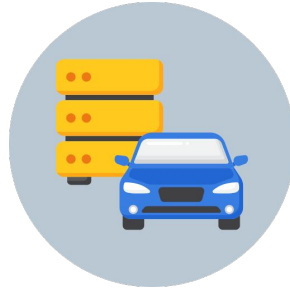


ArchVehicle



Database II Class

Project Documentation

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Introduction

This documentation describes the project realized for the Database II Class. In this document you can find more details about:

- **Requirements of the project;**
- **Dataset choice;**
- **Dataset analysis and cleaning;**
- **DBMS choice;**
- **Data Scheme creation;**
- **Uploading data to the database;**
- **Technologies choice for the webapp;**
- **Description of the page realized and the possible actions;**
- **Webapp installation.**

Description of the system

ArchiVehicle has the goal to simplify and digitalize the the information management about a vehicle park of a car dealer. This software is intended for the userd of a business that have to retrieve the information about the vehicles and memorize them into the system, thanks to a graphical user interface served by a client/server web application. ArchiVehicle offers the following functionalities:

- 1. Insert, update, delete the information about a vehicle;**
- 2. Insert, update, delete the information about a manufacturer of vehicles;**
- 3. Searching for a vehicle by applying some filters;**
- 4. Quick view of the number of vehicles by each manufacturer, based on various characteristics by vehicle.**

Dataset

Information about the initial dataset

Not having available information about vehicles, in order to simulate the use of this application, a public dataset from Kaggle has been picked. The choosed dataset is [Vehicle Dataset 2024](#). For each column it has been defined a description about the showed information e the data type to be memorized. If necessary, it has been specified the possible insertable value of the picked column:

Column name	Description	Data type
name	Full name of the vehicle	String
description	A brief description of the vehicle	String
make	The vehicle's manufacturer name	String
model	The model name of the vehicle	String
type	The vehicle type	String: {"New", "Used"}
year	The year of production of the vehicle	Intero
price	The vehicle price	Decimal
engine	Info about the vehicle engine	String
cylinders	The number of cylinders in the vehicle engine	Decimal
fuel	The type of fuel used by the vehicle	String
mileage	The number of miles driven by the vehicle	Decimal
transmission	The type of vehicle transmission	String
trim	The level of vehicle accessories	String
body	The body style of the vehicle	String: { "Convertible", "Hatchback", "Pickup Truck", "SUV", "Sedan", "Cargo Van", "Passegner Van", "Minivan" }
doors	The number of vehicle doors	Decimal
exterior_color	The exterior color of the vehicle	String
interior_color	The interior color of the vehicle	String
drivetrain	The type of vehicle traction	String: { "All-wheel Drive", "Four-wheel Drive", "Front-wheel Drive", "Rear-wheel Drive" }

Generation of vehicle manufacturer dataset

Now having all the information about the vehicles, but still missing the ones about the manufacturers, it has been decided to use ChatGPT to request the generation of a dataset about the manufacturers. After extracting the name of all the manufacturers, with the techniques showed in the [Data Cleaning](#) section, the dataset has been generated and downloaded in a csv format. The conversation is showed next:

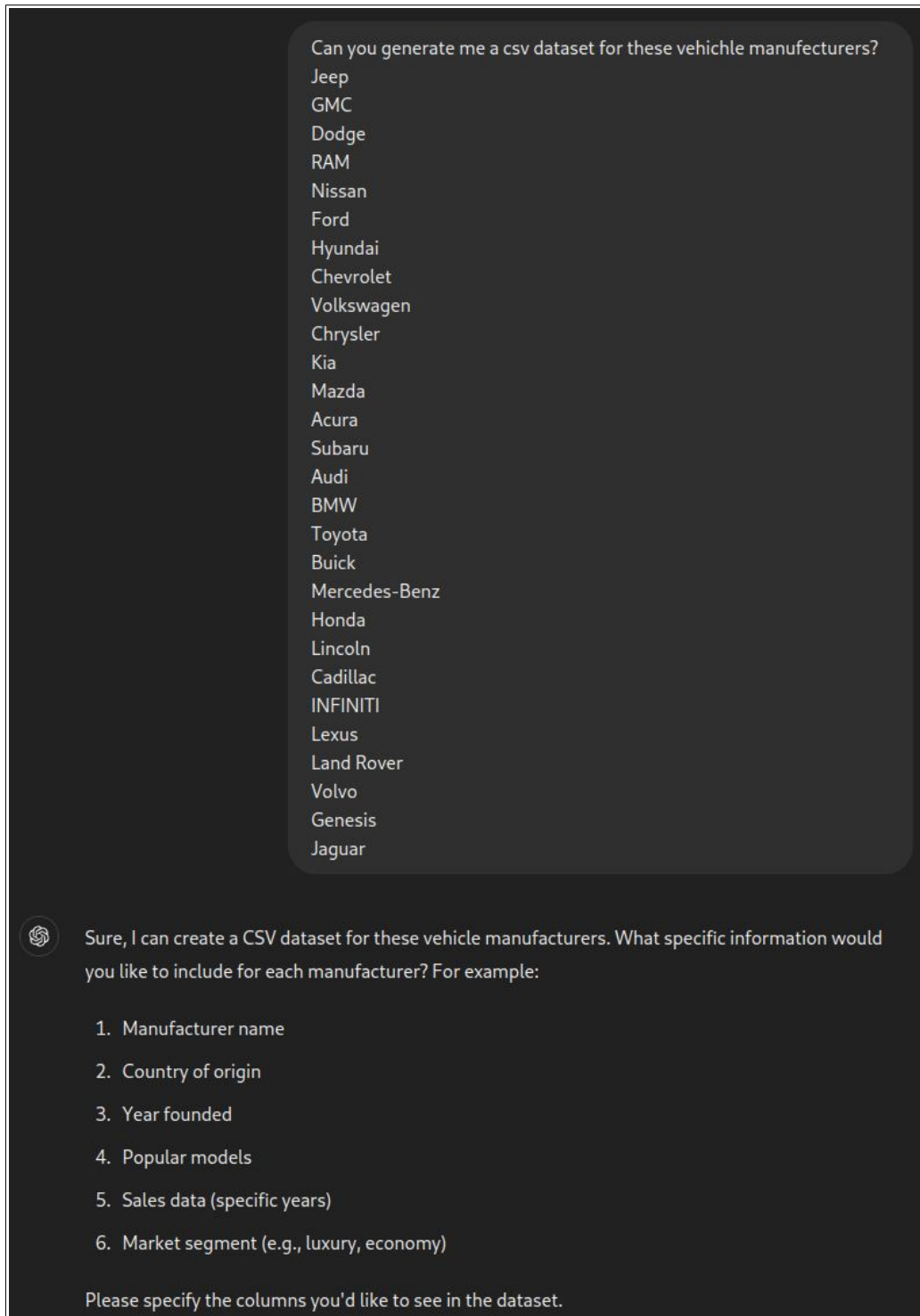



Figure 1: Generation of vehicle manufacturer dataset - Part 1

Manufacturer name, Country of origin, Year Founded, Founder, Detailed description


Great! I will create a CSV dataset with the following columns for the specified vehicle manufacturers:

1. Manufacturer Name
2. Country of Origin
3. Year Founded
4. Founder
5. Detailed Description

Here's the dataset:

csv

Copia codice

```

Manufacturer Name,Country of Origin,Year Founded,Founder,Detailed Description
Jeep,USA,1941,Willys-Overland,Jeep is an American automobile marque, now owned by S
GMC,USA,1911,William C. Durant,GMC (General Motors Truck Company) is a division of
Dodge,USA,1900,Horace and John Dodge,Dodge is an American brand of automobiles, a c
RAM,USA,2010,FCA US LLC,RAM Trucks, a division of Stellantis, focuses on light to m
Nissan,Japan,1933,Yoshisuke Aikawa,Nissan is a Japanese multinational automobile ma
Ford,USA,1903,Henry Ford,Ford Motor Company is an American multinational automaker
Hyundai,South Korea,1967,Chung Ju-yung,Hyundai Motor Company is a South Korean mult
Chevrolet,USA,1911,Louis Chevrolet and William C. Durant,Chevrolet, colloquially re
Volkswagen,Germany,1937,Ferdinand Porsche,Volkswagen is a German motor vehicle manu
Chrysler,USA,1925,Walter Chrysler,Chrysler is one of the "Big Three" automobile mar
Kia,South Korea,1944,Kim Cheol-ho,Kia Corporation is a South Korean multinational a
Mazda,Japan,1920,Jujiro Matsuda,Mazda Motor Corporation is a Japanese multinational
Acura,Japan (USA),1986,Honda Motor Co.,Acura is the luxury vehicle division of the
Subaru,Japan,1953,Kenji Kita,Subaru is the automobile manufacturing division of the
Audi,Germany,1909,August Horch,Audi is a German automobile manufacturer that desigr
BMW,Germany,1916,Franz Josef Popp,BMW (Bayerische Motoren Werke AG) is a German mul
Toyota,Japan,1937,Kiichiro Toyoda,Toyota Motor Corporation is a Japanese multinatic
Buick,USA,1903,David Dunbar Buick,Buick is a division of the American automobile ma
Mercedes-Benz,Germany,1926,Karl Benz and Gottlieb Daimler,Mercedes-Benz is a German
Honda,Japan,1948,Soichiro Honda and Takeo Fujisawa,Honda Motor Co., Ltd. is a Japar
Lincoln,USA,1917,Henry M. Leland,Lincoln, formally the Lincoln Motor Company, is a
Cadillac,USA,1902,William Murphy, Lemuel Bowen, Henry M. Leland,Cadillac is a divis
INFINITI,Japan,1989,Nissan Motor Co.,INFINITI is the luxury vehicle division of the
Lexus,Japan,1989,Eiji Toyoda,Lexus is the luxury vehicle division of the Japanese a
Land Rover,UK,1948,Maurice Wilks,Land Rover is a British brand of predominantly fou
Volvo,Sweden,1927,Assar Gabrielsson and Gustaf Larson,Volvo Cars is a Swedish luxur
Genesis,South Korea,2015,Hyundai Motor Group,Genesis Motor, LLC is the luxury vehic
Jaguar,UK,1922,William Lyons and William Walmsley,Jaguar is a brand of Jaguar Land

```

This CSV dataset contains the requested information for each vehicle manufacturer.

Figure 2: Generation of vehicle manufacturer dataset - Part 2

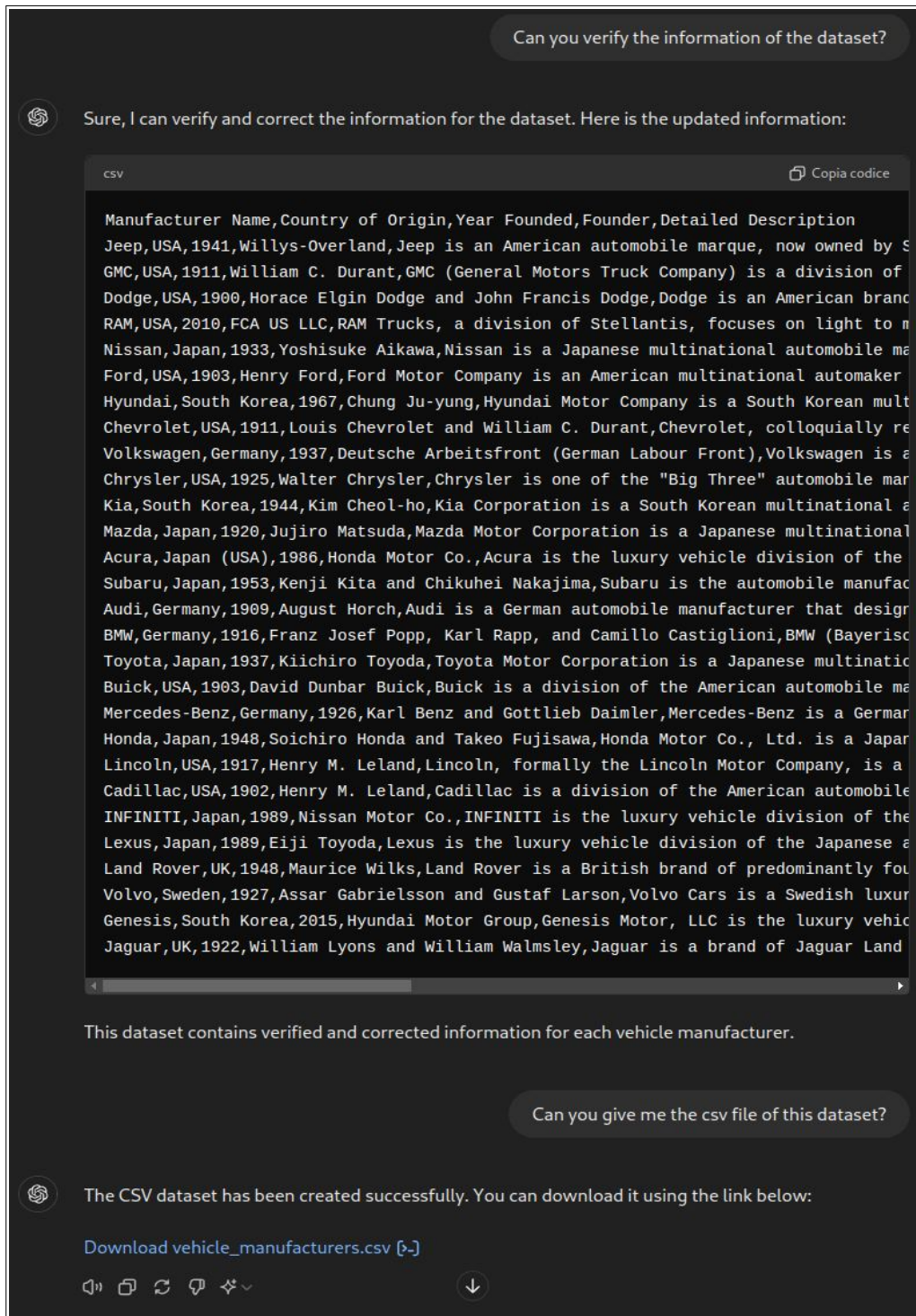


Figure 3: Generation of vehicle manufacturer dataset - Part 3

The result dataset has the following columnns:

Nome colonna	Descrizione	Tipo di dato
name	The manufacturer name	String
country	The country where the production company was founded	String
year	The year the production company was founded	Integer
founder	The name of the founder of the production company	String
description	A brief description of the production company	String

Data Cleaning

After obtaining all the dataset, before is possible to load them on the db, some data cleaning operations have been necessary. For this reason, two notebooks has been realized, using also the pandas library. The main operation are showed next:

- **vehicles_dataset_manufacturer_extract.ipynb:**
 1. Extract the make column that contains the manufacturers name;
 2. Remove the duplicates from the extracted column;
 3. Save the column on a csv file.
- **vehicles_dataset_cleaning.ipynb:**
 1. Remove the production year from the elements of the name column;
 2. Remove the rows whit null/empty values;
 3. Remove extra newline/spacing characters from the element of description column;
 4. Change the type of cylinders and doors column from float to int;
 5. Retrieve the indexes of the rows with meaningless numerical values (0 or 0.0) and the remove these rows;
 6. Retrieve the indexes of the rows where the description is under 100 characters lenght and remove these rows;
 7. Remove the duplicated rows by the name column;
 8. Change the name of body column to chassis;
 9. Simplify all the chassis Van types, grouping them up;
 10. Create a new column image wiht default value "img";
 11. Change the make column name to manufacturer_id and change the manufacturers name with the respective id in the database;
 12. Change the name of some columns e move them, in order to correctly import the dataset into the database;
 13. Save the cleaned dataset on a csv file.

Database

Database Choose

In order to manage the persistent data of this application, it has been decided to use MongoDB and there are several reason:

1. **Data structure:** thanks to the “flexibility” of a NoSQL database, is possible to save the partial info of an entity in a less rigid way. In this case, the car dealer, could have received only the essential vehicles information from the manufacturers and still starts to save them, so they can be later integrated with the missing ones.
2. **Scalability:** a NoSQL database offers an increased expandability, so it's easier to distribute the data on different nodes on the network. In this case, the car dealer could have multiple shops in the country, having the necessity to use the application on more machines and to define a distribute solution for the database.

Data Scheme

Even if the database been used is a NoSQL, for each collection has been defined a document structure in order to define the data scheme.

Data structure of the manufacturers collection

For each document of the manufacturers collection, since there are a few attributes the structure is on a single level, as showed in the next example:

```
{
  "_id": {
    "$oid": "6687ea0b2d6d295df5c1f188"
  },
  "name": "Jeep",
  "country": "USA",
  "year": 1941,
  "founder": "Willyes-Overland",
  "description": "Jeep is an American automobile marque, now
                 owned by Stellantis. It is known for its rugged
                 off-road vehicles and military origins."
}
```

Data structure of the vehicles collection

For each document of the vehicles collection, since there are a lot of attributes, the structure is on multiple levels with subdocuments. Considering the choices took in the [Database Choose](#) section, an example of a document is showed next:

```
{
  "id": {
    "$oid": "66957f0b62d99ecd714e267b"
  },
  "name": "Jeep Grand Cherokee 4xe Trailhawk",
  "description": "Diamond Black Crystal Pearlcoat 2023 Jeep Grand Cherokee Trailhawk 4xe 4WD 8-Speed Automatic 2.0L I4 DOHC 2.0L I4 DOHC, 4WD. Clement Chrysler Dodge Jeep Ram of Columbia is pleased to offer this 2023 Jeep Grand Cherokee Trailhawk 4xe in Diamond Black Crystal Pearlcoat with Global Black Leather. This Grand Chero...",
  "model": "Grand Cherokee 4xe",
  "chassis": "SUV",
  "year": 2023,
  "price": 59547 (in dollari),
  "image": "../static/img/vehicle_sample_suv.png",
  "manufacturer_id": {
    "$oid": "6687ea0b2d6d295df5c1f188"
  },
  "mechanical_details": {
    "engine": "16V GDI DOHC Turbo Hybrid",
    "cylinders": 4,
    "fuel": "Hybrid",
    "mileage": 185,
    "transmission": "8-Speed Automatic",
    "drivetrain": "Four-wheel Drive",
  },
  "body_details": {
    "trim": "Trailhawk",
    "doors": 4,
    "exterior_color": "Diamond Black",
    "interior_color": "Global Black"
  }
}
```

Datasets import

After completing all the operation about generating, transforming, cleaning the datasets and defined the structure of the documents, the datasets have been imported into the database, thanks to the DBMS GUI, Compass. In order to correctly create the documents, it has been first imported the manufacturers dataset, so in this way is possible to define the reference between the vehicle document and the respective manufacturer document. In the next figures, this process is showed:

Import

To collection archiVehicle.manufacturer

Import file: vehicle_manufacturers.csv

Options

Select delimiter: Comma

☒ Ignore empty strings

☐ Stop on errors

Specify Fields and Types [Learn more about data types](#)

<input checked="" type="checkbox"/> country	<input checked="" type="checkbox"/> year	<input checked="" type="checkbox"/> founder	<input checked="" type="checkbox"/> description
String	Int32	String	String
USA	1941	Willys-Overland	Jeep is an American automobile marque, ...
USA	1911	William C. Durant	GMC (General Motors Truck Company) is ...
USA	1900	Horace Elgin Dodge and John Francis Do...	Dodge is an American brand of automobi...
USA	2010	FCA US LLC	RAM Trucks, a division of Stellantis, focus...
Japan	1933	Yoshisuke Aikawa	Nissan is a Japanese multinational auto...
USA	1903	Henry Ford	Ford Motor Company is an American mult...
South Korea	1967	Chung Ju-yung	Hyundai Motor Company is a South Kore...
USA	1911	Louis Chevrolet and William C. Durant	Chevrolet, colloquially referred to as Che...
Germany	1937	Deutsche Arbeitsfront (German Labour Fr...	Volkswagen is a German motor vehicle m...
USA	1925	Walter Chrysler	Chrysler is one of the 'Big Three' automob...

Cancel Import

Figure 4: Manufacturers dataset import

Import

To collection archiVehicle.vehicle

Import file: vehicles_dataset_clean.csv

Options

Select delimiter Comma

☒ Ignore empty strings

☐ Stop on errors

Specify Fields and Types

Learn more about data types

	<input checked="" type="checkbox"/> name	<input checked="" type="checkbox"/> description	<input checked="" type="checkbox"/> model	<input checked="" type="checkbox"/> chassis	<input checked="" type="checkbox"/> type
	String	String	String	String	String
1	Jeep Wagoneer Series II	Heated Leather Seats, Nav System, Moon...	Wagoneer	SUV	New
2	Jeep Grand Cherokee Laredo	AI West is committed to offering every cu...	Grand Cherokee	SUV	New
3	Dodge Durango Pursuit	White Knuckle Clearcoat 2023 Dodge Du...	Durango	SUV	New
4	RAM 3500 Laramie	2024 Ram 3500 Laramie Billet Silver Meta...	3500	Pickup Truck	New
5	Nissan Murano Platinum	Boasts 28 Highway MPG and 20 City MP...	Murano	SUV	New
6	Jeep Wagoneer Base	Alloy Wheels / Premium Wheels, Apple Ca...	Wagoneer	SUV	New
7	Ford F-350 Lariat Super Duty	Engine: 6.7L High Output Power Stroke V8...	F-350	Pickup Truck	New
8	Jeep Grand Cherokee Altitude	Silver Zynith 2024 Jeep Grand Cherokee ...	Grand Cherokee	SUV	New
9	Jeep Compass Latitude	24/32 City/Highway MPG2024 Jeep Com...	Compass	SUV	New
10	RAM 3500 Tradesman	Granite Crystal Metallic Clearcoat 2024 ...	3500	Pickup Truck	New

Cancel

Import

Figure 5: Vehicles dataset import

Web Application

Technologies choose

Having short times to realize this application, it has been decided to use technologies with a low learning curve and writing not too much code, using also already defined components where is possible to do it. For these reasons, the picked technologies are:

- **Database Driver: PyMongo**
- **Application logic / back-end: Flask**
- **Presentation logic / front-end: Bootstrap**

PyMongo

PyMongo is the recommended driver by the MongoDB developers, in order to exploit the potential of their database within a web application. PyMongo offers the main operations to interact with the database. Once the package has been installed, the first step is to import the package and start the connection with the database:

```
from pymongo import MongoClient  
  
client = MongoClient('localhost', 27017)
```

Flask

Flask is a micro-framework created for developing web-application in a fast and easy way. Being a micro-framework, there are few functionalities out of the box, such as the server, the debugger, the router, the component for processing requests and responses. Once the package has been installed, the first step is to create a new module named `app.py` and define the first route for the index page, that will only initially gave a response with a classic “Hello World!” message:

```
from flask import Flask  
@app.route("/")  
def index():  
    return "Hello, World!"
```

Bootstrap

Bootstrap is a framework created for realizing responsive web pages, offering templates for each necessary component. Thanks to the import html component functionality offered by Flask, is possible to reuse the different components on the web application pages. In order to start use Bootstrap, it's necessary to include the respective tags inside the page header.

Descrizione delle pagine

Home Page

In the Home Page, is possible to do a search of the vehicles and apply filters related to the property of the vehicles.

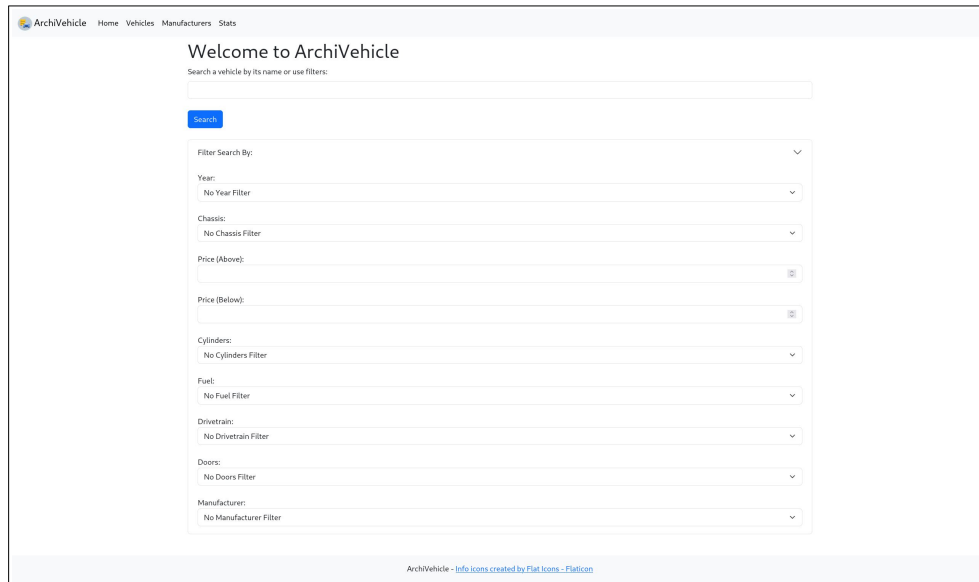


Figure 6: Home Page

Vehicles Page

In the Vehicles Page, is possible to display all the various vehicles and pick one in order to go to the dedicated vehicle page where more details are showed. It is also possible to insert a new vehicle.

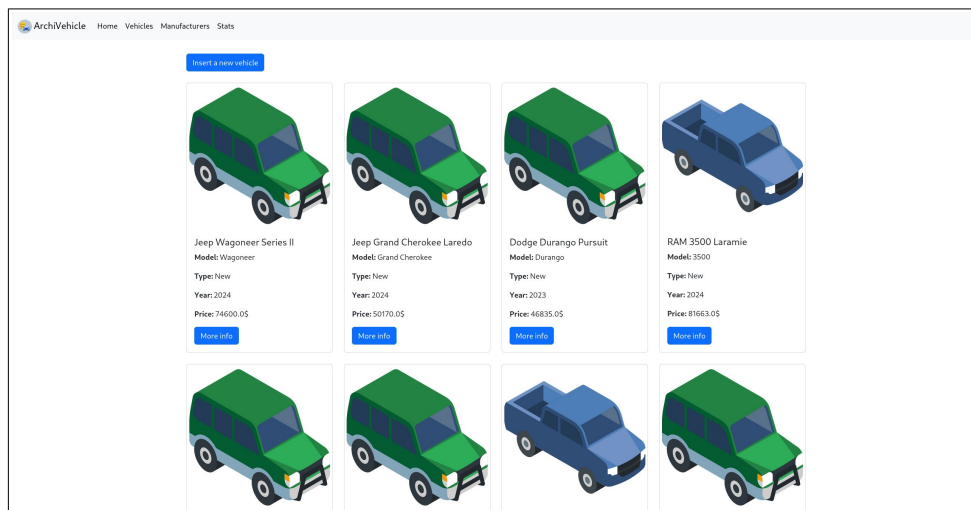


Figure 7: Vehicles Page

Insert Vehicle Page

In the Insert Vehicle Page, is possible to insert the info about a new vehicle. The fields marked with a red asterisk are mandatory because they define the main info about the vehicle. Through the two dropdown lists is possible to insert the info related to the details of the vehicle, following the document structure and the data scheme for the vehicle.

ArchiVehicle Home Vehicles Manufacturers Stats

General Info: (*) Mandatory

Name *

Model *

Chassis *

Type *

Year *

Price (\$) *

Manufacturer *

Description *

Mechanical Details

Body Details

Save

ArchiVehicle - Info icons created by Flat Icons - FlatIcon

Figure 8: Insert Vehicle Page

Home'. The form fields are the same as in Figure 8, but the 'Save' button is now disabled. The footer text is the same as in Figure 8."/>

ArchiVehicle Home Vehicles Manufacturers Stats

Vehicle inserted successfully. Go back [Home](#)

General Info: (*) Mandatory

Name *

Model *

Chassis *

Type *

Year *

Price (\$) *

Manufacturer *

Description *

Mechanical Details

Body Details

Save

ArchiVehicle - Info icons created by Flat Icons - FlatIcon

Figure 9: Insert Vehicle Page - Success Message

Show Single Vehicle Page

In the Show Single Vehicle Page, is possible to display all the information about the vehicle. Also, is possible to go to the Update Vehicle Page for updating the info about the vehicle and to delete the info about the vehicle after confirming the alert message.

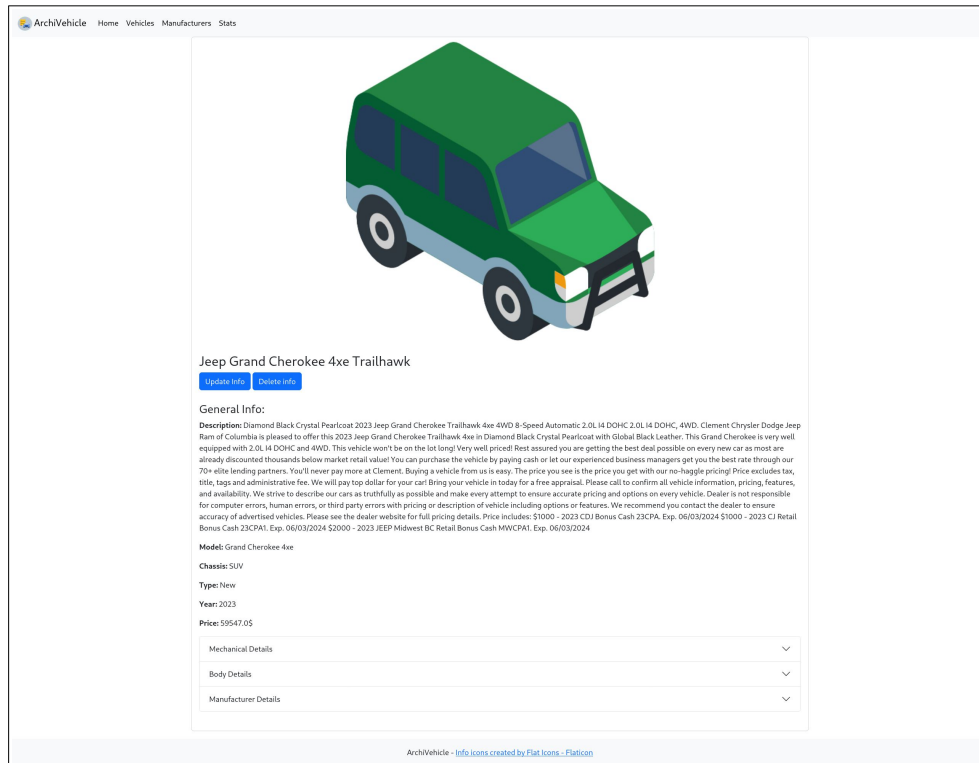


Figure 10: Show Single Vehicle Page

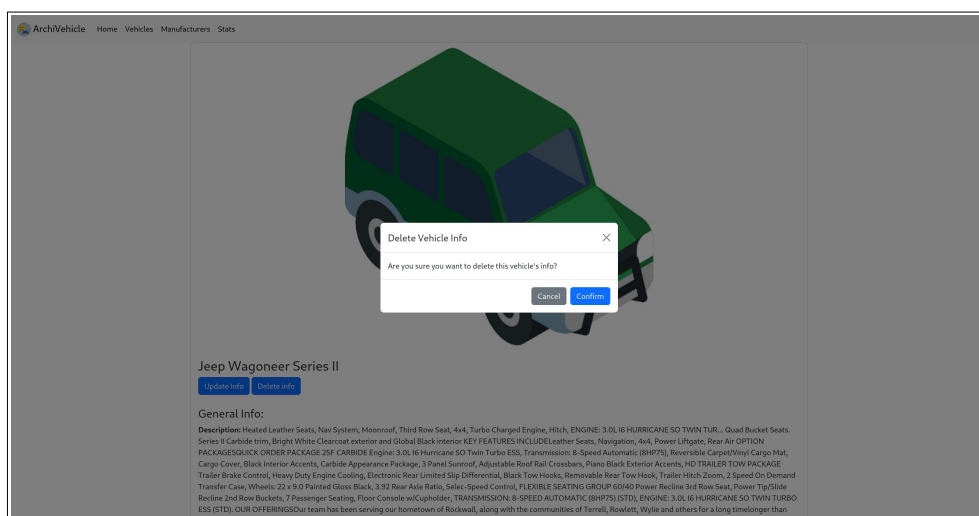


Figure 11: Show Single Vehicle Page - Confirm Message

Manufacturers Page

In the Manufacturers Page, is possible to display the info about all the loaded manufacturers. Also, is possible to insert a new manufacturer, update the info of an already existent manufacturer or delete an existing one.

ArchiVehicle

Home Vehicles Manufacturers Stats

Insert a new manufacturer


Name	Country	Year	Founder	Description		
Jeep	USA	1941	Willys-Overland	Jeep is an American automobile marque, now owned by Stellantis. It is known for its rugged off-road vehicles and military origins.	Update info	Delete info
GMC	USA	1911	William C. Durant	GMC (General Motors Truck Company) is a division of the American automobile manufacturer General Motors, primarily focused on trucks and utility vehicles.	Update info	Delete info
Dodge	USA	1900	Horace Elgin Dodge and John Francis Dodge	Dodge is an American brand of automobiles, a division of Stellantis, known for its performance cars, trucks, and SUVs.	Update info	Delete info
RAM	USA	2010	FCA US LLC	RAM Trucks, a division of Stellantis, focuses on light to mid-weight commercial vehicles and pickup trucks.	Update info	Delete info
Nissan	Japan	1933	Yoshisuke Aikawa	Nissan is a Japanese multinational automobile manufacturer, known for producing a wide range of cars, trucks, and SUVs.	Update info	Delete info
Ford	USA	1903	Henry Ford	Ford Motor Company is an American multinational automaker that has its main headquarters in Dearborn, Michigan. It was founded by Henry Ford.	Update info	Delete info
Hyundai	South Korea	1967	Chung Ju-yung	Hyundai Motor Company is a South Korean multinational automotive manufacturer headquartered in Seoul, South Korea.	Update info	Delete info
Chevrolet	USA	1911	Louis Chevrolet and William C. Durant	Chevrolet, colloquially referred to as Chevy, is an American automobile division of the American manufacturer General Motors.	Update info	Delete info
Volkswagen	Germany	1937	Deutsche Arbeitsfront (German Labour Front)	Volkswagen is a German motor vehicle manufacturer headquartered in Wolfsburg, Germany, known for the iconic Beetle and a wide range of vehicles.	Update info	Delete info
Chrysler	USA	1925	Walter Chrysler	Chrysler is one of the 'Big Three' automobile manufacturers in the United States, now a part of Stellantis.	Update info	Delete info
Kia	South Korea	1944	Kim Cheol-ho	Kia Corporation is a South Korean multinational automotive manufacturer headquartered in Seoul, known for producing a wide range of vehicles.	Update info	Delete info
Mazda	Japan	1920	Juuro Matsuda	Mazda Motor Corporation is a Japanese multinational automaker based in Fuchū, Hiroshima, Japan, known for its innovative rotary engine technology.	Update info	Delete info
Acura	Japan (USA)	1986	Honda Motor Co.	Acura is the luxury vehicle division of the Japanese automaker Honda, known for its performance and luxury vehicles.	Update info	Delete info
Subaru	Japan	1953	Kenji Kita and Chikuhai Nakajima	Subaru is the automobile manufacturing division of the Japanese transportation conglomerate Subaru Corporation, known for its use of the boxer engine layout.	Update info	Delete info
Audi	Germany	1909	August Horch	Audi is a German automobile manufacturer that designs, engineers, produces, markets, and distributes luxury vehicles.	Update info	Delete info
BMW	Germany	1916	Franz Josef Popp, Karl Rapp, and Camillo Castiglioni	BMW (Bayerische Motoren Werke AG) is a German multinational company which produces luxury vehicles and motorcycles.	Update info	Delete info
Toyota	Japan	1937	Kiichiro Toyoda	Toyota Motor Corporation is a Japanese multinational automotive manufacturer headquartered in Toyota City, Japan.	Update info	Delete info
Buick	USA	1903	David Dunbar Buick	Buick is a division of the American automobile manufacturer General Motors, offering primarily luxury vehicles.	Update info	Delete info
Mercedes-Benz	Germany	1926	Karl Benz and Gottlieb Daimler	Mercedes-Benz is a German global automobile marque and a division of Daimler AG, known for luxury vehicles, buses, coaches, and trucks.	Update info	Delete info
Honda	Japan	1948	Soichiro Honda and Takeo Fujisawa	Honda Motor Co., Ltd. is a Japanese public multinational conglomerate known for manufacturing automobiles, motorcycles, and power equipment.	Update info	Delete info
Lincoln	USA	1917	Henry M. Leland	Lincoln, formally the Lincoln Motor Company, is a luxury vehicle division of the American automobile manufacturer Ford.	Update info	Delete info
Cadillac	USA	1902	Henry M. Leland	Cadillac is a division of the American automobile manufacturer General Motors that designs and builds luxury vehicles.	Update info	Delete info
INFINITI	Japan	1989	Nissan Motor Co.	INFINITI is the luxury vehicle division of the Japanese automaker Nissan, headquartered in Yokohama, Japan.	Update info	Delete info
Lexus	Japan	1989	Eiji Toyoda	Lexus is the luxury vehicle division of the Japanese automaker Toyota, known for its reliability and luxury.	Update info	Delete info
Land Rover	UK	1948	Maurice Wilks	Land Rover is a British brand of predominantly four-wheel drive, off-road capable vehicles, owned by multinational car manufacturer Jaguar Land Rover.	Update info	Delete info

ArchiVehicle - Info icons created by Flat Icons - Flaticon

Figure 12: Manufacturers Page

Stats Page

In the Stats Page, is possible to display the number of all the vehicles for the respective manufacturer, counting the vehicles given the different features.


ArchiVehicle

[Home](#)
[Vehicles](#)
[Manufacturers](#)
[Stats](#)

Manufacturer	#Vehicles	Chassis						Cylinders				Fuel				Drivetrain				Doors			
		Convertible	Hatchback	Pickup Truck	SUV	Sedan	Van	3	4	6	8	Diesel	E85 Flex Fuel	Gasoline	Hybrid	PHEV Hybrid Fuel	All-wheel Drive	Four-wheel Drive	Front-wheel Drive	Rear-wheel Drive	2	3	4
Jeep	34	1	0	1	32	0	0	0	16	17	0	0	0	26	7	0	0	32	0	1	0	0	33
GMC	4	0	0	4	0	0	0	0	0	0	4	2	0	2	0	0	0	3	0	1	1	0	3
Dodge	13	0	0	0	11	2	0	0	8	2	3	0	0	11	2	0	10	0	0	3	0	0	13
RAM	16	0	0	12	0	0	4	0	0	15	1	11	0	5	0	0	0	12	4	0	0	4	12
Nissan	17	0	0	2	10	5	0	2	8	6	1	0	0	17	0	0	5	2	9	1	0	0	17
Ford	26	0	0	5	16	0	5	4	8	12	2	1	2	23	0	0	7	13	3	3	1	4	21
Hyundai	19	0	0	5	10	4	0	0	18	1	0	0	0	11	8	0	13	0	6	0	0	0	19
Chevrolet	14	0	0	8	6	0	0	1	6	1	6	0	0	14	0	0	3	7	3	1	0	0	14
Volkswagen	10	0	0	4	6	0	0	0	10	0	0	0	0	10	0	0	4	0	6	0	0	0	10
Chrysler	6	0	0	0	0	1	5	0	0	6	0	0	0	5	1	0	2	0	3	1	0	0	6
Kia	13	0	1	0	12	0	0	0	12	1	0	0	0	11	2	0	6	0	7	0	0	0	13
Mazda	5	1	0	0	4	0	0	0	5	0	0	0	0	2	1	2	4	0	0	1	1	0	4
Acura	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subaru	1	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Audi	6	0	2	0	3	1	0	0	6	0	0	0	0	6	0	0	5	0	1	0	0	0	6
BMW	3	0	0	0	1	2	0	0	2	1	0	0	0	3	0	0	1	0	0	2	0	0	3
Toyota	4	0	0	3	1	0	0	0	1	3	0	0	0	1	3	0	1	2	0	1	0	0	4
Buick	4	0	0	0	4	0	0	3	1	0	0	0	0	4	0	0	2	0	2	0	0	0	4
Mercedes-Benz	9	0	0	0	4	1	4	0	6	3	0	4	0	5	0	0	5	0	0	4	0	4	5
Honda	4	0	0	0	4	0	0	0	4	0	0	0	0	1	3	0	3	0	1	0	0	0	4
Lincoln	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Cadillac	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	1	0	1	0	0	0	2
INFINITI	1	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	1
Lexus	1	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1
Land Rover	3	0	0	0	3	0	0	0	2	1	0	0	0	3	0	0	2	1	0	0	1	0	2

ArchiVehicle - Info icons created by Flat Icons - FlatIcon

Figure 13: Stats Page

ArchiVehicle Installation

In order to install and use ArchiVehicle you need to follow the steps:

1. Import through MongoDB Compass these collections of documents:

- archiVehicle.manufacturer.json
- archiVehicle.vehicle.json

2. Change the current directory to the root of the project;

3. Create a virtual environment with the command:

- `python -m venv .venv`

4. Activate the virtual environment;

5. Install the needed dependencies with the command:

- `pip install flask pymongo`

6. Execute the flask server with the command:

- `flask run`