So, in this kernel I analysed data with following this process.This is the project of Tesla electric car-sharing service company

The links to Resource Finding for this project are:

1.Github([https://github.com/Jerome-debug/bundi-moriinga-wk-3](https://github.com/Jerome-debug/bundi-moriinga-wk-))

2.Google Drive[(https://drive.google.com/drive/u/2/folders/1tpY5hXnmLLJx7OqMlKuSLXo-IeNdLv0c)](https://drive.google.com/drive/u/2/folders/1tpY5hXnmLLJx7OqMlKuSLXo-IeNdLv0c))

#### CRISP-DM (Cross-Industry Standard Process for Data Mining)

* Business Understanding
* Data Understanding
* Data Preparation
* Modeling
* Evaluation
* Deployment

So, in this kernel I analysed data with following this process.

## **Business Understanding**

**Overview**

Electric cars come in three main types with differing power systems designed to meet varying driving needs.They are: fuel cell, battery-electric, plug-in hybrid electric cars.

#### **Battery-Electric Cars**

Battery-electric cars are all electric and don’t use gasoline, and instead have a large battery that powers one or more electric motors. Currently, battery-electrics have a driving range of 80 to more than 300 miles, with ranges increasing as new models are introduced. In addition to driving past the gas station, battery-electrics don’t require much maintenance (such as oil changes, smog checks, spark plug changes and replacing a catalytic converter or various other parts that wear out and break down) compared to gas cars.

[Charging](https://driveclean.ca.gov/electric-car-charging) a battery-electric car can be done at home using standard 120-volt or 240-volt house plugs, or away from home at public or workplace charging stations. One benefit of battery-electric cars over plug-in hybrids is the capability to use DC fast chargers, which provide more than 100 miles of range in 30 minutes.

Learn more about [battery-electric cars](https://driveclean.ca.gov/battery-electric).

#### **Plug-in Hybrid Electric Cars**

Plug-in hybrid electric cars offer both gas-only and electric-only driving—even at relatively high speeds. With smaller batteries than battery electrics, plug-in hybrids achieve an electric-only range of 20-55 miles, during which they produce no tailpipe emissions. When the car uses up its electric range, it switches to gas and drives just like a conventional car.

Because most Californians commute less than 30 miles, most plug-in hybrid electric driving can be done in electric-only mode.

#### **Fuel Cell Electric Cars**

A fuel cell electric car runs on electricity, but does so differently than battery-electric cars or plug-in hybrids. Its power system is composed of numerous cells combined into a stack that chemically combine hydrogen gas from the car’s tank and oxygen from the air to produce electricity.

Fuel cells have a driving range of 300-400 miles on a single tank and can be refueled in about five minutes at [hydrogen fueling](https://driveclean.ca.gov/hydrogen-fueling) stations, which are becoming more common in California. An additional benefit for fuel cell drivers is that auto manufacturers provide three years’ worth of free hydrogen fuel. Incentives like this are why many people are choosing to drive electric.

Objectives

Our main objective is to process stations data to understand electric car usage over time .

Like any transformative new technology, electric vehicles create a variety of potent economic development challenges and opportunities. While the electric vehicle market is still at a relatively early stage of development, it is poised to reshape industries and communities the world over.

Consumers spent USD 120 billion on electric car purchases in 2020, a 50% increase from 2019, which breaks down to a 41% increase in sales and a 6% rise in average prices. The rise in average prices reflects that Europe, where prices are higher on average than in Asia, accounted for a bigger proportion of new electric car registrations.

PHEVs typically have driving ranges that are comparable to gasoline vehicles. PHEVs have two fuel economy values: one for when the vehicle operates primarily on electricity (listed in terms of MPGe), and one for when the vehicle operates only on gasoline (listed as MPG).

Business Success criteria

To understand the usage of autolib car hire services .

Assessing the Situation

1. **Resource Inventory**
   1. Datasets:

Autolib dataset [[http://bit.ly/autolib\_dataset]](https://drive.google.com/a/moringaschool.com/file/d/1-rIM5ihDu79RaH7rAs-d-7SQSAQhrY9N/view?usp=sharing)

b. Autolib Description [(https://drive.google.com/a/moringaschool.com/file/d/13DXF2CFWQLeYxxHFekng8HJnH\_jtbfpN/view?usp=sharing](https://drive.google.com/a/moringaschool.com/file/d/13DXF2CFWQLeYxxHFekng8HJnH_jtbfpN/view?usp=sharing))

**ASSUMPTIONS AND CONSTARINTS**

This sample contains data from April 1 to April 9, 2018.

Overall, Dalberg Data Insights had collected data at the following times:

First pilot: every 5 minutes from October 6, 2017, 11:13 AM to October 8, 2017, 10:21 AM

Second Pilot: every minute from October 9, 2017, 15:53 PM to October 10, 2017, 15:31PM

Production: every minute from October 30, 16:59 PM to July 31, 2018, 23:59 PM (date of

the end of the Autolib services, although our automatic downloads went on after that).

During the collection periods, on some occasions the download failed, which created dome gaps in

the data. These gaps are represented on Figures 1 and 2 . Except for an important gap from

November 11 to November 14, 2017, missing files were rare.

**DATA MINING GOALS**

Our main goal is to understand the electric car usage over time by solving for the following research question;*Identifying the most popular hour of the day for picking up a shared electric car (Bluecar) in the city of Paris over the month of April 2018.*

This project describes the concepts of data mining and their synergy with manufacturing environments. A generic process is introduced, which outlines data mining goals and techniques, supported by example scenarios. Various applications of manufacturing environments are shown in which data mining has been applied to successfully, and potential areas in which the outlined mechanisms are capable of being applied.

For this project, we are using the availed dataset by the company. These datasets are

1.Autolib dataset [[http://bit.ly/autolib\_dataset]](https://drive.google.com/a/moringaschool.com/file/d/1-rIM5ihDu79RaH7rAs-d-7SQSAQhrY9N/view?usp=sharing)

2.AutolibDescription[(https://drive.google.com/a/moringaschool.com/file/d/13DXF2CFWQLeYxxHFekng8HJnH\_jtbfpN/view?usp=sharing](https://drive.google.com/a/moringaschool.com/file/d/13DXF2CFWQLeYxxHFekng8HJnH_jtbfpN/view?usp=sharing))

Data Description/Understanding

We have one dataset available for this project showing Autolib availability information .

**Autolib Description-**his dataset gives the glossary description,liscencing and the origin of the data

1. Autolib Dataset**-** This dataset, on the other hand, focuses on the company customer data. It contains the availability of Autolib services

Autolib dataset [[http://bit.ly/autolib\_dataset]](https://drive.google.com/a/moringaschool.com/file/d/1-rIM5ihDu79RaH7rAs-d-7SQSAQhrY9N/view?usp=sharing).AutolibDescription[(https://drive.google.com/a/moringaschool.com/file/d/13DXF2CFWQLeYxxHFekng8HJnH\_jtbfpN/view?usp=sharing](https://drive.google.com/a/moringaschool.com/file/d/13DXF2CFWQLeYxxHFekng8HJnH_jtbfpN/view?usp=sharing))

Data in these files were stored in form of tables,columns and rows.

### **Verifying Data Quality**

During the collection periods, on some occasions the download failed, which created dome gaps in

the data. These gaps are represented on Figures 1 and 2 . Except for an important gap from

November 11 to November 14, 2017, missing files were rare.

## **Data Preparation**

These are the steps followed in preparing the data

#### **Loading Data**

Loaded the datasets from the CSV and then created a python notebook using google colab.

#### **2.Cleaning Data**

Changed the year,month,day,hour,min ,colums to a new column(“date\_new”) Checked for any missing and duplicate values

Deleted columns with missing values

Selecting a sample subset of data

Aggregating records

**Modelling**

The modeling techniques employed are driven by the company’s data mining goal,thus using python to answer our data mining goal

Use historical information about previous services offered to generate a model that is highly understandable.

At its simplest, this involves clustering subscription orders to determine which cars are most often sought. Stations data, and even rental records, are added for richer results

Our Autolib Descreiption link has all the terms used the modeling of this project

**Evaluation**

The study produced what are hoped to be better product recommendations and an improved insight on strongholds and weakpoints. The evidence that the product recommendations are better .To produce the final report, the analysts will try to identify some general trends in the rulesets that can be more easily explained.

As a result of reviewing the process of the initial data mining project, we have developed a greater appreciation of the interrelations between steps in the process.

Now we are fairly confident of both the accuracy and relevancy of the project results and so is continuing to the deployment phase.

**Deployment**

As it turns out,there is quite high distribution of subscription of utilib cars compared to the non utilib cars but being shared.Most people prefer using the Electric cars.