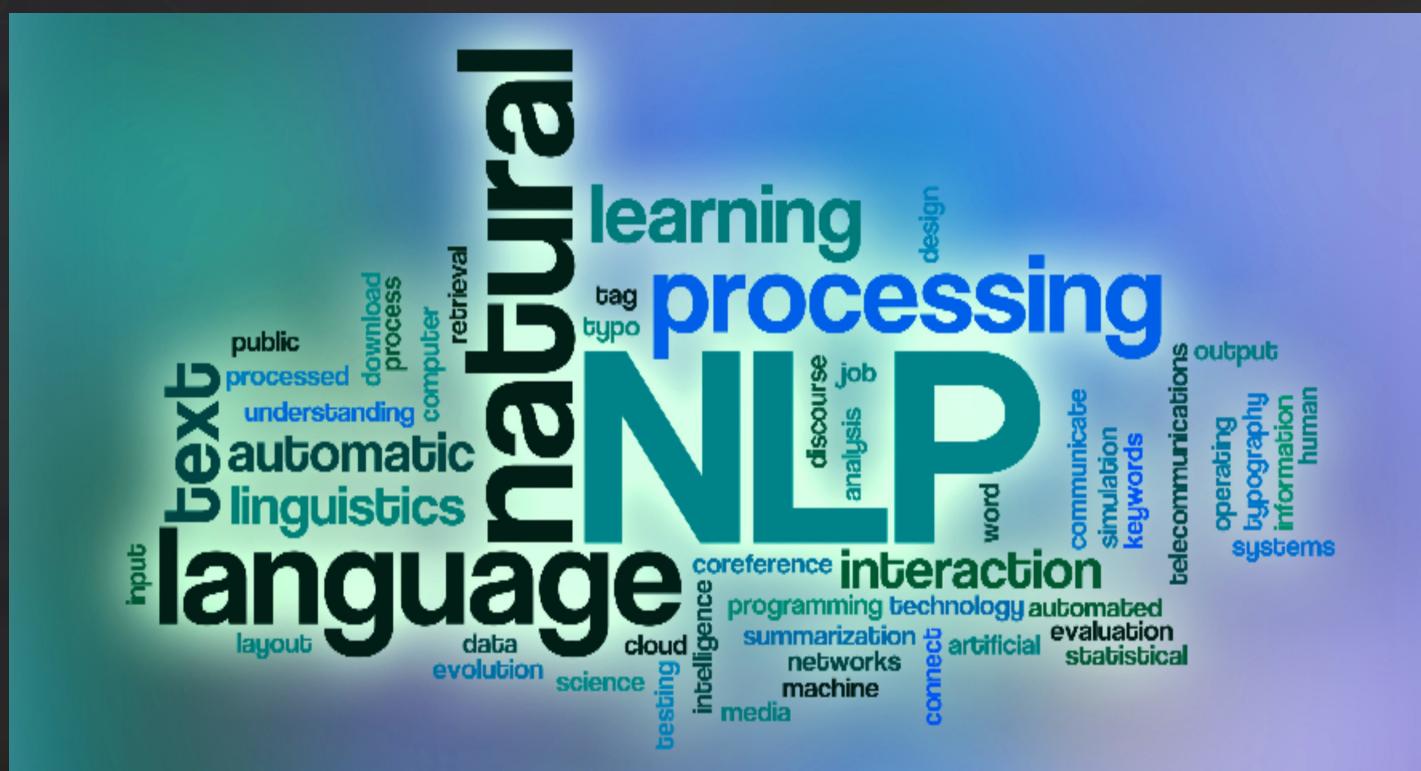


They bridge the gap between human understanding and respective computer interpretation.

With a chatbot interface the user does not need any kind of technical background and leveraging the modern day AI and NLP tools we can get maximum efficiency.

# Proposed Solution

We have implemented a Natural Language interface to access a Database Management System for users who do not have knowledge about SQL.



The user can access the database using a chatbot interface where he/she can retrieve data using *simple English language* rather than using complex SQL queries.

The system takes .sql file as an input and an SQL parser program fetches the tables, attributes, primary keys of each table and the relations between the tables(foreign keys).

# Features implemented



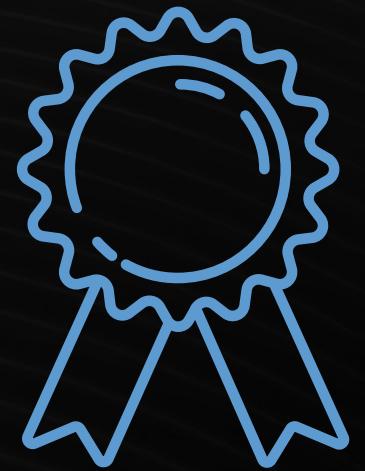
SQL Parser which can take any custom database schema file and extract tables, attributes, keys and their dependencies.

Correctly forming a query for the given English statement which can be given as input from chat text or using mic (audio-input).

Generating queries with multiple WHERE conditions, AGGREGATE functions from sentences (table names and attributes are identified by their synonyms as well)

Download option to download larger output from the given query to a CSV format.

# Unique Selling Points



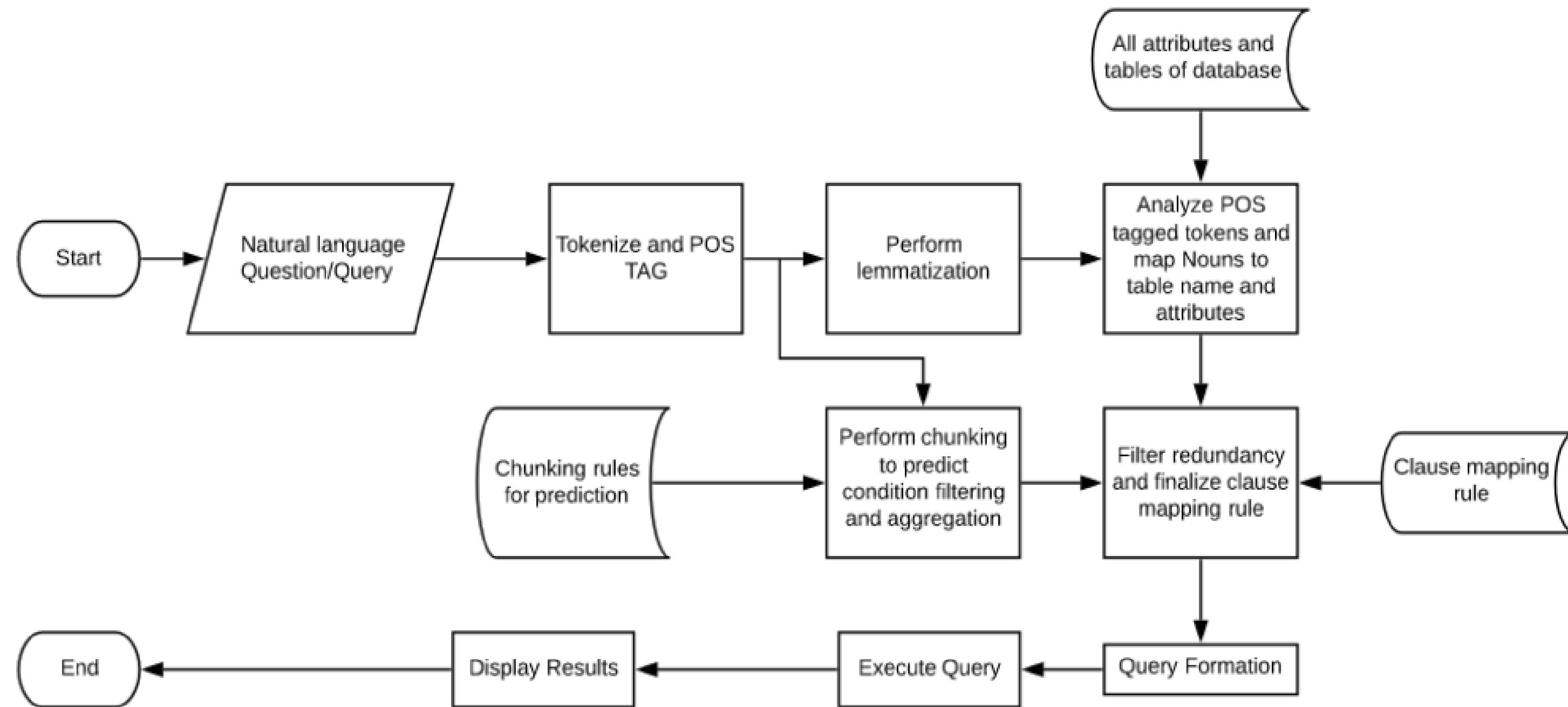
SQL parser algorithm fetches the attributes, dependencies of ANY custom database schema

The algorithm which generates the correct SQL query from a Natural Language statement (question) given by the user

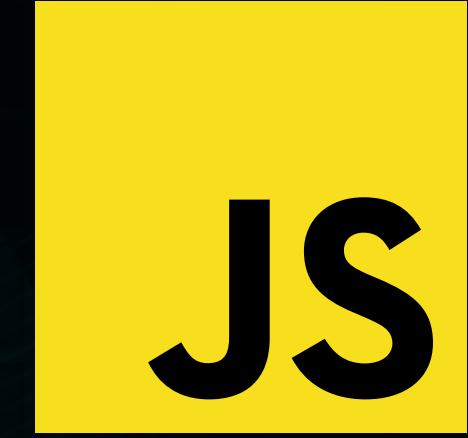
A brief analysis of retrieved data is presented along with some visualizations for better interpretations

Restricted access for non-admin users (complete database can be accessed only by admins) to assure Security of private data

# Architecture



# Tech Stack



## BACKEND

- PYTHON
- FLASK
- SPACY
- NLTK
- MYSQL



## spaCy



NLTK



Flask

## FRONTEND

- HTML5
- CSS3
- AJAX
- JQUERY
- SPEECH-TO-TEXT

# Applications



This kind of interface has wide applications where the users of the database don't necessarily need to be well-versed with SQL language and Database management.

Any user can access data and get a high level overview for further use directly from the user-friendly chatbot interface.

Some applications can be -

- Hospitals to store and retrieve medical records
- Financial markets to retrieve data and analyse market trends.
- E-commerce companies to save and retrieve data of customers and products.

# Future Scope

1. Complex queries like JOINs, subqueries and Data Manipulation.
2. Multilingual facility to cater a wider range of people.
3. Increased efficiency for complicated English questions.
4. Effective Visualization to get better insights of the data.
5. Increase Security of the system by Access Control.

