Evaluating Gen AI's Capabilities for Assisting Users in Database Design for SQL and NoSQL Systems

Assignment-4

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1 Introduction

In this report,we aim to explore the capabilities of GenAI in assisting ua with database creation, focusing on both MySQL and NoSQL (generic NoSQL database). The database creation process is evaluated through the lens of developing a database for the popular video game series "Pokemon." The game's mechanics involve Pokemon entities with specific types and moves, each contributing to their effectiveness in battles. Given this context, the challenge lies in designing a database schema capable of effectively managing Pokemon, types, moves, and their intricate relationships. Additionally, the study investigates GenAI's responsiveness and effectiveness in guiding users through the creation of databases tailored to MySQL and NoSQL environments. Through this exploration, we aim to gain insights into the strengths and limitations of GenAI in database development tasks, particularly in diverse database systems such as MySQL and NoSQL

2 Problem Statement:

1. Create all the tables needed:
   - Pokémon
   - Type
   - Move

   (a) With the following details, populate the tables: (5)
      - Bulbasaur is a Pokémon of Grass type.
      - Charmander is a Pokémon of Fire type.
      - Squirtle is a Pokémon of Water type.
      - Eevee is a Pokémon of Normal type.

- Pidgey is a Pokémon of the Normal/Flying type.
- Bulbasaur can learn Tackle, Vine Whip, and Return.
- Charmander can learn Tackle, Ember, and Return.
- Squirtle can learn Tackle, Water Gun, and Return.
- Eevee can learn Tackle, Headbutt, and Return.
- Pidgey can learn Tackle, Wing Attack, and Return.
- Tackle has 35 power and is Normal type.
- Water Gun has 40 power and is Water type.
- Ember has 40 power and is Fire type.
- Vine Whip has 40 power and is Grass type.
- Wing Attack has 65 power and is Flying type.
- Headbutt has 70 power and is Normal type.
- Return has 100 power and is Normal type.
- Fire is powerful against Grass but weak to Water.
- Grass is powerful against Water but weak to both Fire and Flying.
- Water is powerful against Fire but weak to Grass.
- Normal is not weak to anything but not powerful against anything either.
- Flying is powerful against Grass and has no weaknesses.

(b) Write a query that returns all the Pokémon who can learn 'Return'. (5)

(c) Write a query that returns all the moves in the game that are powerful against Grass. (5)

3 MySQL

GenAI offered precise guidance for MySQL database design, providing step-by-step instructions for creating the necessary tables. The response facilitated seamless creation of tables for Pokemon, Type, Move, PokemonMove, and TypeEffectiveness. Subsequent queries for data population and retrieval yielded successful results on the first attempt.

4 NoSQL

In contrast, the experience with NoSQL databases, albeit generic, posed challenges. GenAI's assistance in NoSQL database creation was limited, necessitating additional effort and consultation of external resources. Despite lacking prior experience, I navigated through the process using available documentation and external tools. Although the experience contributed to learning about NoSQL database design, GenAI's guidance was not as comprehensive as anticipated.

5 Analysis and Conclusion

MySQL database creation benefited from GenAI's clear and concise instructions, resulting in a straightforward process. However, the limited support for NoSQL databases, as observed in this generic NoSQL scenario, underscores the need for improvement. Enhancing GenAI's adaptability to various NoSQL databases can enhance its utility in diverse database management tasks. Despite challenges encountered with NoSQL, the experience provided valuable insights into database design and management practices.