1.INTRODUCTION:

1.1Overview

A brief description about your project

BANK NOTE AUTHENTICATION:

It is a classification project, since the variable to be predicted is binary (fraudulent or legal).

The goal here is to model the probability that a banknote is fraudulent, as a function of its features.Data set contains five attributes naming variance,skewness,curtosis,entropy and the class.

1.2 Purpose The use of this project.

What can be achieved using this.

Lot of miscreants induces fake **notes** into the market which resemble exactly the original **note**. Hence, there is a **need** for an efficient **authentication** system which predicts accurately whether the given **note** is genuine or not.

Model is trained in such a way that with the given attributes the model will able to determine the type of note.

So that it is fast and accuarte way to find the type of note so we can develop the model with the train and test data our model will ready to detremine the type.

2.LITERATURE SURVEY

2.1 Existing problem Existing approaches or method to solve this problem

A **currency detector** or **currency validator** is a device that determines whether notes These devices are used in a wide range of automated machines, such as supermarket self check outmachines, , payphones, launderette washing machines, car park ticket machines, , public transport ticket machines, and vending machines.

The process involves examining the coins and/or notes that have been inserted into the machine, and conducts various tests to determine if the currency is counterfeit. Because the parameters are different for each coin or note, these currency acceptors must be correctly programmed for each item to be accepted.

In normal operation, if any item such as a coin, banknote, card or ticket is accepted, it is retained within the machine and it falls into a storage container to allow a member of staff to collect it later when emptying the machine. If the item is rejected, the machine returns the item to the customer. If a coin is rejected, it usually falls into a tray or rolls out of a slot at the bottom where the customer can remove the coin. If a banknote, card or ticket is rejected, it is ejected out of the machine so that the customer can remove it from the slot into which it was inserted.

2.2 Proposed solution

What is the method or solution suggested by you?

We can opt the machine learning to solve this problem so that it easily identifies trends and

patterns .No human intervention needed so that we can perform the task irrespective the presence of humans.We adopted the java and applied linear regression and logistic regression it gives output upon training the model with train data sets the model is enough ready to distinguish between the notes.

THEORITICAL ANALYSIS :

3.2 Hardware / Software designing Hardware and software requirements of the project:

ECLIPSE :

Eclipse is an integrated development environment used in computer programming. It contains a base workspace and an extensible plug-in system for customizing the environment.
Eclipse software development kit (SDK) is free and open-source software, released under the terms of the Eclipse Public License, although it is incompatible with the GNU General Public License. It was one of the first IDEs to run under GNU Classpath and it runs without problems under iced tea

WEKA:

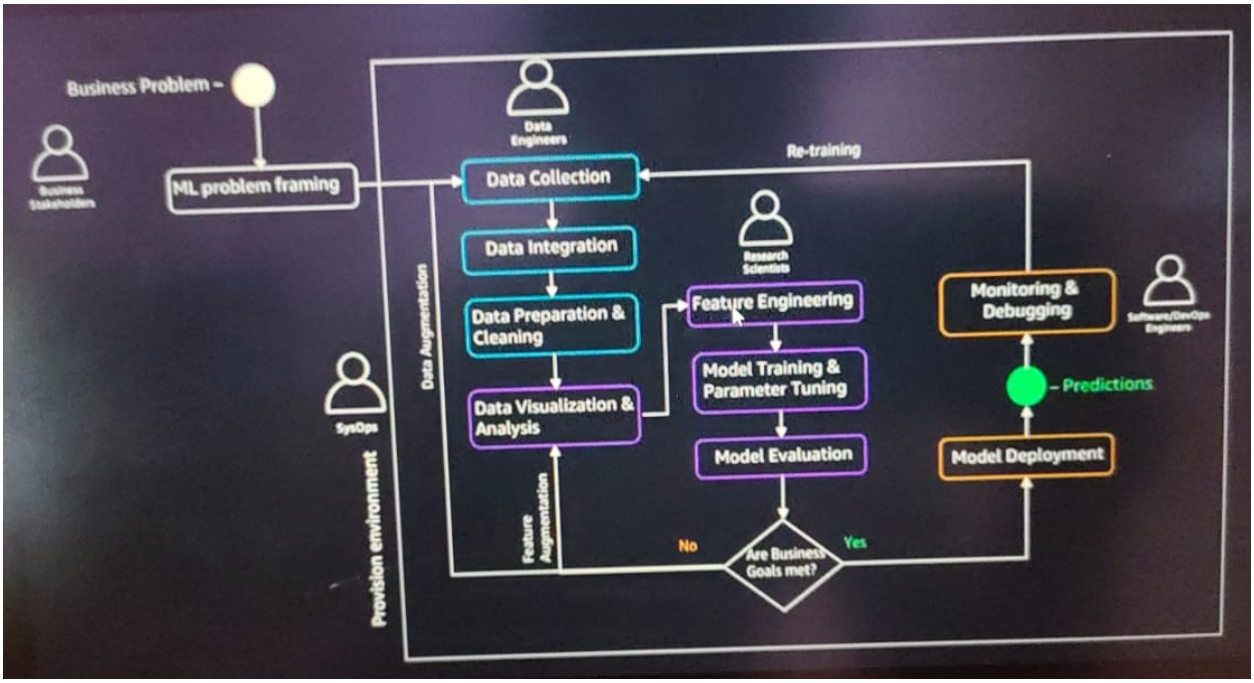
Weka is a collection of machine learning algorithms for solving real-world data mining problems. It is written in Java and runs on almost any platform.

Weka is tried and tested open source machine learning software that can be accessed through a graphical user interface, standard terminal applications, or a Java API. It is widely used for teaching, research, and industrial applications, contains a plethora of built-in tools for standard machine learning tasks, and additionally gives transparent access to well-known toolboxes such as scikit-learn, R, and Deeplearning4j.

MICROSOFT EXCEL:

A worksheet is a collection of cells where you keep and manipulate the data. Each Excel workbook can contain multiple worksheets.

3.1Block diagram Diagrammatic overview project



4 EXPERIMENTAL INVESTIGATIONS

Analysis or the investigation made while working on the solution.

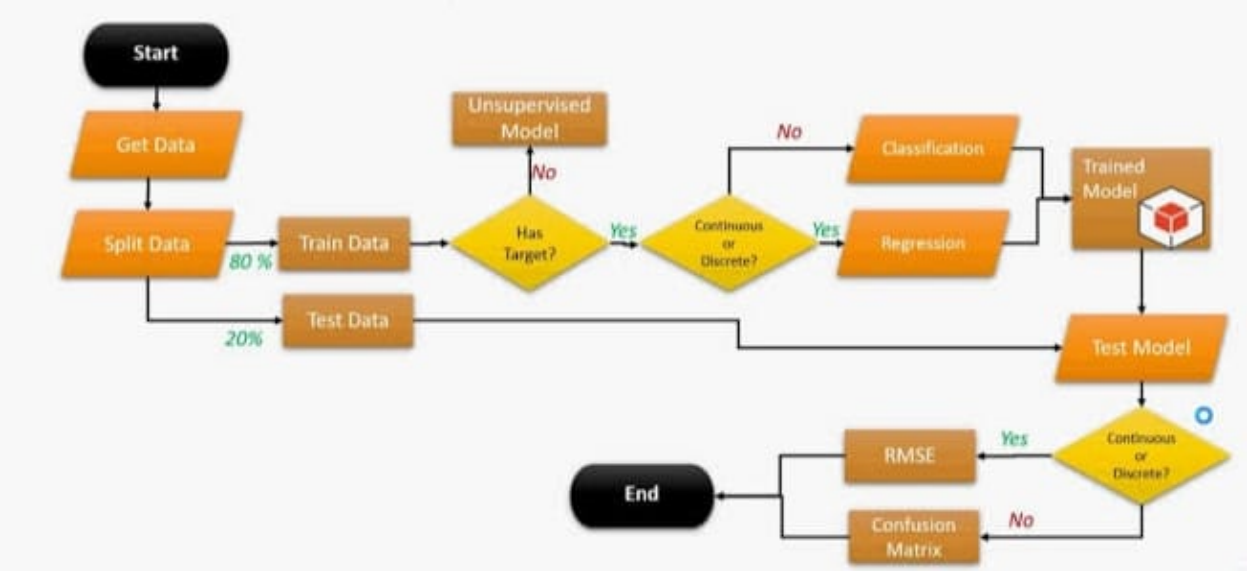
1:Detect forged banknotes using Neural Designer

2:weka environment and operations

3:Banknotes are one of the most important assets of a country. Some miscreants introduce fake notes which bear a resemblance to original note to create discrepancies of the money in the financial market. It is difficult for humans to tell true and fake banknotes apart especially because they have a lot of similar features. Fake notes are created with precision, hence there is need for an efficient algorithm which accurately predicts whether a banknote is genuine or not. This paper proposes machine learning techniques to evaluate authentication of banknotes. Supervised learning algorithms such as Back propagation Neural Network (BPN) and Support Vector Machine (SVM) are used for differentiating genuine banknotes from fake ones. The study also shows the comparison of these algorithms in classification of banknotes.

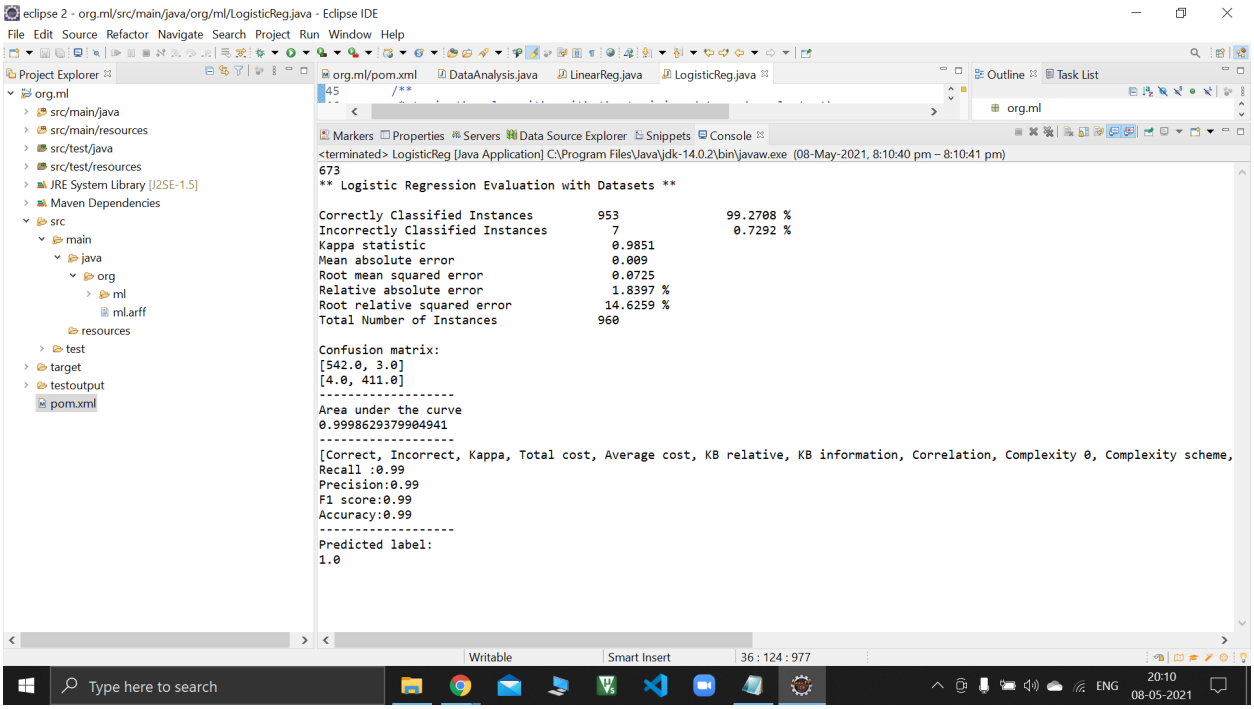
5 FLOWCHART

Diagram



6 RESULT

Final findings (Output) of the project along with screenshots.


eclipse 2 - org.ml/src/main/java/org/ml/LogisticReg.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Project Explorer
org.ml
src/main/java
src/main/resources
src/test/java
src/test/resources
JRE System Library [J2SE-1.5]
Maven Dependencies
src
main
java
org
ml
ml.arff
resources
test
target
testoutput
pom.xml
org.ml/pom.xml
DataAnalysis.java
LinearReg.java
LogisticReg.java
Outline
Task List
org.ml
Markers Properties Servers Data Source Explorer Snippets Console
<terminated> LogisticReg [Java Application] C:\Program Files\Java\jdk-14.0.2\bin\javaw.exe (08-May-2021, 8:10:40 pm – 8:10:41 pm)
673
** Logistic Regression Evaluation with Datasets **
Correctly Classified Instances 953 99.2708 %
Incorrectly Classified Instances 7 0.7292 %
Kappa statistic 0.9851
Mean absolute error 0.009
Root mean squared error 0.0725
Relative absolute error 1.8397 %
Root relative squared error 14.6259 %
Total Number of Instances 960
Confusion matrix:
[542.0, 3.0]
[4.0, 411.0]
Area under the curve
0.9998629379904941
[Correct, Incorrect, Kappa, Total cost, Average cost, KB relative, KB information, Correlation, Complexity 0, Complexity scheme,
Recall :0.99
Precision:0.99
F1 score:0.99
Accuracy:0.99
Predicted label:
1.0
Writable
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36 : 124 : 977
Type here to search
ENG
20:10
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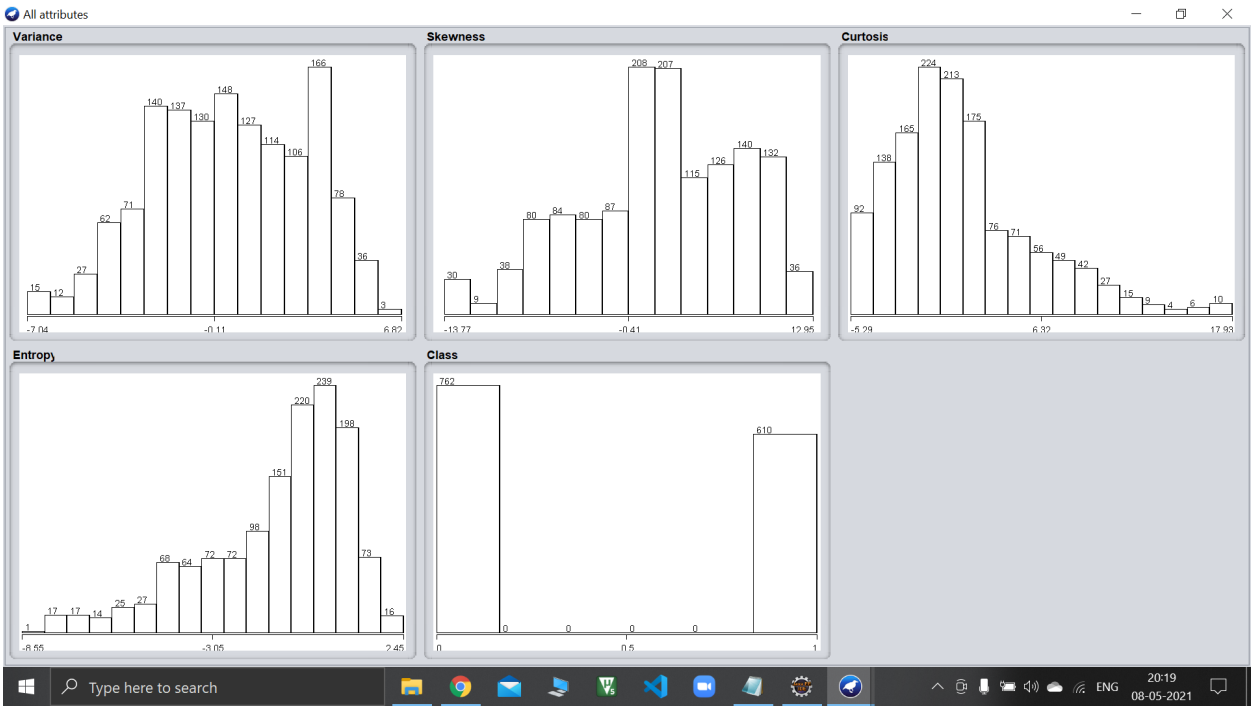
All attributes
Variance
Skewness
Curtosis
Entropy
Class
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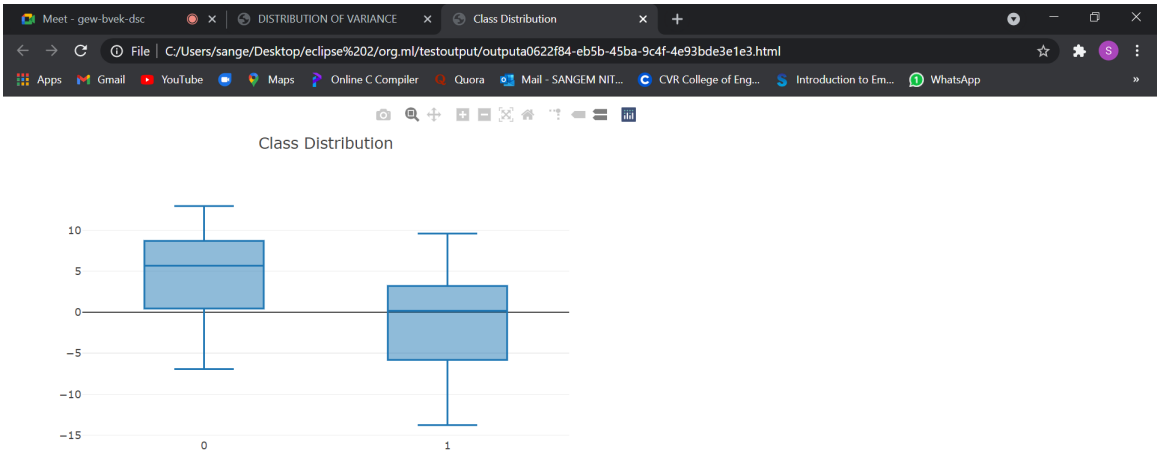
08-05-2021


Meet - gew-bvek-dsc
DISTRIBUTION OF VARIANCE
Class Distribution
File | C:/Users/sange/Desktop/eclipse%202/org.ml/testoutput/outputa0622f84-eb5b-45ba-9c4f-4e93bde3e1e3.html
Apps
Gmail
YouTube
Maps
Online C Compiler
Quora
Mail - SANGEM NIT...
CVR College of Eng...
Introduction to Em...
WhatsApp
Class Distribution
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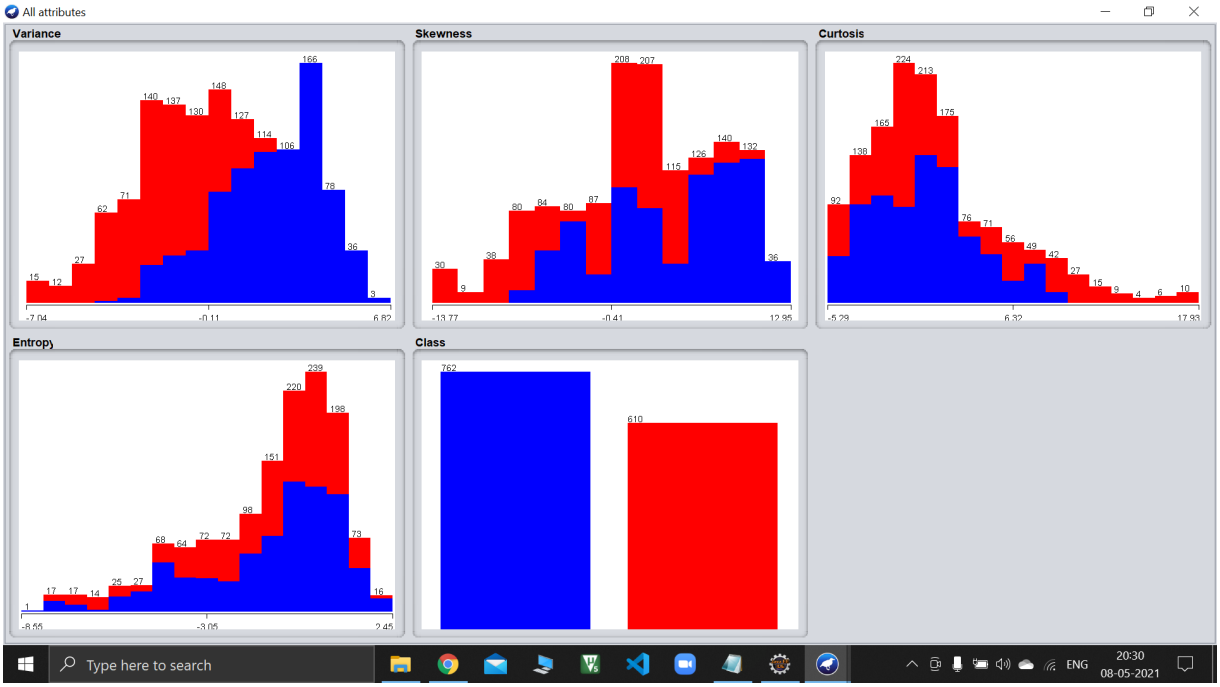
08-05-2021


All attributes
Variance
Skewness
Curtosis
Entropy
Class
762
610
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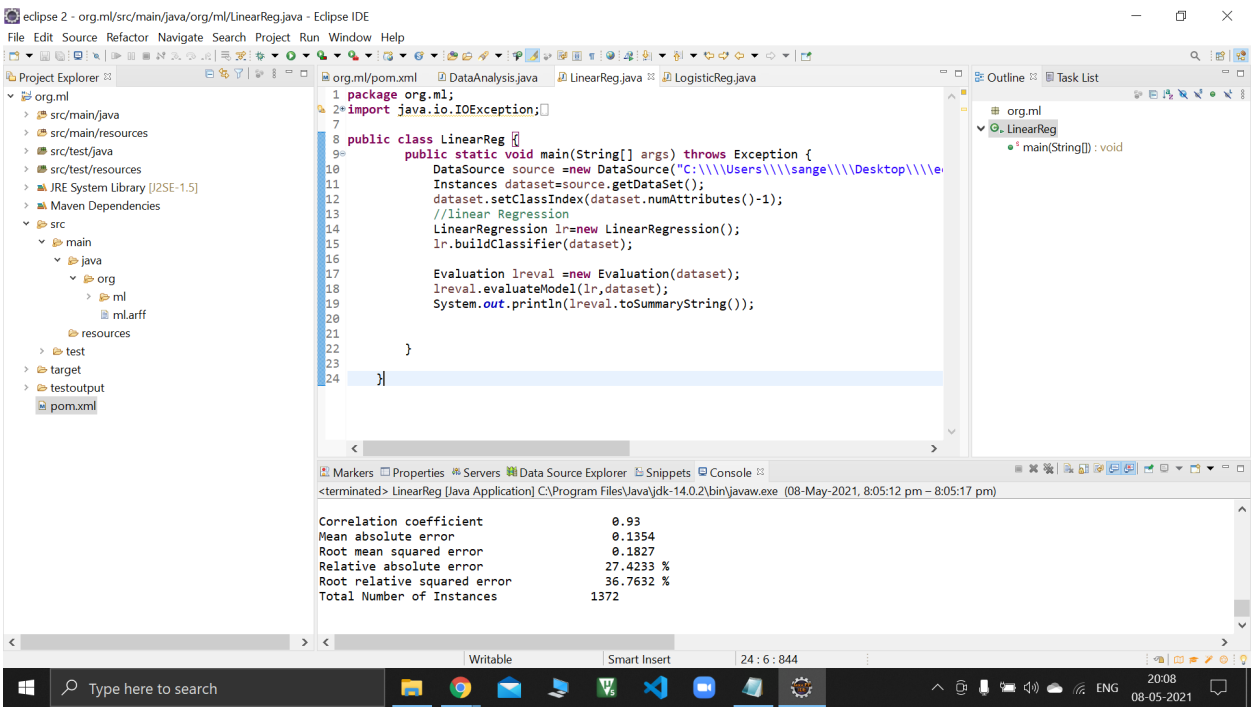
08-05-2021



7 ADVANTAGES & DISADVANTAGES

List of advantages and disadvantages of the proposed solution

1. Easily identifies trends and patterns
2.No human intervention needed
3.Continuous Improvement
4.Handling multi-dimensional and multi-variety data
5.Wide Applications

Disadvantages:

1.Data Acquisition
2.Time and Resources
3.Interpretation of Results
4.High error-susceptibility

8 APPLICATIONS

The areas where this solution can be applied:

Whenever you go to the bank to deposit some cash money, the cashier places banknotes in a machine which tells whether a banknote is real or not. This is a classification problem where we are given some input data and we have to classify the input into one of the several predefined categories. Rule-based as well as statistical techniques are commonly used for solving classification problems. Machine learning algorithms fall in the category of statistical

techniques.

9 CONCLUSION

Conclusion summarizing the entire work and findings.

After analyzing various techniques used to detect forged banknotes, this paper presents banknote authentication for recognizing the banknote as genuine or fake by using two supervised learning techniques. Extensive experiments have been performed on banknotes dataset using both the models to find the best model suitable for classification of the notes. ROC and other metrics have been calculated to compare the performances of both the techniques. The result shows that back-propagation neural network outperforms support vector machine and gives 100% success rate.

10 FUTURE SCOPE

Enhancements that can be made in the future

Machines available today are not only fake note detector but they provide an extra facility of counting them. This
feature can be added with our device that would make it as most reliable counterfeit currency detector along with
counting feature that would be helpful for banking purpose. This project discussed a technique for verifying Indian
paper currency. This project is an effort to suggest an approach for extracting characteristic of Indian paper currency.
Approach suggested from the beginning of image acquisition to converting it to gray scale image and up to the word
segmentation has been stated. The work will surely be very useful for minimizing the counterfeit currency. In Future,
Mobile app can be developed which would be useful for normal as well as visually impaired persons, the same system
can be developed for the remaining Indian currency notes and other country’s currency notes. Also the app’s interface

can be further modified as per the user requirements. This will increase its utilization by increasing its user network
since India is going to establish the largest digital network in the world in the coming years. Thus the application will
be available in all android devices and IOS devices in future if worked upon.

11 BIBILOGRAPHY

References of previous works or websites visited/books referred for analysis about the project, solution previous findings etc

https://www.neuraldesigner.com/learning/examples/banknote-authentication
https://www.youtube.com/watch?v=1Zs-cm6TBv4
https://www.youtube.com/results?search_query=bank+note+authentication
https://www.ijcaonline.org/archives/volume179/number20/shahani-2018-ijca-916343.pdf

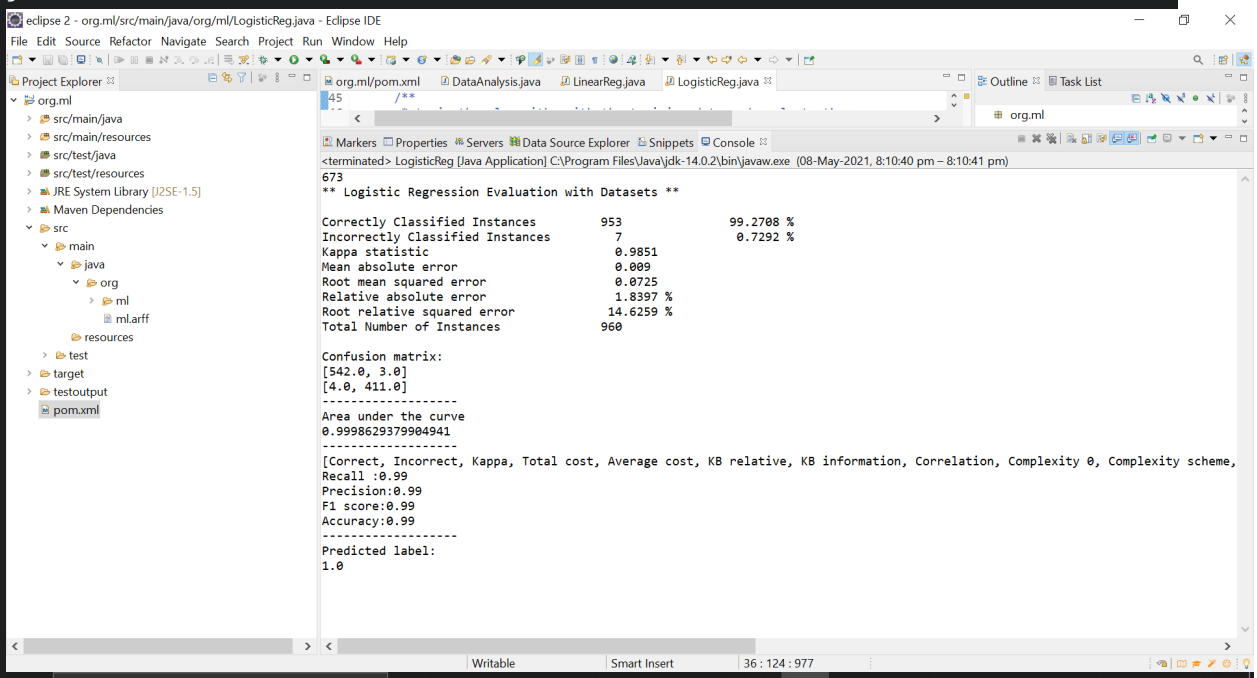
12.APPENDIX

```
1  package org.ml;
2
3  import java.util.Arrays;
4
5  import weka.classifiers.Classifier;
6  import weka.classifiers.evaluation.Evaluation;
7  import weka.core.Instance;
8  import weka.core.Instances;
9  import weka.core.converters.ConverterUtils.DataSource;
10
11 public class LogisticReg {
12
13 public static Instances getInstances (String filename)
14 {
15
16     DataSource source;
17     Instances dataset = null;
18     try {
19           source = new DataSource(filename);
20           dataset = source.getDataSet();
21           dataset.setClassIndex(dataset.numAttributes()-1);
22
```

```
23
24      } catch (Exception e) {
25            // TODO Auto-generated catch block
26            e.printStackTrace();
27
28      }
29
30      return dataset;
31  }
32
33  public static void main(String[] args) throws Exception{
34
35      Instances train_data =
    getInstances("C:\\Users\\sange\\Desktop\\eclipse
    2\\org.ml\\src\\main\\java\\org\\ml\\a_test.arff");
36      Instances test_data =
    getInstances("C:\\Users\\sange\\Desktop\\eclipse
    2\\org.ml\\src\\main\\java\\org\\ml\\a_train.arff");
37      System.out.println(train_data.size());
38
39      /** Classifier here is Linear Regression */
40      Classifier classifier = new
    weka.classifiers.functions.Logistic();
41      /** */
42      classifier.buildClassifier(train_data);
43
44
45      /**
46       * train the alogorithm with the training data and evaluate
    the
47       * algorithm with testing data
48       */
49      Evaluation eval = new Evaluation(train_data);
50      eval.evaluateModel(classifier, test_data);
51      /** Print the algorithm summary */
52      System.out.println("** Logistic Regression Evaluation with
    Datasets **");
53      System.out.println(eval.toSummaryString());
54  //        System.out.print(" the expression for the input data as
    per alogorithm is ");
```

```
55 //        System.out.println(classifier);
56
57     double confusion[][] = eval.confusionMatrix();
58     System.out.println("Confusion matrix:");
59     for (double[] row : confusion)
60          System.out.println(    Arrays.toString(row));
61     System.out.println("--------------------");
62
63     System.out.println("Area under the curve");
64     System.out.println( eval.areaUnderROC(0));
65     System.out.println("--------------------");
66
67     System.out.println(eval.getAllEvaluationMetricNames());
68
69     System.out.print("Recall :");
70     System.out.println(Math.round(eval.recall(1)*100.0)/100.0);
71
72     System.out.print("Precision:");
73
   System.out.println(Math.round(eval.precision(1)*100.0)/100.0);
74     System.out.print("F1 score:");
75     System.out.println(Math.round(eval.fMeasure(1)*100.0)/100.0);
76
77     System.out.print("Accuracy:");
78     double acc = eval.correct()/(eval.correct()+
   eval.incorrect());
79     System.out.println(Math.round(acc*100.0)/100.0);
80
81
82     System.out.println("--------------------");
83     Instance predicationDataSet = test_data.get(2);
84     double value =
   classifier.classifyInstance(predicationDataSet);
85     /** Prediction Output */
86     System.out.println("Predicted label:");
87     System.out.print(value);
88
89
90 }
91
```

```
92 }
```


eclipse 2 - org.ml/src/main/java/org/ml/LogisticReg.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Project Explorer
org.ml
src/main/java
src/main/resources
src/test/java
src/test/resources
JRE System Library [J2SE-1.5]
Maven Dependencies
src
main
java
org
ml
ml.arff
resources
test
target
testoutput
pom.xml
org.ml/pom.xml
DataAnalysis.java
LinearReg.java
LogisticReg.java
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org.ml
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Precision:0.99
F1 score:0.99
Accuracy:0.99
Predicted label:
1.0
Writable
Smart Insert
36 : 124 : 977
Type here to search
ENG
20:10
08-05-2021

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93
```