INFO 6210

Data Management and Database Design
Physical Data Model and Social Media

Assignment 2

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Abstract:

The theme of this assignment is based on Domain Fortune 500 Companies, Among the fortune 500 companies, the companies ranking, and revenue is based on the user's ranking and company's investments. CEO's of the individual company play a pivotal role in generating the company's reputation. Now-a-days the social media presence has been significant in determining the company's ranking and revenue. In this assignment, we are inferencing the impact of social media presence for the company called the 'Nerd Analytics'. As a part of database team, we will analyze the producer consumer model for the company's ranking and revenue. Also, through our data base model we emphasize on providing statisticians team and machine learning experts database model that is cleaned and data gathered from social media. For Fortune 500 Companies we will model the revenue and ranking and analyze the social media impact on it. As a part of model, the Producer are the CEO, Consumers are users and companies are Fortune 500 companies.

The Conceptual Model compromises of entities that have the following:

1. **Producer**

- As a part of Producer Consumer model, the producer is the company's CEO who is the primarily responsible for generating the revenue. Also, the ranking of the company affects a lot whenever the CEO's social media presence is either garnered or hampered. We are establishing the model for producers from CEO's tweets using Tweepy API.

2. **Consumer**

- For Consumer we had used Reddit API, though reddit API we had gathered the user's data such as the upvotes, user names and their comments on the description. The ranking of the company will be substantially impacted based on the consumer's (users) views and descriptions. Here, the reddit submission id attribute is uniquely identified as each reddit will have unique submission id and the same can be used as primary key.

3. Companies

- For the company data, the source is CSV file which is extracted using the Data Scrapping of website of Fortune 500 company. The data scrapping has been done from the beautiful soup and the detailed information related to company details such as company ceo, revenue, address and ranking related details are extracted.

The amalgamation from different sources has been done to create a conceptual database model.

Part 1

A. Design Requirements

1. A Domain

- Our Domain is Company
- Company Details like Revenue, Ranking etc.

2. Conceptual models (entities) for a tweet/post, a Social Media user, a person and a company

- Our Conceptual Model includes Tweeter Posts of CEO's and Companies along with reddit posts of several users

3. Conceptual Models (entities) that represent consumers, producers and companies in your chosen model

- In our chosen model following are the representations:

Producers	Twitter Post of CEO's
Consumers	Reddit Users Post's
Companies	Fortune 500 Companies

4. Conceptual models (entities) for at least two things specific to the domain (e.g. a game, a film, a song, etc.)

- **In our conceptual model the two things specific to the domain are:**

Company Ranking
Company Revenue

5. **Relationships that connect the entities**

- ➢ We have established the relationship among several entities using the Primary Keys and Foreign keys

6. **Appropriate attributes and keys**

- ➢ All the attribute and keys are appropriately defined and designed for the conceptual model

7. **ER Diagrams that illustrate the entire conceptual model**

- ➢ Yes, our ER Diagram illustrates all schema for entire conceptual model

8. **The ER diagrams can use standard ER symbols or UML**

- ➢ The diagram illustrates the ER Symbols and relationships.

B. Questions You Must Answer about Conceptual Model

1. **What are the ranges, data types and format of all the attributes in your entities?**

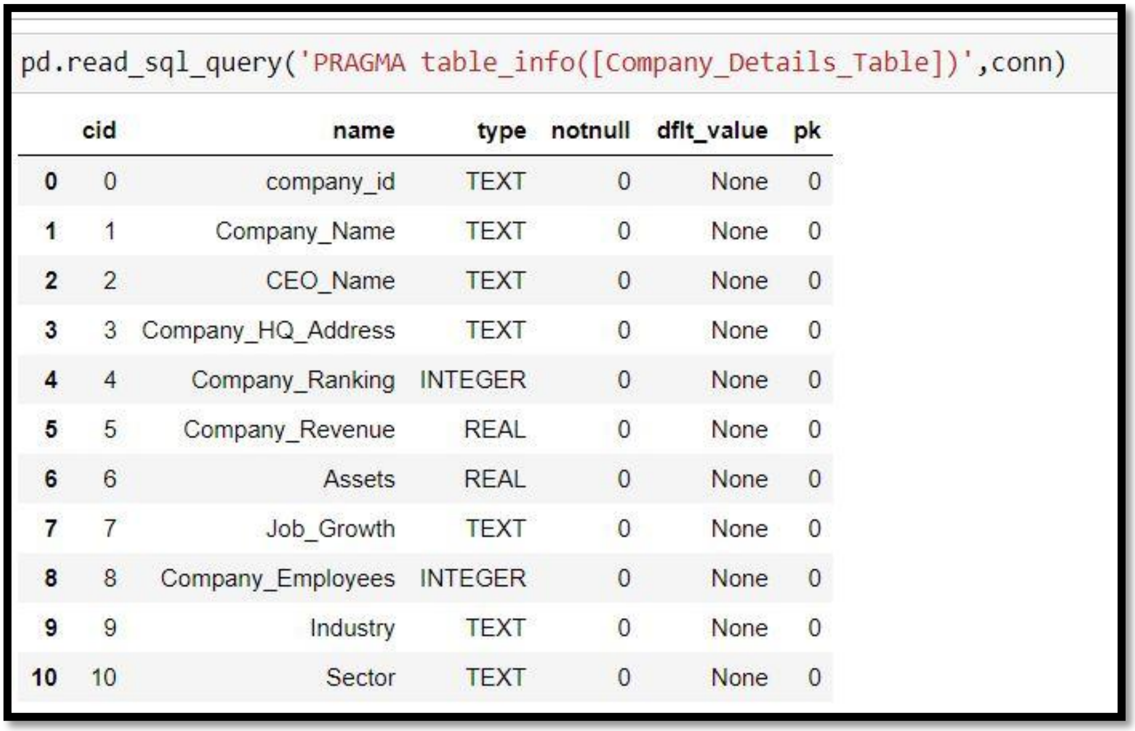
- ➢ To describe the range, data type and format of all the attributes in your entities we can use the describe function for individual table.

- **Company_Details_Table;**

INFO 6210

Data Management and Database Design
Physical Data Model and Social Media

Assignment 2

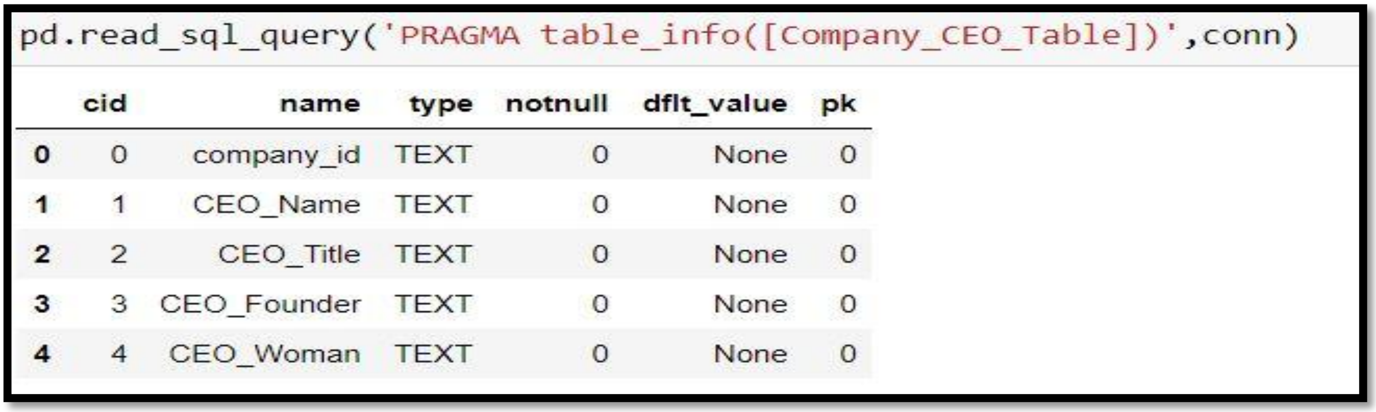


```
pd.read_sql_query('PRAGMA table_info([Company_Details_Table])',conn)
```

	cid	name	type	notnull	dflt_value	pk
0	0	company_id	TEXT	0	None	0
1	1	Company_Name	TEXT	0	None	0
2	2	CEO_Name	TEXT	0	None	0
3	3	Company_HQ_Address	TEXT	0	None	0
4	4	Company_Ranking	INTEGER	0	None	0
5	5	Company_Revenue	REAL	0	None	0
6	6	Assets	REAL	0	None	0
7	7	Job_Growth	TEXT	0	None	0
8	8	Company_Employees	INTEGER	0	None	0
9	9	Industry	TEXT	0	None	0
10	10	Sector	TEXT	0	None	0

➢ Table: Company_Details_Table

- **Company_CEO_Table;**



```
pd.read_sql_query('PRAGMA table_info([Company_CEO_Table])',conn)
```

	cid	name	type	notnull	dflt_value	pk
0	0	company_id	TEXT	0	None	0
1	1	CEO_Name	TEXT	0	None	0
2	2	CEO_Title	TEXT	0	None	0
3	3	CEO_Founder	TEXT	0	None	0
4	4	CEO_Woman	TEXT	0	None	0

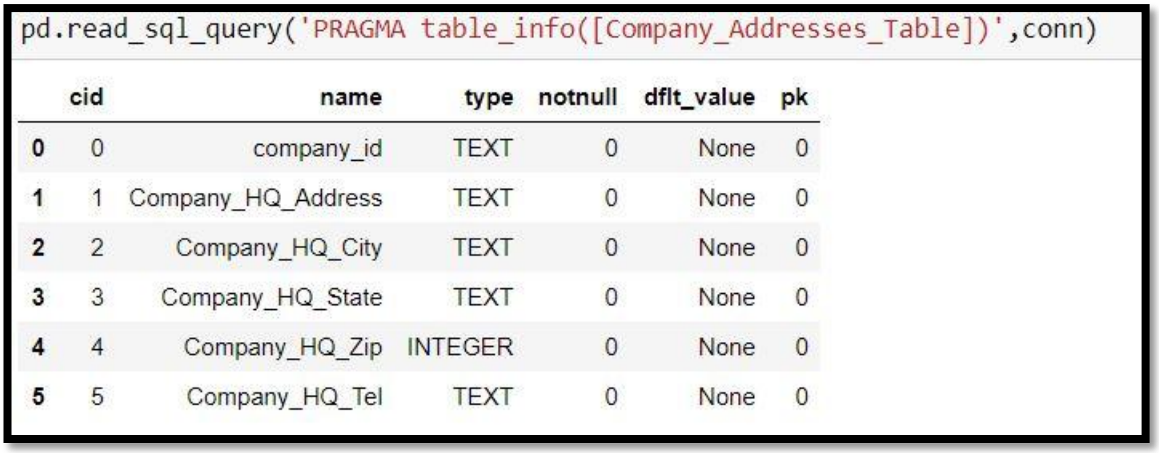
➢ Table: Company_CEO_Table

INFO 6210

Data Management and Database Design
Physical Data Model and Social Media

Assignment 2

- **Company_Address_Table;**

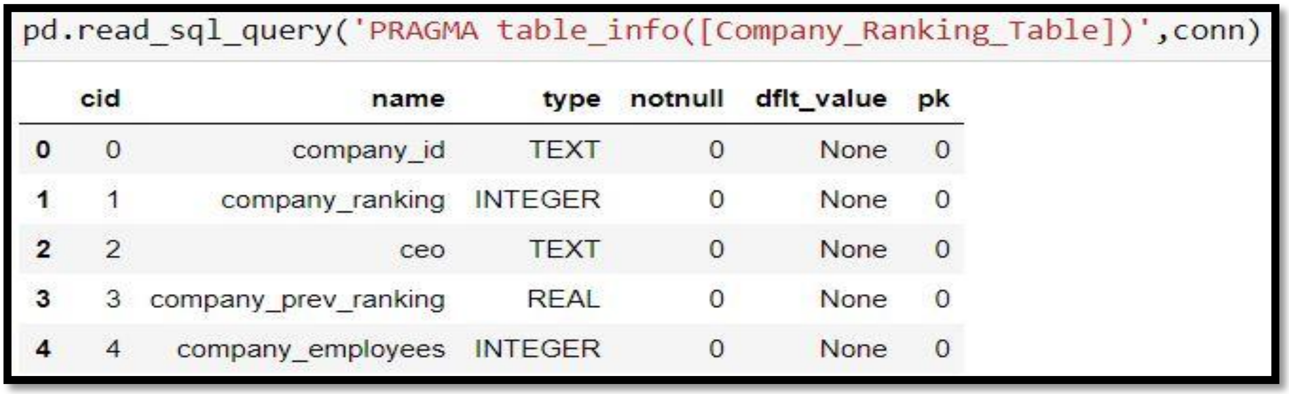


```
pd.read_sql_query('PRAGMA table_info([Company_Addresses_Table])',conn)
```

	cid	name	type	notnull	dflt_value	pk
0	0	company_id	TEXT	0	None	0
1	1	Company_HQ_Address	TEXT	0	None	0
2	2	Company_HQ_City	TEXT	0	None	0
3	3	Company_HQ_State	TEXT	0	None	0
4	4	Company_HQ_Zip	INTEGER	0	None	0
5	5	Company_HQ_Tel	TEXT	0	None	0

➢ Table: Company_Address_Table

- **Company_Ranking_Table;**



```
pd.read_sql_query('PRAGMA table_info([Company_Ranking_Table])',conn)
```

	cid	name	type	notnull	dflt_value	pk
0	0	company_id	TEXT	0	None	0
1	1	company_ranking	INTEGER	0	None	0
2	2	ceo	TEXT	0	None	0
3	3	company_prev_ranking	REAL	0	None	0
4	4	company_employees	INTEGER	0	None	0

➢ Table: Company_Ranking_Table

2. When should you use an entity versus attribute?

➢ Here in our conceptual model we have used Company Address as a separate entity as the address of each company will be different having different headquarters at different location, zip code, city and state.

- If we had just used address as an attribute, then it would have been difficult for storing proper details about each individual company and during data cleaning as well.
- For example, to find the number of companies in Boston it is easy to have address as an entity rather than an attribute.

3. When should you use an entity or relationship, and placement of attributes?

- Entity Relationship Diagrams is a pivotal data modelling tool and will help organize the data in our model into entities and define the relationships between the entities. The, process has proved to enable the analyst to produce a good database structure so that the data can be stored and retrieved in a most efficient manner.

- **Entity:** A data entity is anything real or abstract about which we want to store data. To store the object details of any real-world data we use entity. For example: In our case Company is an entity.

- **Relationship:** A data relationship is a natural association that exists between one or more entities. E.g. Company have company rankings. **Cardinality** defines the number of occurrences of one entity for a single occurrence of the related entity. E.g. A Company can have many processing in several industries and sectors.

- **Attribute:** A data attribute is a characteristic common to all or most instances of an entity. The attribute placements are based on primary key and foreign key.

4. How did you choose your keys? What are unique?

- The Primary Key and Foreign key has been established based on the conceptual schema.

- Company ID will be the Primary Key for the Company_Details_Table. Also, it will be Foreign Key for the other tables such as Company_Revenue, Company_address, etc.

- All the names of different companies are unique, so it can be easily set as Primary Key.

- The Company_Address_Table, Company_Ranking_Table have company address and company ranking as primary key as all tuples are unique since attribute is also unique for each company's address and ranking.

5. **Did you model hierarchies using the "ISA" design element? Why or why not?**

- Our Model doesn't have an ISA Relation. The ISA Relation would have been established had the Domain Company would have been segregated into different sub companies based on the company industries and sectors.

- For eg: A table created dedicatedly only for Finance group, Technology group etc. then we could have established the ISA Relation such as Finance Group Company is a Company, Technology Group Company is a company.

6. **Were there design alternatives? What are the tradeoffs: entity vs attribute, entity vs relationship, binary vs. ternary relationships?**

- There were no design alternatives and for the tradeoff's also we were able to justify the entity vs attribute for the Company_Address entity, also entity vs relationship has been indicated during company details in foreign key and for binary vs ternary relationship, we have attributes in several entities like Company_Profiftable, CEO_women where we get proper binary data such as yes or no.

7. **Where are you going to find real-world data to populate your model?**

- The real-world data to populate our model will be available on fortune 500 company's website where the company's data will change continuously also the User's comments and CEO's comments for the company will be posted gradually.

INFO 6210

Data Management and Database Design
Physical Data Model and Social Media

Assignment 2

Conceptual Diagram

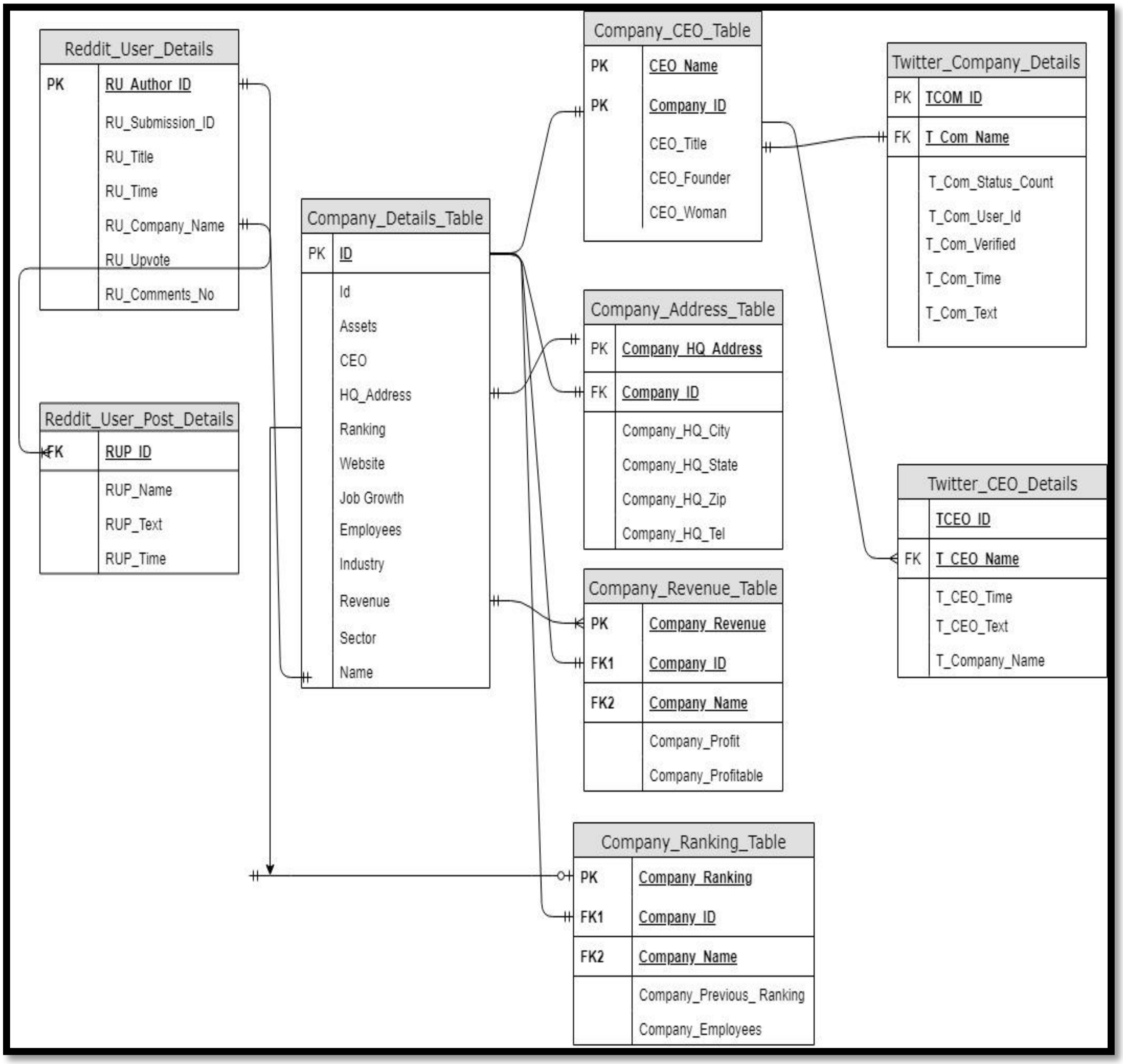


Figure: 1

INFO 6210

Data Management and Database Design
Physical Data Model and Social Media

Assignment 2

E-R Diagram

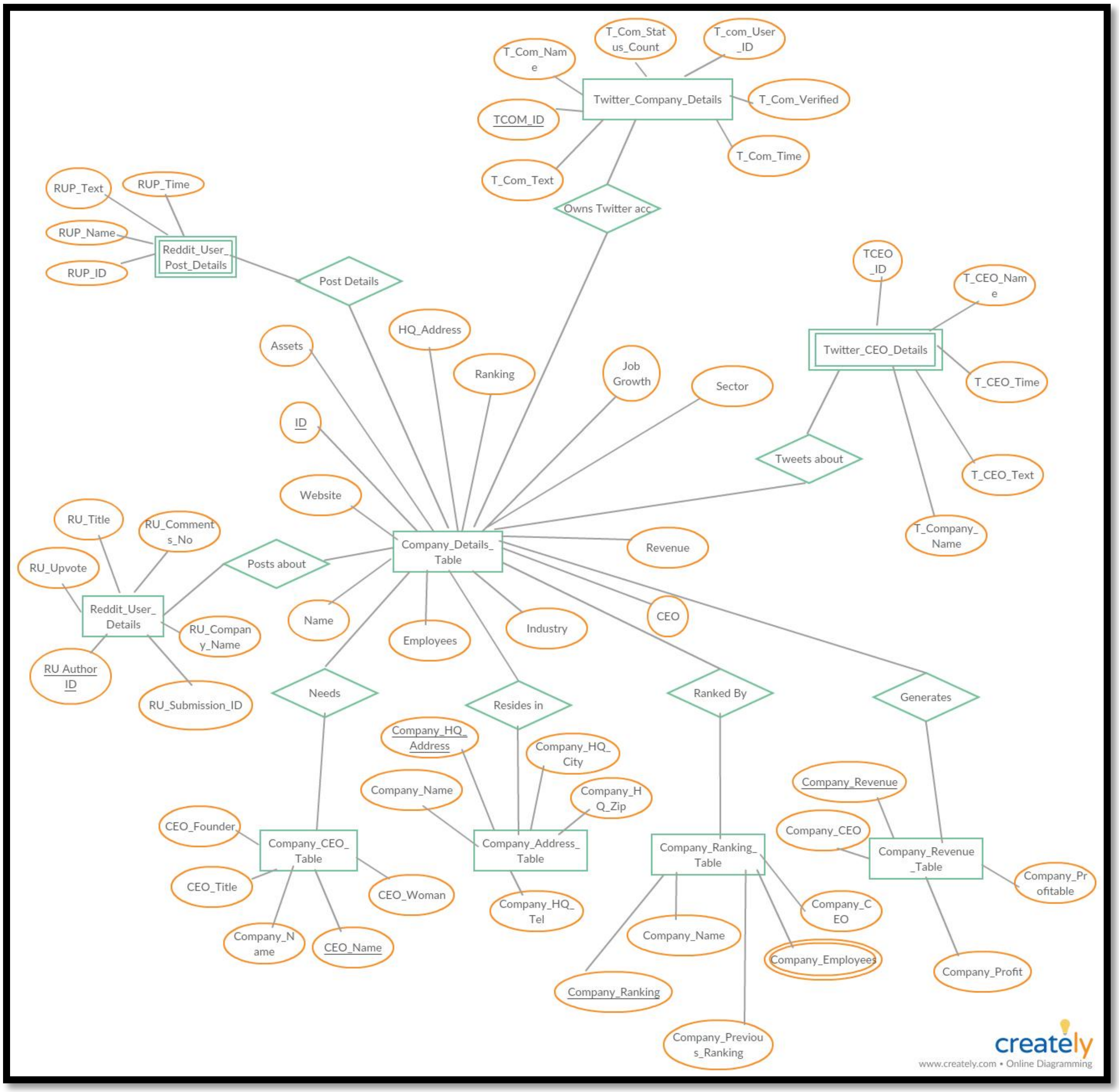


Figure: 2

INFO 6210

Data Management and Database Design
Physical Data Model and Social Media

Assignment 2

Contributions

- **Tweepy API – Aditya Kamat**
- **Reddit API – Nikunj Doshi**
- **CSV Data Extraction – Aditya Kamat**
- **Data Cleaning – Aditya Kamat**
- **SQL Queries – Aditya Kamat, Nikunj Doshi**
- **Report Preparation – Nikunj Doshi, Aditya Kamat**
- **GitHub – Aditya Kamat, Nikunj Doshi**

%Contribution : 50% - 50%

Conclusions

- We were able to establish a relationship for the model and show the relationship for the domain etc.

- The Producer and Consumer were used from social media API's, Producer were shown in form of Twitter API's and Consumer were shown in form of Reddit API for the users. The extracted data from twitter and reddit API were used to extract the status count, comment count, title, user id, company text.

- Through the conceptual schema, and the ER diagram we have developed the model for different companies name we were able to relate the features of companies and different social media users. Also, we were able to clean the data from the csv files and eliminated all duplicate and null values.

Citations

- **For WEB API**

➢ https://stackoverflow.com/questions/47925828/how-to-create-a-pandas-dataframe-using-tweepy

➢ https://tweepy.readthedocs.io/en/v3.5.0/code_snippet.html

INFO 6210

Data Management and Database Design
Physical Data Model and Social Media

Assignment 2

- https://www.reddit.com/dev/api/

For Web Scrapping

- https://www.bing.com/videos/search?q=web+scrapping+youtube&view=detail&mid=DA3EB1EAE99DC9ADBD97DA3EB1EAE99DC9ADBD97&FORM=VIRE
- https://github.com/nikbearbrown/INFO_6210/blob/master/Week1/NBB_%20BeautifulSoup.ipynb
- http://fortune.com/fortune500/

For SQL Lite

- https://www.sqlite.org/docs.html
- https://www.programmableweb.com/api/reddit

For CSV File

- http://pandas.pydata.org/pandas-docs/version/0.17/generated/pandas.DataFrame.drop_duplicates.html
- https://stackoverflow.com/questions/9785049/python-how-to-use-json-dumps-on-windows
- http://book.pythontips.com/en/latest/enumerate.html
- https://pandas.pydata.org/pandas-docs/stable/reference/api/pandas.DataFrame.loc.html

INFO 6210

Data Management and Database Design
Physical Data Model and Social Media

Assignment 2

- https://stackoverflow.com/questions/14037540/writing-a-python-list-of-lists-to-a-csv-file
- https://github.com/nikbearbrown/INFO_6210/blob/master/Movie_DB_Example/TMDB_Movie_Data_Assignment_Example.ipynb
- https://stackoverflow.com/questions/34682828/extracting-specific-selected-columns-to-new-dataframe-as-a-copy

For E R Diagram File

- **http://web.cs.ucdavis.edu/~green/courses/ecs165a-w11/2-er.pdf**
- **http://users.csc.calpoly.edu/~jdalbey/205/Lectures/HOWTO-ERD.html**

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INFO 6210

Data Management and Database Design
Physical Data Model and Social Media

Assignment 2