

SOFE 3290U: Software Quality & Project Management

Lab 4

CRN 75766

Submission for Rivka Sagi

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Github repository:

[https://github.com/RivkaRSagi/SOFE3980U\\_Lab4](https://github.com/RivkaRSagi/SOFE3980U_Lab4)

**Accuracy:** accuracy represents how accurate the model is by taking the percentage of data points that were predicted correctly. It is calculated by taking the sum of true positives and true negatives (ie, the correctly predicted data) and dividing it by the total number of data points; true positives plus true negatives plus false positives plus false negatives. This metric is applicable for all different types of models, not just binary ones.

**Recall:** recall represents how well the model correctly identifies positive data from the pool of actual positives in the dataset.

**Precision:** precision represents the percentage of correctly predicted data that is also positive.

## 1. Single-variable Continuous Regression Problem

Code Output:

```
C:\Users\User\Desktop\SoftwareQuality\Lab4_100780926\Lab4\SOFE3980U_Lab4\SVCR>java -jar target\SVCR-1.0.0-jar-with-dependencies.jar
Model 1:
MSE = 112.09929
MAE = 8.447413
MARE = 12.452924

Model 2:
MSE = 102.97186
MAE = 8.1291275
MARE = 11.941063

Model 3:
MSE = 410.53354
MAE = 16.090708
MARE = 23.739824

Model 2 has the lowest error overall and is therefore recommended.
C:\Users\User\Desktop\SoftwareQuality\Lab4_100780926\Lab4\SOFE3980U_Lab4\SVCR>
```

## 2. Single-variable Binary Regression Problem

Code Output:

```
Command Prompt

C:\Users\User\Desktop\SoftwareQuality\Lab4_100780926\Lab4\SOFE3980U_Lab4\SVBR>java -jar target/SVBR-1.0.0-jar-with-dependencies.jar

FOR MODEL 1:

BCE: 0.3844347102235062
Confusion Matrix
      y=1    y=0
y^=1  4283.0  780.0
y^=0  4158.0  779.0
Accuracy = 0.8441
Precision = 0.8459411416156429
Recall = 0.8461082576056894
f1 score = 0.8460246913580247
auc roc = 0.921295938463498

FOR MODEL 2:

BCE: 0.34039937777537665
Confusion Matrix
      y=1    y=0
y^=1  4497.0  504.0
y^=0  4434.0  565.0
Accuracy = 0.8931
Precision = 0.8992201559688062
Recall = 0.888384037929672
f1 score = 0.8937692537016795
auc roc = 0.9595736840496595

FOR MODEL 3:

BCE: 0.3121580322756847
Confusion Matrix
      y=1    y=0
y^=1  4833.0  225.0
y^=0  4713.0  229.0
Accuracy = 0.9546
Precision = 0.9555160142348754
Recall = 0.9547609640458317
f1 score = 0.9551383399209485
auc roc = 0.9911630612322951

C:\Users\User\Desktop\SoftwareQuality\Lab4_100780926\Lab4\SOFE3980U_Lab4\SVBR>
```

### 3. Multiclass Classification

#### Code Output:

```
C:\Users\User\Desktop\SoftwareQuality\Lab4_100780926\Lab4\SOFE3980U_Lab4\MCC>java -jar target/MCC-1.0.0-jar-with-dependencies.jar
CE = 1.0077137650650554
Confusion matrix
      y=1    y=2    y=3    y=4    y=5
y^=1  505    148    197    145    33
y^=2  35     1906   238    144    37
y^=3  35     139    2886   126    33
y^=4  28     136    202    1944   32
y^=5  44     130    237    139    501

C:\Users\User\Desktop\SoftwareQuality\Lab4_100780926\Lab4\SOFE3980U_Lab4\MCC>
```