

Architecture

Credit Card Default Prediction

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Libraries Requirements

Flask==2.0.1

Flask-Cors==3.0.10

Jinja2==3.0.1

numpy==1.19.5

pandas==1.1.5

scikit-learn==0.24.2

sklearn==0.0

seaborn==0.0

warning=0.0

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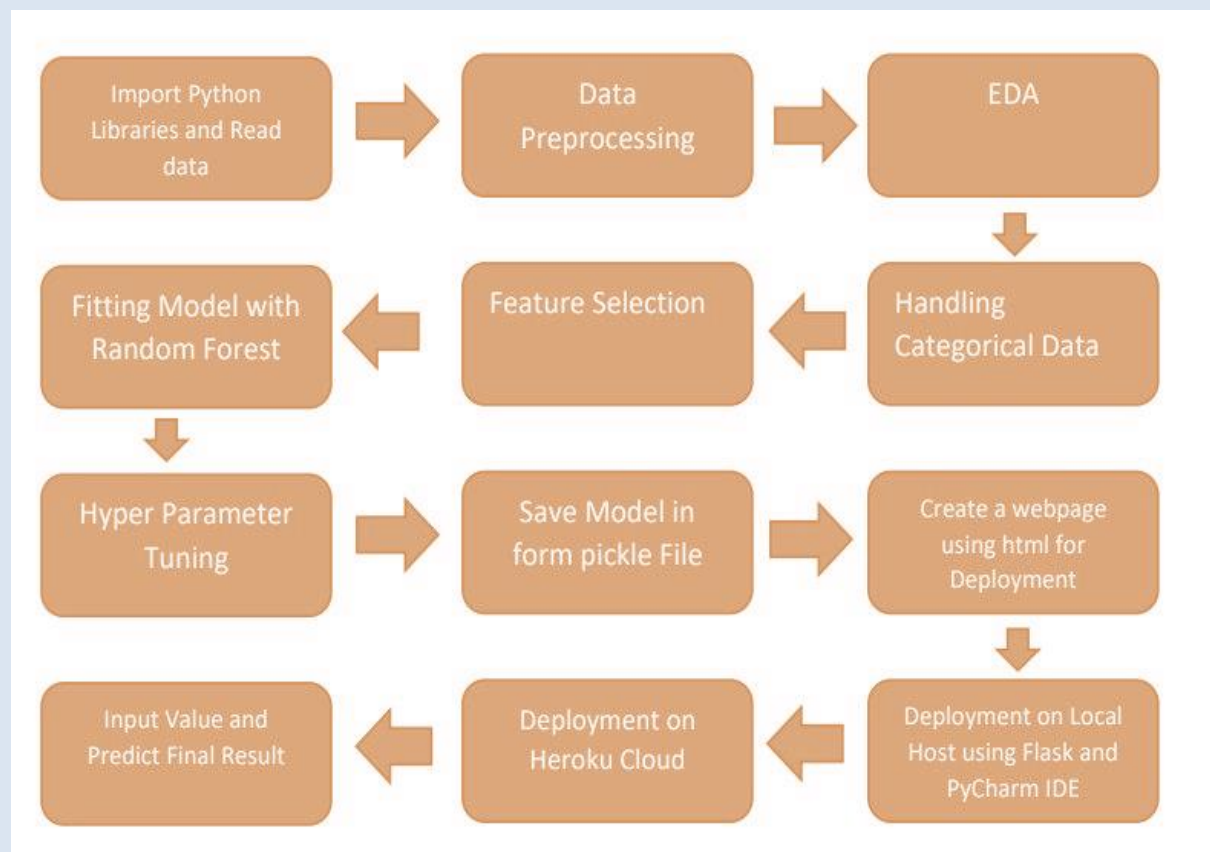
Abstract

Introduction

Why this Architecture Design documentation?

The main objective of the Architecture design documentation is to provide the internal logic understanding of the flight fare prediction code. The Architecture design documentation is designed in such a way that the programmer can directly code after reading each module description in the documentation.

1 Architecture



2 Architecture design

This project is to create an interface for the user to predict if the person would default on credit card next month, in addition to this, in need of getting the real time project

experience we are importing the gathered data into our own database and then start the project from the scratch.

2.1 Data gathering from main source

The data for the current project is being gathered from Kaggle dataset, the link to the data is:<https://www.kaggle.com/datasets/uciml/default-of-credit-card-clients-dataset>

2.2 Data description

There are about 30k+ records of credit card default with 25 columns consisting of information like payment balance, payment of September to April etc

2.3 Data pre-processing

Steps performed in pre-processing are:

- Data set is divided in 70:30 ratio for train and test respectively.
- ID column was dropped as its unnecessary for our modeling.
- We have also dropped columns 'PAY_2', 'PAY_3', 'PAY_4', 'Pay_5', 'PAY_6', 'BILL_AMT2', 'BILL_AMT3', 'BILL_AMT4', 'BILL_AMT5', 'BILL_AMT6' as they possess multi-collinearity with columns 'PAY_0' and 'BILL_AMT0' respectively
- The attribute name 'default.payment.next.month' was converted to 'Payment_default' for naming convenience.
- Pay_0:No consumption of credit card=-2, Pay duly(paid on time)=-1, payment delay for one month=1, payment delay for two months=2, payment delay for nine months and above=-9.
- No Null values in dataset

2.4 Modelling

The pre-processed data is then visualized and all the required insights are being drawn. Although from the drawn insights, the data is randomly spread but still modelling is performed with different machine learning algorithms to make sure we cover all the possibilities. And finally, as expected random forest regression performed well and further hyperparameter tuning is done to increase the model's accuracy.

2.5 UI integration

HTML file is being created and are being integrated with the created machine learning model. All the required files are then integrated to the app.py file and tested locally. Note: We have not make the HTML File.

2.6 Data from user

The data from the user is retrieved from the created HTML web page.

2.7 Data validation

The data provided by the user is then being processed by app.py file and validated. The validated data is then sent for the prediction.

2.8 Rendering the results

The data sent for the prediction is then rendered to the web page.

2.9 Deployment

The tested model is then deployed to NETLIFY. So, users can access the project from any internet devices.

ScreenShot of the App Interface

1. The first page displays the pop up window where the user has to provide specific details such as Gender, Repayment status, Bill amount etc

- All the information will be used to predict the results.

The screenshot shows a web browser window with the URL 'localhost:8080/predict'. The page title is 'Credit Card Defaulter Prediction'. The form is divided into two main sections: 'Demographic Data' and 'Behavioral Data'.

Demographic Data:

- Sex:** Radio buttons for Male and Female.
- Education:** Radio buttons for Graduate School, University, High School, Others, and Unknown.
- Marrital Status:** Radio buttons for Married, Single, and Others.
- Age:** A text input field with the placeholder 'in years'.
- Limit Balance:** A text input field with the placeholder 'amount in dollar'.

Behavioral Data:

- Repayment Status:** A text input field with the placeholder '0'. Below it, a note: '(-1=pay duly, 1=one month delay, 2=two months delay, ... 9=delay for nine months and above)'. There is also a 'September' label above the input.
- Bill Amounts:** A text input field with the placeholder '0'. Above it, a label: 'Amount of bill statements (in dollar)'. There is also a 'September' label above the input.
- Previous Payments:** A section with a label: 'Amount of previous payments (in dollar)'. It contains a grid of input fields for different months: April, May, June, July, August, and September. Each input field has a placeholder '0'.

At the bottom of the form, there is a 'Predict' button and a larger box labeled 'Defaulter'.

2. Incase you miss out one input the webpage will alert you for the same or if the entered value is more than the set value it will alert you for the same.

Credit Card Defaulter Prediction

Demographic Data:

Sex:

☐ Male ☐ Female

Education:

☐ Graduate School ☐ University ☐ High School ☐ Others ☐ Unknown

Marital Status:

☐ Married ☐ Single ☐ Others

Age:

31

Limit Balance:

Amount of given credit in dollar (includes individual and family/supplementary credit)

Amount in dollar

! Please fill out this field.

Behavioral Data:

Repayment Status:

(-1=pay duly, 1=one month delay, 2=two months delay, ... 9=delay for nine months and above)

September

13

Bill Amounts: Amount of bill statements (in dollar)

September

2000

Previous Payments: Amount of previous payments (in dollar)

April

2800

May

2340

June

0

July

0

August

0

September

0

Predict

Defaulter

← ↻ ⓘ localhost:8080/predict

Credit Card Defaulter Prediction

Demographic Data:

Sex:

☐ Male ☐ Female

Education:

☐ Graduate School ☒ University ☐ High School ☐ Others ☐ Unknown

Marital Status:

☐ Married ☒ Single ☐ Others

Age:

32

Limit Balance:

Amount of given credit in dollar (includes individual and family/supplementary credit)

20000

Behavioral Data:

Repayment Status:

(-1=pay duly, 1=one month delay, 2=two months delay, ... 9=delay for nine months and above)

September

13

Bill Amounts: Amount of bill statements (in dollar)

September

0

Previous Payments: Amount of previous payments (in dollar)

April	May	June
0	0	0
July	August	September
0	0	0

! Value must be less than or equal to 9.

Predict

Defaulter

2. After entering all the data we will get the predictions at the bottom page, i.e if the borrower will default or not.

a) In this case the Borrower will not be a Defaulter in next month.

localhost:8080/predict

Credit Card Defaulter Prediction

Demographic Data:

Sex:
☒ Male ☐ Female

Education:
☒ Graduate School ☐ University ☐ High School ☐ Others ☐ Unknown

Marrital Status:
☒ Married ☐ Single ☐ Others

Age: 32

Limit Balance:
Amount of given credit in dollar (includes individual and family/supplementary credit)
20000

Behavioral Data:

Repayment Status:
(-1=pay duly, 1=one month delay, 2=two months delay, ... 9=delay for nine months and above)
September
-1

Bill Amounts: Amount of bill statements (in dollar)
September
2000

Previous Payments: Amount of previous payments (in dollar)

April	May	June
0	0	0
July	August	September
0	0	0

Predict

Not Defaulter

localhost:8080/predict

Credit Card Defaulter Prediction

Demographic Data:

Sex:
☐ Male ☐ Female

Education:
☐ Graduate School ☐ University ☐ High School ☐ Others ☐ Unknown

Marrital Status:
☐ Married ☐ Single ☐ Others

Age: in years

Limit Balance:
Amount of given credit in dollar (includes individual and family/supplementary credit)
amount in dollar

Behavioral Data:

Repayment Status:
(-1=pay duly, 1=one month delay, 2=two months delay, ... 9=delay for nine months and above)
September
0

Bill Amounts: Amount of bill statements (in dollar)
September
0

Previous Payments: Amount of previous payments (in dollar)

April	May	June
0	0	0
July	August	September
0	0	0

Predict

Not Defaulter

b) In this case the Borrower will be a Defaulter in next month.

Credit Card Defaulter Prediction

Demographic Data:

Sex:

☒ Male ☐ Female

Education:

☒ Graduate School ☐ University ☐ High School ☐ Others ☐ Unknown

Marrital Status:

☒ Married ☐ Single ☐ Others

Age: 32

Limit Balance:

Amount of given credit in dollar (includes individual and family/supplementary credit)

20000

Behavioral Data:

Repayment Status:

(-1=pay duly, 1=one month delay, 2=two months delay, ... 9=delay for nine months and above)

September

3

Bill Amounts: Amount of bill statements (in dollar)

September

20000

Previous Payments: Amount of previous payments (in dollar)

April

4000

July

May

2000

August

June

0

September

Predict

Not Defaulter

