

Advanced Data Science Capstone

# My used Car

BY: Meher Selmi

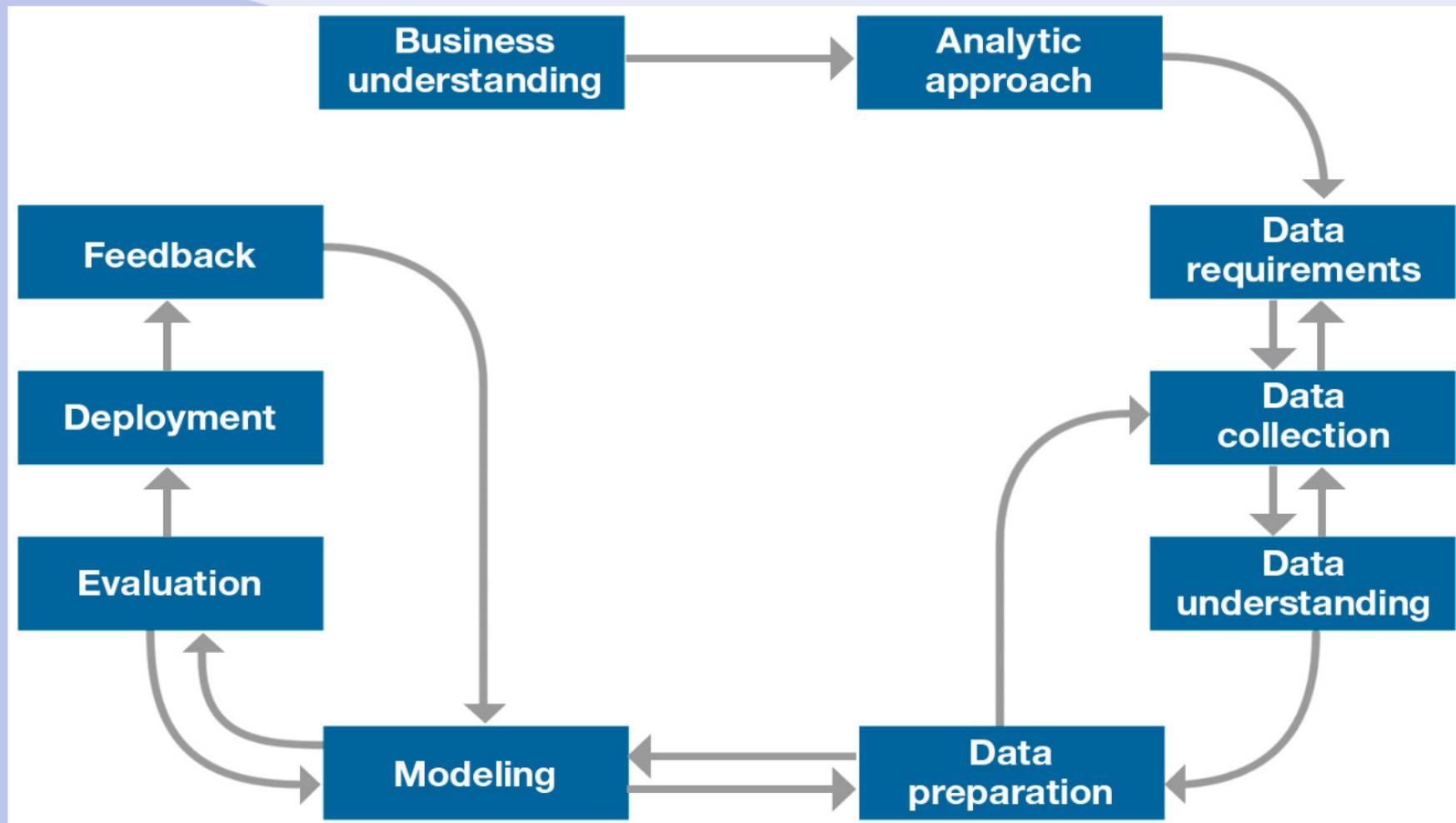




# Introduction

In order to earn the Advanced Data Science Certificate from **IBM**, we should build a data science project, so I suggest developing an app that predicts the price of a used car.

# Data Science methodology



Source: IBM Data Science Methodology figure 1: ***Foundational methodology for data science***.  
Link : <https://www.ibmbigdatahub.com/blog/why-we-need-methodology-data-science>

# Business Understanding & Analytic Approach



- If you have a car that you want to sell it, you will find some difficult to fix the best price considering characteristic and the market price
- Everyone spends a lot of time searching and asking to reach the right price to sell their cars



# Solution

- build an app which helps the user to fix the price of the car according to characteristic and the market price.
- using new technologies such as AI, machine learning, and cloud computing (IBM Cloud) to solve the problem.

L

# Data Requirements



Make



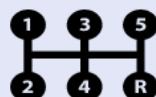
Model



Year



Mileage



Transmission



Engine size



Price

# Data Collection



# Data Understanding

	name	price	mile_age	make	model	fuel	power	transmission	engine_size	description	linkofproduct
0	voiture	0 DT	0	AC	Seven	Essence	23	Autre	Autres	 تجربة 3 سهولة مع LEASING SERVICE  	<a href="https://www.tayara.tn/listings/voitures-9/fcee...">https://www.tayara.tn/listings/voitures-9/fcee...</a>
1	hyundai i10 sedan	0 DT	170000	Hyundai	Grand i10	Essence	5	Gris	Berline	Tel 20329598	<a href="https://www.tayara.tn/listings/voitures-9/9d48...">https://www.tayara.tn/listings/voitures-9/9d48...</a>
2	Volvo c30	0 DT	117	Volvo	C30	Essence	6	Blanc	Compacte	Volvo c30 très propre	<a href="https://www.tayara.tn/listings/voitures-9/49a0...">https://www.tayara.tn/listings/voitures-9/49a0...</a>
3	Mercedes	0 DT	340000	Mercedes-Benz	Classe ML	Diesel	11	4 x 4	Automatique	Tout option	<a href="https://www.tayara.tn/listings/voitures-9/fd38...">https://www.tayara.tn/listings/voitures-9/fd38...</a>
4	Citroën DS4	41000 DT	131000	Citroen	DS4	Essence	7	Noir	Autres	À vendre une très belle DS4,très propre ,moteu...	<a href="https://www.tayara.tn/listings/voitures-9/77bf...">https://www.tayara.tn/listings/voitures-9/77bf...</a>

Raw data (primary data)

# Data Understanding

	name	price	mile_age	make	model	fuel	power	transmission	engine_size	description	linkofproduct
0	voiture	0 DT	0	AC	Seven	Essence	23	Autre	Autres	 تجربة تسري كرهية مع 3 LEASING SERVICE  	<a href="https://www.tayara.tn/listings/voitures-9/fcee...">https://www.tayara.tn/listings/voitures-9/fcee...</a>
1	hyundai i10 sedan	0 DT	170000	Hyundai	Grand i10	Essence	5	Gris	Berline	Tel 20329598	<a href="https://www.tayara.tn/listings/voitures-9/9d48...">https://www.tayara.tn/listings/voitures-9/9d48...</a>
2	Volvo c30	0 DT	117	Volvo	C30	Essence	6	Blanc	Compacte	Volvo c30 très propre	<a href="https://www.tayara.tn/listings/voitures-9/49a0...">https://www.tayara.tn/listings/voitures-9/49a0...</a>
3	Mercedes	0 DT	340000	Mercedes-Benz	Classe ML	Diesel	11	4 x 4	Automatique	Tout option	<a href="https://www.tayara.tn/listings/voitures-9/fd38...">https://www.tayara.tn/listings/voitures-9/fd38...</a>
4	Citroën DS4	41 000 DT	131000	Citroen	DS4	Essence	7	Noir	Autres	A vendre une très belle DS4,très propre ,moteu...	<a href="https://www.tayara.tn/listings/voitures-9/77bf...">https://www.tayara.tn/listings/voitures-9/77bf...</a>

# Data Understanding

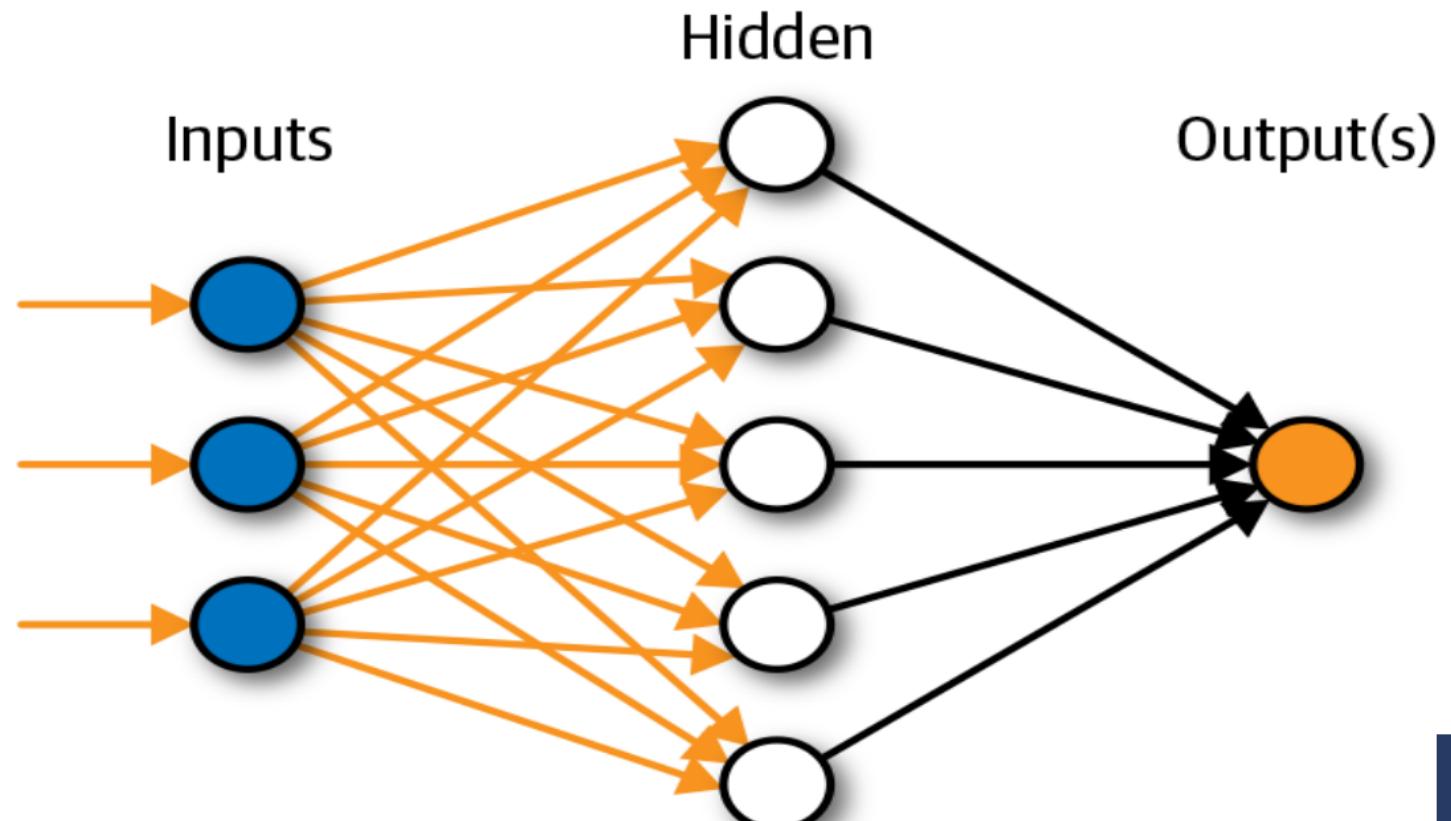
```
car_style=['Compacte','Berline','Cabriolet','4 x 4','Monospace','Utilitaire','Pick up','Autres']
car_condition=['Nouveau','Avec kilométrage','Non dédouanné','RS','Pièces manquantes']
transmission=['Automatique','Manuelle']
engine_size=[1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2.0, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6,
             2.7, 2.8, 2.9, 3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 4.0]
```

# Data preparation

- Delete missing values 
  - Convert types 
  - Data normalisation 
  - Fix data in columns 
  - Encoding catogorical data
  - Split data to train and test dataset
- e.g. (if price=0)
- e.g. (price: "41.000DT" to 41000)
- e.g. (mileage: "117Km" to 117000)
- e.g. ("Automatique" will be in transmission )

# Modeling

## Artificial Neural Network

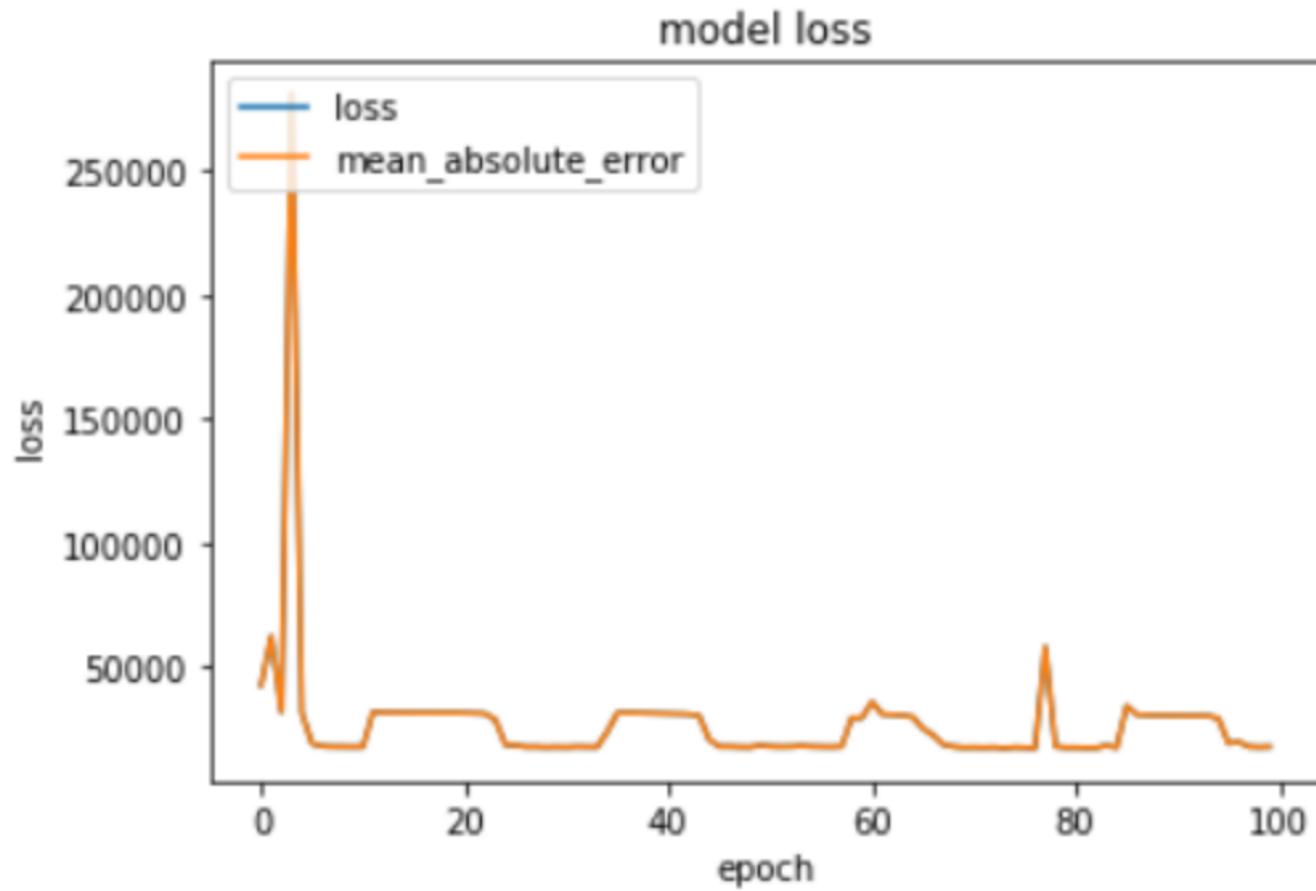


# Modeling

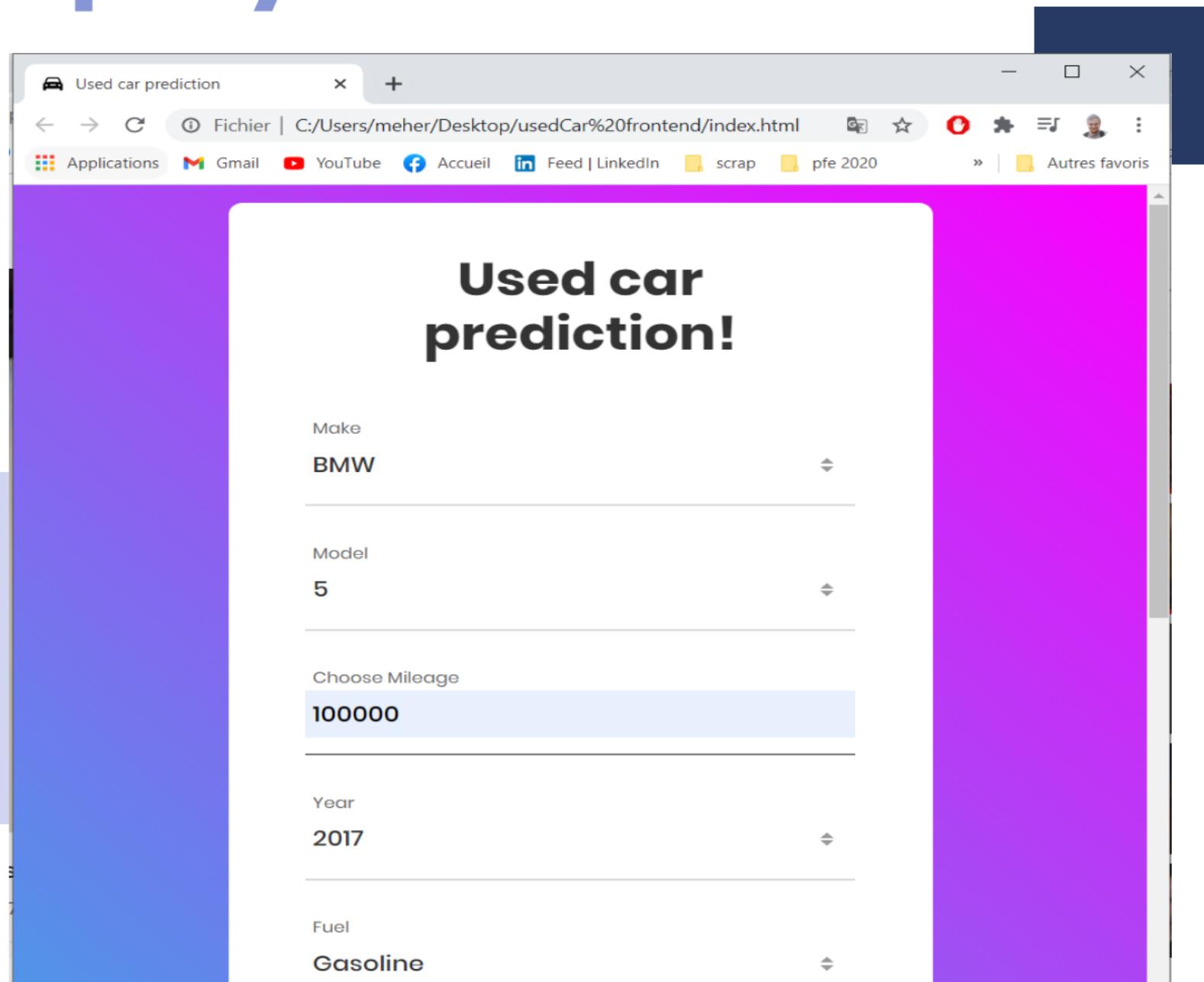
Model: "sequential\_4"

Layer (type)	Output Shape	Param #
<hr/>		
dense_1 (Dense)	(None, 128)	405120
dense_2 (Dense)	(None, 128)	16512
dense_3 (Dense)	(None, 128)	16512
dense_4 (Dense)	(None, 64)	8256
dense_5 (Dense)	(None, 64)	4160
dense_6 (Dense)	(None, 32)	2080
dense_7 (Dense)	(None, 64)	2112
dense_8 (Dense)	(None, 16)	1040
dense_9 (Dense)	(None, 8)	136
dense_10 (Dense)	(None, 64)	576
dense_output (Dense)	(None, 1)	65
<hr/>		
Total params: 456,569		
Trainable params: 456,569		
Non-trainable params: 0		

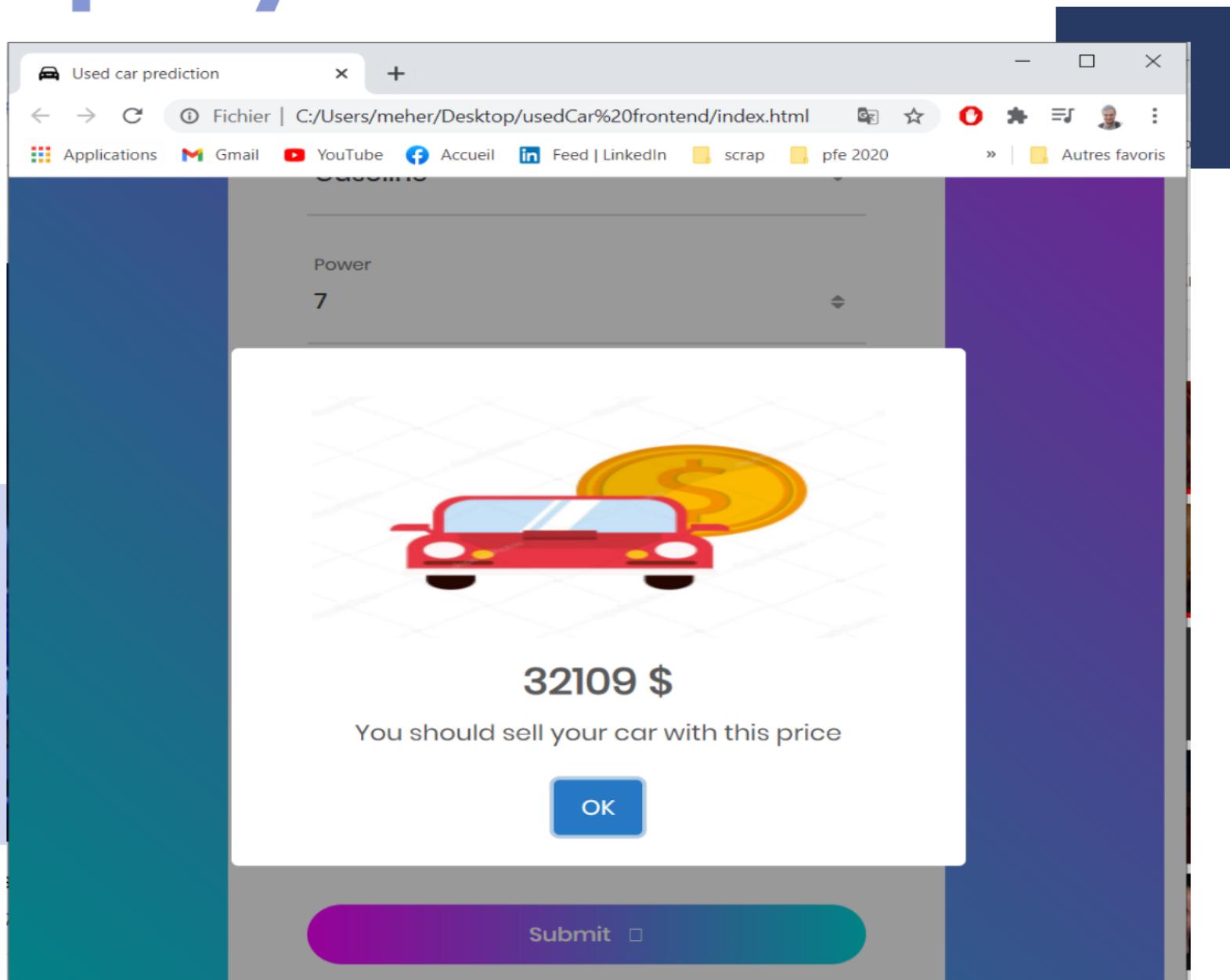
# Evaluation



# Deployment



# Deployment





**Thank You**