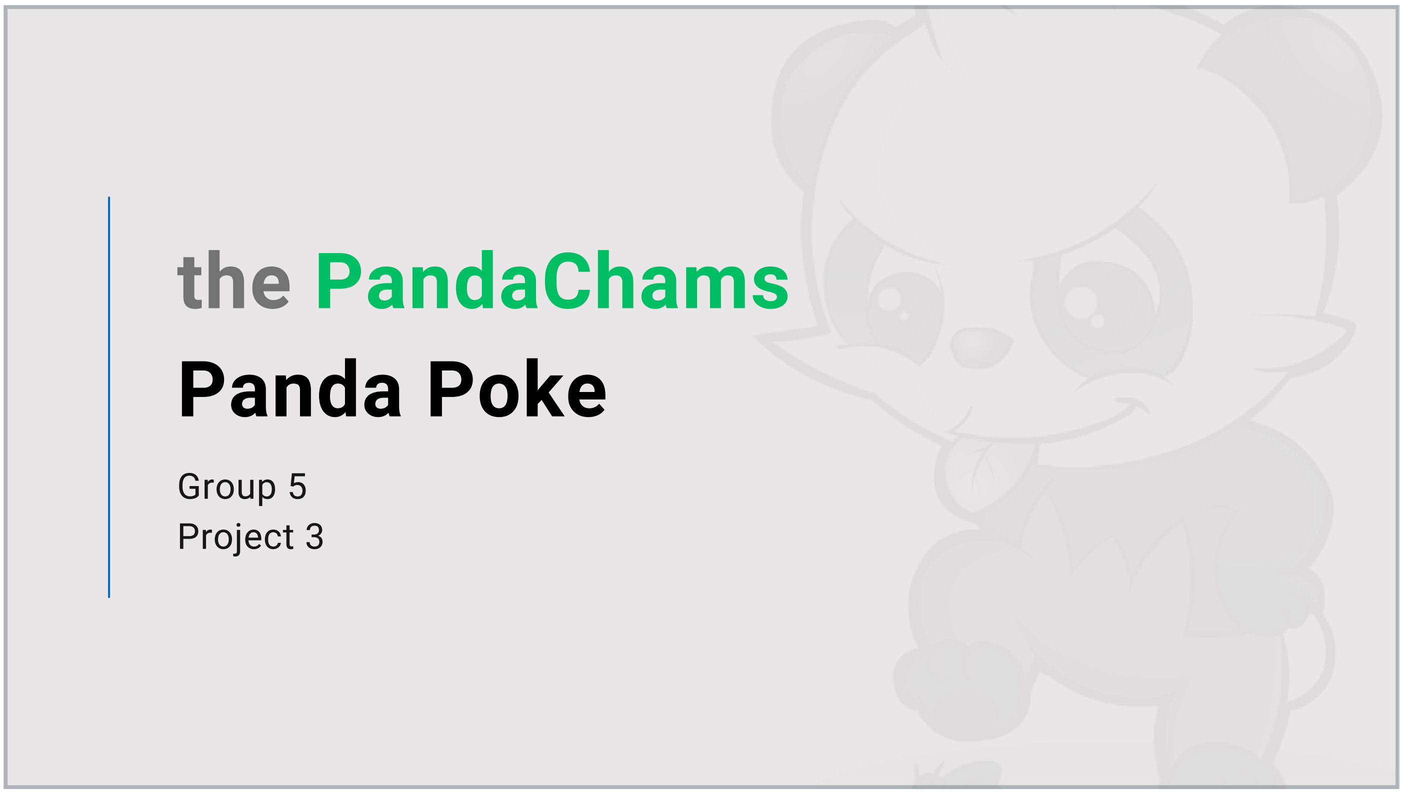
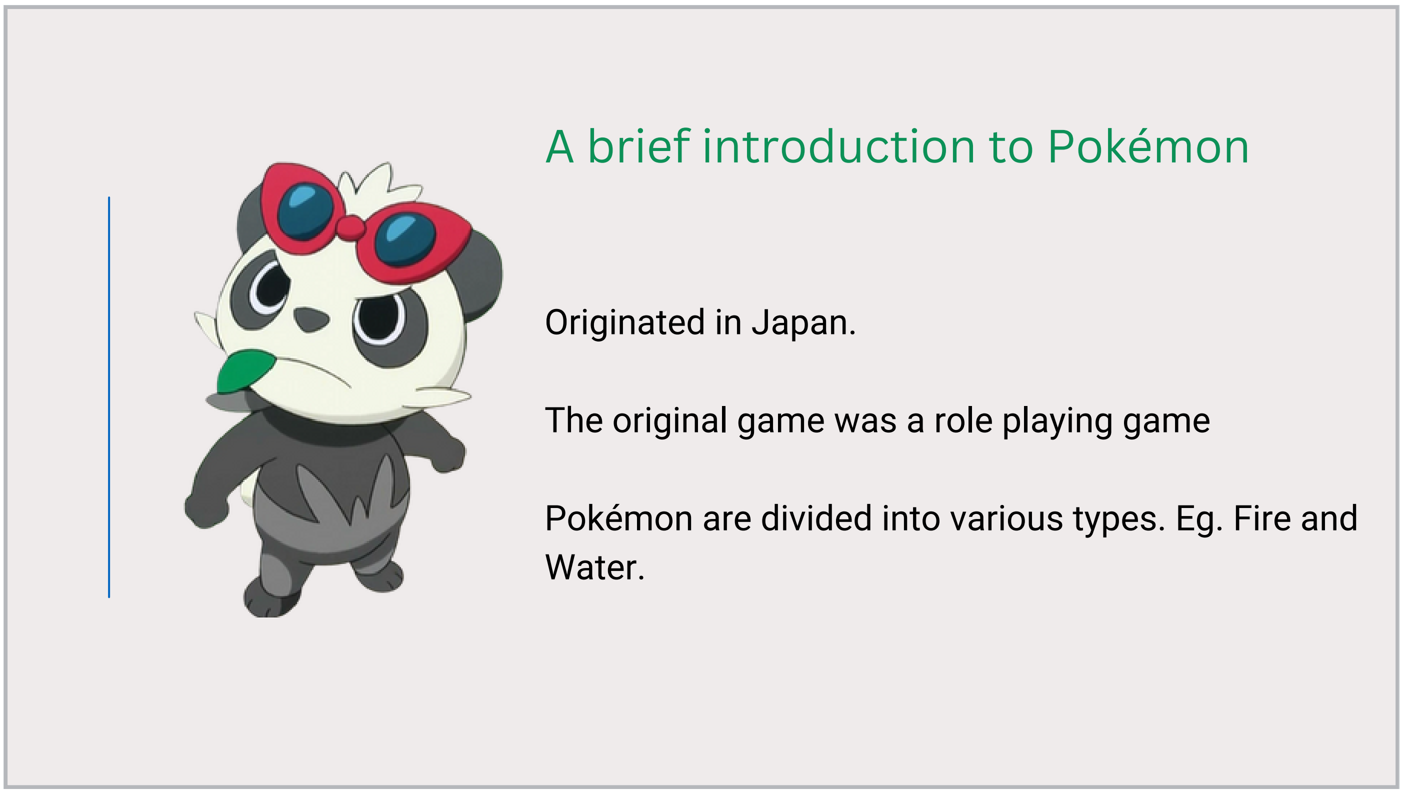


the PandaChams

Panda Poke

Group 5
Project 3



A brief introduction to Pokémon

Originated in Japan.

The original game was a role playing game

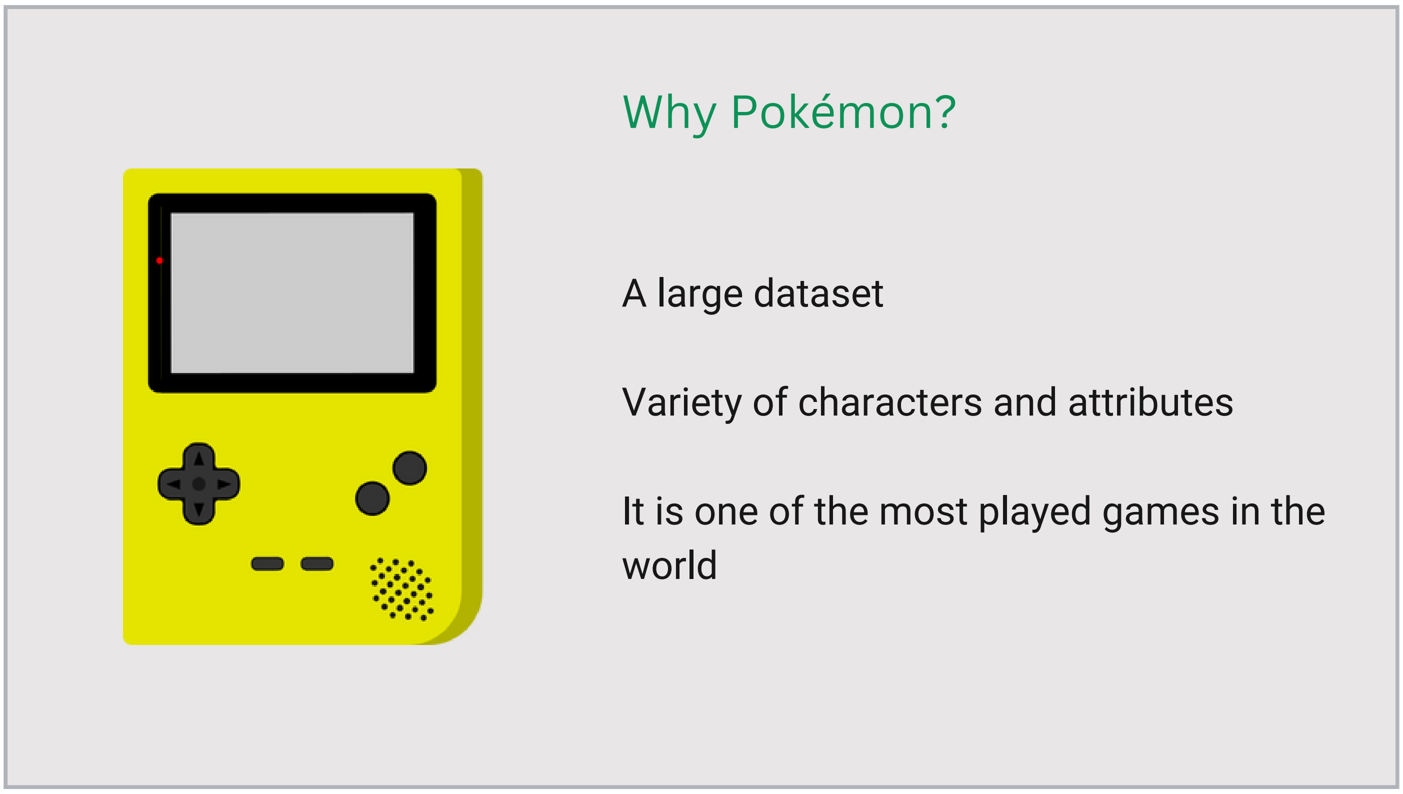
Pokémon are divided into various types. Eg. Fire and Water.

A quick overview.

Pokémon short for 'pocket monsters' originated in Japan and it started out as Pokémon green and Pokémon red. The game goes as far back as 1996. today Pokémon is played all over the world.

Original game was a role playing game where a player would build a team of monsters to fight off other monsters and ultimately become the best.

Pokémon are divided into two types, namely fire and water.



Why Pokémon?

A large dataset

Variety of characters and attributes

It is one of the most played games in the world

A large dataset, which was narrowed down to 1000

Variety of characters and attributes which means a good starting point for analysis

It is one of the most played games in the world and therefore a great subject to study

Required Dependencies and Libraries

- Pandas
- Requests
- Json
- SQLAlchemy
- Config
- Warnings
- Flask

The Libraries which have been used for this project are

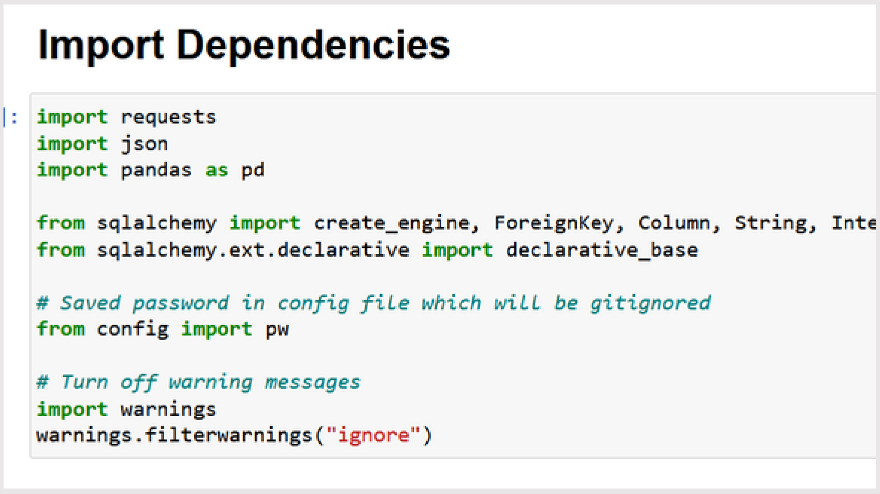
- D3 https://d3js.org/
- Plotly https://plotly.com/
- Chart.js https://www.chartjs.org/
- APEXCharts https://apexcharts.com/
- Bootstrap & Star Admin 2 – Bootstrap Admin Dashboard

Sources of Data

There were 3 different endpoints used

- Pokemon: https://pokeapi.co/api/v2/pokemon/
- Pokemon Species: https://pokeapi.co/api/v2/pokemon-species/
- Growth Rate: https://pokeapi.co/api/v2/growth-rate/

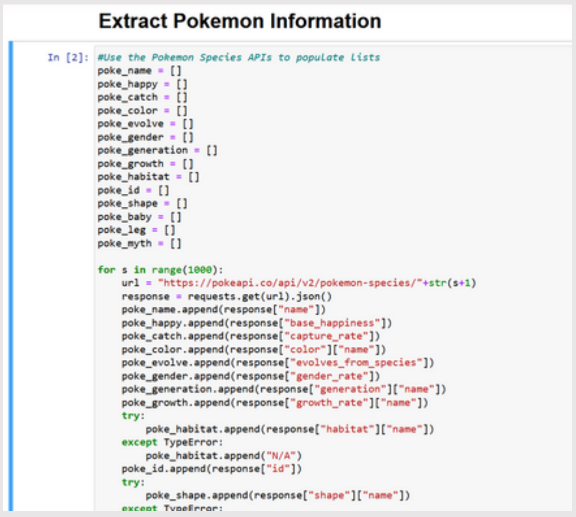
Dependencies for ETL



Import Dependencies

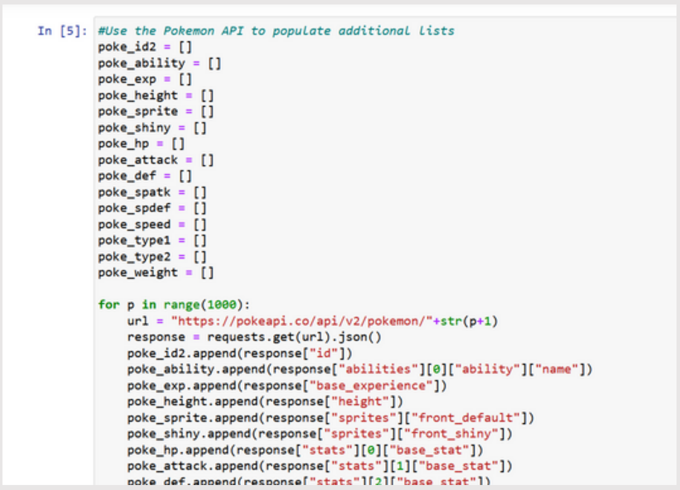
```
]: import requests
   import json
   import pandas as pd

   from sqlalchemy import create_engine, ForeignKey, Column, String, Inte
   from sqlalchemy.ext.declarative import declarative_base

   # Saved password in config file which will be gitignored
   from config import pw

   # Turn off warning messages
   import warnings
   warnings.filterwarnings("ignore")
```

Data extraction



Extract Pokemon Information

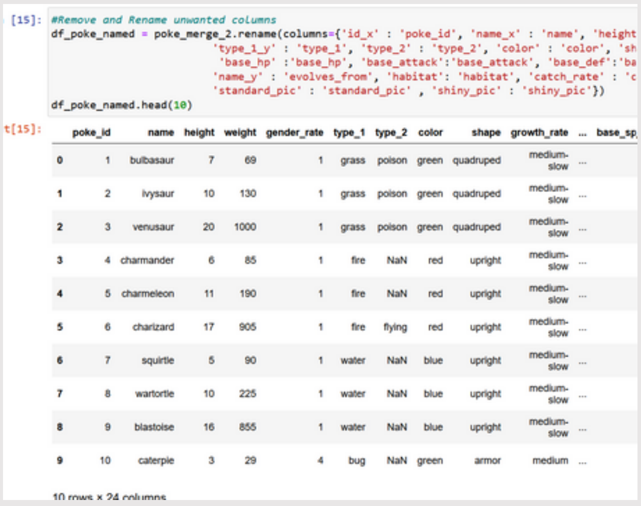
```
In [2]: #Use the Pokemon Species APIs to populate lists
poke_name = []
poke_happy = []
poke_catch = []
poke_color = []
poke_evolve = []
poke_gender = []
poke_generation = []
poke_growth = []
poke_habitat = []
poke_id = []
poke_shape = []
poke_baby = []
poke_leg = []
poke_myth = []

for s in range(1000):
    url = "https://pokeapi.co/api/v2/pokemon-species/"+str(s+1)
    response = requests.get(url).json()
    poke_name.append(response["name"])
    poke_happy.append(response["base_happiness"])
    poke_catch.append(response["capture_rate"])
    poke_color.append(response["color"]["name"])
    poke_evolve.append(response["evolves_from_species"])
    poke_gender.append(response["gender_rate"])
    poke_generation.append(response["generation"]["name"])
    poke_growth.append(response["growth_rate"]["name"])
    try:
        poke_habitat.append(response["habitat"]["name"])
    except TypeError:
        poke_habitat.append("N/A")
    poke_id.append(response["id"])
    try:
        poke_shape.append(response["shape"]["name"])
    except TypeError:
```



```
In [5]: #Use the Pokemon API to populate additional lists
poke_id2 = []
poke_ability = []
poke_exp = []
poke_height = []
poke_sprite = []
poke_shiny = []
poke_hp = []
poke_attack = []
poke_def = []
poke_spatk = []
poke_spdef = []
poke_speed = []
poke_type1 = []
poke_type2 = []
poke_weight = []

for p in range(1000):
    url = "https://pokeapi.co/api/v2/pokemon/"+str(p+1)
    response = requests.get(url).json()
    poke_id2.append(response["id"])
    poke_ability.append(response["abilities"][0]["ability"]["name"])
    poke_exp.append(response["base_experience"])
    poke_height.append(response["height"])
    poke_sprite.append(response["sprites"]["front_default"])
    poke_shiny.append(response["sprites"]["front_shiny"])
    poke_hp.append(response["stats"][0]["base_stat"])
    poke_attack.append(response["stats"][1]["base_stat"])
    poke_def.append(response["stats"][2]["base_stat"])
```

Preparing and extracting the
Pokemon data needed for analysis

Merging and Cleaning

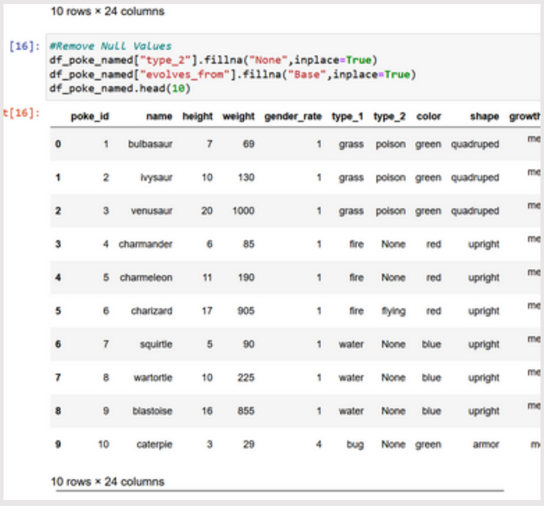


```
[15]: #Remove and Rename unwanted columns
      df_poke_named = poke_merge_2.rename(columns={'id_x' : 'poke_id', 'name_x' : 'name', 'height
                                'type_1_y' : 'type_1', 'type_2' : 'type_2', 'color' : 'color', 'sh
                                 'base_hp' :'base_hp', 'base_attack':'base_attack', 'base_def':'ba
                                'name_y' : 'evolves_from', 'habitat': 'habitat', 'catch_rate' : 'c
                                'standard_pic' : 'standard_pic' , 'shiny_pic' : 'shiny_pic'})
      df_poke_named.head(10)
```

t[15]:

	poke_id	name	height	weight	gender_rate	type_1	type_2	color	shape	growth_rate	...	base_sp
0	1	bulbasaur	7	69	1	grass	poison	green	quadruped	medium-slow	...	
1	2	ivysaur	10	130	1	grass	poison	green	quadruped	medium-slow	...	
2	3	venusaur	20	1000	1	grass	poison	green	quadruped	medium-slow	...	
3	4	charmander	6	85	1	fire	NaN	red	upright	medium-slow	...	
4	5	charmeleon	11	190	1	fire	NaN	red	upright	medium-slow	...	
5	6	charizard	17	905	1	fire	flying	red	upright	medium-slow	...	
6	7	squirtle	5	90	1	water	NaN	blue	upright	medium-slow	...	
7	8	wartortle	10	225	1	water	NaN	blue	upright	medium-slow	...	
8	9	blastoise	16	855	1	water	NaN	blue	upright	medium-slow	...	
9	10	caterpie	3	29	4	bug	NaN	green	armor	medium	...	

10 rows × 24 columns



10 rows × 24 columns

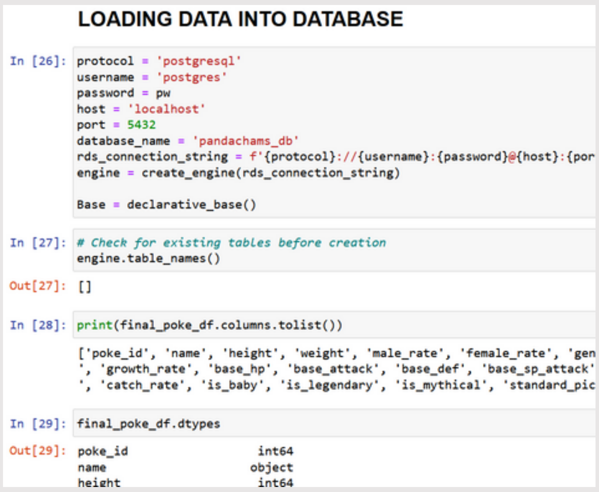
```
[16]: #Remove Null Values
      df_poke_named["type_2"].fillna("None",inplace=True)
      df_poke_named["evolves_from"].fillna("Base",inplace=True)
      df_poke_named.head(10)
```

t[16]:

	poke_id	name	height	weight	gender_rate	type_1	type_2	color	shape	growth
0	1	bulbasaur	7	69	1	grass	poison	green	quadruped	me
1	2	ivysaur	10	130	1	grass	poison	green	quadruped	me
2	3	venusaur	20	1000	1	grass	poison	green	quadruped	me
3	4	charmander	6	85	1	fire	None	red	upright	me
4	5	charmeleon	11	190	1	fire	None	red	upright	me
5	6	charizard	17	905	1	fire	flying	red	upright	me
6	7	squirtle	5	90	1	water	None	blue	upright	me
7	8	wartortle	10	225	1	water	None	blue	upright	me
8	9	blastoise	16	855	1	water	None	blue	upright	me
9	10	caterpie	3	29	4	bug	None	green	armor	m

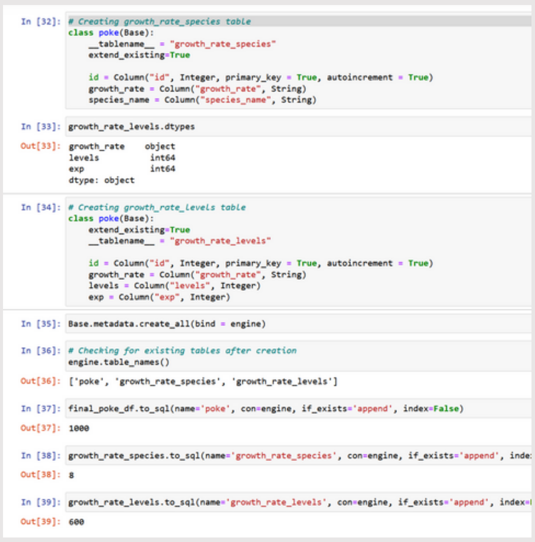
10 rows × 24 columns

DB connetion and Table creation



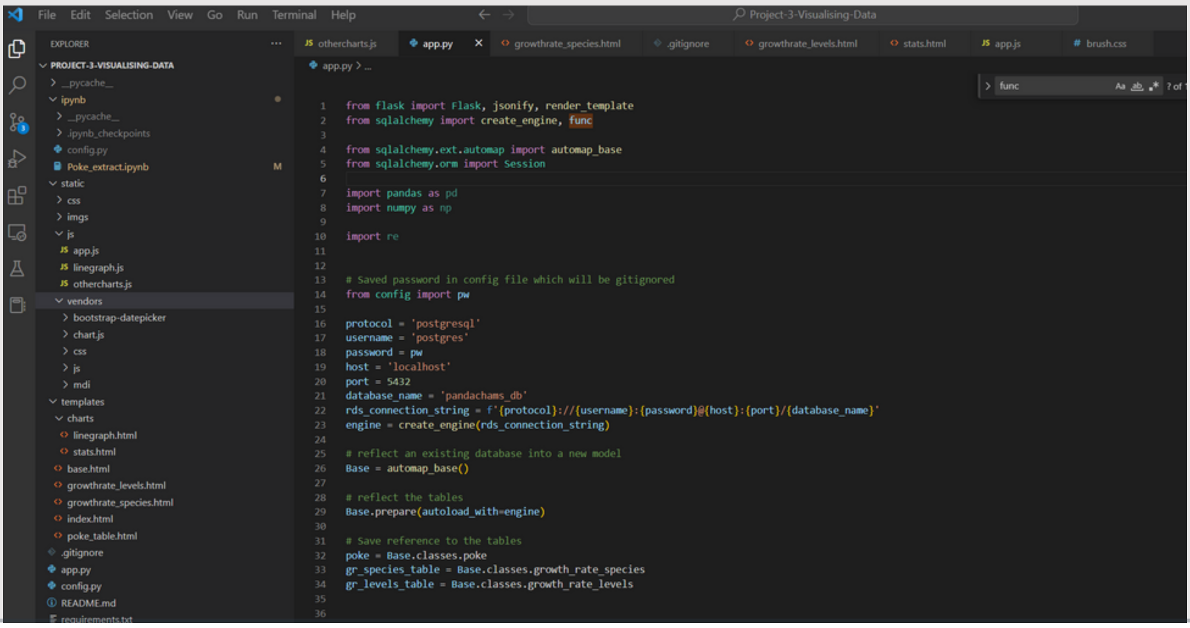
LOADING DATA INTO DATABASE

```
In [26]: protocol = 'postgresql'
         username = 'postgres'
         password = pw
         host = 'localhost'
         port = 5432
         database_name = 'pandachams_db'
         rds_connection_string = f'{protocol}://{username}:{password}@{host}:{por
         engine = create_engine(rds_connection_string)

         Base = declarative_base()

In [27]: # Check for existing tables before creation
         engine.table_names()

Out[27]: []

In [28]: print(final_poke_df.columns.tolist())

         ['poke_id', 'name', 'height', 'weight', 'male_rate', 'female_rate', 'gen
         ', 'growth_rate', 'base_hp', 'base_attack', 'base_def', 'base_sp_attack'
         ', 'catch_rate', 'is_baby', 'is_legendary', 'is_mythical', 'standard_pic

In [29]: final_poke_df.dtypes

Out[29]: poke_id                    int64
         name                      object
         height                     int64
```



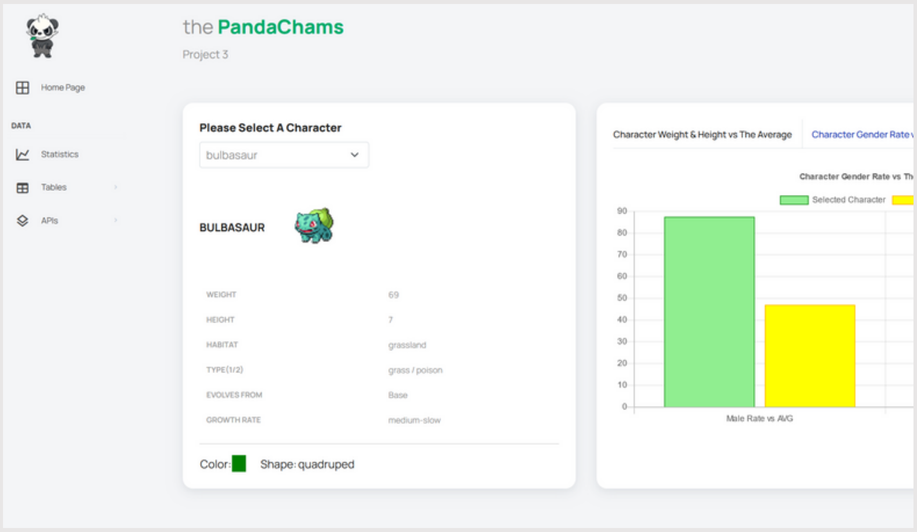
```
In [32]: # Creating growth_rate_species table
         class poke(Base):
             __tablename__ = "growth_rate_species"
             extend_existing=True

             id = Column("id", Integer, primary_key = True, autoincrement = True)
             growth_rate = Column("growth_rate", String)
             species_name = Column("species_name", String)

In [33]: growth_rate_levels.dtypes

Out[33]: growth_rate    object
         levels          int64
         exp             int64
         dtype: object

In [34]: # Creating growth_rate_levels table
         class poke(Base):
             extend_existing=True
             __tablename__ = "growth_rate_levels"

             id = Column("id", Integer, primary_key = True, autoincrement = True)
             growth_rate = Column("growth_rate", String)
             levels = Column("levels", Integer)
             exp = Column("exp", Integer)

In [35]: Base.metadata.create_all(bind = engine)

In [36]: # Checking for existing tables after creation
         engine.table_names()

Out[36]: ['poke', 'growth_rate_species', 'growth_rate_levels']

In [37]: final_poke_df.to_sql(name='poke', con=engine, if_exists='append', index=False)

Out[37]: 1000

In [38]: growth_rate_species.to_sql(name='growth_rate_species', con=engine, if_exists='append', inde

Out[38]: 8

In [39]: growth_rate_levels.to_sql(name='growth_rate_levels', con=engine, if_exists='append', index=

Out[39]: 600
```

The File System and Flask



```python
from flask import Flask, jsonify, render_template
from sqlalchemy import create_engine, func

from sqlalchemy.ext.automap import automap_base
from sqlalchemy.orm import Session

import pandas as pd
import numpy as np

import re


# Saved password in config file which will be gitignored
from config import pw

protocol = 'postgresql'
username = 'postgres'
password = pw
host = 'localhost'
port = 5432
database_name = 'pandachams_db'
rds_connection_string = f'{protocol}://{username}:{password}@{host}:{port}/{database_name}'
engine = create_engine(rds_connection_string)

# reflect an existing database into a new model
Base = automap_base()

# reflect the tables
Base.prepare(autoload_with=engine)

# Save reference to the tables
poke = Base.classes.poke
gr_species_table = Base.classes.growth_rate_species
gr_levels_table = Base.classes.growth_rate_levels
```

The Landing Page



the **PandaChams**

Project 3

Please Select A Character

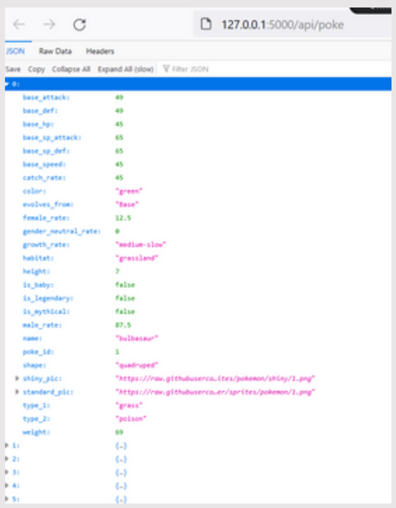
bulbasaur

BULBASAUR

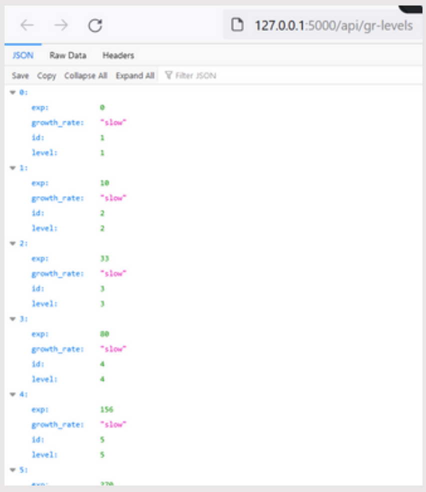
WEIGHT	69
HEIGHT	7
HABITAT	grassland
TYPE(1/2)	grass / poison
EVOLVES FROM	Base
GROWTH RATE	medium-slow

Color: 🟩 Shape: quadruped

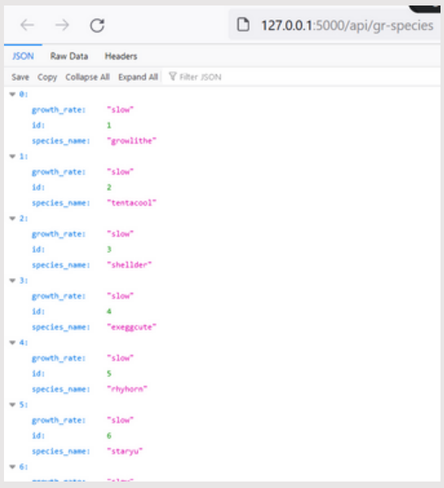
Locally Gerated APIs


127.0.0.1:5000/api/poke

```
▼ 0:
    base_attack:          49
    base_def:             49
    base_hp:              45
    base_sp_attack:       65
    base_sp_def:          65
    base_speed:           45
    catch_rate:           45
    color:                "green"
    evolves_from:         "Base"
    female_rate:          12.5
    gender_neutral_rate:  0
    growth_rate:          "medium-slow"
    habitat:              "grassland"
    height:               7
    is_baby:              false
    is_legendary:         false
    is_mythical:          false
    male_rate:            87.5
    name:                 "bulbasaur"
    poke_id:              1
    shape:                "quadruped"
  ▶ shiny_pic:            "https://raw.githubuserco…ites/pokemon/shiny/1.png"
  ▶ standard_pic:         "https://raw.githubuserco…er/sprites/pokemon/1.png"
    type_1:               "grass"
    type_2:               "poison"
    weight:               69
▶ 1:                      {…}
▶ 2:                      {…}
▶ 3:                      {…}
▶ 4:                      {…}
▶ 5:                      {…}
```


127.0.0.1:5000/api/gr-levels

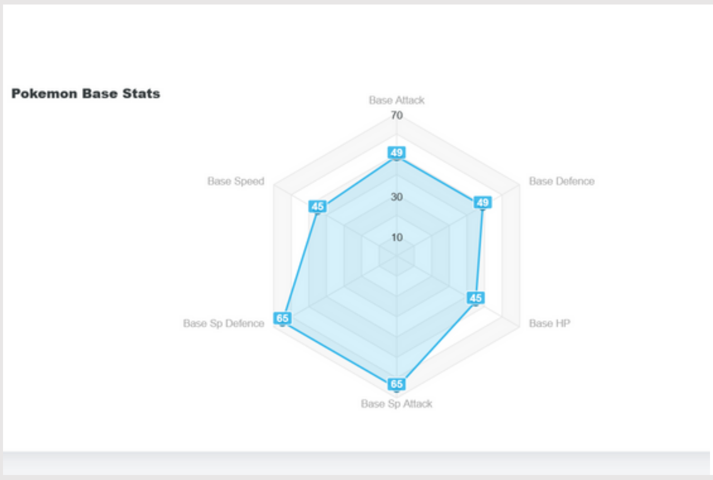
```
▼ 0:
    exp:          0
    growth_rate:  "slow"
    id:           1
    level:        1
▼ 1:
    exp:          10
    growth_rate:  "slow"
    id:           2
    level:        2
▼ 2:
    exp:          33
    growth_rate:  "slow"
    id:           3
    level:        3
▼ 3:
    exp:          80
    growth_rate:  "slow"
    id:           4
    level:        4
▼ 4:
    exp:          156
    growth_rate:  "slow"
    id:           5
    level:        5
▼ 5:
```

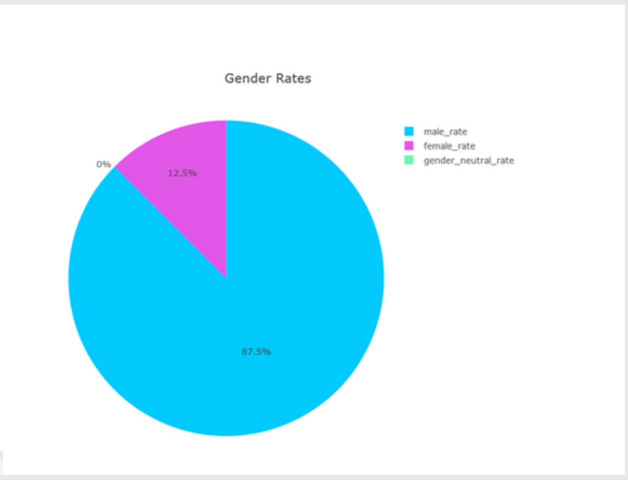

127.0.0.1:5000/api/gr-species

```
▼ 0:
    growth_rate:   "slow"
    id:            1
    species_name:  "growlithe"
▼ 1:
    growth_rate:   "slow"
    id:            2
    species_name:  "tentacool"
▼ 2:
    growth_rate:   "slow"
    id:            3
    species_name:  "shellder"
▼ 3:
    growth_rate:   "slow"
    id:            4
    species_name:  "exeggcute"
▼ 4:
    growth_rate:   "slow"
    id:            5
    species_name:  "rhyhorn"
▼ 5:
    growth_rate:   "slow"
    id:            6
    species_name:  "staryu"
▼ 6:
```

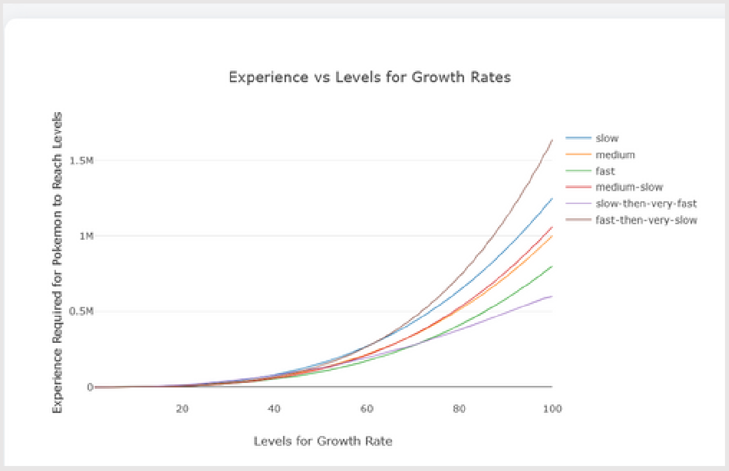
Radar Plot for Base Stats

Pie Chart for Gender Rates

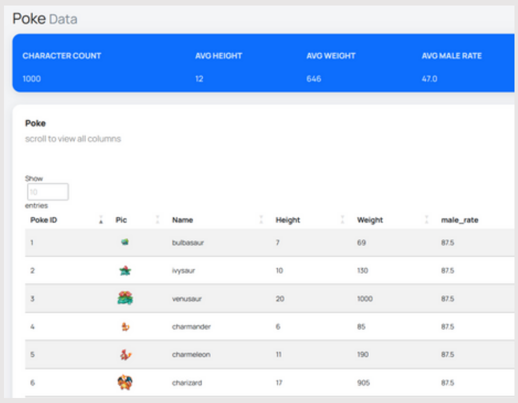




Growth Rates Comparison Line Graph



Tables extracted from local API



Poke Data

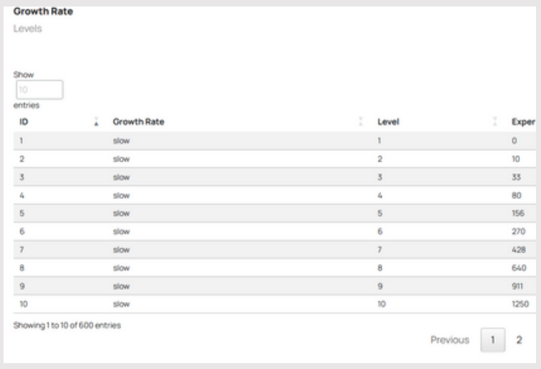
CHARACTER COUNT	AVG HEIGHT	AVG WEIGHT	AVG MALE RATE
1000	12	646	47.0

Poke

scroll to view all columns

Show 10 entries

Poke ID	Pic	Name	Height	Weight	male_rate
1		bulbasaur	7	69	87.5
2		ivysaur	10	130	87.5
3		venusaur	20	1000	87.5
4		charmander	6	85	87.5
5		charmeleon	11	190	87.5
6		charizard	17	905	87.5



Growth Rate

Levels

Show 10 entries

ID	Growth Rate	Level	Exper
1	slow	1	0
2	slow	2	10
3	slow	3	33
4	slow	4	80
5	slow	5	156
6	slow	6	270
7	slow	7	428
8	slow	8	640
9	slow	9	911
10	slow	10	1250

Showing 1 to 10 of 600 entries

Previous 1 2

Challenges

- No Location data in dataset as Fictional regions

Next Steps....

- To obtain a map for Pokemon locations generation
- Using more endpoints to incorporate moves and types