Model Deployment with Flask Using Heroku

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Model Deployment Stages

Stage 1: Choose a problem and gather data

The problem is predicting student GPA using their SAT scores.

The data used for this project contains two variables:

1. GPA scores
2. SAT scores

Stage 2: Build and save the machine learning model.

The goal of this model is to predict GPA score using SAT scores.

It was built using a linear regression model, from the scikit-learn library in python, and saved using the pickle library.

```python
import pandas as pd
import pickle
from sklearn.linear_model import LinearRegression
import seaborn as sns
sns.set()

df = pd.read_csv("Dataset/data.csv")

x = df['SAT']
y = df['GPA']

# changing the dimensionality of x from 1d array tp 2d array, to fit the sklearn regression library
x_matrix = x.values.reshape(-1,1)

reg = LinearRegression()
reg.fit(x_matrix, y)

# Save model
with open("model.pkl", "wb") as file:
    pickle.dump(reg, file)

```

Step 3: Deploy using Flask

Having installed flask, the next stage is building the app.py module.

```python
from flask import Flask, render_template, request
import marks as m

app = Flask(__name__)


@app.route("/", methods=["GET", "POST"])
def marks():
    global mk
    mk = 0
    if request.method == "POST":
        sat_score = request.form["sat_score"]
        marks_pred = m.gpa_prediction(sat_score)
        mk = marks_pred

    return render_template("index.html", my_marks=mk)


if __name__ == "__main__":
    app.run(debug=True)
```

Then, create the index.html file for the web browser.

```html
<html>
<head lang=en>
<title>Model Deployment</title>

<meta charset="utf-8">
<meta http-equiv="Content-type" content="text/html; charset=utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1">

<body>
    <h1>Predict your GPA</h1>

    <p>Enter your SAT score!</p>

    <form action="/" method="post">
        <input type="number" name="sat_score" placeholder="sat score">
        <input type="submit">
    </form>

    <p>Your predicted GPA is: </p>
    {{my_marks}}

</body>
</head>
</html>
```

Step 4: Prepare for deployment on Heroku

Heroku provides a free domain name, and a cloud storage to host our application.

Having registered on the Heroku website, Create a Procfile, a GitHub repository and a requirements.txt file.

Procfile

```
web: gunicorn app:app
```

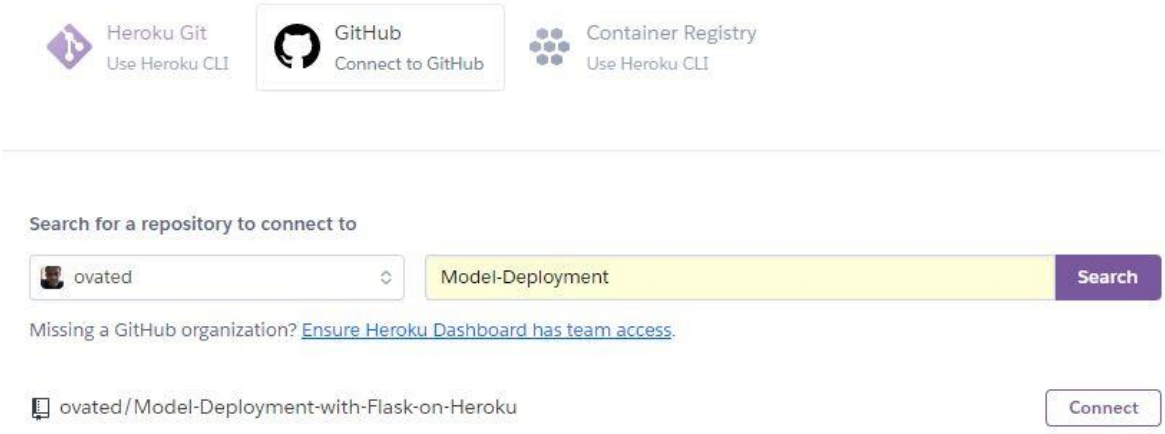
Requirements.txt

```
flask>=1.1.2
pandas>=1.4.3
numpy>=1.19.2
seaborn>=0.11.2
sklearn>=0.0
scikit-learn>=1.1.1
```

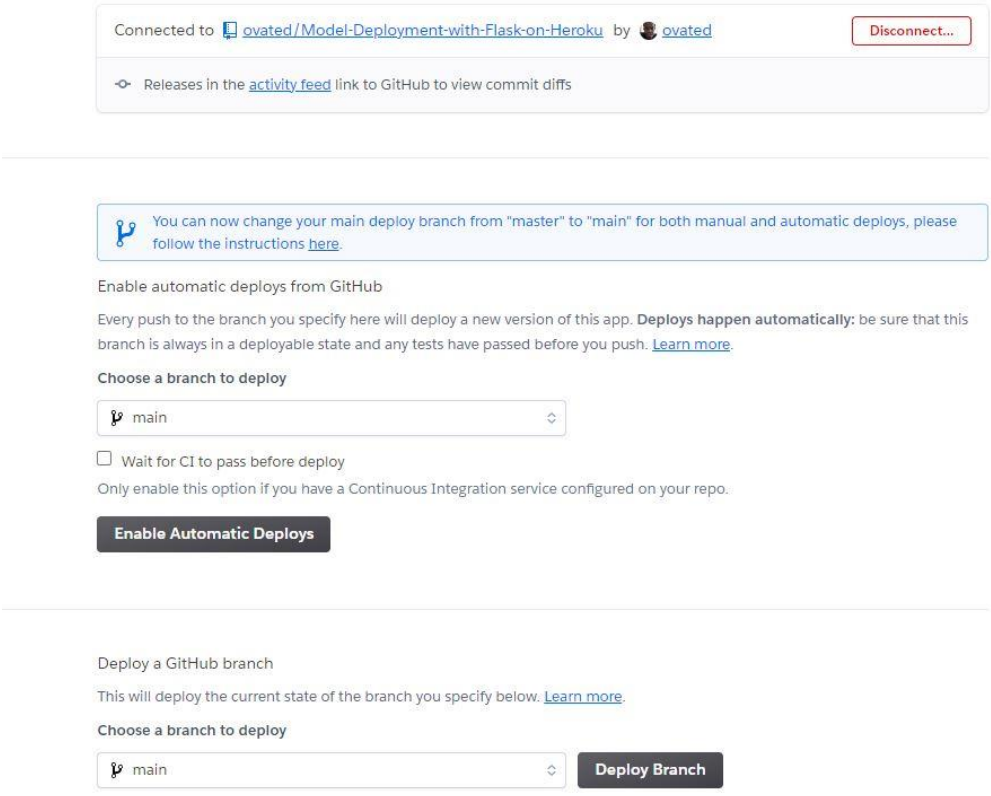
Step 5: Deployment on Heroku

Create a new app

Then, find and connect to your GitHub repository, created for the project.



Finally, Deploy the application.



Project repository: https://github.com/ovated/Model-Deployment-with-Flask-on-Heroku

Deployed application link: https://gpa-predicton.herokuapp.com/