Group 15

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CSC 315 and BUS/MGT 385

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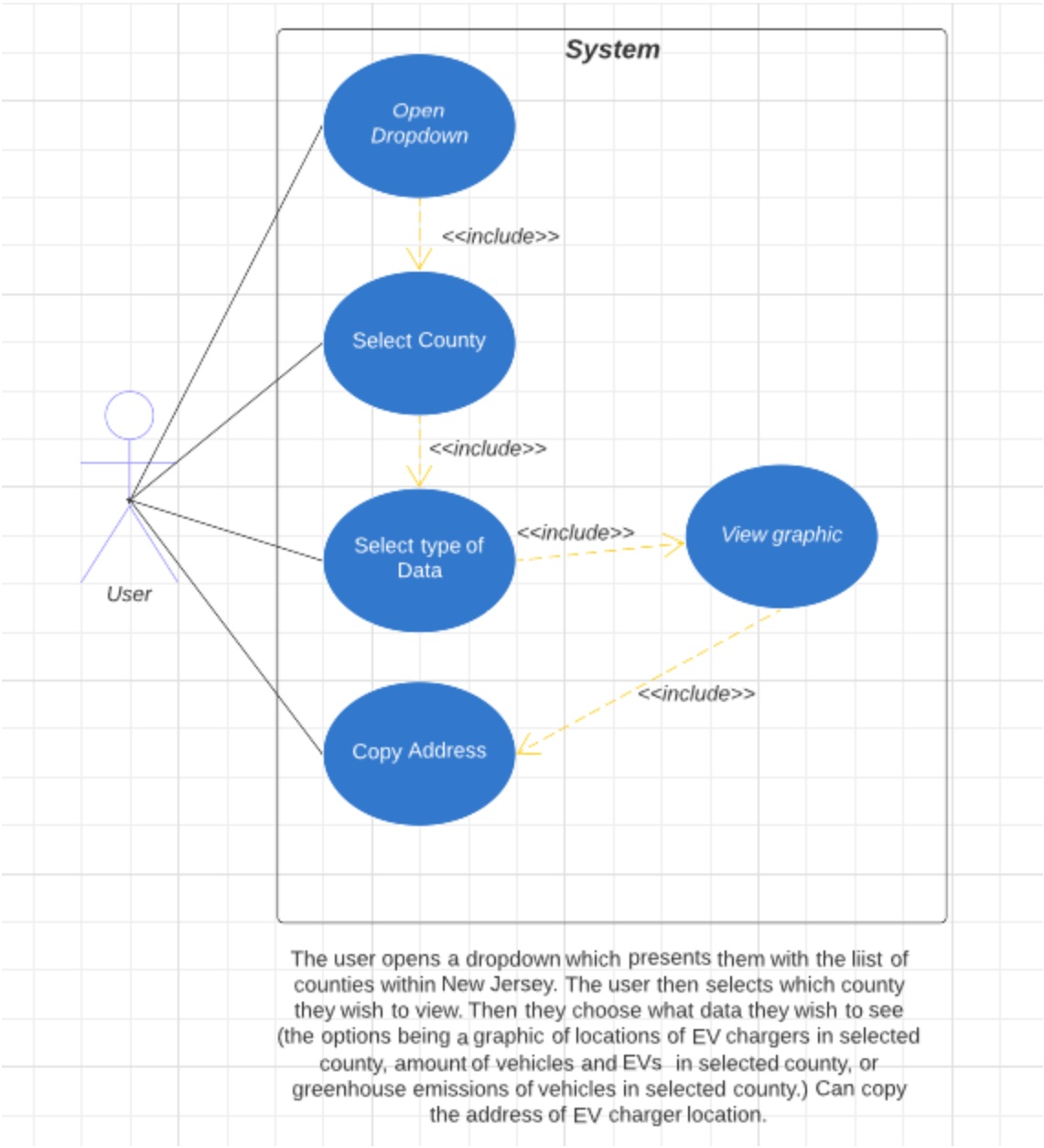
Phase III: Narrative

A relational database is a type of database that stores and organizes data into tables using a predefined structure based on the relationships between the data in the database. Some of the main components of a relational database are tables, rows, columns, and keys. A table is made up of rows and columns, and is a collection of all the data that comes from the rows and columns. Rows go horizontally across the table and represent individual instances of the data, while columns go vertically and represent specific types of data. Relational databases use a language named Structured Query Language, or SQL, to interact with the data within the database. Using SQL statements, users are given the ability to create, add, modify, or delete data by specifying the action and elements they would like to affect. The command is then executed by the RDBMS, or relational database management system, which is responsible for storage of the data and enforcing constraints on the data. Relational databases are extremely valuable because they provide data accuracy and integrity, simple use for users, and security(Lutkevich, 2021). The data can be easily categorized and stored, and if a new category were to be added, it can be done without affecting other applications. Moreover, users can easily extract data that they need using SQL, a simple language.

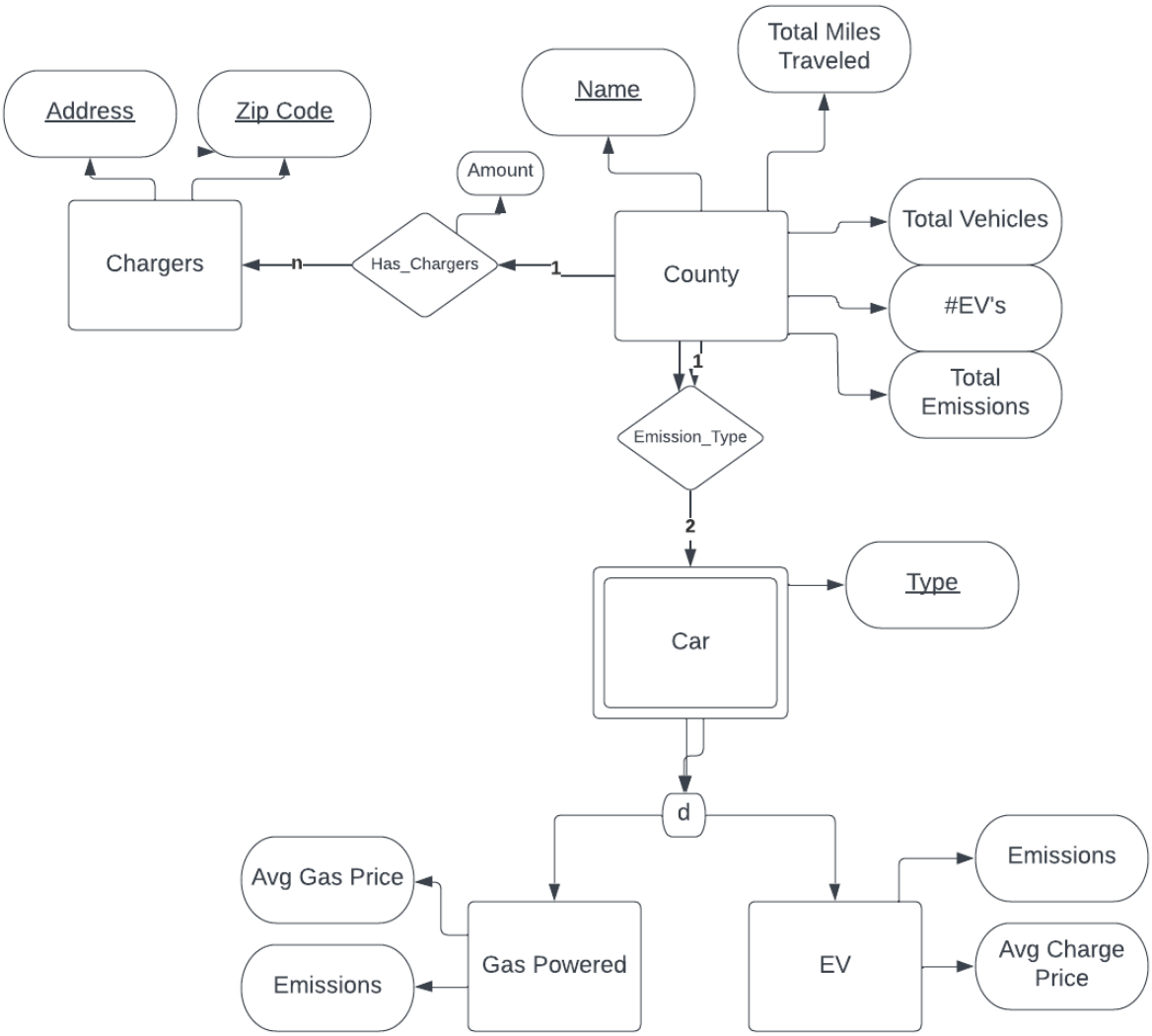
Lastly, constraints and security is enforced, meaning that data will be accurate and only certain users can have access to certain data if specified. Overall, relational databases are extremely useful and valuable.

The UML Use Case Diagram depicts how a user would navigate our system and be able to extract the data that they desire. The user opens a drop down menu which presents them with a list of counties in New Jersey. Next, the user can select a county, and would then choose what kind of data to look at. The options given are a graphic of locations of EV chargers in said county, amount of vehicles and EV's in said county, or greenhouse emissions of vehicles in said county. The user also has the capability of copying the address of the EV charger location. The goals of this system are to allow users to easily access data pertaining to vehicle energy, fuel consumption, and ownership statistics for any county in New Jersey. The scope of our system is not limited to any particular range, as it can be used by anyone who wants to view data regarding electric vehicles or gas-powered vehicles. The reason behind our database model being this way is to be able to show the harmful effects of conventional gas-powered vehicles compared to the lesser effects of electric vehicles.



The user opens a dropdown which presents them with the liist of counties within New Jersey. The user then selects which county they wish to view. Then they choose what data they wish to see (the options being a graphic of locations of EV chargers in selected county, amount of vehicles and EVs in selected county, or greenhouse emissions of vehicles in selected county.) Can copy the address of EV charger location.

ER Diagram 0


Total Miles Traveled
Address
Zip Code
Name
Amount
Total Vehicles
Chargers
n
Has_Chargers
1
County
#EV's
1
Total Emissions
Emission_Type
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d
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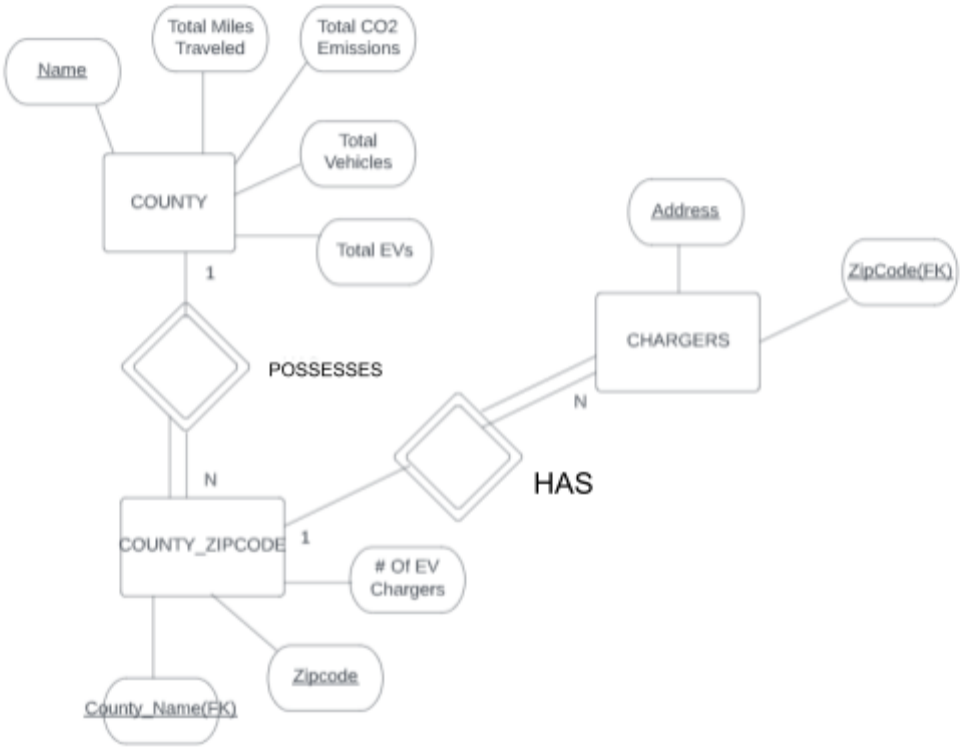
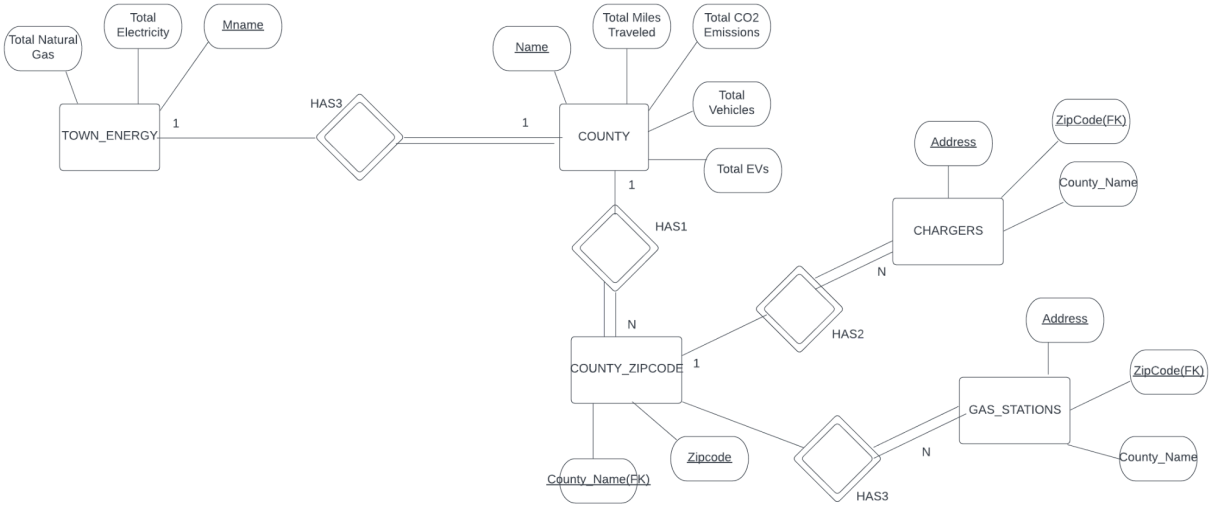
EV
Emissions
Avg Charge Price

ER Diagram 1 (as of 4/8/23)



ER Diagram 2 (as of 4/18/23)



ER Diagram 0 : The ER diagram shows how all of our entities relate to one another. You can get from entity to entity by showing how they all work and get different information from different attributes by doing so. There are 5 entities, Chargers, County, Car, Gas Powered, and EV. These entities represent what the user is most likely going to use as grounds to get the information they want. If they want information about the county, then they can access a county and get the information from there, same goes with chargers, and cars. Cars is an interesting entity because it is a weak entity, there is only a partial key for it, which is the type. This is because Cars is dependent on county for information on what is happening. Cars needs to know what county they are in before it can give the information of emissions of types of vehicles. All of the attributes are information that the user is going to want to access. They can also get different information by going between relations, for example, 1 county has 2 different car types, gas powered and EV's. You can access that by going through that relation.

4/8/23 : Changed ER Diagram to only have 3 attributes : COUNTY, COUNTY_ZIPCODE, and CHARGERS. The county entity contains attributes that provide information about the name, total miles traveled, total CO2 emissions, total vehicles, and total EVs for each county. COUNTY is part of the POSSESSES relationship, the other entity being COUNTY_ZIPCODE, which provides the county name, zip codes per county, and number of EV chargers per zip code. COUNTY_ZIPCODE is participating in a relationship with CHARGERS, which shows the address of each charger and the zipcode that it belongs to.

4/18/23 : Added GAS_STATION and EV_CHARGER entities, both with a foreign key referencing ZIPCODE from COUNTY_ZIPCODE. Also added energy and natural gas usage per municipality as an entity, TOWN_ENERGY, that references the municipality name of COUNTY.

References

Lutkevich, B., 2021, Relational Database (Newton, MA: TechTarget), https://www.techtarget.com/searchdatamanagement/definition/relational-database