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Homework-1

**Chapter 1: Quick Facts About Generative AI (GenAI)**

**- What is Generative AI?**

Generative AI is a technology that can create brand new content by analyzing the data sets it has. This content can be in the form of text, images, music, video or code. What makes it different from other artificial intelligence systems is that instead of just recognizing what already exists, it can produce new and original outputs based on what it has learned.

**- In which areas is it used?**

1. **Content Production:**It is widely used in the advertising, media and entertainment industry to produce blog posts, scripts, social media content or visual designs.
2. **Health:**It is useful in areas such as interpreting radiology images, summarizing medical texts, or providing personalized treatment recommendations.
3. **Education:**It is integrated into educational technologies for purposes such as creating content according to students' levels, preparing test questions, or providing individual feedback.

In addition to these areas, its use is rapidly increasing in law, finance, game development, customer service and many other sectors.

**- What kind of applications can be developed when combining GenAI with graph databases?**

Graph databases are structures that represent relationships between data through nodes and connections. When combined with GenAI, these structures can be used to develop very powerful and contextually aware systems. For example:

* **Fraud detection:**Systems that identify suspicious activity by analyzing the connections between complex financial transactions.
* **Complex recommendation systems:**More accurate recommendations that work not only on user behavior, but also on social networks, interests and related data.
* **Information extraction and visualization:**Applications that contribute to decision support systems by creating relationship maps between big data.

Such combinations are particularly effective in making sense of large and complex data structures.

**- Are there any risks or ethical controversies?**

Although this technology has many benefits, its newness and uniqueness can also bring with it some significant risks and ethical issues.

* **Misleading content:**There is a risk of producing deepfake videos, fake news or misleading texts, which could threaten information security.
* **Copyright and data usage:**GenAI systems may have used copyrighted or proprietary content during training, which could lead to legal disputes.
* **Prejudice and discrimination:**Biases in training data can cause systems to make biased decisions, which can create serious problems, especially in hiring, loan application, or judicial decision support systems.
* **Lack of transparency and control:**Many GenAI models cannot explain how they “make their decisions,” raising questions about their reliability.

Therefore, compliance with ethical principles, legal regulations and user awareness are of great importance in the development of GenAI technology.

**Chapter 2: Loading Data and Working with the Explore Interface**

**Tasks**

**Search-1**

**Screenshot:**

ekran görüntüsü, diyagram içeren bir resim

Yapay zeka tarafından oluşturulan içerik yanlış olabilir.

**Explanation:**

This image shows all the people in the database, with all the relationships they have with all the other nodes. Each person is connected to other nodes, especially movies. The connections are usually established with ACTED\_IN or DIRECTED relationships.

**Point to Note:**

Some people are associated with many movies. This means that they are involved in many projects. For example, famous actors like Tom Hanks seem to be associated with more movies.

**Search-2**

**Screenshot:**

ekran görüntüsü, diyagram, çizgi içeren bir resim

Yapay zeka tarafından oluşturulan içerik yanlış olabilir.

**Explanation:**

The graph that appears as a result of this search brings up all the relationships belonging to movies that contain the word “Matrix”. Movie nodes and the person nodes, actors, directors and producers associated with them are displayed.

**Point to Note:**

Some actors have appeared in more than one movie that includes the word "Matrix" in it. This situation causes an actor to be associated with more than one movie. Also, the directors and producers of all three movies are the same person.

**Search-3**

**Screenshot:**

yazılım, ekran görüntüsü içeren bir resim

Yapay zeka tarafından oluşturulan içerik yanlış olabilir.

**Explanation:**

This search shows the graph of Tom Hanks, the blue node in the middle, all the movies he has appeared in, the green nodes, and all the actors he has acted with in those movies, the brown nodes. The blue node in the center, Tom Hanks, is associated with many movies, and each movie node has an “ACTED\_IN” relationship to other actors.

**Point to Note:**

Some actors have appeared in more than one movie with Tom Hanks. These actors are considered more notable when associated with more than one movie node. Also, the number of movies Tom Hanks has appeared in is much higher than the average number in the database.

**Chapter 3: Exploring Data with Cypher Queries**

**Questions**

**1. LIST ALL MOVIE NAMES IN THE DATABASE.**

Cyhper Query:

MATCH (m:Movie) RETURN m.title

Conclusion:



Comment:

With this query we can see the names of all the movies in the database. I noticed that the list is quite crowded, which shows that we have a large dataset.

**2. FIND MOVIES THAT “TOM HANKS” STARRED IN.**

Cyhper Query:

MATCH (m:Movie) RETURN m.title

Conclusion:



Comment:

This query lists the movies Tom Hanks has appeared in. The fact that he has acted in a wide variety of movies and genres shows his popularity in the industry and that he is good at his job.

**3. LIST THE DIRECTORS FOR EACH MOVIE.**

Cyhper Query:

MATCH (d:Person)-[:DIRECTED]->(m:Movie) RETURN m.title, d.name

Conclusion:



Comment:

This query lists the directors of each movie. I noticed that some directors appear in more than one movie. This way we can find different movies by a director we like.

**4. LIST TWO DIFFERENT PAIRS OF ACTORS THAT PLAYED IN THE SAME MOVIE (WITHOUT REPEATING).**

Cyhper Query:

MATCH (a:Person)-[:ACTED\_IN]->(m:Movie)<-[:ACTED\_IN]-(b:Person)

WHERE a.name < b.name

RETURN a.name, b.name, m.title

Conclusion:



Comment:

This query matches two different actors who appeared in the same movie. I was surprised to see so many matches. I also noticed that some actors had co-stars in more than one movie.

**5. FIND PEOPLE AND MOVIES WHO HAVE BOTH DIRECTED AND ACTED IN A MOVIE.**

Cyhper Query:

MATCH (p:Person)-[:DIRECTED]->(m:Movie)<-[:ACTED\_IN]-(p)

RETURN p.name, m.title

Conclusion:



Comment:

This query shows people who both direct and act in a movie. I thought there might be more names who direct and act in their own projects. I also noticed that these people are generally experienced and versatile in the industry.

**6. LIST THE ACTORS WHO PLAYED IN "THE MATRIX" MOVIE.**

Cyhper Query:

MATCH (p:Person)-[:ACTED\_IN]->(m:Movie {title: "The Matrix"}) RETURN p.name

Conclusion:



Comment:

This query shows actors from the movie The Matrix. I thought there were more actors from The Matrix in the database, but I was surprised to see only five.

**7. FIND THE 5 PEOPLE WHO HAVE APPEARED IN THE MOST MOVIES.**

Cyhper Query:

MATCH (p:Person)-[:ACTED\_IN]->(m:Movie)

RETURN p.name, COUNT(m) AS film\_sayisi

ORDER BY movie\_number DESC

LIMIT 5

Conclusion:



Comment:

This query shows the actors who have appeared in the most movies in the Database. The result was pretty much as I expected, the reason I chose Tom Hanks in the previous task was because I thought he had the most movies, and this Cyhper query confirmed that.

**8. LIST OTHER ACTORS WHO HAVE APPEARED IN THE SAME MOVIE WITH “TOM HANKS”.**

Cyhper Query:

MATCH (p:Person {name: "Tom Hanks"})-[:ACTED\_IN]->(m:Movie)<-[:ACTED\_IN]-(co:Person)

RETURN DISTINCT co.name

Conclusion:



Comment:

This query shows Tom Hanks' co-stars. As in the previous task, we can see that Tom Hanks has a lot of movies and co-stars.

**9. FIND MOVIES DIRECTED BY "LANA WACHOWSKI."**

Cyhper Query:

MATCH (d:Person {name: "Lana Wachowski"})-[:DIRECTED]->(m:Movie) RETURN m.title

Conclusion:



Comment:

This query shows movies directed by Lana Wachowski. I only knew her as the director of the Matrix series along with her brother, I learned about her other two movies thanks to the query.

**10. LIST THE MOVIES RELEASED AFTER 2000.**

Cyhper Query:

MATCH (m:Movie) WHERE m.released > 2000

RETURN m.title, m.released

ORDER BY m.released ASC

Conclusion:



Comment:

This query displays movies released after 2000 in ascending order. I got a list with the oldest movies in the database after 2000 at the top and the newest movies at the bottom. This allowed me to see the trend of movie production over time. I also had the opportunity to examine movies released after the year I was born.