Logistic Regression

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Decoding Data Science

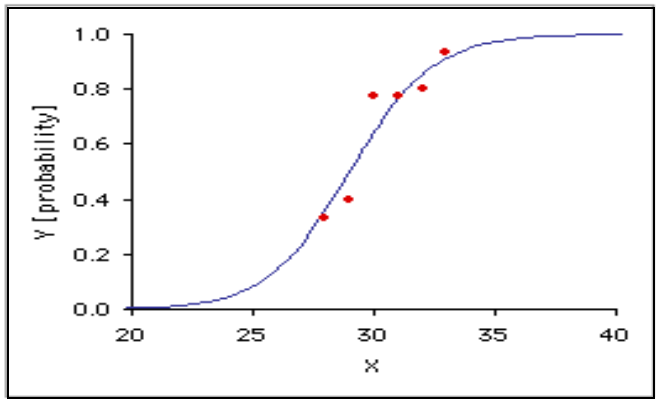
Logistic Regression – Introduction

In Linear regression, the outcome variable is continuous and the predictor variables can be a mix of numeric and categorical. But often there are situations where we wish to evaluate the effects of multiple explanatory variables on a binary outcome variable

For example, the effects of a number of factors on the development or otherwise of a disease. A patient may be cured or not; a prospect may respond or not, should we grant a loan to particular person or not, etc.

When the outcome or dependent variable is binary, and we wish to measure the effects of several independent variables on it, we uses Logistic Regression

- The binary outcome variable can be coded as 0 or 1.
- The logistic curve is shown in the figure below:



We estimate the probability of success by the equation:

$$P = \frac{e^{a+bX}}{1+e^{a+bX}}$$

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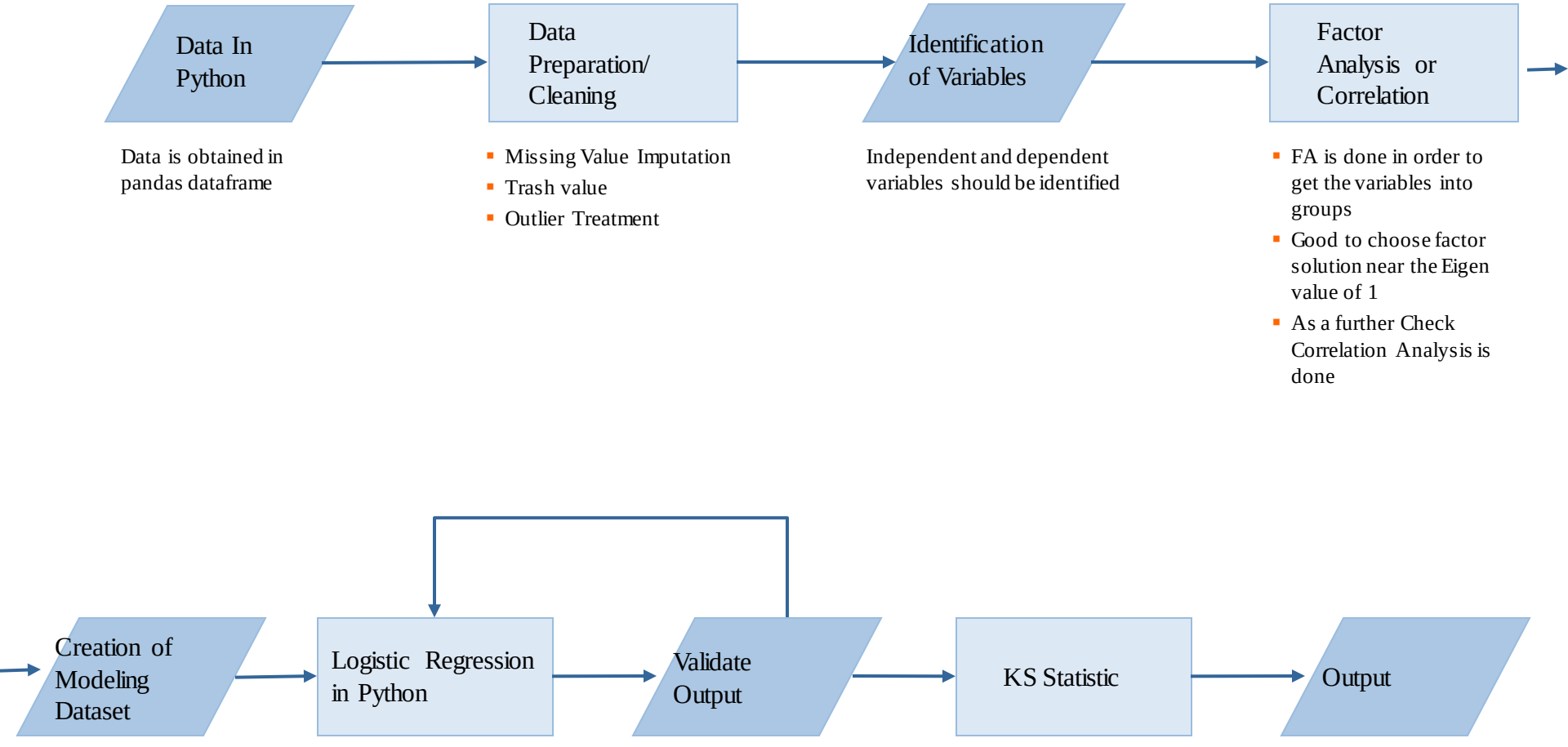
Process Flow



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Python code

Step 1: Importing the dataset

```
dataset = pd.read_csv('car_purchase_Ads.csv')
X = dataset.iloc[:, :-1].values
y = dataset.iloc[:, -1].values
```

Step 2: Splitting the dataset into the Training set and Test set

```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.25, random_state = 0)
```

Step 2: Feature Scaling

```
from sklearn.preprocessing import StandardScaler
sc = StandardScaler()
X_train = sc.fit_transform(X_train)
X_test = sc.transform(X_test)
```

Step 4 : Training the Logistic Regression model on the Training set

```
from sklearn.linear_model import LogisticRegression
classifier = LogisticRegression(random_state = 0)
classifier.fit(X_train, y_train)
```

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Python code

Step 5: Predicting a new result

```
print(classifier.predict(sc.transform([[30,87000]])))
```

Step 6: Predicting the Test set results

```
y_pred  = classifier.predict(X_test)
print(np.concatenate((y_pred.reshape(len(y_pred),1),  y_test.reshape(len(y_test),1)),1))
```

Step 7: Making the Confusion Matrix

```
from sklearn.metrics import confusion_matrix, accuracy_score
cm = confusion_matrix(y_test, y_pred)
print(cm)
accuracy_score(y_test, y_pred)
```

Practice

For location of code and dataset

https://drive.google.com/drive/folders/1CMYQTNd02MraMAQ1V-T2eNvicedvLlAu

Thank You!
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