Credit Risk Prediction Cloud and API deployment

LISUM10

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https://github.com/MohsenBah/Credit_risk_prediction
https://credit-risk-webapp.herokuapp.com/

Agenda

Data Glacier

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- ✓**Goal**: Deploying ML, tested by Postman, on Cloud,
- ✓ **Data**: it has 9 features and 1 response variable: **Age, Sex, Job, Housing, Saving accounts, Checking accounts, Credit amount , Duration, Purpose, Risk** (target value)
- ✓ **Model:** Logistic Regression.
- ✓**Deployment: D**eploying web app written by Flask API on Heroku.

Data

In [2]:
```
data=pd.read_csv("/Users/mohsen/Documents/GitHub/Credit_risk_prediction/german_credit_data.csv", index_col=0)
data
```

Out[2]:

	Age	Sex	Job	Housing	Saving accounts	Checking account	Credit amount	Duration	Purpose	Risk
0	67	male	2	own	NaN	little	1169	6	radio/TV	good
1	22	female	2	own	little	moderate	5951	48	radio/TV	bad
2	49	male	1	own	little	NaN	2096	12	education	good
3	45	male	2	free	little	little	7882	42	furniture/equipment	good
4	53	male	2	free	little	little	4870	24	car	bad
...	...	...	...	...	...	...	...	...	...	...
995	31	female	1	own	little	NaN	1736	12	furniture/equipment	good
996	40	male	3	own	little	little	3857	30	car	good
997	38	male	2	own	little	NaN	804	12	radio/TV	good
998	23	male	2	free	little	little	1845	45	radio/TV	bad
999	27	male	2	own	moderate	moderate	4576	45	car	good

1000 rows × 10 columns

Saving (serialization) the final Model


```
params = {
    "C": np.logspace(-3, 3, 7),
    "penalty": ["l1", "l2"]
}  # l1 lasso l2 ridge
model = LogisticRegression()
kfold=RepeatedStratifiedKFold(n_splits=10, n_repeats=3, random_state=1)

logreg_cv = GridSearchCV(model, params, cv=kfold)
logreg_cv.fit(X, y)
print("tuned hpyerparameters :(best parameters) ", logreg_cv.best_params_)
print("accuracy :", logreg_cv.best_score_)
```

Logistic Regression has been selected as the final model. The grid search chose l2 penalty.

The model was saved as a **Pickle file.**

```
pickle.dump(logreg_cv, open('model.pkl','wb'))
```

Web App Script

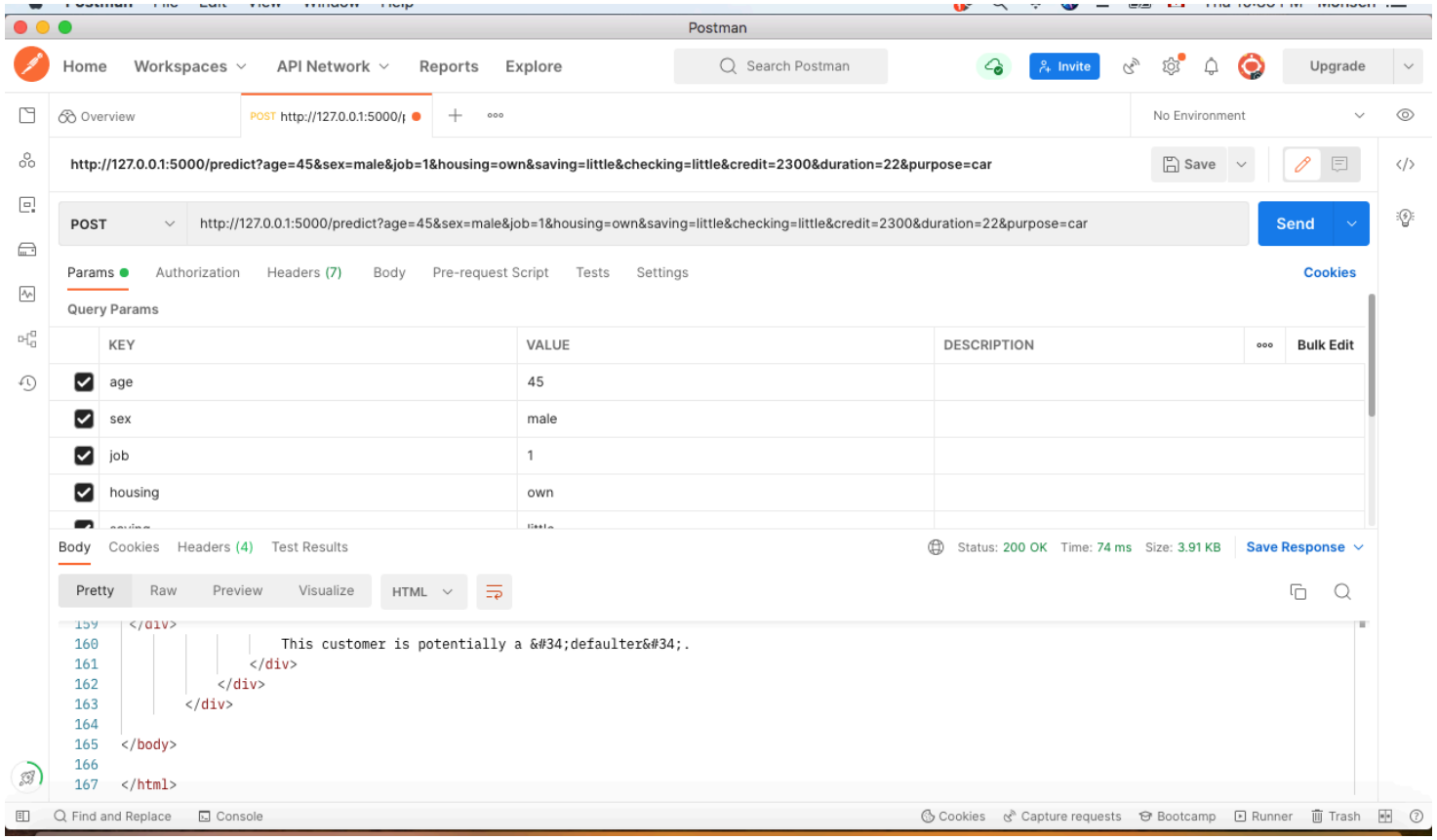
Web app via Flask API was written as shown.

The new test observation is needed to some preprocessing to become ready to predict, including changing the categorical variables to dummies.

```
import numpy as np
import pandas as pd
from flask import Flask, request, render_template
import pickle
import os


app = Flask(__name__)


clf = pickle.load(open('/Users/mohsen/Documents/GitHub/Credit_risk_prediction/model.pkl','rb'))


@app.route('/')
def home():
    return render_template('index.html')

@app.route('/predict',methods=['POST'])
def predict():
    features = [x for x in request.form.values()]
    a = [np.array(features)]
    b=pd.DataFrame(a,columns=['Age', 'Sex', 'Job', 'Housing', 'Saving accounts',
                              'Checking account','Credit amount', 'Duration',
                              'Purpose'
                              ])
    c=pd.get_dummies(b,columns=[
                       'Sex', "Housing", 'Saving accounts', 'Checking account',
                       'Purpose'
                   ])
    new_x=pd.DataFrame(np.zeros((1,19)),columns=['Age', 'Job', 'Credit amount', 'Duration', 'Sex_male', 'Housing_own',
       'Housing_rent', 'Saving accounts_moderate',
       'Saving accounts_quite rich', 'Saving accounts_rich',
       'Checking account_moderate', 'Checking account_rich', 'Purpose_car',
       'Purpose_domestic appliances', 'Purpose_education',
       'Purpose_furniture/equipment', 'Purpose_radio/TV', 'Purpose_repairs',
       'Purpose_vacation/others'])
    for i in c.columns:
        if i in new_x.columns:
           new_x[i]=1
    pred = clf.predict(new_x)[0]
    if pred == 1:
       output = "non defaulter"
    else:
       output = "defaulter"


    return render_template('index.html', prediction_text='This customer is potentially a "{}".'.format(output))

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

Testing the model on Postman API

- The model was tested successfully on Postman and it is ready to deploy on Heroku cloud.



Deploying on Heroku

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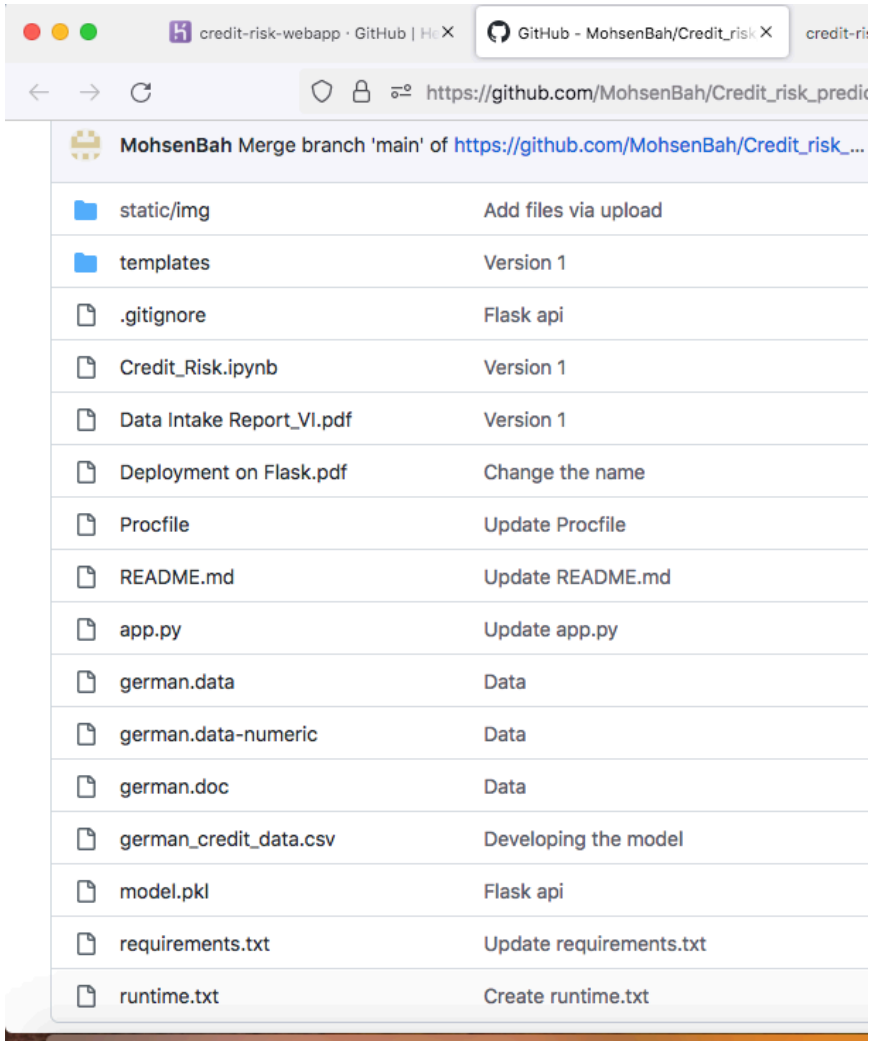

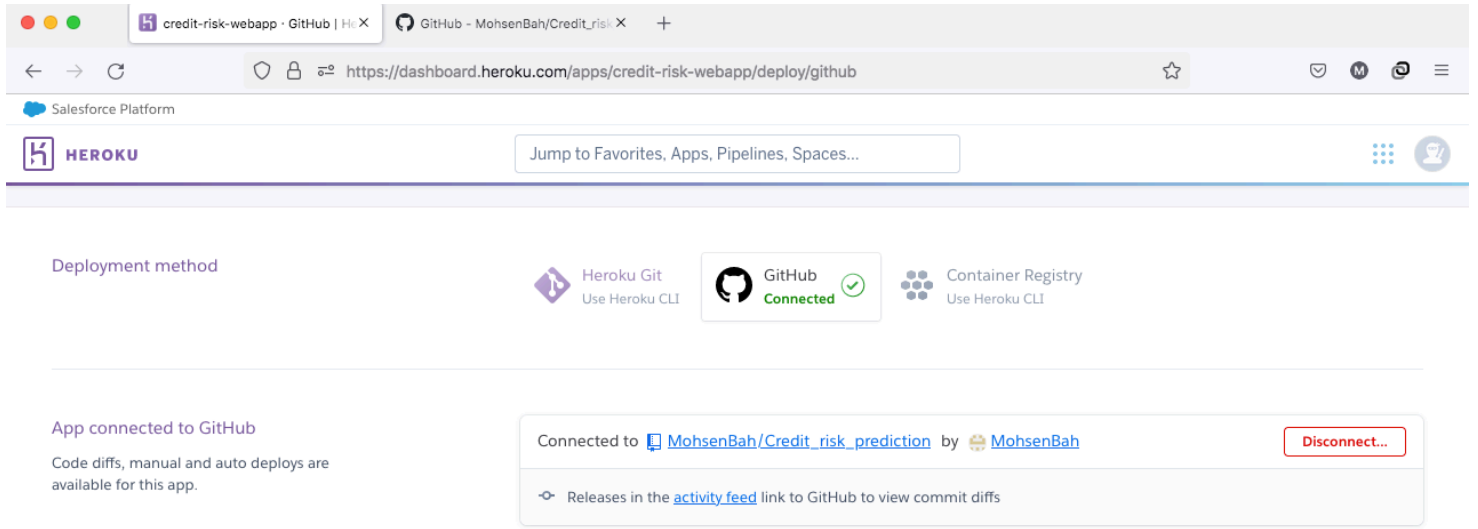

1. All files (requirements.txt and Procfile) are ready to deployed on the repo.
2. The repo was connected with Heroku.

Deploying on Heroku – cont'd

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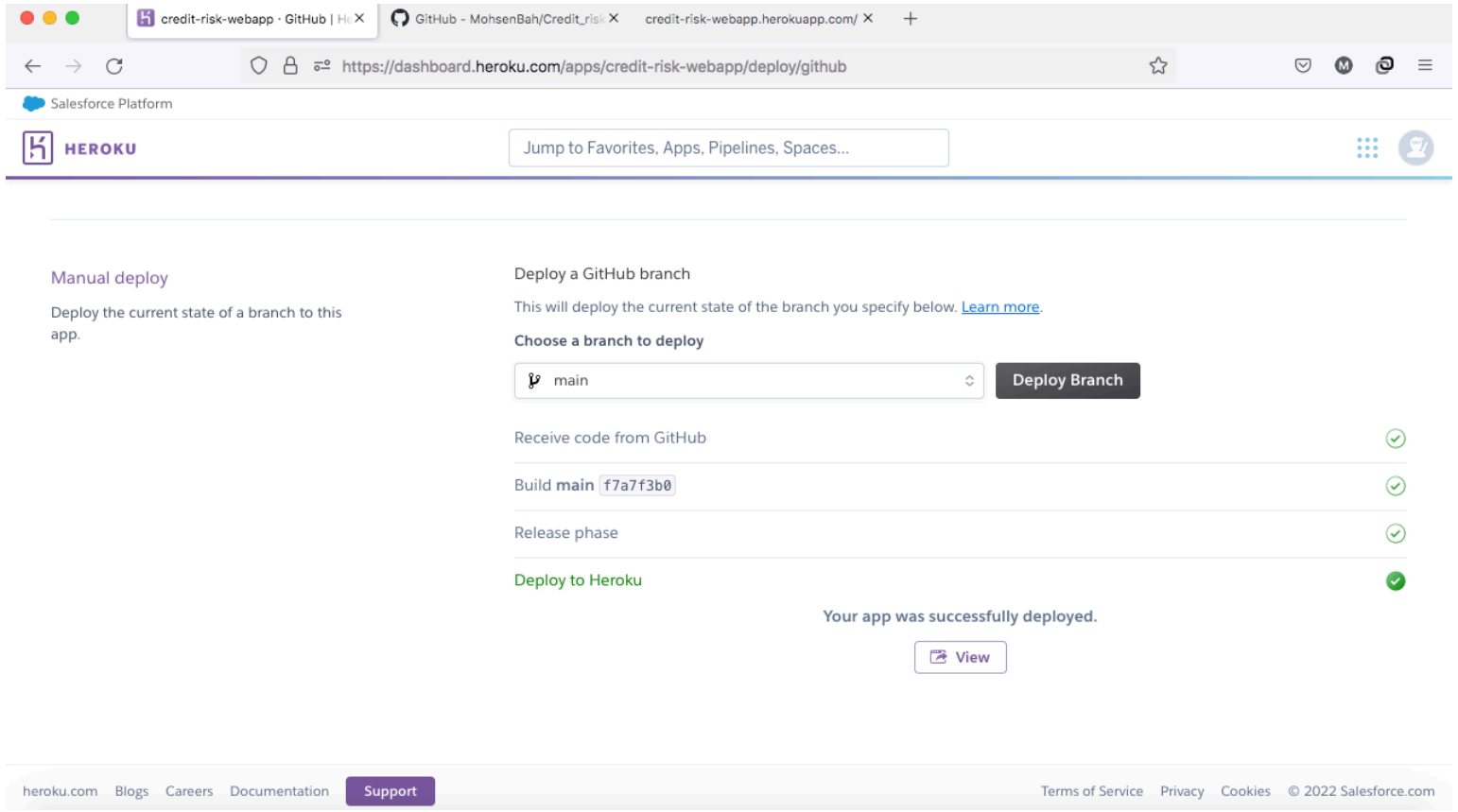
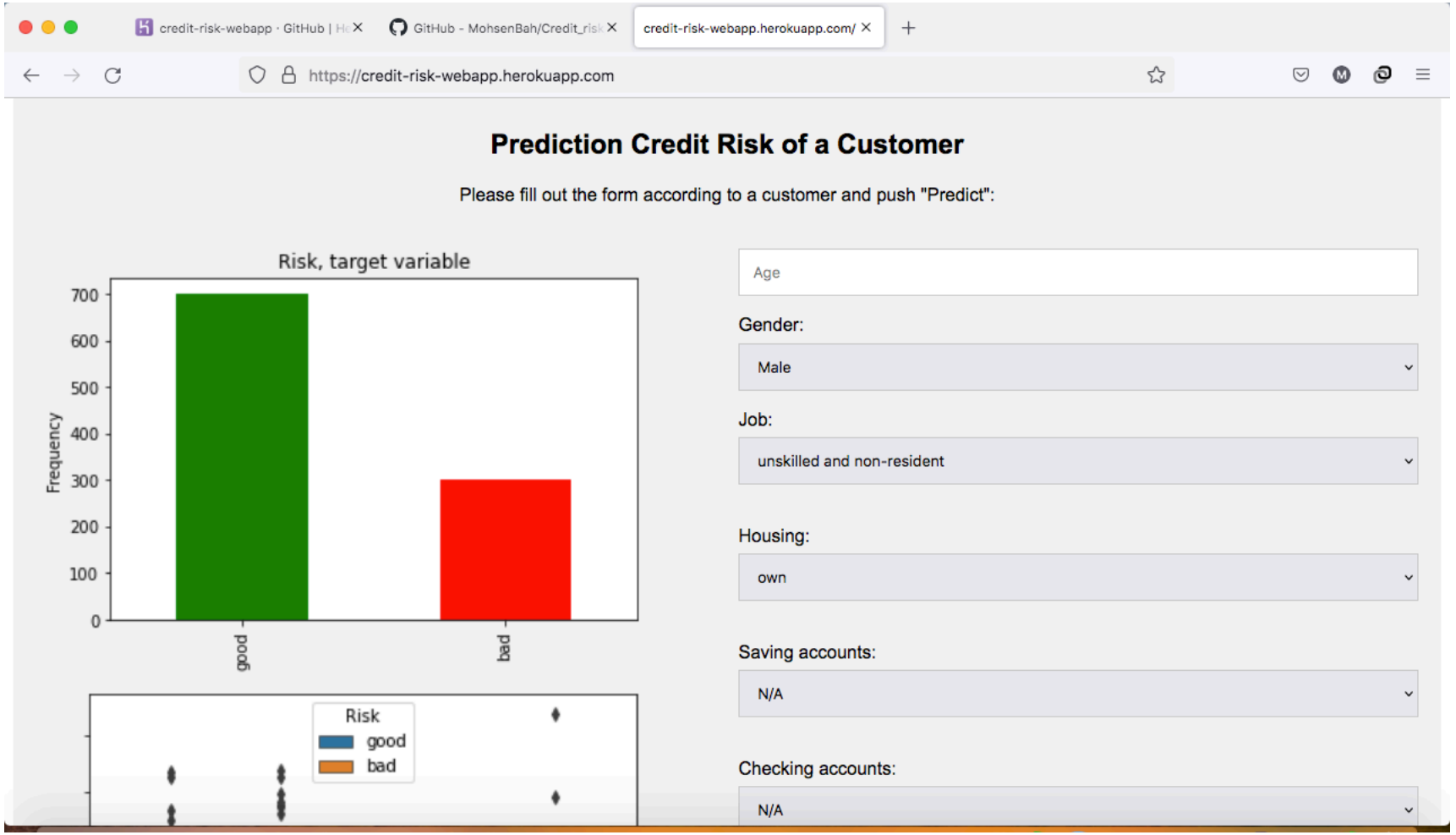
- App was successfully deployed on Heroku cloud.



Deploying on Heroku – cont'd

- https://credit-risk-webapp.herokuapp.com
- It is the successfully deployed app.



Thank You