deti universidade de aveiro
departamento de eletrónica, telecomunicações e informática

AskSQL

Transforma Linguagem Natural em SQL, Relatorios e Graficos

Mestrado Ciência de Dados
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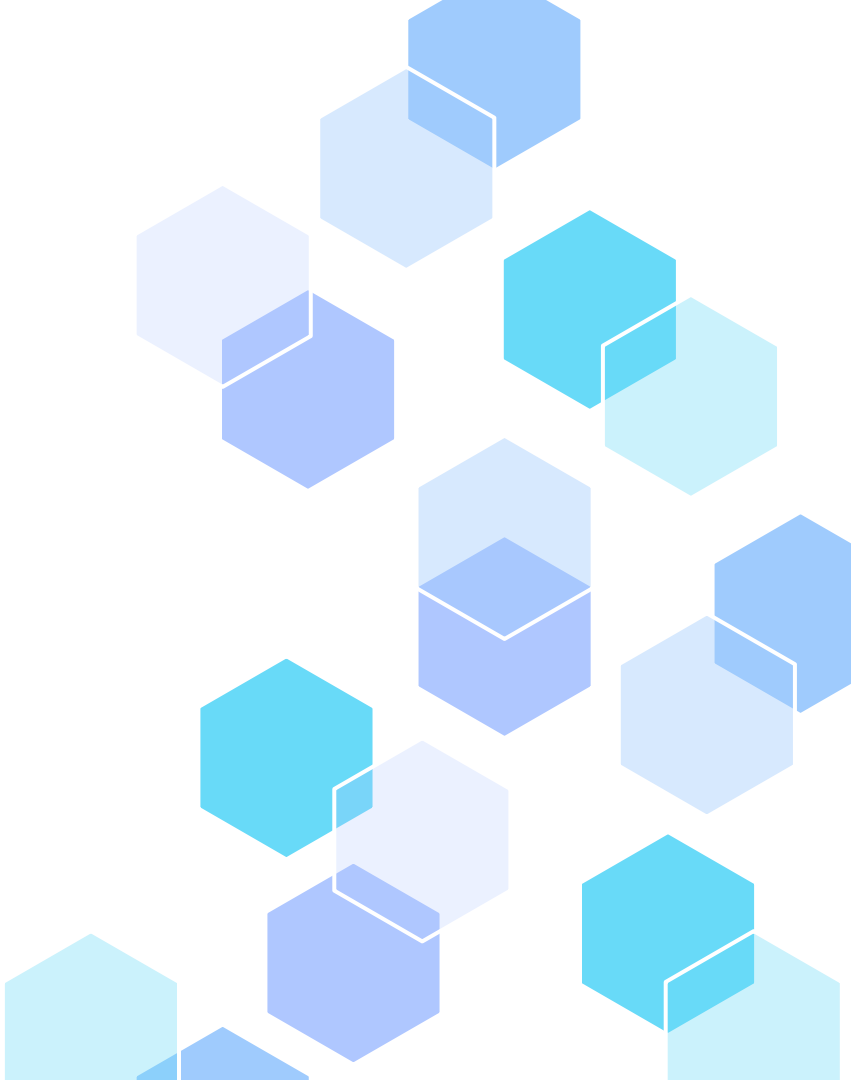
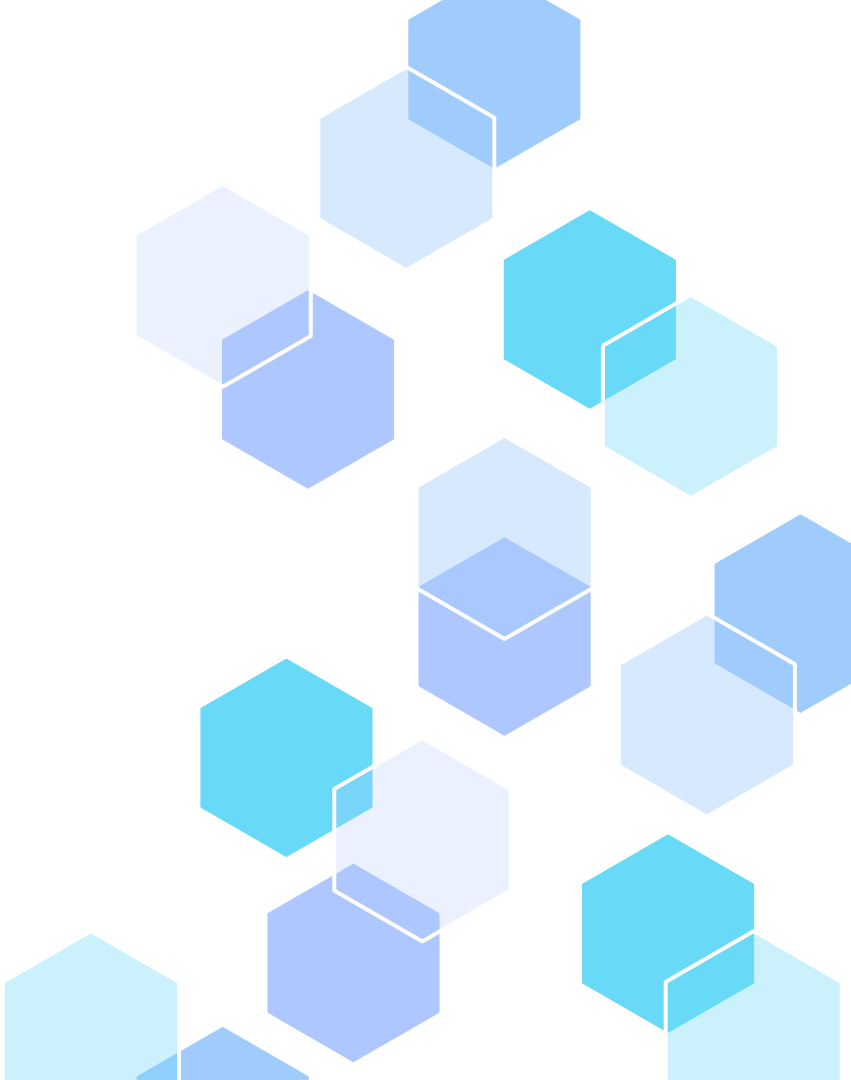
Introduction



02

Problem



Context & Motivation

More people want to perform complex tasks **without technical expertise with AI**.

In the field of **data analysis**, there is a growing demand for **simple and accessible solutions**.

The need to master **programming languages or BI tools** remains a major barrier.

Challenges faced by non-technical users:

- Difficulty interacting with databases.
- Lack of knowledge in SQL or analytics tools.
- Dependence on technical professionals to generate reports.

Problem & Goals

To create an intuitive and user-friendly application that allows:

- Generation of **reports and charts** through **natural language input**.
- No need for technical knowledge in **databases** or **BI tools**.

Report Generation

Graph Generation

SQL Exploration

Problem & Goals

How the application works:

1. The user types a request in natural language
   e.g., “I want a report of sales by category and country in 2023.”

2. The system uses **Natural Language Processing (NLP)** and a **Large Language Model (LLM)** to interpret the query.

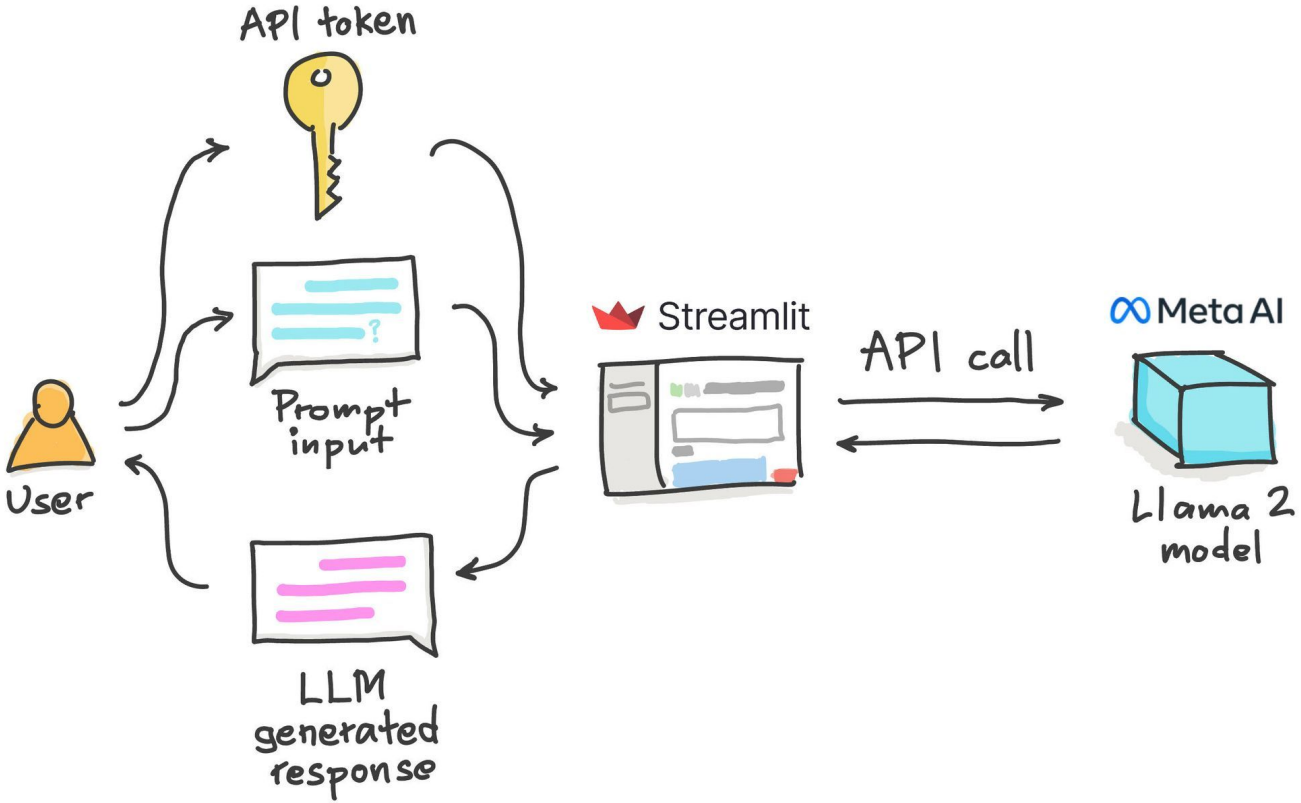
3. An **SQL query** is automatically generated.

4. The query is executed, and the data is presented in **interactive reports and dynamic visualizations**.

03

Implementation

Implementation



Implementation

To make the application more interactive and helpful, we added a set of simple commands, inspired by GitHub Copilot:

- **/sql** – Shows the SQL query generated from the user's request
- **/tables** – Lists the available tables in the database
- **/chart** – Displays the Python code used to generate the chart
- **/explain** – Explains the results of the query in a simple way
- **/refactor** – Edits the last prompt with new information
- **/reset** – Clears the current conversation to start fresh

These commands help users understand, explore, and customize their data analysis — even with no technical background!

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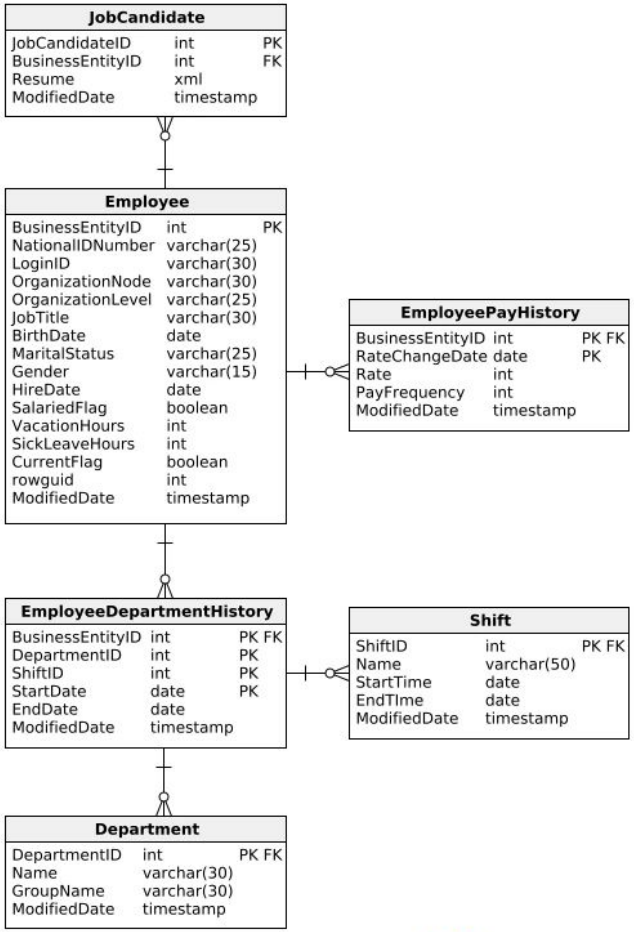
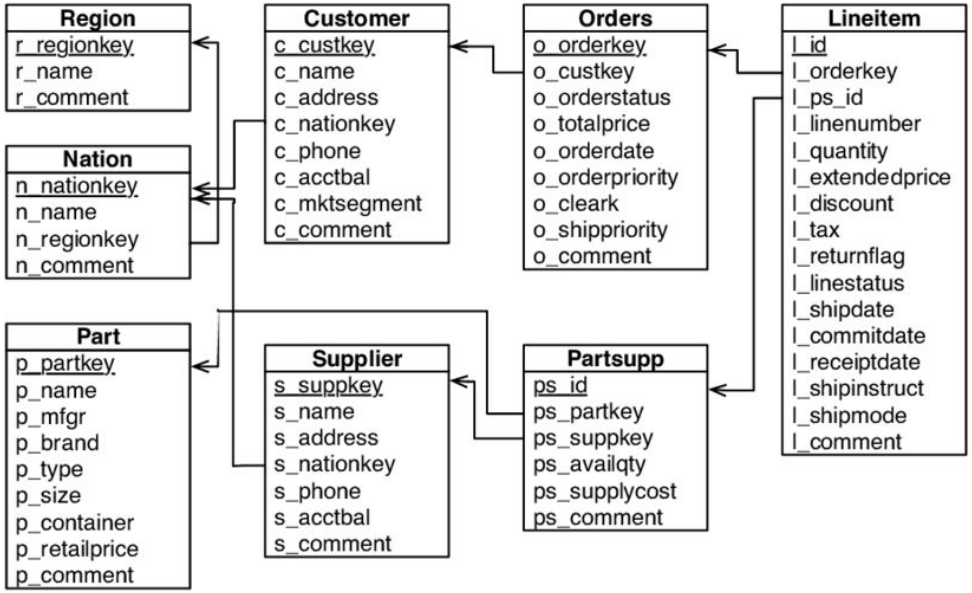
Results

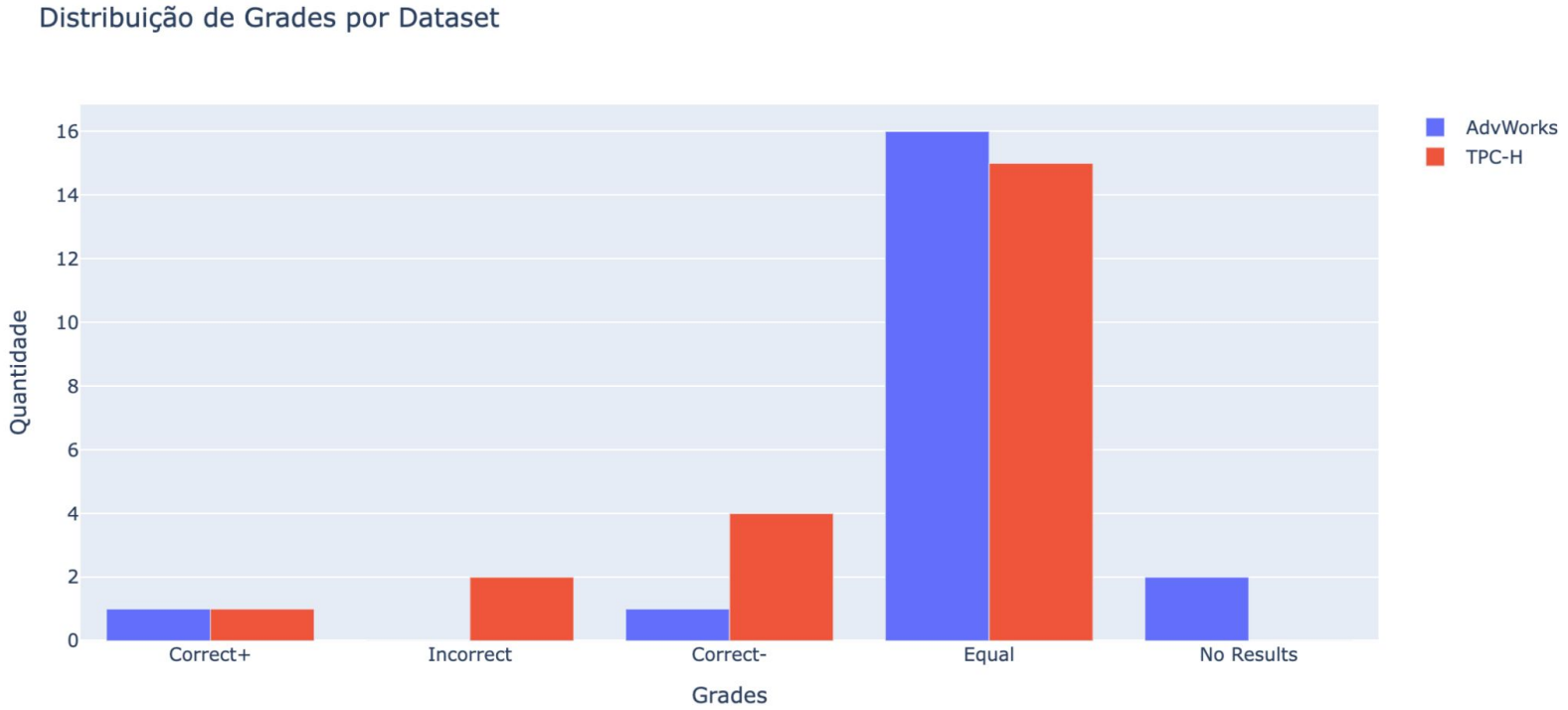
Adventure Works Diagram





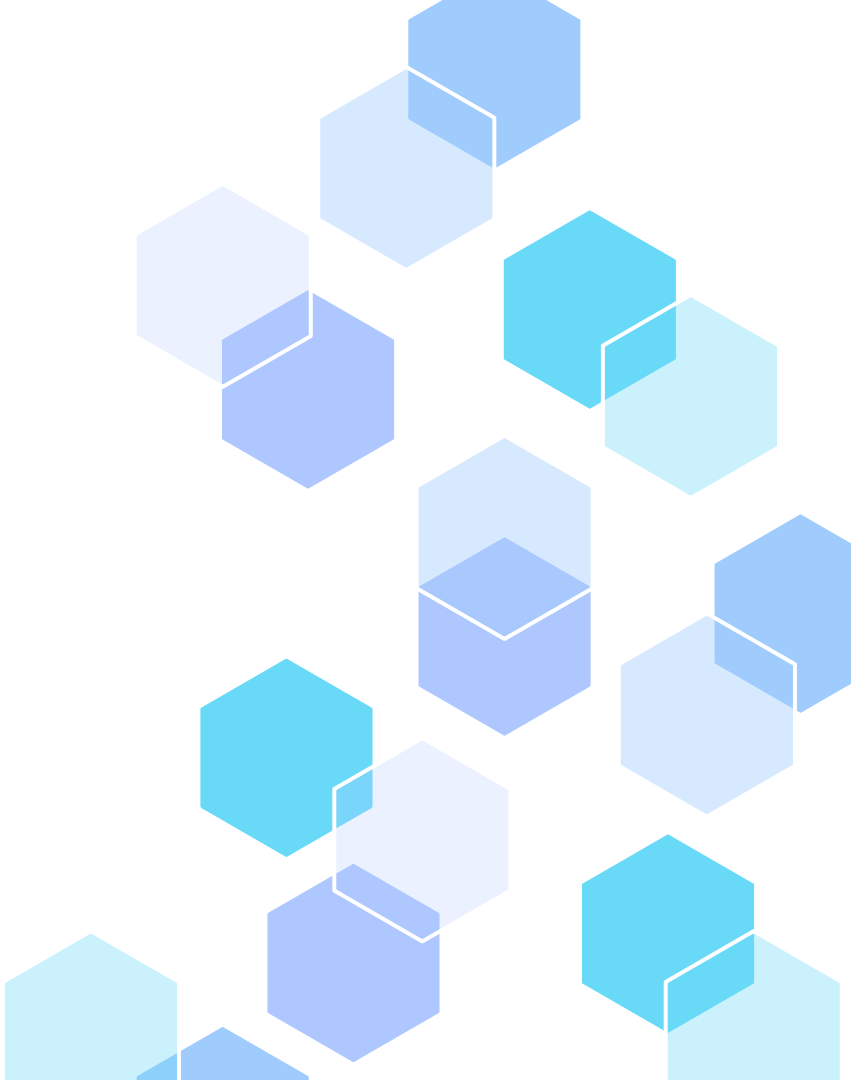
TPC-H Diagram

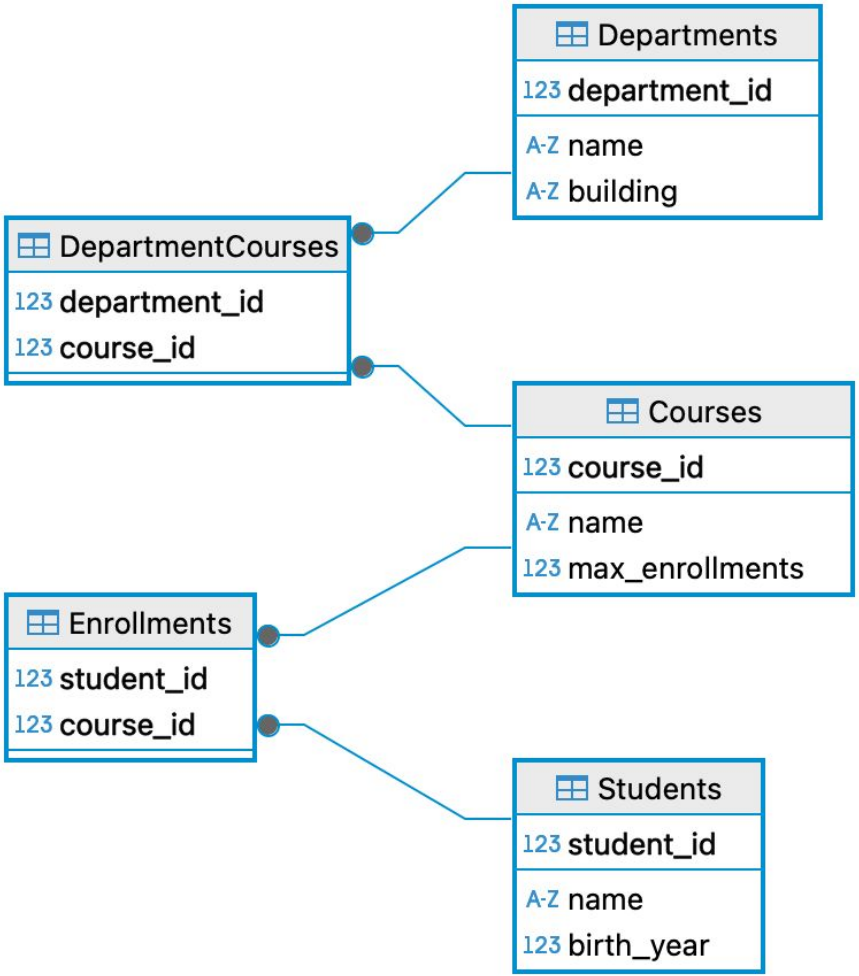
Results


Distribuição de Grades por Dataset
Quantidade
16
14
12
10
8
6
4
2
0
Correct+
Incorrect
Correct-
Equal
No Results
Grades
AdvWorks
TPC-H

05

Exploration




Departments
123 department_id
A-Z name
A-Z building
DepartmentCourses
123 department_id
123 course_id
Courses
123 course_id
A-Z name
123 max_enrollments
Enrollments
123 student_id
123 course_id
Students
123 student_id
A-Z name
123 birth_year

Thanks!

Do you have any questions?