

CSC 430/530 Project Proposal:

Database System for wireless charging E-vehicle

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Problem Statement

- Since their first introduction to the consumer market barely a decade ago, electric vehicles have rapidly grown in popularity.
- It has been observed that The percentage of all car sales that compose electric vehicle sales are still minuscule, with 2021 only seeing 3.4 percent of all car sales be hybrid or electric car.
- Fast charging or Instant charging for electric vehicles is a decisive green light to the prevailing acceptance of EVs.It could be a solution to consumers' range anxiety and the assurance of electric vehicles.To be truly competitive with gasoline vehicles, EVs should enable a driver to recharge swiftly parallel to gasoline-fueled vehicles.
- There are, however, EVs coming with wireless charging capability, including the upcoming Genesis GV60. As more vehicles adopt the technology and become more efficient, a charging highway is a massive step forward for charging times and range anxiety issues.
- However, there are challenges involved in creating and managing such a system which could accommodate tracking various entities and ensuring robust payment tracking.



Application Area - Electric Car Owners

- Targeted towards electric car owners looking for organized method of tracking amount owed to charging companies.
- Extra security provided through verification of each transaction through electric grid.
- Consistent and accurate amount due by customer and amount of battery charged.
- More convenient than traditional wired EV charging



Need for application

Electric car charging companies could lose track of amount owed by customers without organization

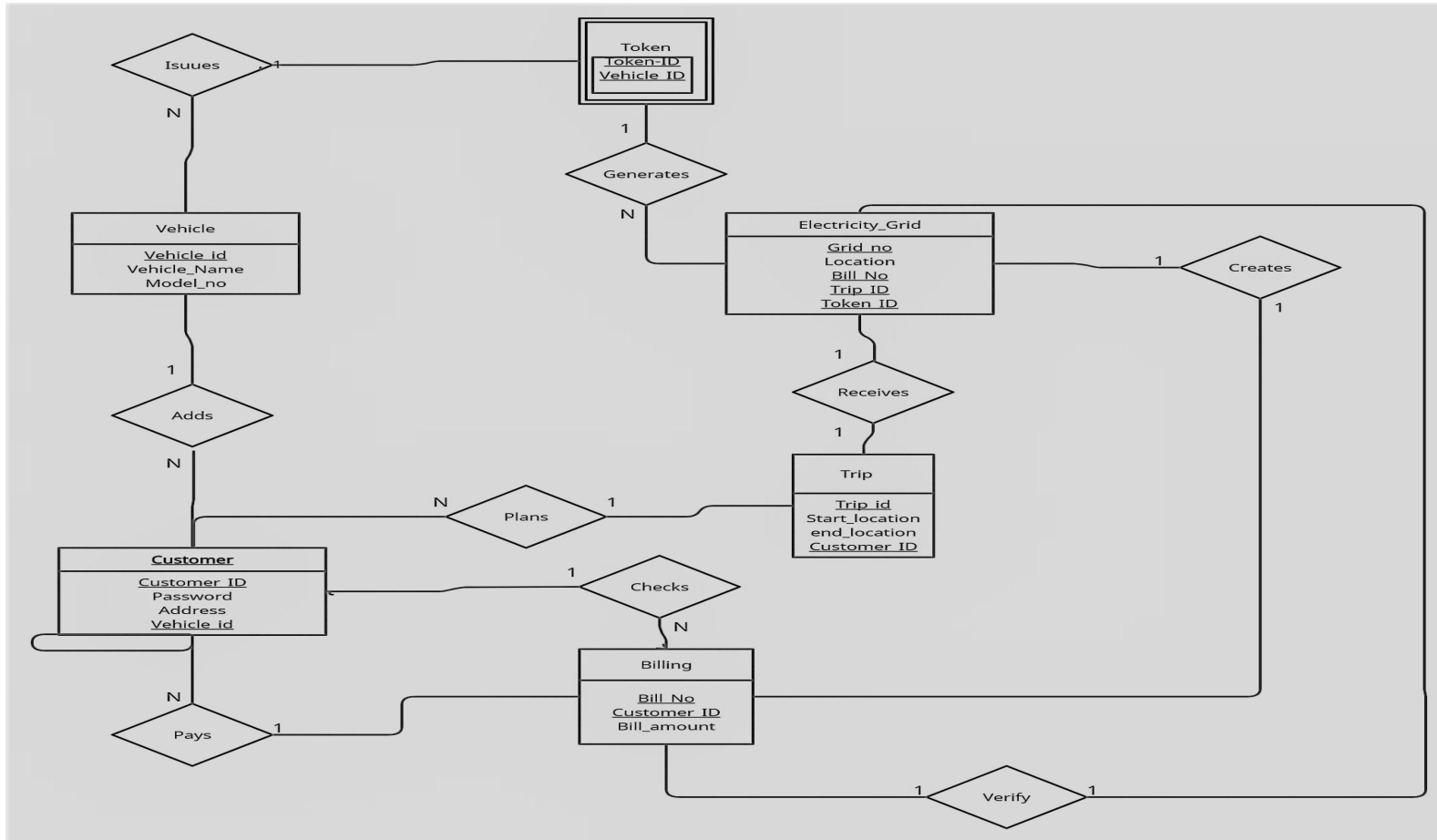
- Keeps track of amount of money owed by electric car owners to charging companies based off distance traveled
- By getting distance traveled by customer, the electric grid can output appropriate amount of charge needed by customer
- Provides a consistent method for billing
- Electric grid verifies transactions for extra security
- Electric grid generates token which tracks amount due and amount of charge obtained by the customers



Need for Database

- A Database system helps to track of customer information for further travel.
- For updating Token details to customer and to vehicle about location coordinates, billing of customer, sharing of data between customer and grid company.
- Generating a bill to customer for payment of amount electricity used for travel for future purpose to customer.

ER Model





Entities

- Customer (customer_ID, vehicle_ID, address, password)
- Vehicle (vehicle_ID, vehicle_name, model_no)
- Billing (Bill_No, Customer_ID, Bill_amount)
- Trip (Trip_ID, start_location, end_location, Customer_ID)
- Token (Token_ID, Vehicle_ID)
- Electricity_Grid (Grid_No, Location, Bill_No, Trip_ID, Token_ID)



Relationship

- Adds(customer, vehicle)
- Pays (Billing, customer)
- plans (Trip, customer)
- Checks(customer, Billing)
- Verify (Billing, Electricity_Grid)
- Receives (Trip, Electricity_Grid)
- Generates(Token, Electricity_Grid)
- Issues (Token, vehicle)
- Creates(Billing, Electricity_Grid)



Constraints

- Trip generated can have multiple charging paths on it's way to destination. However, an optimal charging path for the trip should be determined.
- Each vehicle can have only one token issued by a single electric grid company at an instance of time .



Timeline

