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REVIEWS TO RATING CONVERSION AND ANALYSIS USING MACHINE LEARNING TECHNIQUES

Charitha Chanamolu
005768174@coyote.csusb.edu

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REVIEWS TO RATING CONVERSION AND ANALYSIS USING MACHINE LEARNING TECHNIQUES

A Project

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

in

Computer Science

---

by

Charitha Chanamolu

March 2019

REVIEWS TO RATING CONVERSION AND ANALYSIS USING MACHINE LEARNING TECHNIQUES

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Charitha Chanamolu

March 2019

Approved by:

Dr. Owen J. Murphy, Advisor, Computer Science and Engineering

Dr. Ernesto Gomez, Committee Member

Dr. Yunfei Hou, Committee Member

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ABSTRACT

With the advent of technology in recent years, people depend more on online reviews to purchase a product. It is hard to determine whether the product is good or bad from hundreds of mixed reviews. Also, it is very time-consuming to read many reviews. So, opinion mining of reviews is necessary.

The main aim of this project is to convert the reviews of a product into a rating and to evaluate the ratings using machine learning algorithms such as Naïve Bayes and Support Vector Machine. In the process of converting the reviews to a rating, score words are created using SentiWordNet and transformed into seven categories from highly positive to highly negative.

ACKNOWLEDGEMENTS

I would like to express my special thanks and sincere gratitude to my advisor and mentor Dr. Owen J. Murphy who supported me all these days in completing my project and who guided me in my academics as well. I would also like to thank my committee members Dr. Ernesto Gomez and Dr. Yunfei Hou for their valuable suggestions and support.

I would also like to thank my parents Mr. Narasimha Swamy Chanamolu and Mrs. Latha Vallabhaneni and my brother, Suraj Chanamolu for being a part of my journey, supporting and helping me to grow physically and mentally.

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CHAPTER ONE

INTRODUCTION

Background

It is often hard for an individual to come to a conclusion after reading numerous reviews of a product from numerous websites. Sometimes people found the product to be useful while some did not. An individual evaluation of the reviews is required to grade it for a final decision.

Existing System

SentiWordNet is a lexical resource for sentiment analysis. It provides scores to the parts of text based on numbers, adverbs or adjectives. The main drawback with this existing system is that it may not always give a good result for the sentimental analysis.

Disadvantages of the Existing System

- It is difficult to find whether the outcome is positive or negative from the scores obtained from SentiWordNet.
- There is no performance evaluation in the existing system.

CHAPTER TWO

SYSTEM ANALYSIS

Proposed System

The goal of the project is to develop a GUI application where the user can view a final rating of a product, movie or series by selecting the dataset of reviews and running the application.

- This application starts with a Login screen where the user can enter his username and password. If any of the details are missing or incorrect a message box will be displayed.
- After logging in, the user will be able to find the project title at the top panel and seven buttons at the bottom panel namely Load Dictionary, SVM Sentiment Analysis, Naïve Bayes Sentiment Analysis, Confusion Matrix, SVM accuracy, Naïve Bayes accuracy, and Correctly Classified Chart.
- Load dictionary is the main button which contains stop word removal, porter stemmer algorithm, and SentiWordNet. The user should load the dictionary every time they log in.
- Support Vector Machine(SVM) sentiment analysis is used to convert the score obtained from SentiWordNet to a rating. The analysis is done by choosing the required dataset for converting reviews. A table displays on

the left panel having the dataset name, review of the product, SVM rating of positive, negative or neutral and the SentiWordNet score.

- Naïve Bayes sentiment analysis is used in converting the score obtained from SentiWordNet into a rating. Naïve Bayes Sentiment Analysis is also done by choosing the required dataset for converting reviews. A table displays on the right panel having the dataset name, review of the product, Naïve Bayes rating of positive, negative and neutral and the SentiWordNet score.
- Confusion matrix contains a table comparing SVM and Naïve Bayes ratings. Both SVM and Naïve Bayes divides the score obtained from SentiWordNet into seven categories from highly positive to highly negative.
- SVM accuracy is the ratio of total positive ratings obtained from the SVM sentiment analysis to the overall scores from the dataset.
- Naïve Bayes is the ratio of the total positive ratings obtained from the Naïve Bayes sentiment analysis to the total ratings from the dataset.
- The Correctly classified chart contains the graphical representation of SVM and Naïve Bayes accuracy.
- Logout terminates the operation from the user.

System Requirement Specifications

The end-user needs to possess the following hardware and software to run the application.

Hardware Requirements

- Laptop having Windows and Eclipse IDE
- RAM-8GB

Software Requirements

- Operating System- Windows 10
- Programming Language- Java
- Toolkit- Java Swing

Programming Used

Graphical User Interface:

In the Graphical User Interface, the user can interact graphically with the screen rather than with the text commands. AWT and Swing are the two sets of Java API for the graphical programming.

Swing

Swing is a part of Java Foundation Classes (JFC) software that implements a set of GUI components. The JFC components are lightweight, and the look and feel of JFC are the same on all platforms. List controls, labels, tree controls, buttons, and table controls are the components included in the swing tool kit.

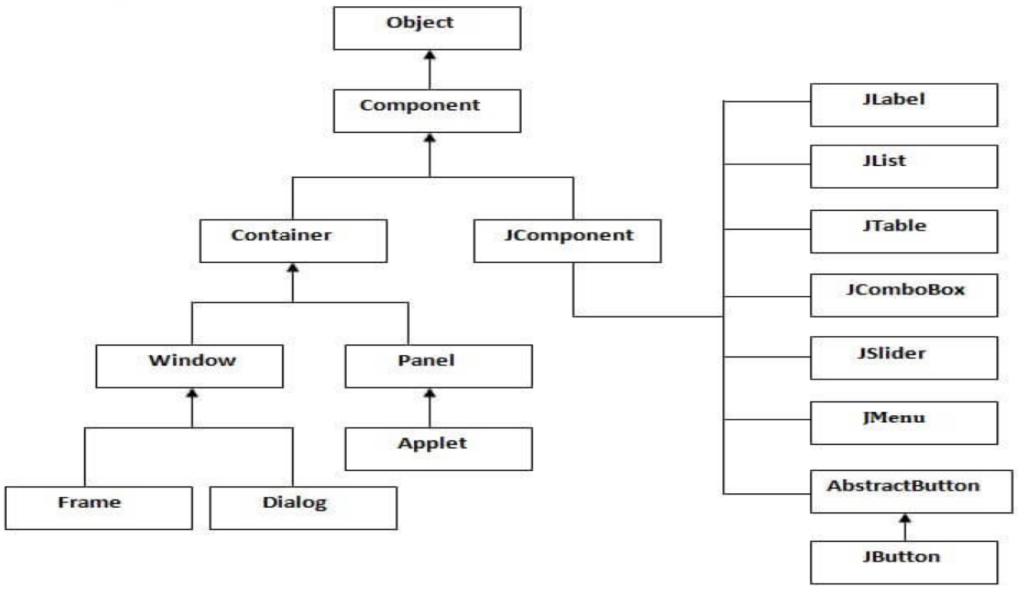


Figure 1. Hierarchy of Java Swing API

SVM

Support Vector Machine (SVM) is used to classify the texts into either positive, negative or neutral. SVM has the distinct advantage of handling large texts. The individual scores obtained for each score word from SentiWordNet are categorized into seven different categories (strong-positive, strong-negative, positive, weak-positive, negative, weak-negative and neutral) using SVM.

strong-positive(sp)=score>0.4

positive(p)=0.3<score<0.4

weak-positive(wp)=0.2<score<0.3

strong-negative(sn)=0.1<score<0.2

negative(n)=0<score<0.1

weak-negative(wn)=score<0

neutral(n)=0

Total positive score for a review(t.p)=svm.sp+svm.p+svm.wp

Total negative score for a review(t.n)= svm.sn+svm.n+svm.wn

SVM accuracy=number of positive reviews/(total number of reviews).

Naïve Bayes

Naïve Bayes Sentiment analysis is used to classify the texts into either positive, negative or neutral. Naïve Bayes has the distinct advantage of handling small texts. The individual scores obtained for each score word from SentiWordNet are categorized into seven different categories (strong-positive, strong-negative, positive, weak-positive, negative, weak-negative and neutral) using Naïve Bayes Sentiment analysis.

strong-positive(sp)=score>0.25

positive(p)=0.2<score<0.25

weak-positive(wp)=0.15<score<0.2

strong-negative(sn)=0.1<score<0.15

negative(n)=0<score<0.1

weak-negative(wn)=score<0

neutral(n)=0

Total positive score for a review(t.p)=nb.sp+nb.p+nb.wp

Total negative score for a review(t.n)= nb.sn+nb.n+nb.wn

Naïve Bayes accuracy=number of positive reviews/(total number of reviews)

CHAPTER THREE

SYSTEM DESIGN

UML Diagrams

Use Case Diagram

Use case diagram mainly shows the interactions between user and the system. It gives the clear overview of what steps are going in the system.

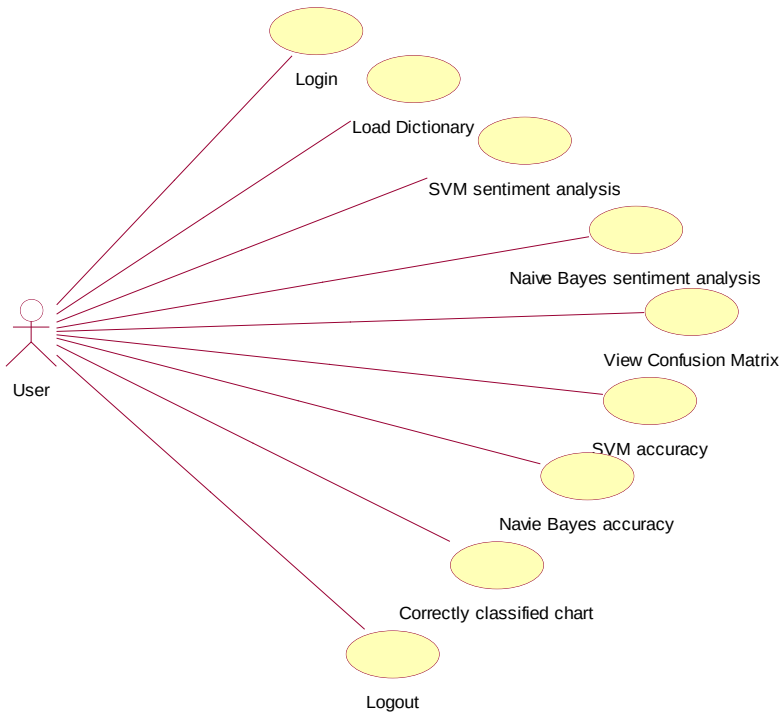


Figure 2. Use Case Diagram for the User

Sequence Diagram

A sequence diagram shows how processes operate with one another and in what order

Figure 3. Sequence Diagram

Data Flow Diagram

A Data Flow Diagram gives the exact information on how the data flows in the system.

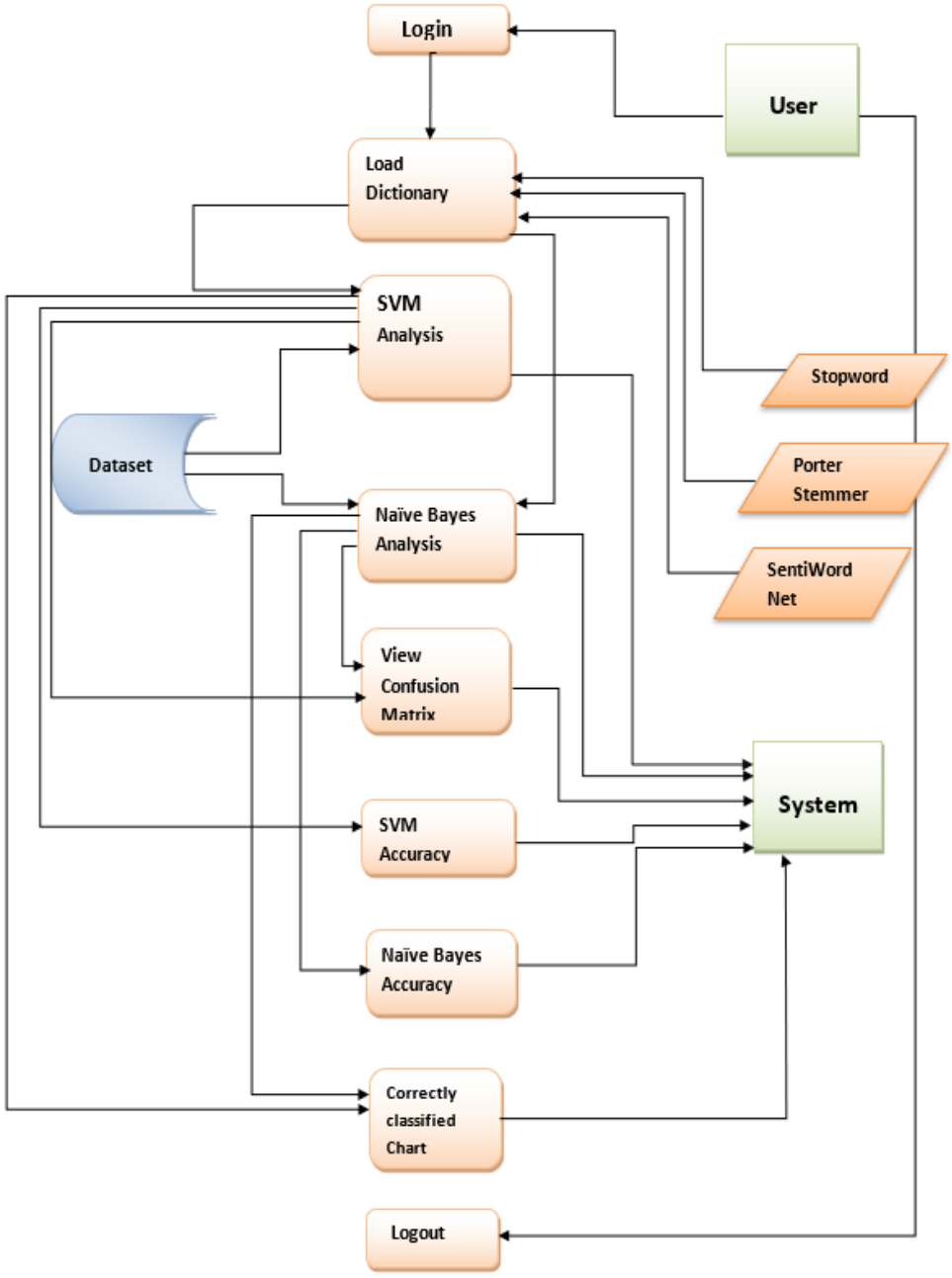


Figure 4. Data Flow Diagram

Activity Diagram

Activity Diagram is a flow chart to represent flow from one activity to another.

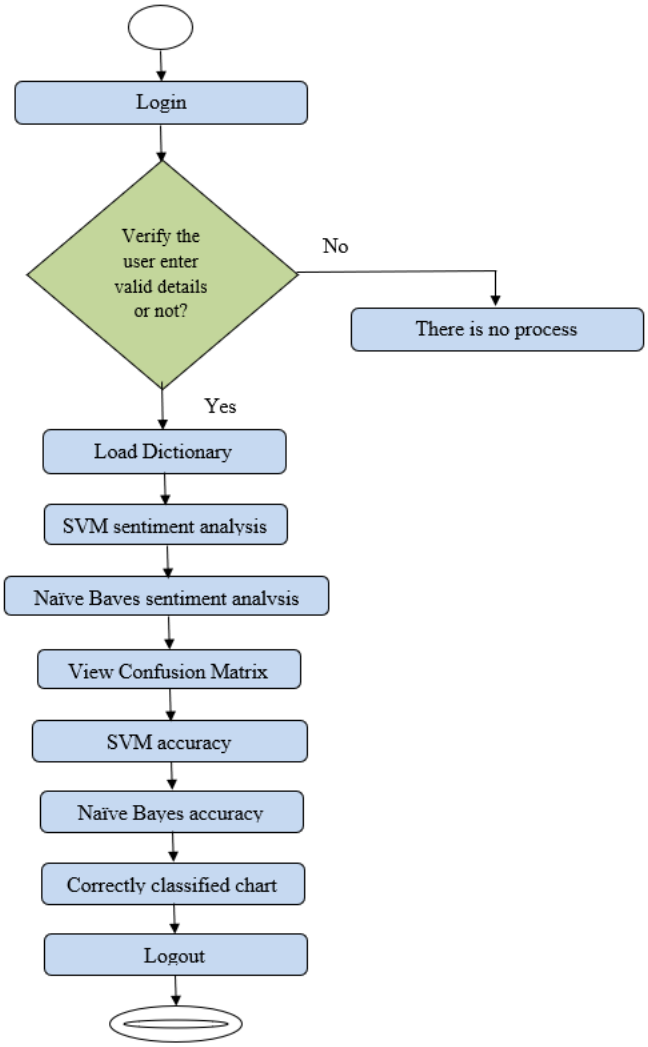


Figure 5. Activity Diagram

Component Diagram

The Component diagram is a special kind of UML diagram that describes the components that are used to form the system. It doesn't give any information about the working of the system.

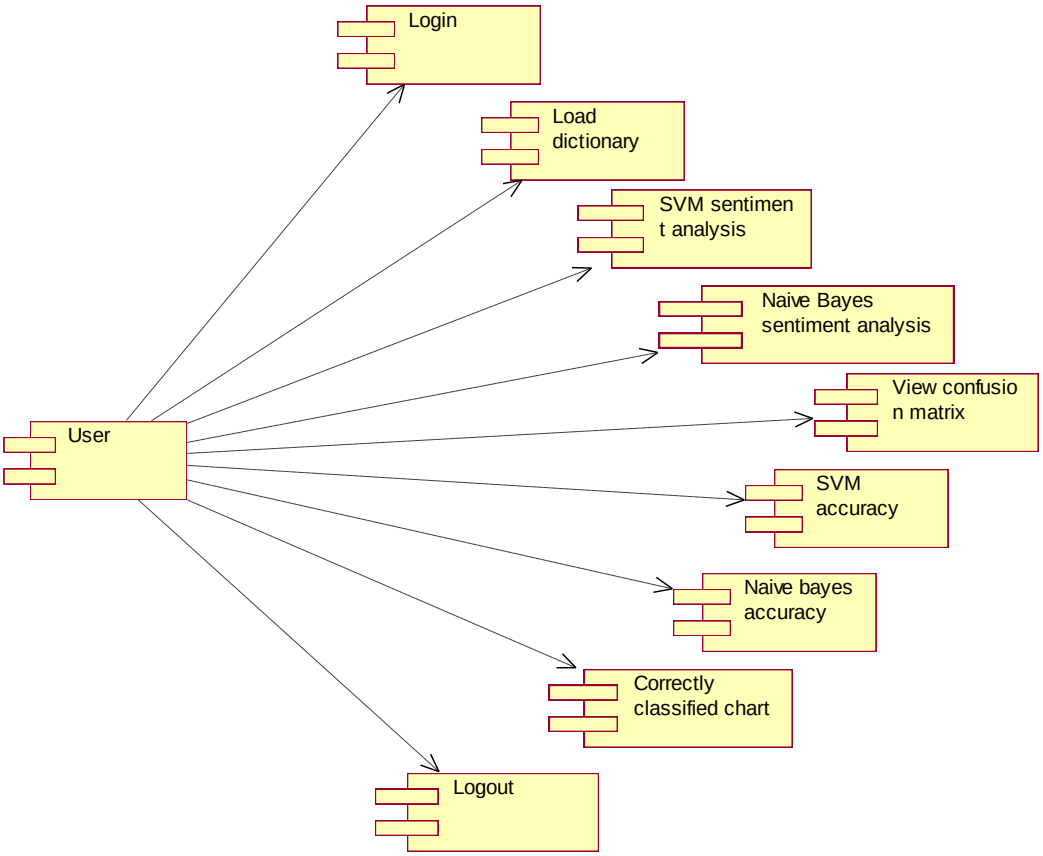


Figure 6. Component Diagram

CHAPTER FOUR

SYSTEM SCREENSHOTS

System Working

Login Screen

At the Login Screen, the user can either login to the application or reset the username and password. A Message box displays if there is any incorrect username or password.

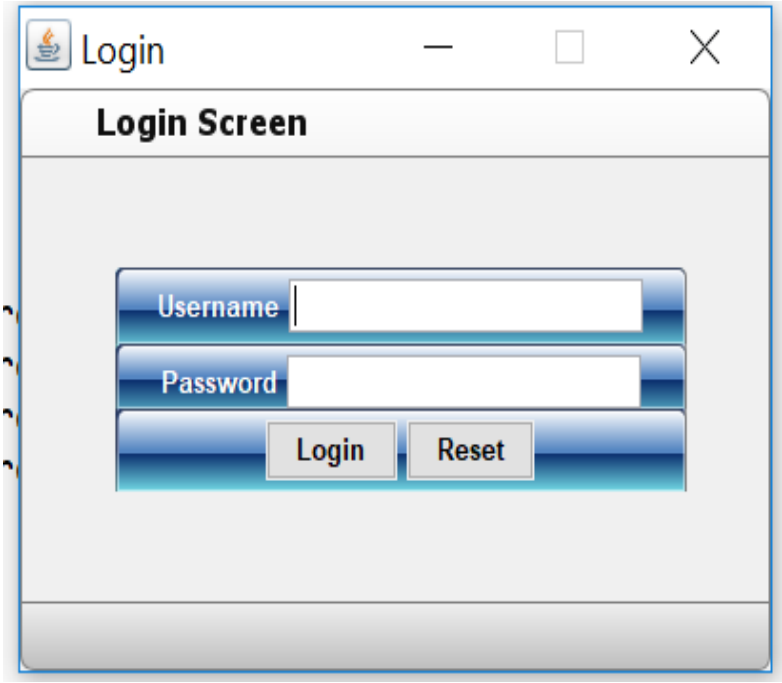


Figure 7. Login Screen

Home Page

This Homepage contains project title on the top panel. Eight buttons in the bottom panel are useful in converting the reviews to a rating.

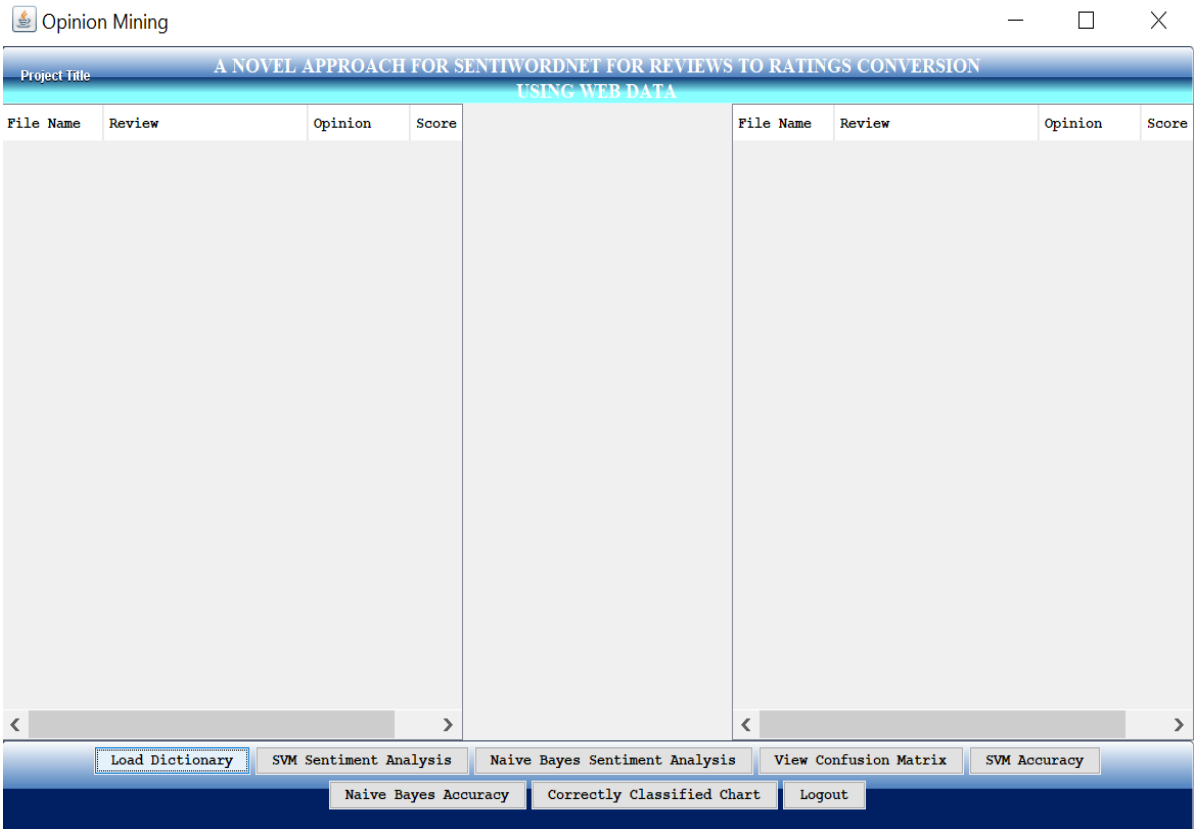


Figure 8. Home Page

Load Dictionary

Load Dictionary loads stop word removal, the porter stemmer algorithm, and SentiWordNet. It displays a message box when the dictionary is loaded.

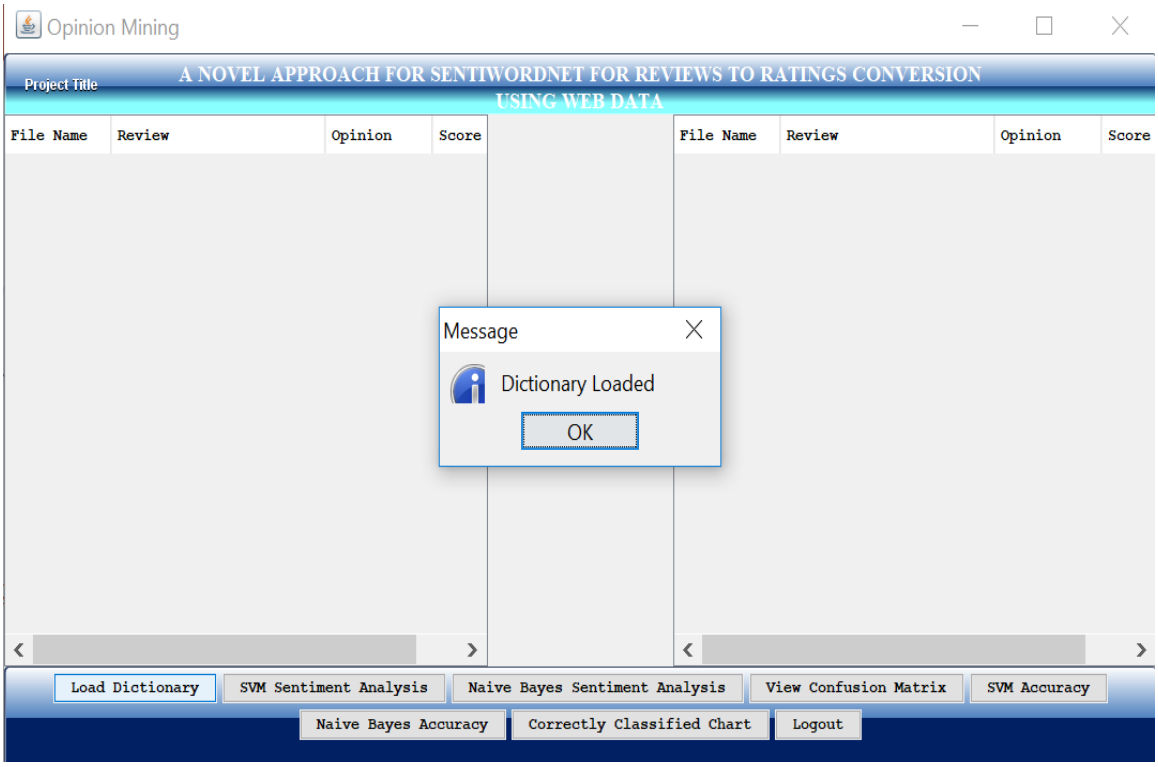


Figure 9. Load Dictionary

SVM Sentiment Analysis

The dataset for which the ratings should be calculated is chosen from the list of the datasets available. Here the dataset containing the reviews of “Bromwell High” which is an animated entertainment series is chosen for SVM Sentiment Analysis.

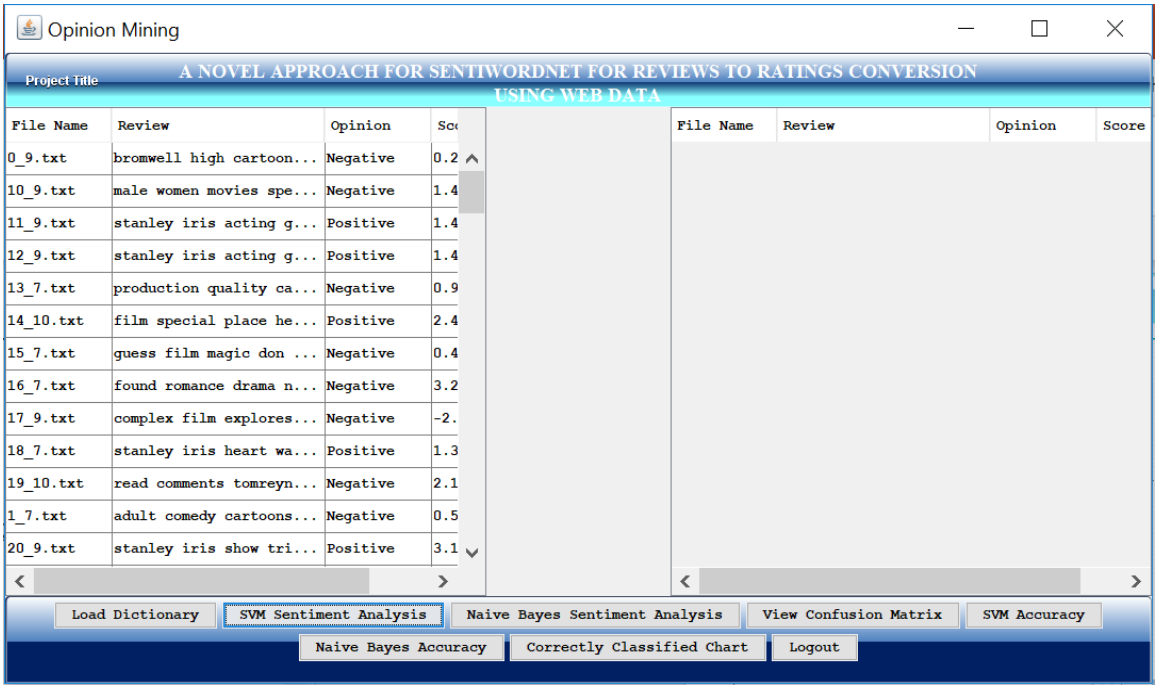


Figure 10. SVM Sentiment Analysis for Bromwell High Series

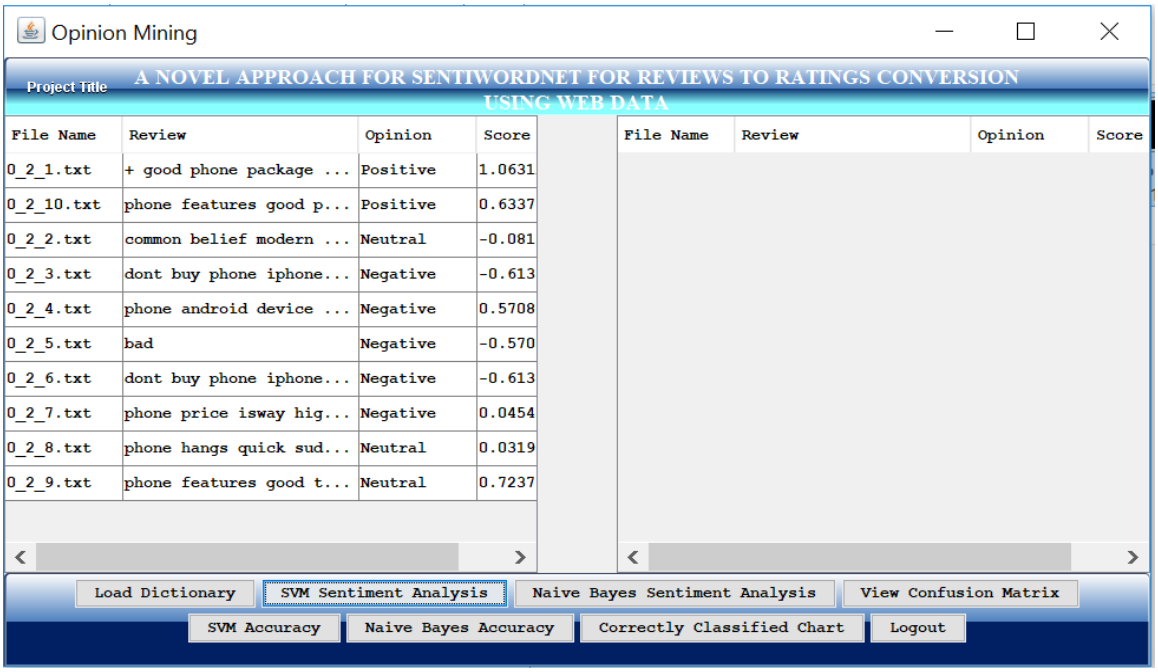


Figure 11. SVM Sentiment Analysis for Device iPhone 8+

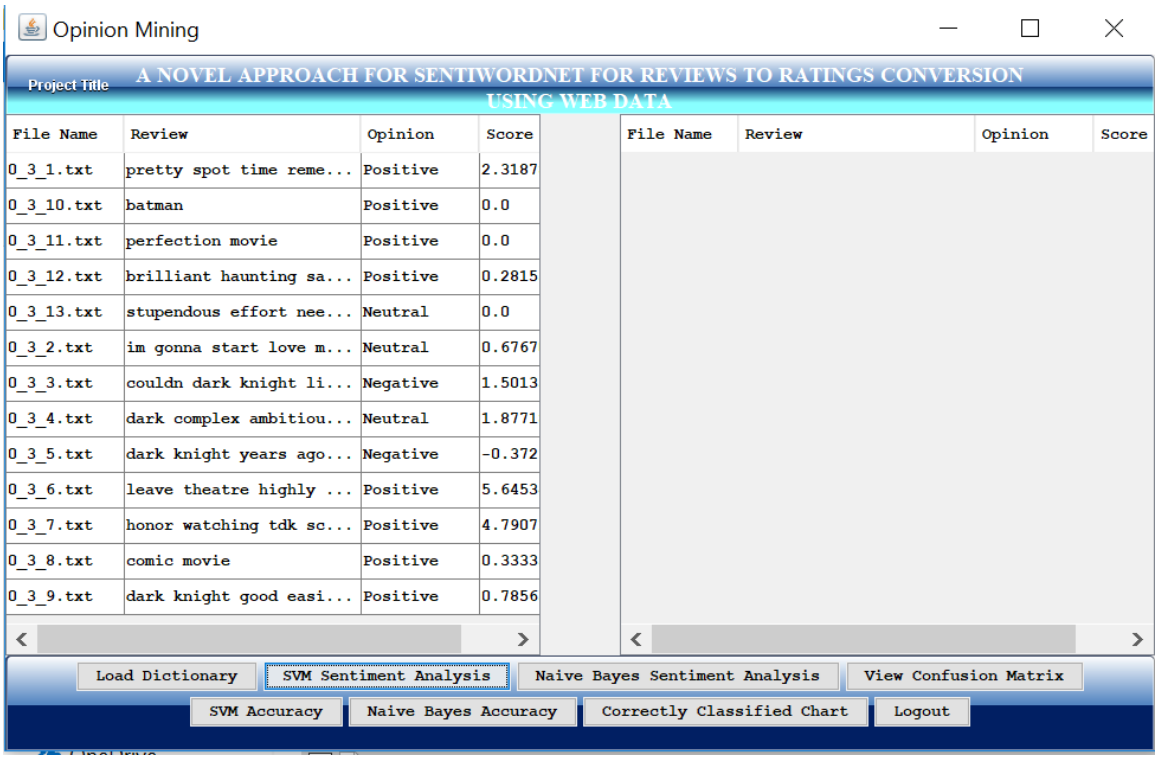


Figure 12. SVM Sentiment Analysis for Dark Knight Movie

Naïve Bayes Sentiment Analysis

The dataset for which the ratings should be calculated is chosen from the list of datasets available. Here the dataset containing the reviews of iPhone 8+ is chosen for Naïve Bayes Sentiment Analysis.

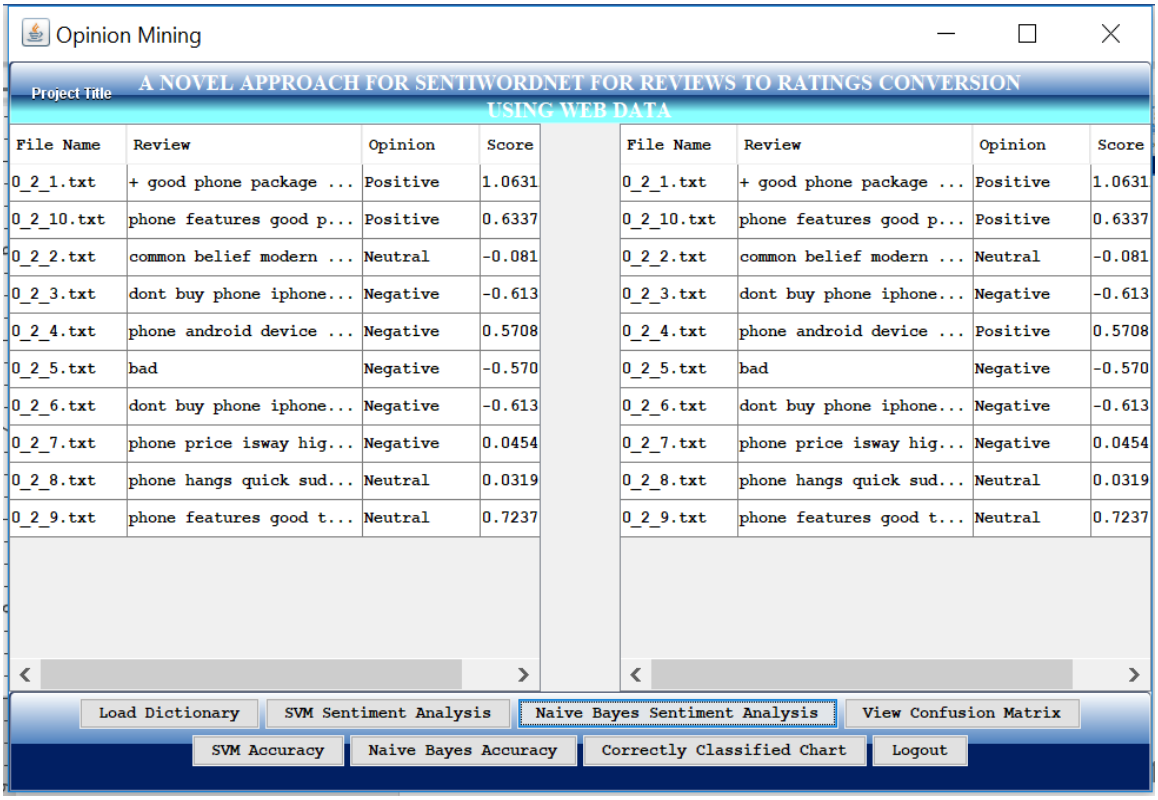


Figure 13. Naïve Bayes Sentiment Analysis for Device iPhone 8+

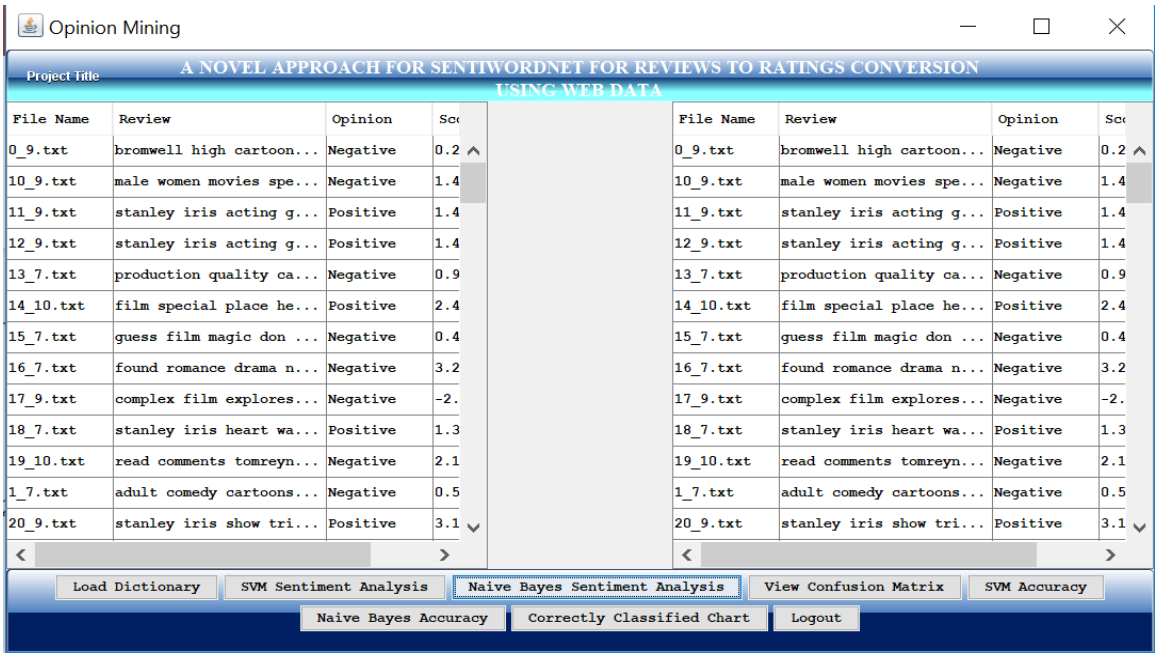


Figure 14. Naïve Bayes Sentiment Analysis for Bromwell High Series

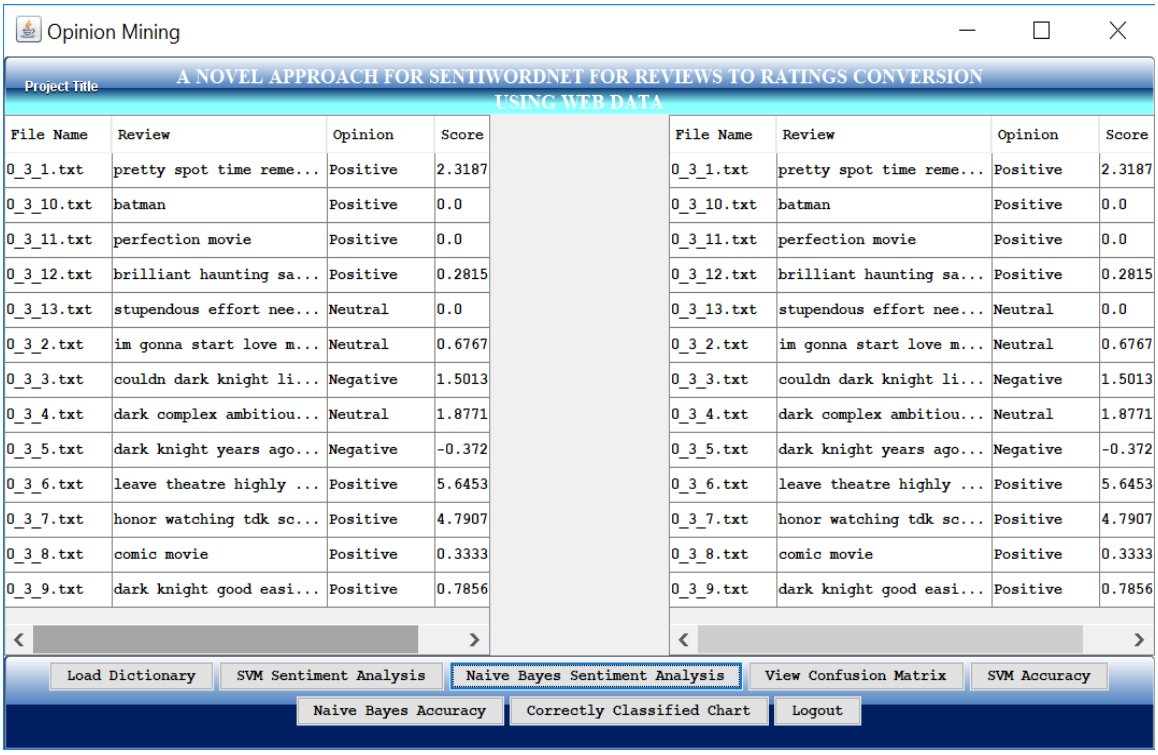
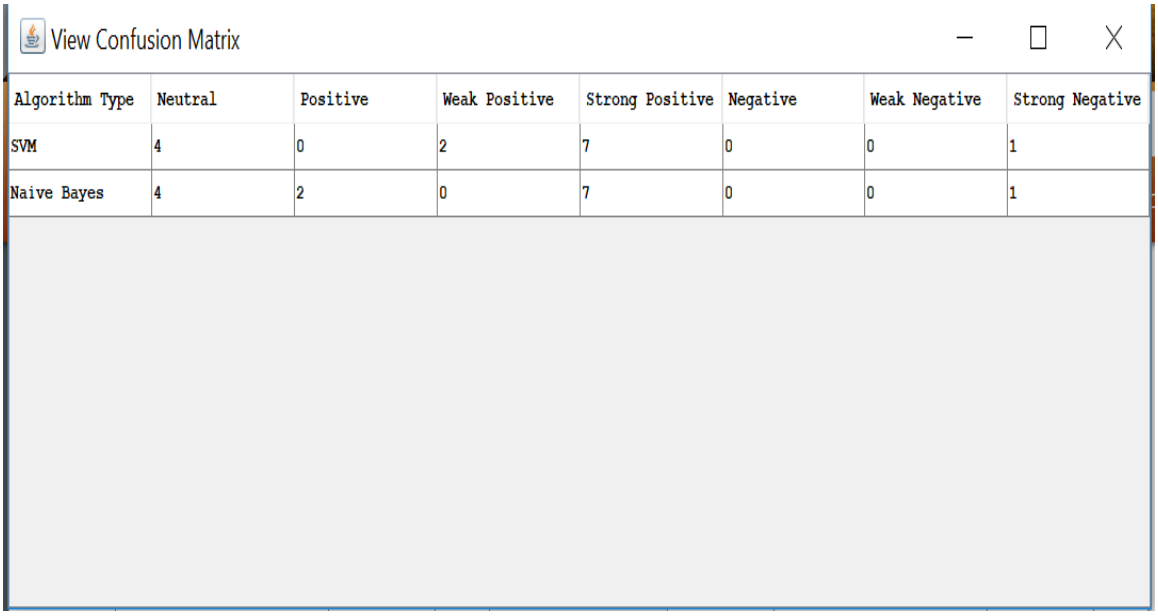


Figure 15. Naïve Bayes Sentiment Analysis for Dark Knight Movie.

Confusion Matrix

SVM and Naïve Bayes Sentiment Analysis divides the given review into seven categories from strong positive to strong negative. The Confusion matrix here is the comparison of ratings between SVM and Naïve Bayes for any dataset of reviews.



Algorithm Type	Neutral	Positive	Weak Positive	Strong Positive	Negative	Weak Negative	Strong Negative
SVM	4	0	2	7	0	0	1
Naive Bayes	4	2	0	7	0	0	1

Figure 16. Confusion Matrix for a Review in the Dataset of Bromwell High

SVM Accuracy

SVM accuracy is the ratio of total positive ratings in the dataset of reviews to the total reviews. The below figure shows that there is only 10.8 percent of positive reviews for the Bromwell High animated series.

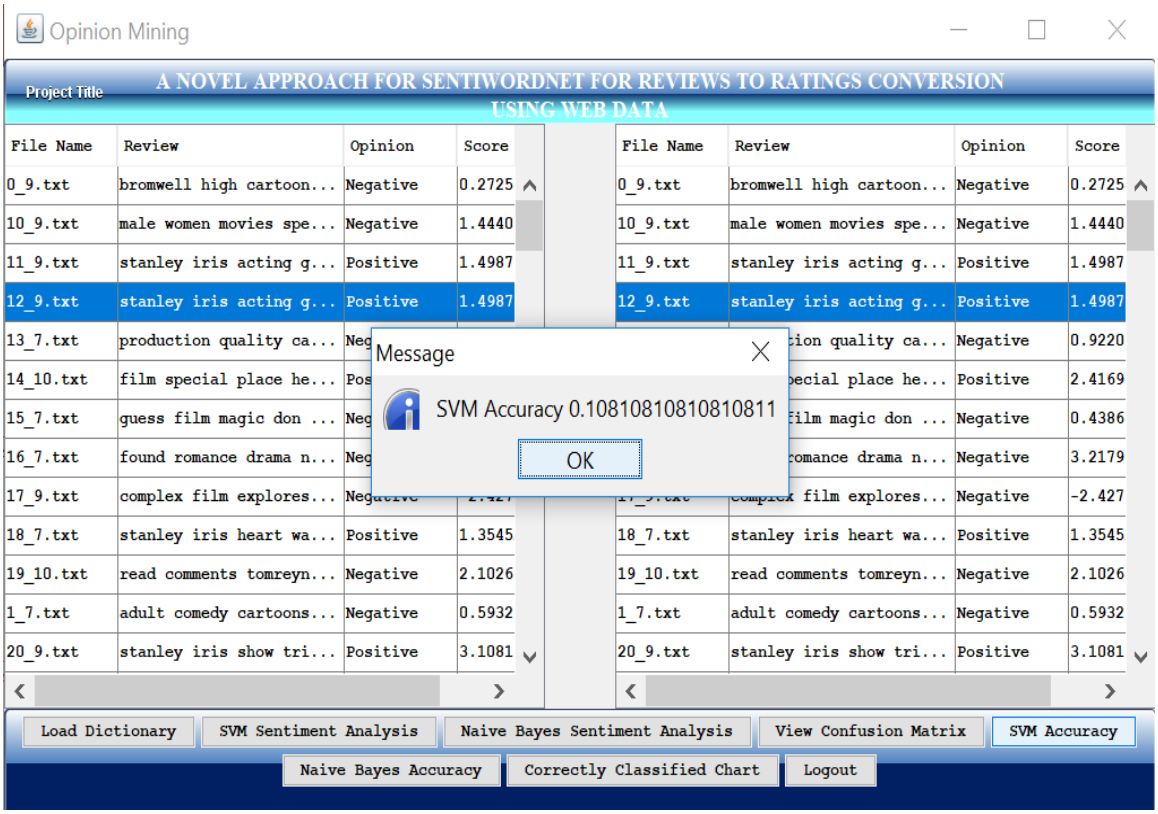


Figure 17. SVM Accuracy for Bromwell High Animated Series

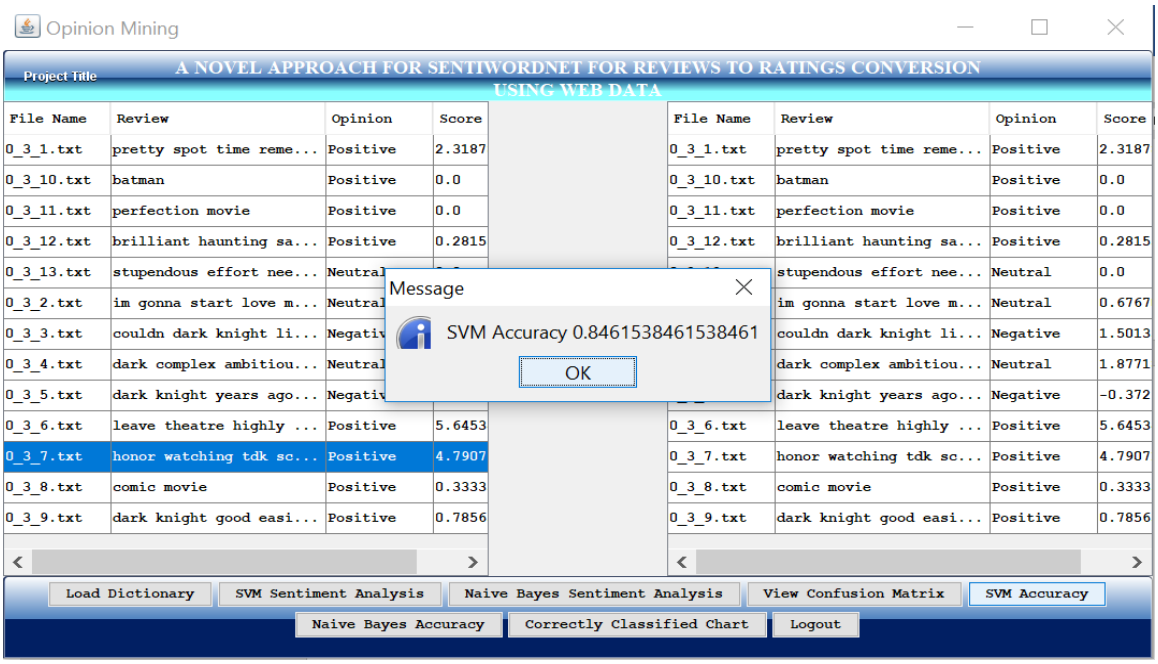


Figure 18. SVM Accuracy for Dark Knight Movie

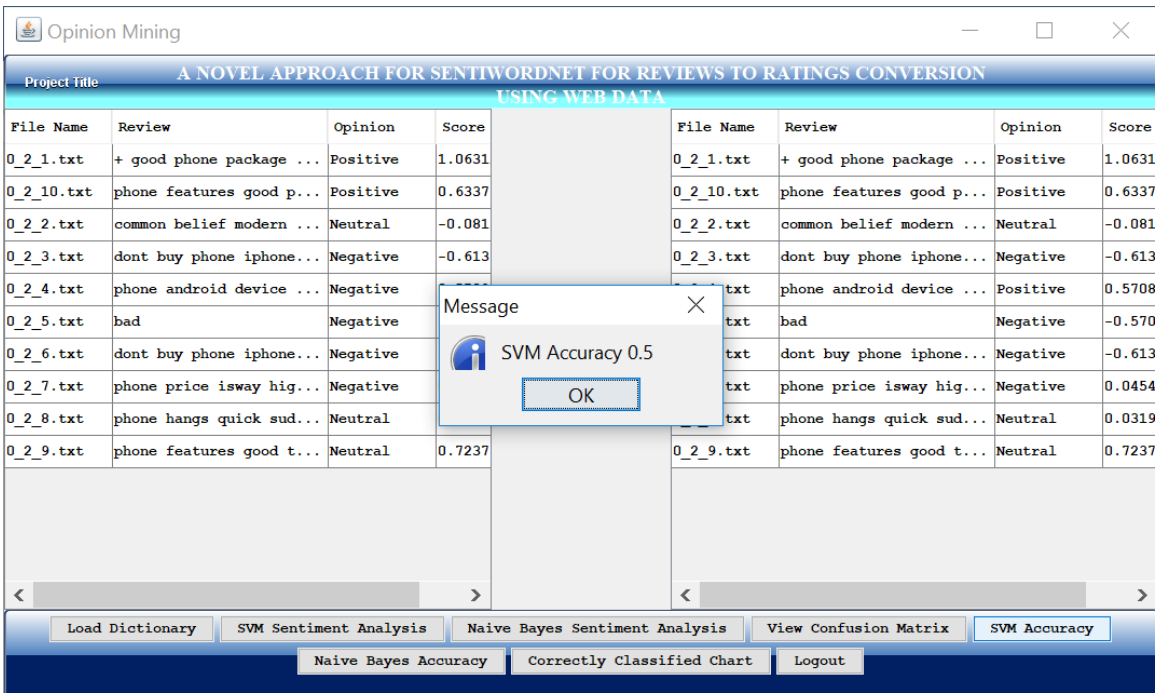


Figure 19. SVM Accuracy for iPhone 8+

Naïve Bayes Accuracy

Naïve Bayes Accuracy is the ratio of total positive ratings in the dataset of reviews to the total reviews. The below figure shows that there are 84.61 percent positive reviews for the movie Dark Knight.

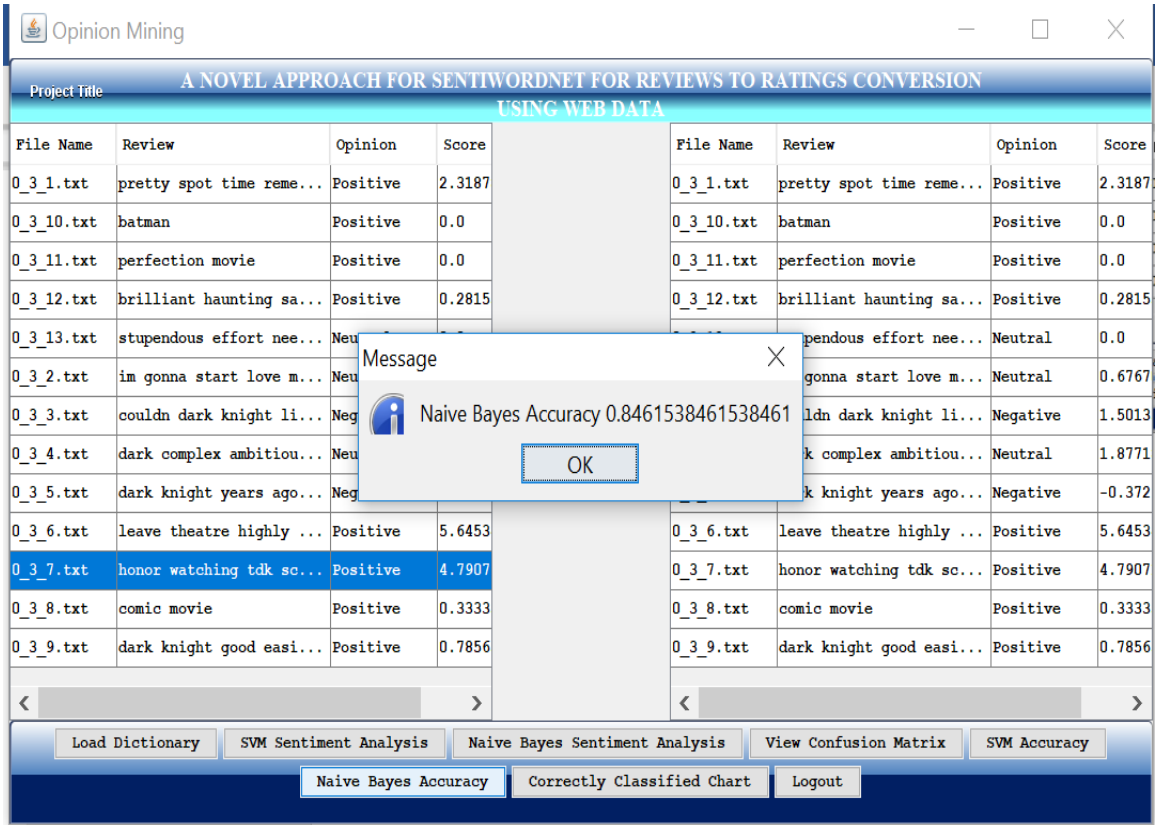


Figure 20. Naïve Bayes Accuracy for the Movie Dark Knight

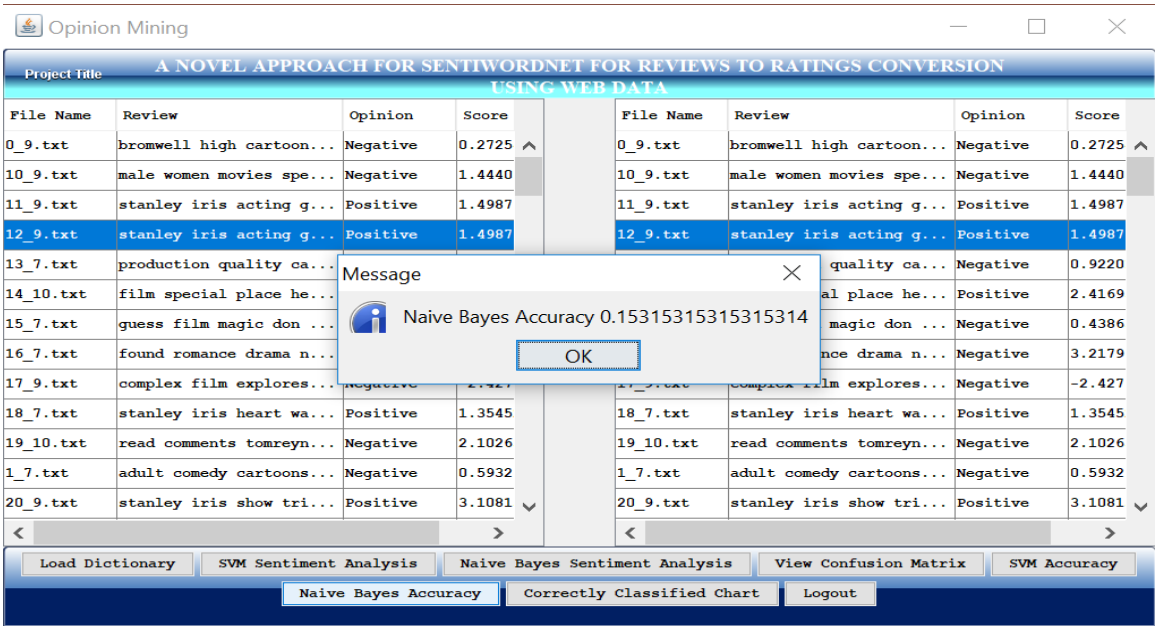


Figure 21. Naïve Bayes Accuracy for the Bromwell High Series

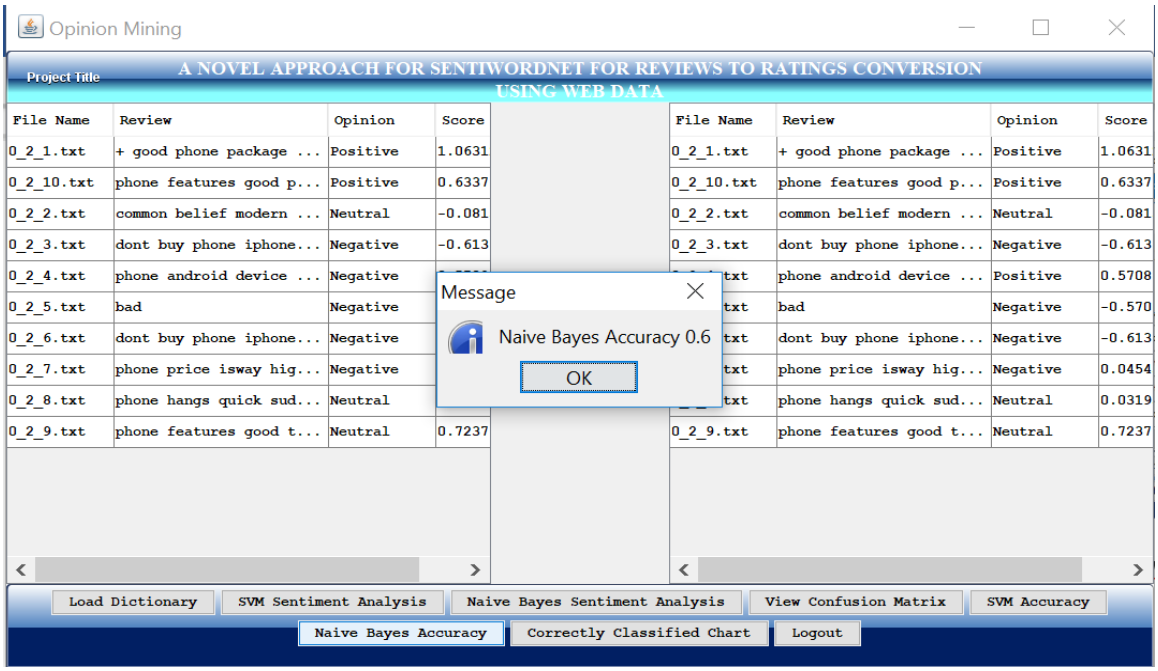


Figure 22. Naïve Bayes Accuracy for the Device iPhone 8+

Correctly Classified Chart

The correctly classified chart contains graphical representation of SVM and Naïve Bayes accuracy. The below figure shows the Correctly Classified Chart for Bromwell high animated series.

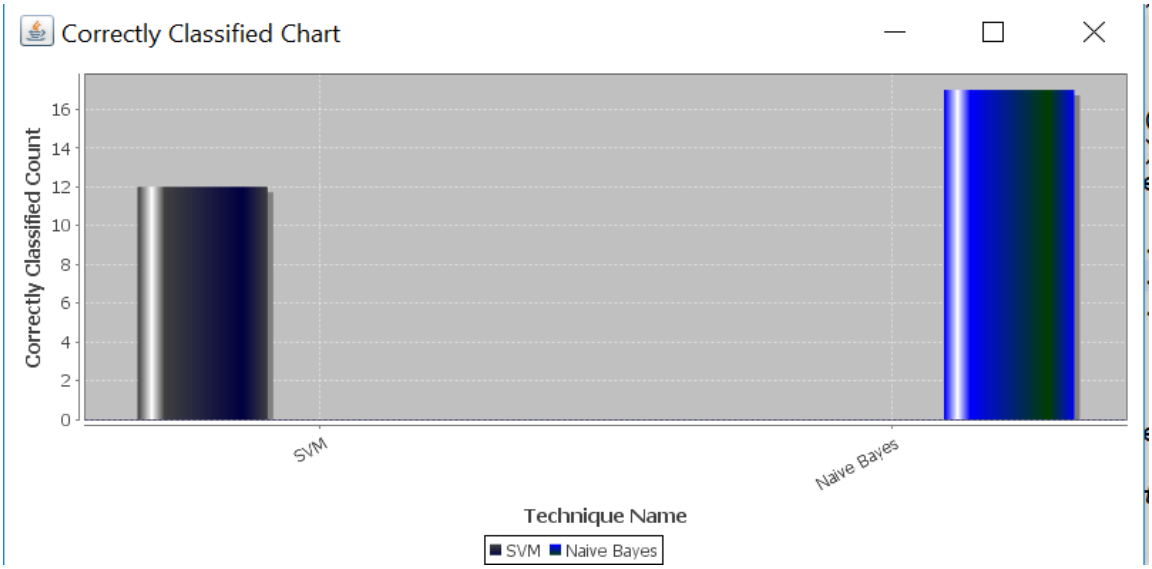


Figure 23. Correctly Classified Chart

CHAPTER FIVE

SYSTEM TESTING

Testing has become a fundamental part of product development and equally important to application development. Testing is done to verify the quality of the product. It also decreases the maintenance cost of the product. A User acceptance test is conducted with nine test cases to ensure proper working of the application.

User Acceptance Testing

In this testing, all the components are equally verified. A total of nine test cases are verified at each level of the application starting from login page to the logout.

Test Cases

Table 1. User Acceptance Testing

Test Case Id	Test Case Name	Test Case Disc.	Test Steps			Test Case Status	Test Priority
			Step	Expected	Actual		
01	Login	Verify either user data is uploaded or not	If data is not uploaded	We cannot get further operations	Logging successfully	High	High
02	Load Dictionary	Verify the dictionary is loaded or not	If it's not loaded	We cannot get the parts of speech from words	Dictionary loaded	High	High

03	SVM Sentiment Analysis	Verify the dataset is loaded or not	If it's not loaded	We cannot discover the opinions	Displaying sentiment results for each review with scores	High	High
04	Naïve Bayes Sentiment Analysis	Verify the dataset is loaded or not	If it's not loaded	We cannot discover the opinions	Displaying sentiment results from Naïve Bayes algorithm	High	High
05	View Confusion Matrix	Verify any one row is selected or not	If it's not selected	We cannot apply the confusion matrix	Get the count of 7 types	High	High
06	SVM Accuracy	Verify any one row is selected or not	If it's not selected	We cannot apply the confusion matrix	Displays the SVM accuracy	High	High
07	Naïve Bayes Accuracy	Verify any one row is selected or not	If it's not selected	We cannot apply the confusion matrix	Displays the Naïve Bayes accuracy	High	High
08	Correctly Classified Chart	Verify the SVM & Naïve Bayes datasets exist or not	If it's not existed	We cannot get the chart	Display the chart for no of positive reviews discover from each algorithm	High	High
09	Logout	Verify all the operations are completed or not	If it's not complete	We cannot exit	Logout from the screen	High	High

CHAPTER SIX

CONCLUSION

This project will be useful for people in making decisions based on online reviews that are incorporated in the review section of websites.

The proposed approach has been tested successfully on the reviews for an animated entertainment series which has the least rating, a device which has a neutral rating and from a movie which has high ratings.

Future Enhancements

Context-Based Sentiment Analysis

SentiWordNet cannot identify the context of the sentence. SentiWordNet can misjudge a positive sentence as a negative or vice versa without considering the context. The accuracy of the current rating system can be improved by considering the context of the sentence.

APPENDIX A

APPLICATION CODE

Code

```
package com;
import javax.swing.JFrame;
import javax.swing.JLabel;
import javax.swing.JTextField;
import javax.swing.JButton;
import javax.swing.JPanel;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import javax.swing.UIManager;
import java.awt.BorderLayout;
import java.awt.Dimension;
import java.awt.Color;
import java.awt.Font;
import javax.swing.JPasswordField;
import javax.swing.JOptionPane;
import com.jd.swing.custom.component.panel.HeadingPanel;
import com.jd.swing.util.PanelType;
import com.jd.swing.util.Theme;
public class Login extends JFrame
{
        CUSTOMPANEL P1;
```

```
JLabel l1,l2;
        JTextField tf1,tf2;
        JButton b1,b2;
        Font f1;
public Login(){
        super("Login ");
        p1 = new CustomPanel("LoginScreen");
        p1.setTitle("Login Screen");
        p1.setLayout(null);

        JPanel main = new
HeadingPanel("",Theme.GLOSSY_METALIC_BLUE_THEME);
        main.setLayout(new BorderLayout());

        f1 = new Font("Microsoft Sanserif",Font.BOLD,13);
        JPanel pan1 = new
HeadingPanel("",Theme.GLOSSY_METALIC_BLUE_THEME);
        l1 = new JLabel("Username");
        l1.setForeground(Color.white);
        l1.setFont(f1);
        PAN1.ADD(L1);
```

```
        tf1 = new JTextField(15);
        tf1.setFont(f1);
        pan1.add(tf1);
        JPanel pan2 = new
HeadingPanel("",Theme.GLOSSY_METALIC_BLUE_THEME);
        l2 = new JLabel("Password");
        l2.setForeground(Color.white);
        l2.setFont(f1);
        pan2.add(l2);
        tf2 = new JPasswordField(15);
        tf2.setFont(f1);
        pan2.add(tf2);
        JPanel pan3 = new
HeadingPanel("",Theme.GLOSSY_METALIC_BLUE_THEME);
        b1 = new JButton("Login");
        b1.setFont(f1);
        pan3.add(b1);
        b1.addActionListener(new ActionListener(){
                public void actionPerformed(ActionEvent ae){
                        login();
                }
        });
```

```
        b2 = new JButton("Reset");
        b2.setFont(f1);
        pan3.add(b2);
        b2.addActionListener(new ActionListener(){
                public void actionPerformed(ActionEvent ae){
                        tf1.setText("");
                        tf2.setText("");
                }
        });
        main.add(pan1,BorderLayout.NORTH);
        main.add(pan2,BorderLayout.CENTER);
        main.add(pan3,BorderLayout.SOUTH);
        main.setBounds(50,80,300,100);
        p1.add(main);
        getContentPane().add(p1,BorderLayout.CENTER);
}
public static void main(String a[])throws Exception{
        UIManager.setLookAndFeel(UIManager.getSystemLookAndFeelClassNa
me());
```

```
        Login login = new Login();
        login.setVisible(true);
        login.setSize(400,300);
        login.setLocationRelativeTo(null);
        login.setResizable(false);
}
public void clear(){
        tf1.setText("");
        tf2.setText("");
}
public void login(){
        String user = tf1.getText();
        String pass = tf2.getText();
        if(user == null || user.trim().length() <= 0){
                JOptionPane.showMessageDialog(this,"Username must be
entered");
                tf1.requestFocus();
                return;
        }
        if(pass == null || pass.trim().length() <= 0)
{
```

```
JOptionPane.showMessageDialog(this,"Password must be entered");
                tf2.requestFocus();
                return;
        }
        try{
                if(user.equals("xxxx") && pass.equals("****")){
                        setVisible(false);
                        UploadDocument ud = new UploadDocument(this);
                        ud.setVisible(true);
                        ud.setExtendedState(JFrame.MAXIMIZED_BOTH);
                }else{
                        JOptionPane.showMessageDialog(this,"invalid user");
                }
        }catch(Exception e){
                e.printStackTrace();
        }
}
}
```

```
package com;
import javax.swing.JFrame;
import javax.swing.JPanel;
import javax.swing.JLabel;
import java.awt.BorderLayout;
import java.awt.Font;
import java.awt.Color;
import javax.swing.JButton;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.io.BufferedReader;
import java.io.FileReader;
import java.io.File;
import java.util.ArrayList;
import javax.swing.JOptionPane;
import javax.swing.JScrollPane;
import javax.swing.JTable;
import javax.swing.table.DefaultTableModel;
import javax.swing.table.TableColumn;
import javax.swing.JFileChooser;
import java.awt.Cursor;
import com.jd.swing.custom.component.panel.HeadingPanel;
import com.jd.swing.util.PanelType;
import com.jd.swing.util.Theme;
import java.awt.Dimension;
import java.io.BufferedReader;
import java.awt.Cursor;
public class UploadDocument extends JFrame{
```

```
JLabel l1;
        JPanel p1,p2,p3,p4;
        Font f1;
        JScrollPane jsp,jsp1;
        Login;
        JButton b1,b2,b3,b4,b5,b6,b7,b8;
        JFileChooser chooser;
        DefaultTableModel dtm,dtm1;
        JTable table,table1;
        POSModel model;
        boolean loaded = false;
        SentiWordNetDemoCode sentiwordnet;
        SVMAnalysis svm;
        NaiveBayes nb;
        double svm_accuracy;
        double nb_accuracy;
        Porter stemmer = new Porter();
        ArrayList<Count> svmcount = new ArrayList<Count>();
        ArrayList<Count> nbcount = new ArrayList<Count>();
public UploadDocument(Login log){
        super("Opinion Mining");
        login = log;
        p1 = new HeadingPanel("Project
Title",Theme.GLOSSY_METALIC_BLUE_THEME);
        p1.setPreferredSize(new Dimension(600,50));
        l1 = new JLabel("<html><body><center>A Novel approach for SentiWordNet for
Reviews to Ratings Conversion<br/>using Web
Data</center></body></html>".toUpperCase());
        l1.setFont(new Font("Times New Roman",Font.BOLD,18));
```

```
l1.setForeground(Color.white);
        p1.add(l1);
        getContentPane().add(p1,BorderLayout.NORTH);

        f1 = new Font("Courier New",Font.BOLD,14);

        p2 = new JPanel();
        p2.setLayout(new BorderLayout());
        dtm = new DefaultTableModel(){
                public boolean isCellEditable(int r,int c){
                        return false;
                }
        };
        table = new JTable(dtm);
        table.setRowHeight(30);
        table.setAutoResizeMode(JTable.AUTO_RESIZE_OFF);
        table.setFont(f1);
        table.getTableHeader().setFont(f1);
        dtm.addColumn("File Name");
        dtm.addColumn("Review");
        dtm.addColumn("Opinion");
        dtm.addColumn("Score");
        table.getColumnModel().getColumn(0).setPreferredWidth(100);
        table.getColumnModel().getColumn(1).setPreferredWidth(200);
        table.getColumnModel().getColumn(2).setPreferredWidth(100);
        table.getColumnModel().getColumn(3).setPreferredWidth(100);
        jsp = new JScrollPane(table);
        p2.add(jsp,BorderLayout.CENTER);
```

```
p4 = new JPanel();
        p4.setLayout(new BorderLayout());
        dtm1 = new DefaultTableModel(){
                public boolean isCellEditable(int r,int c){
                        return false;
                }
        };
        table1 = new JTable(dtm1);
        table1.setRowHeight(30);
        table1.setAutoResizeMode(JTable.AUTO_RESIZE_OFF);
        table1.setFont(f1);
        table1.getTableHeader().setFont(f1);
        dtm1.addColumn("File Name");
        dtm1.addColumn("Review");
        dtm1.addColumn("Opinion");
        dtm1.addColumn("Score");
        table1.getColumnModel().getColumn(0).setPreferredWidth(100);
        table1.getColumnModel().getColumn(1).setPreferredWidth(200);
        table1.getColumnModel().getColumn(2).setPreferredWidth(100);
        table1.getColumnModel().getColumn(3).setPreferredWidth(100);
        jsp1 = new JScrollPane(table1);
        p4.add(jsp1,BorderLayout.CENTER);


        p3 = new HeadingPanel("",Theme.GLOSSY_METALIC_BLUE_THEME);
        p3.setPreferredSize(new Dimension(150,80));
        chooser = new JFileChooser(new File("."));
```

```
chooser.setFileSelectionMode(JFileChooser.DIRECTORIES_ONLY);
        b1 = new JButton("Load Dictionary");
        b1.setFont(f1);
        p3.add(b1);
        b1.addActionListener(new ActionListener(){
                public void actionPerformed(ActionEvent ae){
                        try{
                                if(!loaded){
                                        Cursor hourglassCursor = new
Cursor(Cursor.WAIT_CURSOR);
                                        setCursor(hourglassCursor);
                                        loadDictionary();
                                        svm = new SVMAnalysis();
                                        nb = new NaiveBayes();
                                        sentiwordnet = new
SentiWordNetDemoCode("SentiWordNet_3.0.0_20130122.txt");
                                        Stopwords.readWords(stemmer);
                                        Cursor normalCursor = new
Cursor(Cursor.DEFAULT_CURSOR);
                                        setCursor(normalCursor);
                                }
                        }catch(Exception e){
                                e.printStackTrace();
                        }

        JOptionPane.showMessageDialog(UploadDocument.this,"Dictionary Loaded");
                }
        });
        b2 = new JButton("SVM Sentiment Analysis");
        b2.setFont(f1);
```

```
p3.add(b2);
        b2.addActionListener(new ActionListener(){
                public void actionPerformed(ActionEvent ae){
                        clearTable();
                        int option = chooser.showOpenDialog(UploadDocument.this);
                        if(option == chooser.APPROVE_OPTION){
                                File = chooser.getSelectedFile();
                                Cursor hourglassCursor = new
Cursor(Cursor.WAIT_CURSOR);
                                setCursor(hourglassCursor);
                                svm(file);
                                Cursor normalCursor = new
Cursor(Cursor.DEFAULT_CURSOR);
                                setCursor(normalCursor);
                        }
                }
        });

        b3 = new JButton("Naive Bayes Sentiment Analysis");
        b3.setFont(f1);
        p3.add(b3);
        b3.addActionListener(new ActionListener(){
                public void actionPerformed(ActionEvent ae){
                        clearTable1();
                        int option = chooser.showOpenDialog(UploadDocument.this);
                        if(option == chooser.APPROVE_OPTION){
                                File = chooser.getSelectedFile();
                                Cursor hourglassCursor = new
Cursor(Cursor.WAIT_CURSOR);
```

```
b4 = new JButton("SVM Accuracy");
        b4.setFont(f1);
        p3.add(b4);
        b4.addActionListener(new ActionListener(){
                public void actionPerformed(ActionEvent ae){
                        double positive = 0;
                        double negative = 0,nuetral=0;
                        for(int i=0;i<dtm.getRowCount();i++){
                                String value = dtm.getValueAt(i,2).toString().trim();
                                if(value.equals("Positive"))
                                        positive = positive + 1;
                                if(value.equals("Neutral"))
                                        nuetral=nuetral+1;
                        }
                        svm_accuracy = (positive+nuetral)/(double)dtm.getRowCount();
                        JOptionPane.showMessageDialog(UploadDocument.this,"SVM
Accuracy "+svm_accuracy);
                }
        });

        b5 = new JButton("Naive Bayes Accuracy");
        b5.setFont(f1);
        p3.add(b5);
        b5.addActionListener(new ActionListener(){
                public void actionPerformed(ActionEvent ae){
                        double positive = 0;
                        double negative = 0,nuetral=0;
```

```
public void clearTable1(){
	for(int i=table1.getRowCount()-1;i>=0;i--){
		dtm1.removeRow(i);
	}
}
public void svm(File file){
	try{
		svmcount.clear();
		String result = "none";
		File file_list[] = file.listFiles();
		for(int i=0;i<file_list.length;i++){
			File fname = file_list[i];
			String review =
svm.analyze(fname.getPath(),model,sentiwordnet,stemmer);
			Count c = new
Count(review,svm.neutral,svm.wp,svm.p,svm.sp,svm.n,svm.wn,svm.sn,svm.score);
			svmcount.add(c);
			int positive = svm.wp+svm.p+svm.sp;
			int negative = svm.n+svm.wn+svm.sn;
			int neutral = svm.neutral;
			if(positive > negative && positive > neutral)
				result = "Positive";
			else if(negative > positive && negative > neutral)
				result = "Negative";
			else if(neutral > positive && neutral > negative)
				result = "Neutral";
			Object row[] = {fname.getName(),review,result,svm.score};
			dtm.addRow(row);
		}
```

```
}catch(Exception e){
                e.printStackTrace();
        }
}
public void naiveBayes(File file){
        try{
                nbcount.clear();
                String result = "none";
                File file_list[] = file.listFiles();
                for(int i=0;i<file_list.length;i++){
                        File fname = file_list[i];
                        String review =
nb.analyze(fname.getPath(),model,sentiwordnet,stemmer);
                        Count c = new
Count(review,nb.neutral,nb.wp,nb.p,nb.sp,nb.n,nb.wn,nb.sn,nb.score);
                        nbcount.add(c);
                        int positive = nb.wp+nb.p+nb.sp;
                        int negative = nb.n+nb.wn+nb.sn;
                        int neutral = nb.neutral;
                        if(positive > negative && positive > neutral)
                                result = "Positive";
                        else if(negative > positive && negative > neutral)
                                result = "Negative";
                        else if(neutral > positive && neutral > negative)
                                result = "Neutral";
                        Object row[] = {fname.getName(),review,result,nb.score};
                        dtm1.addRow(row);
                }
```

```
}catch(Exception e){
		e.printStackTrace();
	}
}
public void loadDictionary(){
	Runnable r = new Runnable(){
		public void run(){
			try{
				model = new POSModelLoader().load(new File("en-
pos-maxent.bin"));
		}catch(Exception e){
				e.printStackTrace();
			}
		}
	};
	new Thread(r).start();
}
}
```

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