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Experion ILP-Batch 1

Task 2

Domain :

EV Charging Station Management

Description :

The database that has been listed is the models that is used to maintain an EV charging station. The database includes the relevant data that is necessary for a user to use a charging station.

- The user just needs to plug in their ev into the charging station and the user and vehicle is identified with the help of VEHICLE and USER tables.
- The type of charging required for an EV is identified using the CHARGINGTYPE table.
- The charging amount is calculated with the help of start and end time in the CHARGING table.
- The amount is reduced from the wallet of the user.
- The transaction is carried out with the help of TRANSACTION table.
- The user can also check the availability of charging stations with the help of STATIONS table

Relevance :

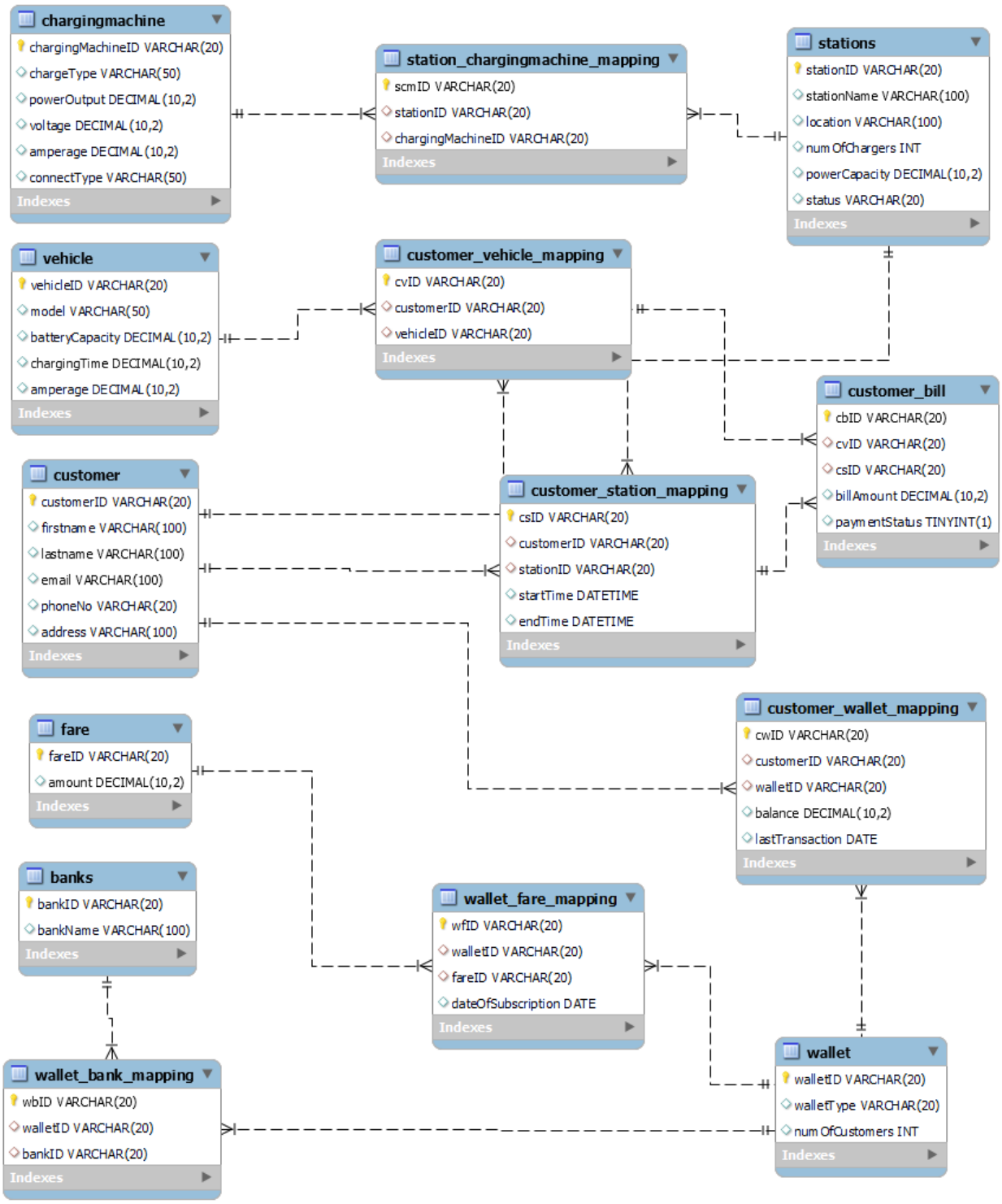
Electric vehicles are increasing at a rapid rate in the current world. A future where all the transportation mediums are replaced with electric engines is not a far-fetched scenario. Through this increase there is a need to manage the exponential increase of charging stations that is about to occur. This document comprises of the models required to manage data present at the charging stations.

Note: These models are created under the assumption that each user has a digital wallet and has subscribed to a particular subscription plan offered by one of the service providers.

Future Enhancement:

These models would be used to create an application that manages the bill payment of an electric vehicle. The application would provide information about the stations which includes the number of charges, distance to station and current availability status.

Entity-Relationship Diagram (ERD) :



Tables :

There are six master tables for this databse.

The tables are – Customer, Vehicle, Stations, Wallet, Fare, Charging Machine

Customer

Field	Data type	Constraint
UserID	Varchar(20)	Primary key
firstname	Varchar(100)	
lastname	Varchar(100)	
email	Varchar(100)	
phoneNo	Varchar(20)	
address	Varchar(100)	

Vehicle

Field	Data type	Constraint
vehicleID	Varchar(20)	Primary key
Model	Varchar(50)	
BatteryCapacity	Decimal(10,2)	
ChargingTime	Decimal(10,2)	
Amperage	Decimal(10,2)	

Stations

Field	Data type	Constraint
stationID	Varchar(20)	Primary key
stationName	Varchar(100)	
location	Varchar(100)	
numChargers	INT	
powerCapacity	Decimal(10,2)	
status	Varchar(20)	

Wallet

Field	Data type	Constraint
walletID	Varchar(20)	Primary key
walletType	Varchar(20)	
noOfCustomers	INT	

Fare

Field	Data type	Constraint
fareID	Varchar(20)	Primary key
amount	Decimal(10,2)	

ChargingMachine

Field	Data type	Constraint
chargeMachineID	Varchar(20)	Primary key
chargeType	Varchar(50)	
powerOutput	Decimal(10,2)	
voltage	Decimal(10,2)	
amperage	Decimal(10,2)	
connectType	Varchar(50)	

Banks

Field	Data type	Constraint
bankID	Varchar(20)	Primary key
bankName	Varchar(100)	

The following are the other tables in the database :

Customer_vehicle_mapping

Field	Data type	Constraint
cvID	Varchar(20)	Primary key
customerID	Varchar(20)	Foreign key
vehicleID	Varchar(20)	Foreign key

Station_chargingMachine_mapping

Field	Data type	Constraint
scmID	Varchar(20)	Primary key
stationID	Varchar(20)	Foreign key
chargeMachineID	Varchar(20)	Foreign key

Customer_station_mapping

Field	Data type	Constraint
csID	Varchar(20)	Primary key
customerD	Varchar(20)	Foreign key
stationID	Varchar(20)	Foreign key
startTime	DATETIME	
endTime	DATETIME	

Wallet_fare_mapping

Field	Data type	Constraint
wfID	Varchar(20)	Primary key
walletID	Varchar(20)	Foreign key
fareID	Varchar(20)	Foreign key
dateOfSubscription	DATE	

Customer_wallet_mapping

Field	Data type	Constraint
cwID	Varchar(20)	Primary key
customerID	Varchar(20)	Foreign key
walletID	Varchar(20)	Foreign key
Balance	Decimal(10,2)	
lastTransaction	DATE	

Customer_bill

Field	Data type	Constraint
cbID	Varchar(20)	Primary key
cvID	Varchar(20)	Foreign key
csID	Varchar(20)	Foreign key
billAmount	Decimal(10,2)	
paymentStatus	boolean	

Wallet_bank_mapping

Field	Data type	Constraint
wbID	Varchar(20)	Primary key
walletID	Varchar(20)	Foreign key
bankID	Varchar(20)	Foreign key

Code in MySQL:

```
create table Customer(
userID varchar(20) primary key,
firstname varchar(100),
lastname varchar(100),
email varchar(100),
phoneNo varchar(20),
address varchar(100)
);

create table Vehicle(
vehicleID varchar(20) primary key,
model varchar(50),
batteryCapacity decimal(10,2),
chargingTime decimal(10,2),
amperage decimal(10,2)
);


create table stations(
stationID varchar(20) primary key,
stationName varchar(100),
location varchar(100),
numOfChargers INT,
powerCapacity decimal(10,2),
```

```
status varchar(20)
);

create table Wallet(
walletID varchar(20) primary key,
walletType varchar(20),
numOfCustomers INT
);

create table Fare(
fareID varchar(20) primary key,
amount decimal(10,2)
);

create table ChargingMachine(
chargingMachineID varchar(20) primary key,
chargeType varchar(50),
powerOutput decimal(10,2),
voltage decimal(10,2),
amperage decimal(10,2),
connectType varchar(50)
);

create table Banks(
bankID varchar(20) primary key,
bankName varchar(100)
);

create table Customer_vehicle_mapping(
```

```
cvID varchar(20) primary key,
customerID varchar(20),
vehicleID varchar(20),
foreign key (customerID) references Customer(customerID),
foreign key (vehicleID) references Vehicle(vehicleID)
);

create table Station_chargingmachine_mapping(
scmID varchar(20) primary key,
stationID varchar(20),
chargingMachineID varchar(20),
foreign key (stationID) references Stations(stationID),
foreign key (chargingMachineID) references chargingMachine(chargingMachineID)
);

create table Customer_station_mapping(
csID varchar(20) primary key,
customerID varchar(20),
stationID varchar(20),
startTime DATETIME,
endTime DATETIME,
foreign key (customerID) references Customer(customerID),
foreign key (stationID) references Stations(stationID)
);

create table Wallet_fare_mapping(
wfID varchar(20) primary key,
walletID varchar(20),
fareID varchar(20),
```

```
dateOfSubscription DATE,
foreign key (walletID) references Wallet(walletID),
foreign key (fareID) references Fare(fareID)
);

create table Customer_wallet_mapping(
IcwD varchar(20) primary key,
customerID varchar(20),
walletID varchar(20),
balance decimal(10,2),
lastTransaction DATE,
foreign key (walletID) references Wallet(walletID),
foreign key (customerID) references Customer(customerID)
);

create table Customer_bill(
cbID varchar(20) primary key,
cvID varchar(20),
csID varchar(20),
billAmount decimal(10,2),
paymentStatus boolean,
foreign key (cvID) references Customer_vehicle_mapping(cvID),
foreign key (csID) references Customer_station_mapping(csID)
);

create table Wallet_bank_mapping(
wbID varchar(20) primary key,
walletID varchar(20),
bankID varchar(20),
```

```
foreign key (bankID) references Banks(bankID),
foreign key (walletID) references Wallet(walletID)
);
```