A

Major Project

On

DETECTING FAKE REVIEWS USING MULTIDEMENSIONAL REPRESENTATIONS WITH FINE GRAINED ASPECTS PLAN

(Submitted in partial fulfillment of the requirements for the award of Degree)

BACHELOR OF TECHNOLOGY

In

COMPUTER SCIENCE AND ENGINEERING

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2020-2024

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

CERTIFICATE

This is to certify that the project entitled **"DETECTING FAKE REVIEWS USING MULTIDIMENSIONAL REPRESENTATIONAS WITH FINE GRAINED ASPECTS PLAN"** being submitted by **R. SANJANA (207R1A0551), B. RAVIKUMAR (207R1A0507) & B. FARHEEN (207R1A0503)** partial fulfillment of the requirement for the award of the degree of B.Tech in Computer Science and Engineering to the Jawaharlal Nehru Technological University Hyderabad, record of bonafide work carried out by them under our guidance and supervision during year 2023-2024.

The results embodied in this thesis have not been submitted to any other University or Institute for the award of any degree or diploma.

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ABSTRACT

Due to the rapid growth of network data, the authenticity and reliability of network information have become increasingly important and have presented challenges. Most of the methods for fake review detection start with textual features and behavioral features. However, they are time-consuming and easily detected by fraudulent users. Although most of the existing neural network-based methods address the problems presented by the complex semantics of reviews, they do not account for the implicit patterns among users, reviews, and products; additionally, they do not consider the usefulness of information regarding fine-grained aspects in identifying fake reviews. In this project, we propose an attention-based multilevel interactive neural network model with aspect constraints that mines the multilevel implicit expression mode of reviews and integrates four dimensions, namely, users, review texts, products and fine-grained aspects, into review representations.We model the relationships between users and products and use these relationships as a regularization term to redefine the model's objective function. The experimental results from three public datasets show that the model that we propose is superior to the state-of-the-art methods; thus showing the effectiveness and portability of our model.

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1. INTRODUCTION

1.1 PROJECT SCOPE

The project scope of "Detecting Fake Reviews Using Multidimensional Representations With Fine-Grained Aspects Plan" involves the development and implementation of a method to identify fake reviews. The approach utilizes multidimensional representations and fine-grained aspects to detect deceptive or misleading reviews. The proposed method involves an attention-based multilevel interactive neural network model with aspect constraints to mine implicit expressions in reviews. This approach aims to address the limitations of existing methods, such as time-consuming and easily manipulable textual and behavioral features. The project likely focuses on leveraging advanced techniques in natural language processing and machine learning to improve the accuracy and efficiency of fake review detection. The multidimensional representations and fine-grained aspects plan may offer a more nuanced and comprehensive approach to identifying fake reviews, potentially leading to more reliable and trustworthy online review systems.

1.2 PROJECT PURPOSE

The purpose of the project "Detecting Fake Reviews Using Multidimensional Representations With Fine-Grained Aspects Plan" is to develop a method to identify fake reviews using advanced techniques in natural language processing and machine learning. The proposed approach aims to address the limitations of existing methods, such as time-consuming and easily manipulable textual and behavioral features. The project focuses on leveraging multidimensional representations and fine-grained aspects to detect deceptive or misleading reviews. The method involves an attention-based multilevel interactive neural network model with aspect constraints to mine implicit expressions in reviews. The project aims to offer a more nuanced and comprehensive approach to identifying fake reviews, potentially leading to more reliable and trustworthy online review systems.

1.3 PROJECT FEATURES

The project "Detecting Fake Reviews Using Multidimensional Representations With Fine-Grained Aspects Plan" incorporates several key features aimed at effectively identifying and addressing fake reviews. These features include the utilization of multidimensional representations to capture global semantic information, modeling the relationship between users, review texts, and products, thereby enhancing the understanding of the reviews. Additionally, the project leverages fine-grained aspect information as a new scheme for fake review detection, allowing for a more detailed and nuanced analysis of reviews to identify deceptive contents. The implementation of an attention-based multilevel interactive neural network model with aspect constraints further enhances the ability to mine implicit expressions in reviews, contributing to the detection of fake or misleading reviews. The project also involves a benchmark study to identify deceptive contents and employs a diverse set of feature engineering techniques to capture the multifaceted behaviors of reviewers, complementing the process of feature extraction from the reviews themselves. The project is implemented using Python, ensuring practical applicability and accessibility

2. SYSTEM ANALYSIS

2.SYSTEM ANALYSIS

SYSTEM ANALYSIS

The system analysis of "Detecting Fake Reviews Using Multidimensional Representations With Fine-Grained Aspects Plan" involves the development and implementation of a method to identify fake reviews using advanced techniques in natural language processing and machine learning. The proposed approach integrates four dimensions, namely, users, review texts, products, and fine-grained aspects, into review representations, enhancing the understanding of the reviews. The project employs an attention-based multilevel interactive neural network model with aspect constraints to mine implicit expressions in reviews, contributing to the detection of fake or misleading reviews. The project also involves a benchmark study to identify deceptive contents and employs a diverse set of feature engineering techniques to capture the multifaceted behaviors of reviewers, complementing the process of feature extraction from the reviews themselves. The system analysis of the project highlights the use of multidimensional representations and fine-grained aspects as key features, contributing to the development of a robust and comprehensive approach to detecting fake reviews.

2.1 PROBLEM DEFINITION

The problem definition of "Detecting Fake Reviews Using Multidimensional Representations With Fine-Grained Aspects Plan" revolves around verifying whether fine-grained aspects can effectively be used as a solution to detect fake reviews. The project aims to address the challenge of identifying deceptive or misleading reviews by exploring the potential of fine-grained aspect information as a new scheme for fake review detection. By analyzing reviews in datasets, the project seeks to reconstruct the representation of reviews from four dimensions, namely users, review texts, products, and fine-grained aspects, with the goal of determining the authenticity of reviews. This problem definition underscores the significance of leveraging multidimensional representations and fine-grained aspects to enhance the accuracy and reliability of fake review detection, thereby contributing to the integrity of online review systems.

2.2 EXISTING SYSTEM

- After analyzing reviews and users on Amazon.com, Jindal and Liu [14] classified spam reviews into three categories: untruthful opinions, reviews of brands only, and non reviews such as advertisements. Additionally, they proposed a total of 36 text-centric, user-centric, and product-centric features that could be combined with logistic regression methods to identify spam reviews. Li *et al.* [6] combined semi supervised machine learning methods to identify fake reviews based on multiple text- and user-related features and analyzed the impact of each feature. Li *et al.* [15] identified the differences in language usage between truthful and fake reviews. Wang *et al.* [16] performed a tensor decomposition of 11 relationships that exist between users and products based on reviews and classified them according to the SVM model.
- Wang *et al.* [10] incorporated text features and behavioral features into sentence representations using the CNN model to solve the problem of cold start in review spam detection. Yuan *et al.* [11] used a hierarchical fusion attention mechanism to model the relationship between users, products, and reviews and generated fused text representations of users and products. In the study of [19], word vectors are combined with three emotional expression features to form sentence representations, this method relied on a multilayer perceptron neural network with two hidden layers for classification.

2.2.1 DISADVANTAGES OF EXISTING SYSTEM

- The system is less effective since it doesn't preset SENTENCE-LEVEL INTERACTIVE ATTENTION NEURAL NETWORK MODULE.
- The system doesn't have MUTUAL ACTIVATION BETWEEN TEXT INFORMATION AND ASPECT INFORMATION

2.3 PROPOSED SYSTEM

- The system proposes a new scheme to detect fake reviews using fine-grained aspects. In order to verify our scheme, the system proposes an attention-based multilevel interactive neural network model with fine-grained aspect constraints for fake review detection; this model can produce multidimensional dense sentence representations that incorporate user expression patterns, product fine-grained attributes, and contextual semantic information at the word and sentence levels.
- The system models the relationship between users, review texts and products, use it as a regularization term to optimize the model's objective function, and incorporate the implicit relationship into the model.
- The experimental results with three public datasets are significantly better than those of the state-of-the-art methods, which demonstrates the usefulness and portability of the MIANA model for the identification of fake reviews.

2.3.1 ADVANTAGES OF PROPOSED SYSTEM

- The system is more effective due to present of FINE-GRAINED ASPECT EXTRACTION.
- The system is more accurate since it presents WORD-LEVEL FUSION.

2.4 FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three considerations involved in the feasibility analysis:

- Economic Feasibility
- Technical Feasibility
- Social Feasibility

2.4.1 ECONOMICAL FEASIBILITY

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

2.4.2 TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

2.4.3 SOCIAL FEASIBILITY

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

2.5 HARDWARE & SOFTWARE REQUIREMENTS

2.5.1 HARDWARE REQUIREMENTS:

Hardware interfaces specify the logical characteristics of each interface between the software product and the hardware components of the system. The following are some hardware requirements.

- **System** : Pentium IV 2.4 GHz.
- **Hard Disk** : 40 GB.
- **Monitor** : 14’ Colour Monitor.
- **Mouse** : Optical Mouse.
- **Ram** : 512 Mb.

2.5.2 SOFTWARE REQUIREMENTS:

Software Requirements specifies the logical characteristics of each interface and software components of the system. The following are some software requirements:

- **Operating system** : Windows 7 Ultimate.
- **Coding Language** : Python.
- **Front-End** : Python.
- **Designing** : Html, css, javascript.
- **Data Base** : MySQL.

3. ARCHITECTURE

3. ARCHITECTURE

3.1 PROJECT ARCHITECTURE

This project architecture shows the procedure followed for classification, starting from input to final prediction.

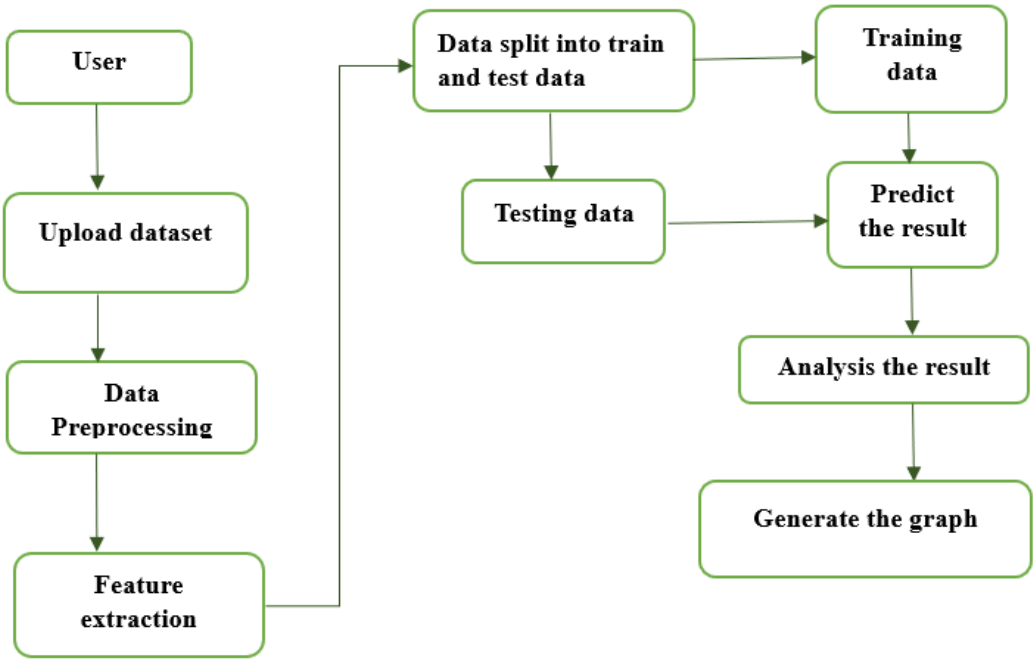


Figure 3.1: Project Architecture for Detecting fake reviews using Multidimensional representations with fine Grained aspects plan.

3.2 DESCRIPTION :

The architecture for "Detecting Fake Reviews Using Multidimensional Representations With Fine-Grained Aspects Plan" involves the implementation of a n-gram model and max features to identify deceptive contents, with a specific focus on fake reviews. Additionally, the project utilizes a CNN model architecture to process multidimensional representations with fine-grained aspects, aiming to achieve an accuracy score of around 90%. The architecture integrates four dimensions, including users, review texts, products, and fine-grained aspects, into review representations, enhancing the understanding of the reviews and enabling the identification of deceptive or misleading content. The use of Python for implementation further underscores the practical applicability and accessibility of the architecture. While specific details of the architecture are not fully outlined in the available sources, the project's approach appears to leverage advanced techniques in natural language processing and machine learning to address the challenge of detecting fake reviews.

- Data collection
- Data preprocessing
- Feature extraction
- Multidimensional representation Model
- Fake review detection Model
- Validation and Testing module
- Prediction
- User Interface
- Integration

3.3 USECASE DIAGRAM

A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted.

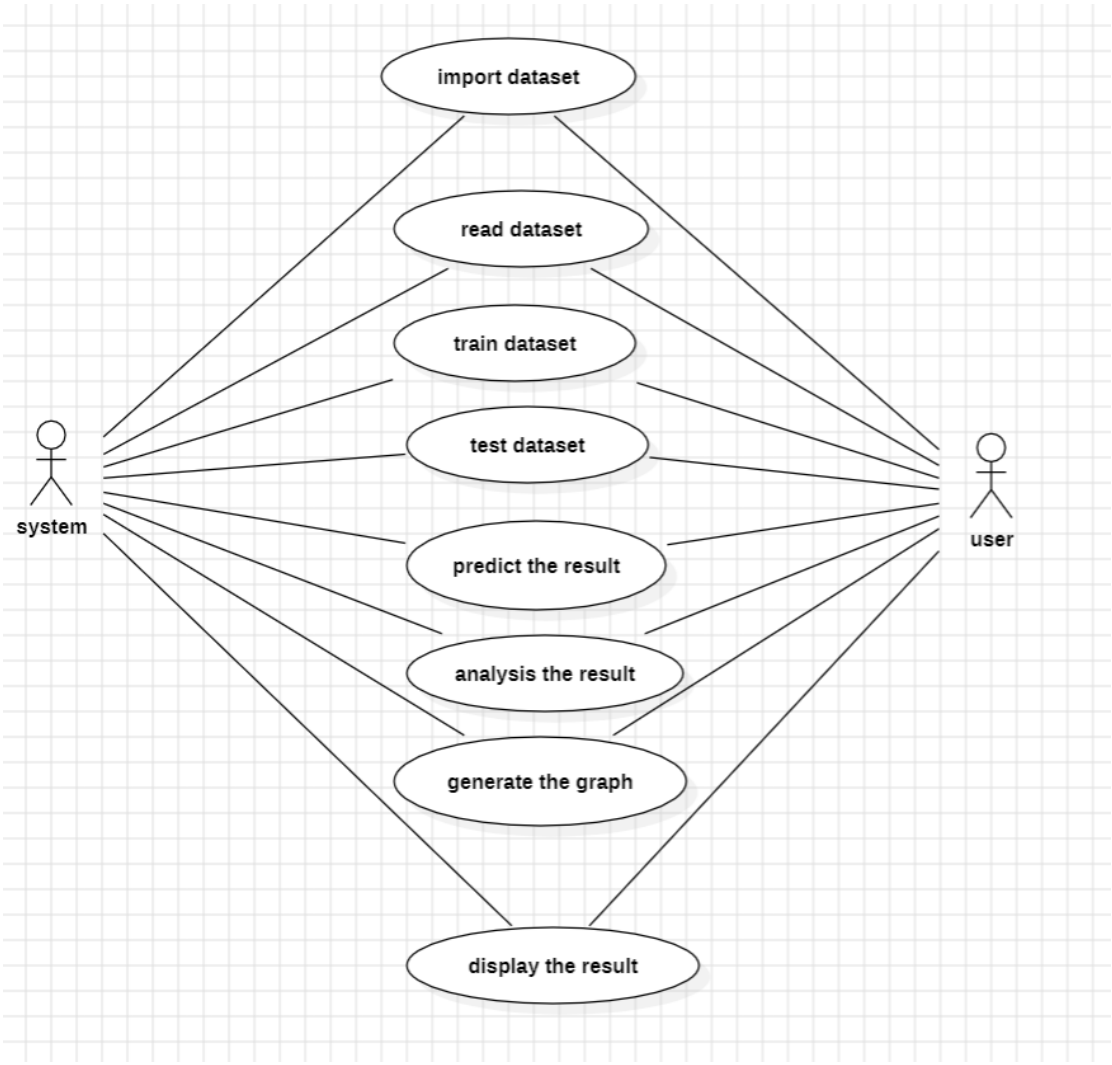


Figure 3.2: Use Case Diagram for Detecting fake reviews using Multidimensional representations with fine Grained aspects plan.

3.4 CLASS DIAGRAM

In software engineering, a class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among the classes. It explains which class contains information.

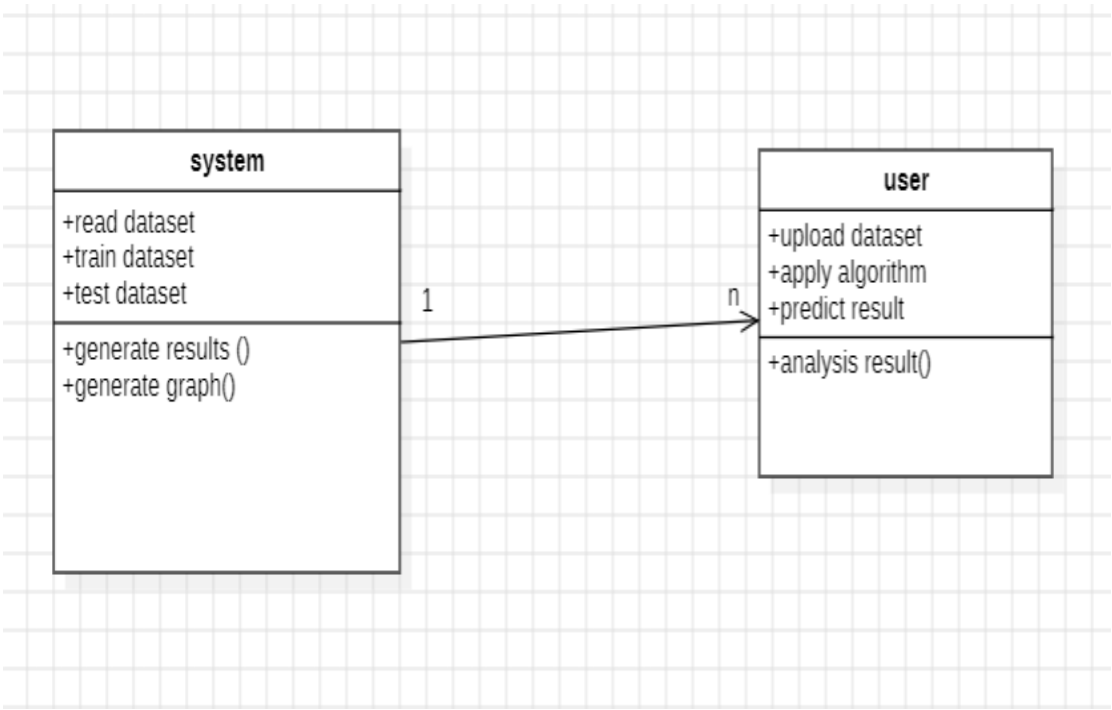


Figure 3.3 Class Diagram for Detecting fake reviews using Multidimensional representations with fine Grained aspects plan.

3.5 SEQUENCE DIAGRAM

A sequence diagram in Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. Sequence diagrams are sometimes called event diagrams, event scenarios, and timing diagrams.

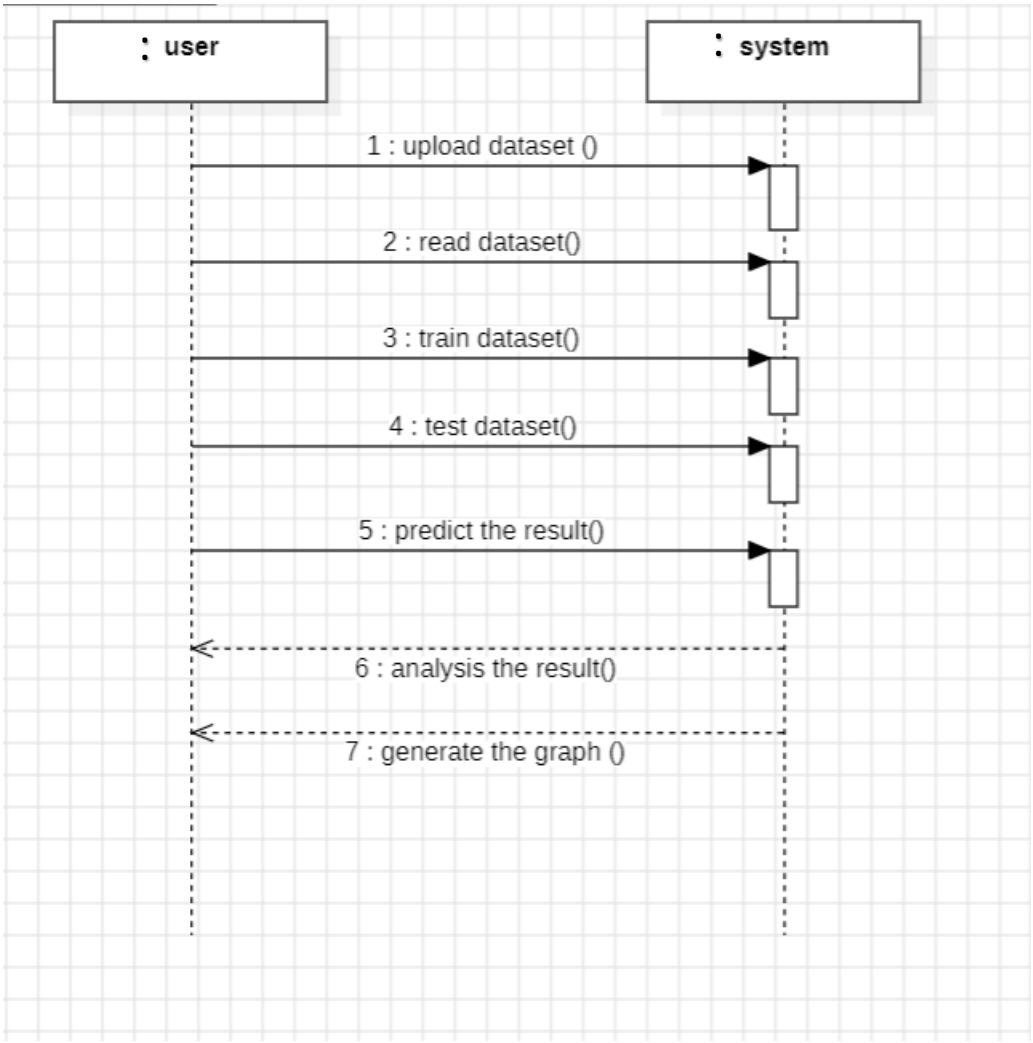


Figure 3.4 Sequence Diagram for Detecting fake reviews using Multidimensional representations with fine Grained aspects plan.

3.6 ACTIVITY DIAGRAM

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control.

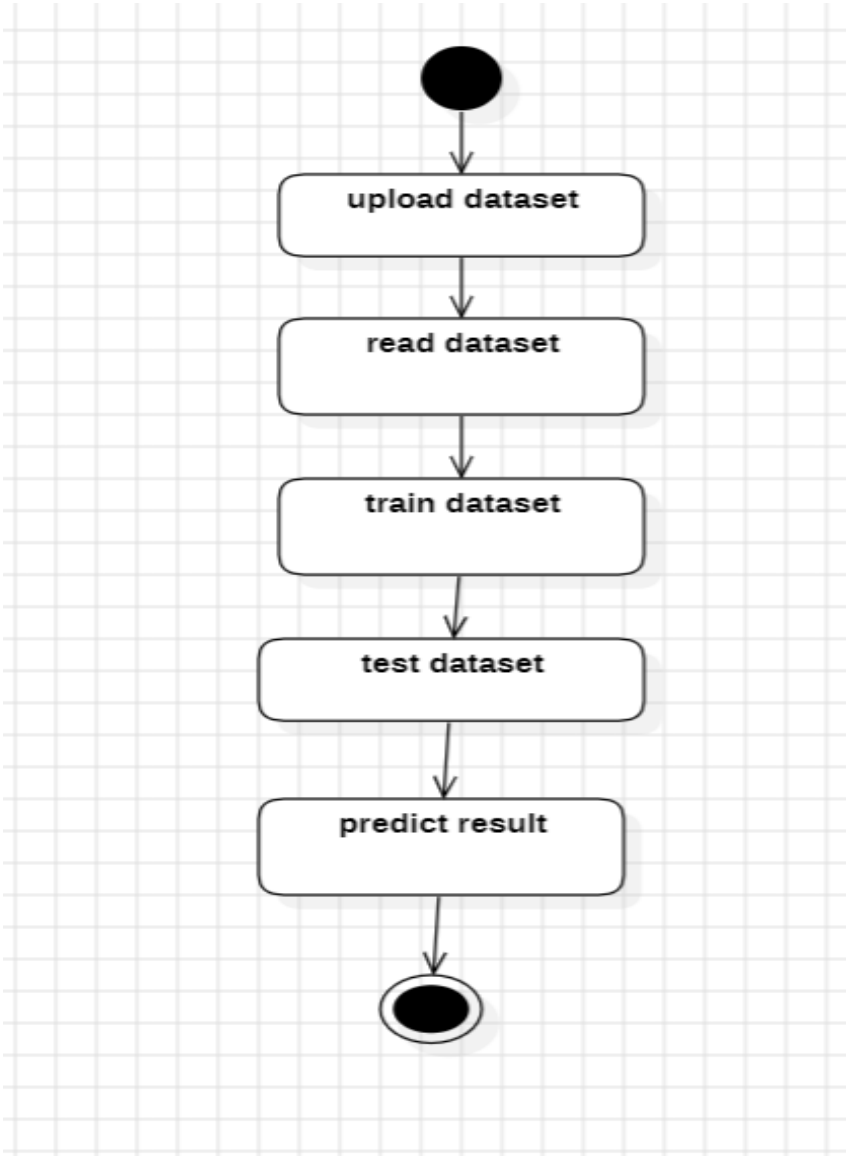


Figure 3.5 Activity Diagram for Detecting fake reviews using Multidimensional representations with fine Grained aspects plan.

3.7 COLLABORATION DIAGRAM:

In collaboration diagram the method call sequence is indicated by some numbering technique as shown below. The number indicates how the methods are called one after another. We have taken the same order management system to describe the collaboration diagram. The method calls are similar to that of a sequence diagram. But the difference is that the sequence diagram does not describe the object organization where as the collaboration diagram shows the object organization.

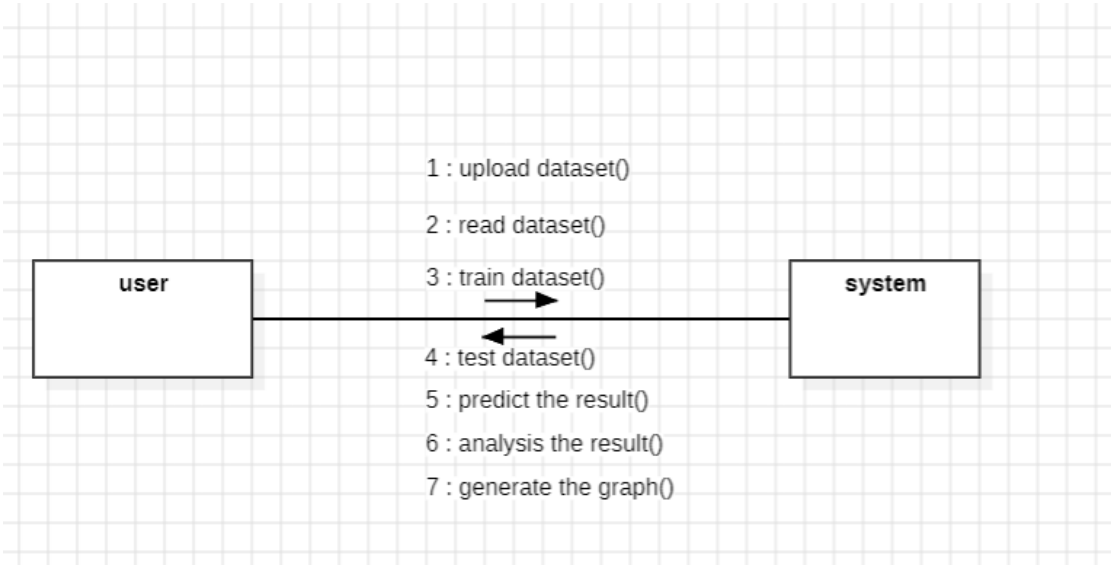


Figure 3.6 collaboration Diagram for Detecting fake reviews using Multidimensional representations with fine Grained aspects plan.

4.IMPLEMENTATION

4.1 SAMPLE CODE

//AddPhotos.aspx

```
using System;
using System.Collections;
using System.Configuration;
using System.Data;
using System.Linq;
using System.Web;
using System.Web.Security;
using System.Web.UI;
using System.Web.UI.HtmlControls;
using System.Web.UI.WebControls;
using System.Web.UI.WebControls.WebParts;
using System.Xml.Linq;
using System.IO;
using System.Data.SqlClient;


public partial class AddPhotos : System.Web.UI.Page
{
   SqlConnection con = new
SqlConnection(ConfigurationManager.ConnectionStrings["TravelCon"].ConnectionSt
ring);
   string season;
   int month;
   protected void Page_Load(object sender, EventArgs e)
   {
      TextBox6.Text = DateTime.Now.ToString();
      DateTime dt = DateTime.Now;
      month = dt.Month;
      if (month == 12 || month == 1 || month == 2)
```

```
        season = "Summer";
      }
      else if(month == 3 || month == 4 || month == 5)
      {
        season = "Autumn";
      }
      else if (month == 6 || month == 7 || month == 8)
      {
        season = "Winter";
      }
      else if (month == 9 || month == 10 || month == 11)
      {
        season = "Spring";
      }
    }
    protected void Button1_Click(object sender, EventArgs e)
    {

FileUpload1.SaveAs(Server.MapPath("~/images/community/")+FileUpload1.FileNa
me);
      string filepath =
Server.MapPath("~/images/community/")+FileUpload1.FileName;
      string fname = FileUpload1.FileName;


      FileStream fs = new FileStream(filepath,FileMode.Open,FileAccess.ReadWrite);
      byte[] buffer = new byte[fs.Length];
      fs.Read(buffer,0,(int)fs.Length);
      fs.Close();


      con.Open();
      SqlCommand cmd = new SqlCommand("insert into community values('" +
TextBox1.Text + "','" + TextBox2.Text
```

```
 + "'," + fname + "',@Photo,'" + TextBox3.Text + "'," + TextBox4.Text + "'," +
TextBox5.Text
                    + "'," + TextBox6.Text + "'," + TextBox7.Text + "'," + TextBox8.Text
+ "'," + season + "')",con);
      cmd.Parameters.AddWithValue("@Photo", buffer);
      cmd.ExecuteNonQuery();
      con.Close();
      Response.Write("<script>alert('Community-Contributed Photos
Added!')</script>");
   }
}
```

//AddTourPackage.aspx

```
using System;
using System.Collections;
using System.Configuration;
using System.Data;
using System.Linq;
using System.Web;
using System.Web.Security;
using System.Web.UI;
using System.Web.UI.HtmlControls;
using System.Web.UI.WebControls;
using System.Web.UI.WebControls.WebParts;
using System.Xml.Linq;
using System.Data.SqlClient;
using System.Collections.Generic;

public partial class AddTourPackage : System.Web.UI.Page
{
```

```
  SqlConnection con = new
SqlConnection(ConfigurationManager.ConnectionStrings["TravelCon"].ConnectionSt
ring);
    string topics;
    protected void Page_Load(object sender, EventArgs e)
    {


    }
    protected void CustomValidator1_ServerValidate(object source,
ServerValidateEventArgs args)
    {
        if (DropDownList1.Text == "Select City")
        {
            args.IsValid = false;
        }
        else
        {
            args.IsValid = true;
        }
    }


    protected void CustomValidator3_ServerValidate(object source,
ServerValidateEventArgs args)
    {
        if (DropDownList3.Text == "Select Season")
        {
            args.IsValid = false;
        }
        else
        {
            args.IsValid = true;
        }
```

```
    }
    protected void Button1_Click(object sender, EventArgs e)
    {
        con.Open();
        SqlCommand cmd = new SqlCommand("insert into travelogues values('" +
TextBox1.Text + "','" + DropDownList1.Text
                    + "','" + topics + "','" + TextBox2.Text + "','" + TextBox3.Text + "','" +
TextBox4.Text
                    + "','" + TextBox5.Text + "','" + TextBox6.Text + "','" + TextBox7.Text
+ "','" + TextBox8.Text
                    + "','" + TextBox9.Text + "','" + DropDownList3.Text +
"','"+0+"')",con);
        cmd.ExecuteNonQuery();
        con.Close();
        Response.Write("<script>alert('Tour Package Added Successfully!')</script>");
    }
    protected void CheckBoxList1_SelectedIndexChanged(object sender, EventArgs e)
    {
        List<string> lst1 = new List<string>();
        for (int i = 0; i < CheckBoxList1.Items.Count; i++)
        {
            if (CheckBoxList1.Items[i].Selected == true)
            {
                string str = Convert.ToString(CheckBoxList1.Items[i]);
                lst1.Add(str);
            }
        }
        topics = string.Join(",", lst1.ToArray());
    }
}
```

//UserInterest.aspx

```
using System;
using System.Collections;
using System.Configuration;
using System.Data;
using System.Linq;
using System.Web;
using System.Web.Security;
using System.Web.UI;
using System.Web.UI.HtmlControls;
using System.Web.UI.WebControls;
using System.Web.UI.WebControls.WebParts;
using System.Xml.Linq;
using System.Data.SqlClient;
using System.Collections.Generic;


public partial class UserInterest : System.Web.UI.Page
{
   SqlConnection con = new
SqlConnection(ConfigurationManager.ConnectionStrings["TravelCon"].ConnectionSt
ring);
   protected void Page_Load(object sender, EventArgs e)
   {
      Label2.Text = Session["uname"].ToString();
   }
   protected void ListBox1_SelectedIndexChanged(object sender, EventArgs e)
   {
      TextBox2.Text = ListBox1.SelectedItem.Text;
   }
   protected void ListBox2_SelectedIndexChanged(object sender, EventArgs e)
   {
      TextBox1.Text = ListBox2.SelectedItem.Text
```

```
}
protected void ListBox4_SelectedIndexChanged(object sender, EventArgs e)
{
   TextBox6.Text = ListBox4.SelectedItem.Text;
}
protected void Button1_Click(object sender, EventArgs e)
{
   Panel7.Visible = true;
   Panel8.Visible = true;
   Panel9.Visible = true;
   BindData();
   BindUserData();
   Bindcommunity();
}

protected void CheckBoxList1_SelectedIndexChanged(object sender, EventArgs e)
{
   List<string> lst1 = new List<string>();
   for (int i = 0; i < CheckBoxList1.Items.Count; i++)
   {
      if (CheckBoxList1.Items[i].Selected == true)
      {
         string str = Convert.ToString(CheckBoxList1.Items[i]);
         lst1.Add(str);
      }
   }
   TextBox4.Text = string.Join(",", lst1.ToArray());
}
protected void BindData()
```

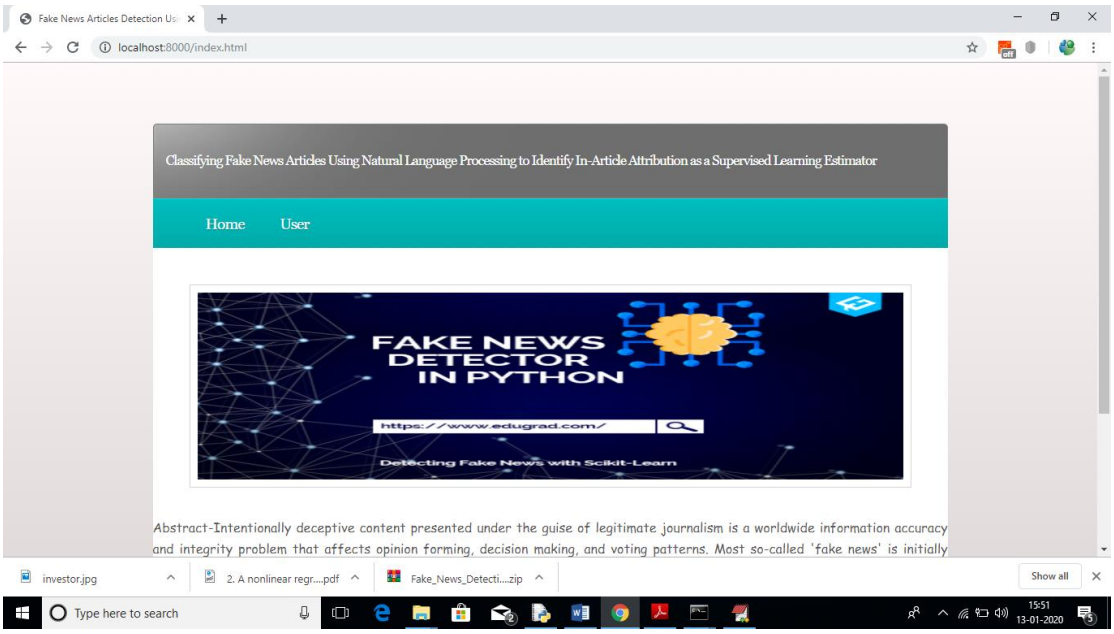
```
        DataSet ds = new DataSet();
        DataTable FromTable = new DataTable();
        con.Open();
        string cmdstr = "Select * from travelogues where (Departure =
'"+TextBox1.Text+"' AND City = '"+TextBox2.Text+"') AND (Cost <=
'"+TextBox3.Text+"' AND Season = '"+TextBox6.Text+"') AND Topics LIKE
'%"+TextBox4.Text+"%' order by rank DESC";
        SqlCommand cmd = new SqlCommand(cmdstr, con);
        SqlDataAdapter adp = new SqlDataAdapter(cmd);
        adp.Fill(ds);
        GridView1.DataSource = ds.Tables[0];
        GridView1.DataBind();
        con.Close();
    }

    protected void BindUserData()
    {
        DataSet ds = new DataSet();
        DataTable FromTable = new DataTable();
        con.Open();
        string cmdstr = "Select * from UserPackage where (Departure = '" +
TextBox1.Text + "' AND Destination = '" + TextBox2.Text + "') AND (Cost <= '" +
TextBox3.Text + "' AND Season = '" + TextBox6.Text + "') AND TopicalInterest
LIKE '%" + TextBox4.Text + "%' order by rank DESC";
        SqlCommand cmd = new SqlCommand(cmdstr, con);
        SqlDataAdapter adp = new SqlDataAdapter(cmd);
        adp.Fill(ds);
        GridView2.DataSource = ds.Tables[0];
        GridView2.DataBind();
        con.Close();
    }
    protected void Bindcommunity()
```

```
    {
        DataSet ds = new DataSet();
        DataTable FromTable = new DataTable();
        con.Open();
        string cmdstr = "Select * from community where (Place = '" + TextBox2.Text +
"' AND Season = '" + TextBox6.Text + "') OR Date LIKE '%" + TextBox5.Text +
"%'";
        SqlCommand cmd = new SqlCommand(cmdstr, con);
        SqlDataAdapter adp = new SqlDataAdapter(cmd);
        adp.Fill(ds);
        DataList1.DataSource = ds.Tables[0];
        DataList1.DataBind();
        con.Close();
    }
    protected void GridView1_RowCommand(object sender,
GridViewCommandEventArgs e)
    {
        if (e.CommandName == "Select")
        {

            int x = Convert.ToInt32(e.CommandArgument);
            GridViewRow row = GridView1.Rows[x];
            string from = row.Cells[0].Text;
            string to = row.Cells[1].Text;
            string topics = row.Cells[2].Text;
            string poi1 = row.Cells[3].Text;
            string poi2 = row.Cells[4].Text;
            string poi3 = row.Cells[5].Text;
            string poi4 = row.Cells[6].Text;
            string time = row.Cells[9].Text;
            string cost = row.Cells[10].Text;
```

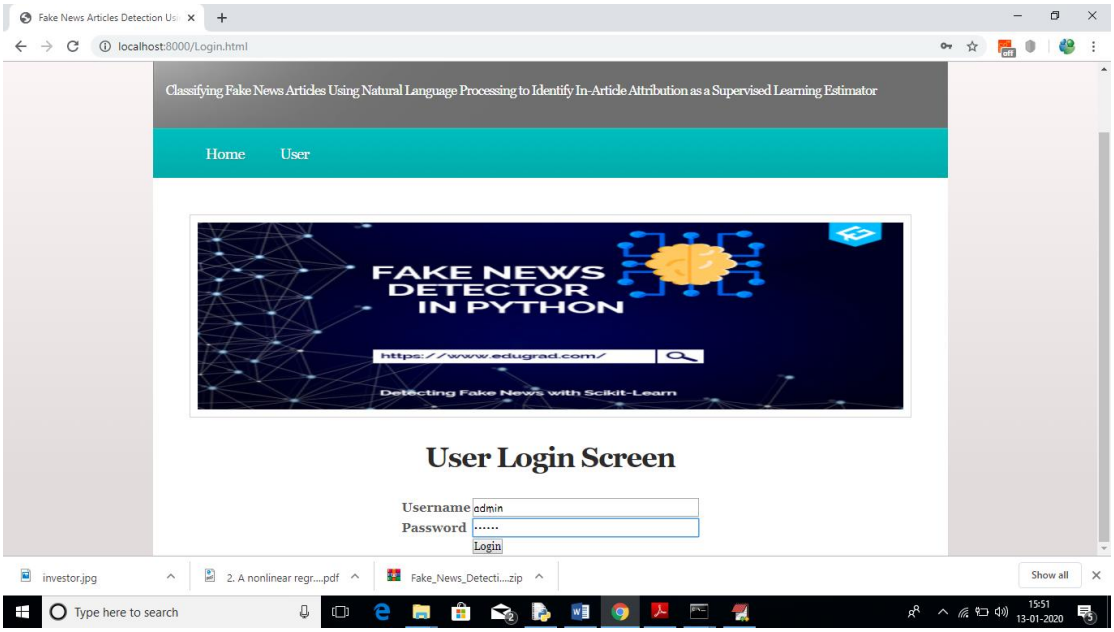
```
            string season = row.Cells[11].Text;
            con.Open();
            SqlCommand cmd = new SqlCommand("select rank from travelogues where
(Departure = '"+from+"' AND City = '"+to+"') AND (Topics = '"+topics+"' AND Cost
= '"+ cost +"') AND Season = '"+season+"'",con);
            int rnk = Convert.ToInt32(cmd.ExecuteScalar());
            rnk++;
            SqlCommand cmm = new SqlCommand("update travelogues set rank = '" +
rnk + "' where (Departure = '" + from + "' AND City = '" + to + "') AND (Topics = '" +
topics + "' AND Cost = '" + cost + "') AND Season = '" + season + "'", con);
            cmm.ExecuteNonQuery();
            con.Close();
            Response.Redirect("UserSelectedPackage.aspx?from=" + from + "&to=" + to
+ "&topics=" + topics + "&i1=" + poi1 + "&i2=" + poi2 + "&i3=" + poi3 + "&i4=" +
poi4 + "&time=" + time + "&cost=" + cost + "&season=" + season);
        }
    }
    protected void GridView2_RowCommand(object sender,
GridViewCommandEventArgs e)
    {
        if (e.CommandName == "Select")
        {
            int x = Convert.ToInt32(e.CommandArgument);
            GridViewRow row = GridView2.Rows[x];
            string uname = row.Cells[0].Text;
            string from = row.Cells[1].Text;
            string to = row.Cells[2].Text;
            string topics = row.Cells[3].Text;
            string poi1 = row.Cells[4].Text;
            string poi2 = row.Cells[5].Text;
            string poi3 = row.Cells[6].Text;
            string poi4 = row.Cells[7].Text;
            string time = row.Cells[9].Text;
```

```
        string cost = row.Cells[10].Text;
        string season = row.Cells[11].Text;


        con.Open();
        SqlCommand cmd = new SqlCommand("select rank from UserPackage where
(Departure = '" + from + "' AND Destination = '" + to + "') AND (TopicalInterest = '"
+ topics + "' AND Cost = '" + cost + "') AND (Season = '" + season + "' AND
Username = '"+uname+"')", con);
        int rnk = Convert.ToInt32(cmd.ExecuteScalar());
        rnk++;
        SqlCommand cmm = new SqlCommand("update UserPackage set rank = '" +
rnk + "' where (Departure = '" + from + "' AND Destination = '" + to + "') AND
(TopicalInterest = '" + topics + "' AND Cost = '" + cost + "') AND (Season = '" +
season + "' AND Username = '" + uname + "')", con);
        cmm.ExecuteNonQuery();
        con.Close();


        Response.Redirect("UserSelectedPackage.aspx?from=" + from + "&to=" + to
+ "&topics=" + topics + "&i1=" + poi1 + "&i2=" + poi2 + "&i3=" + poi3 + "&i4=" +
poi4 + "&time=" + time + "&cost=" + cost + "&season=" + season);
    }
  }
}
```

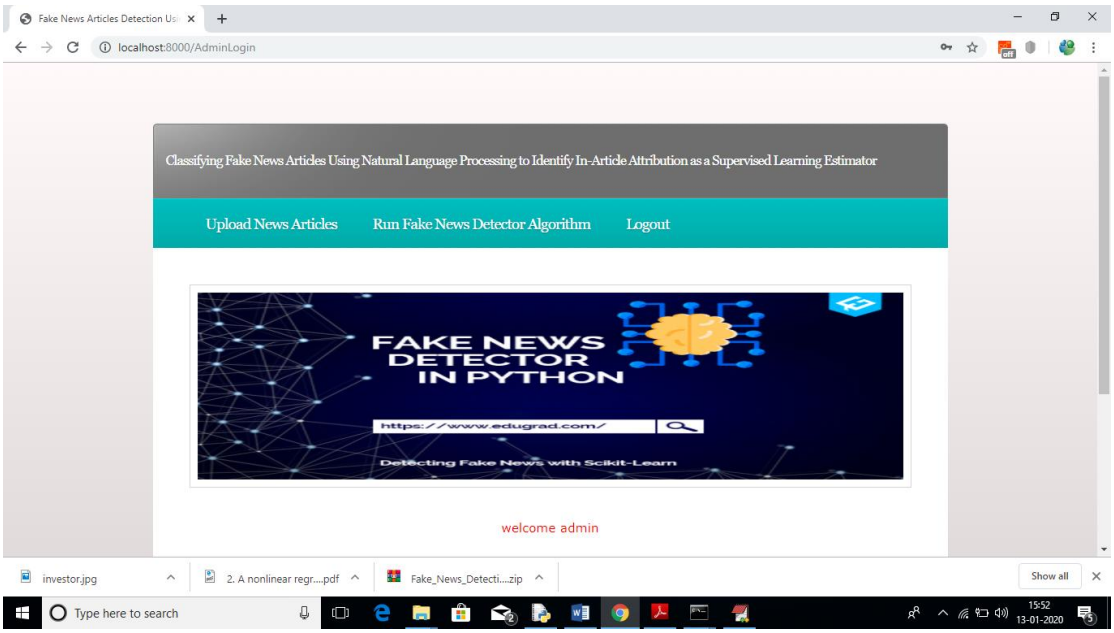
5.SCREENSHOTS



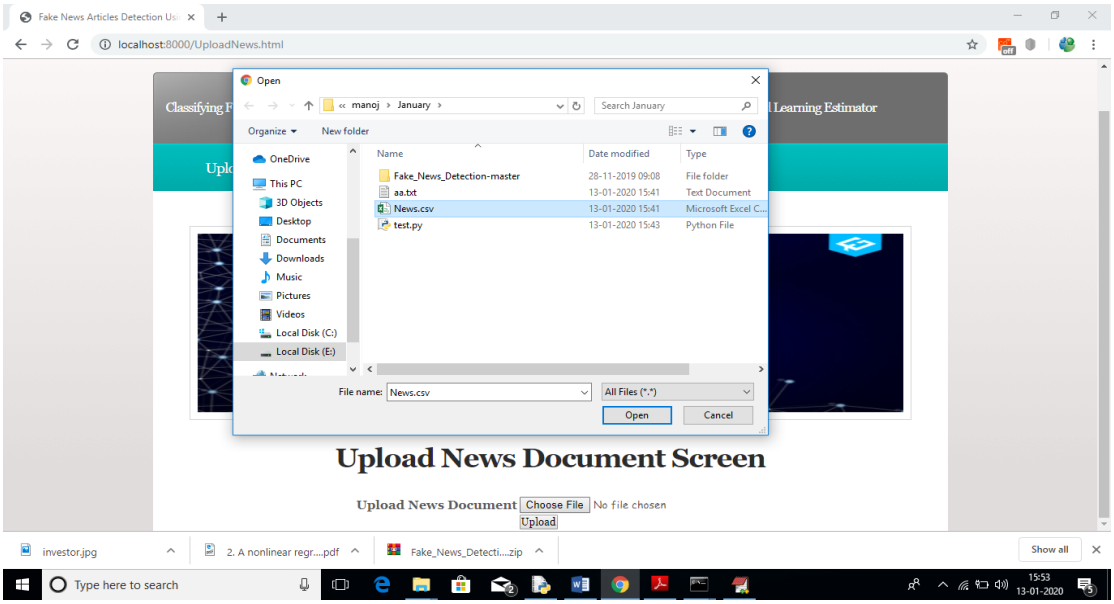
Screenshot 5.1 User link



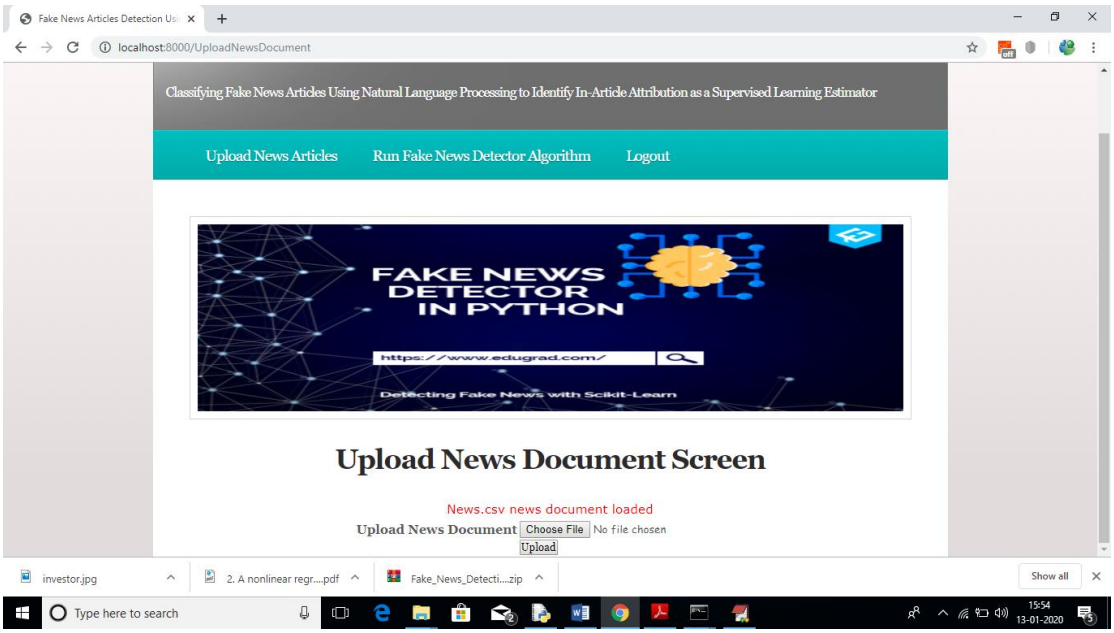
Screenshot 5.2 User login page



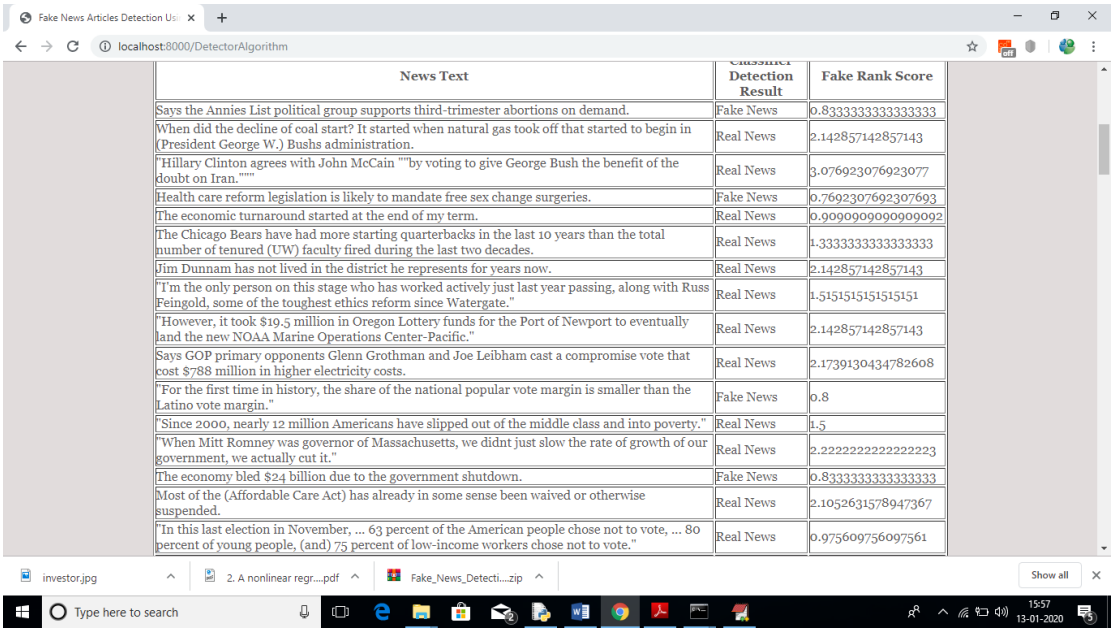
Screenshot 5.3 Admin page



Screenshot 5.4 Upload dataset news.csv

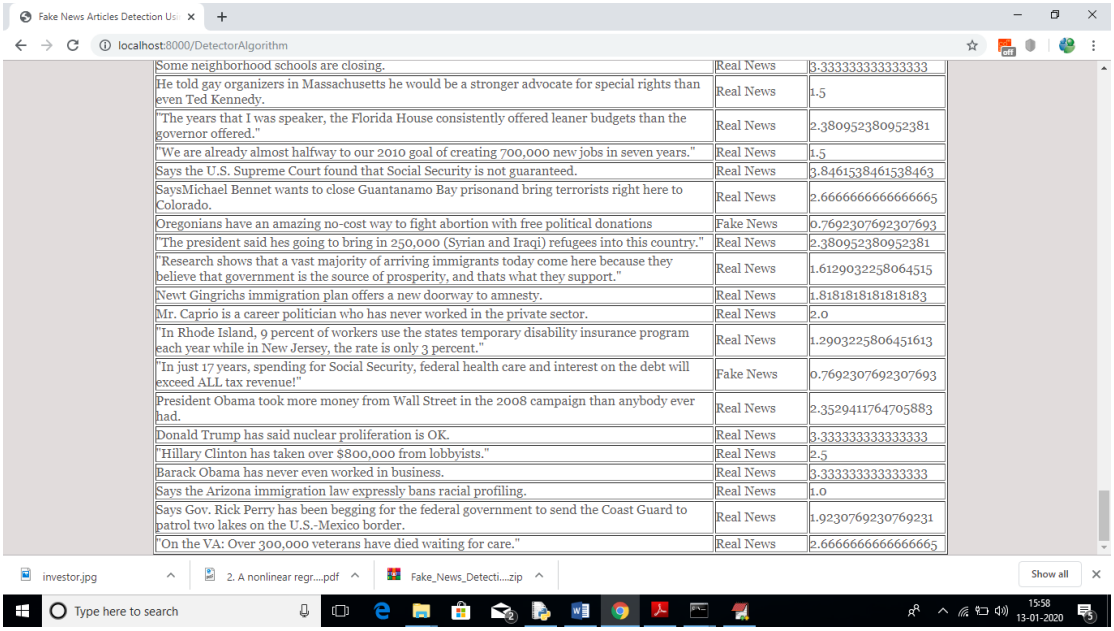


Screenshot 5.5 File uploaded successfully and Run fake news detector



News Text	Classifier Detection Result	Fake Rank Score
Says the Annies List political group supports third-trimester abortions on demand.	Fake News	0.8333333333333333
When did the decline of coal start? It started when natural gas took off that started to begin in (President George W.) Bushs administration.	Real News	2.142857142857143
"Hillary Clinton agrees with John McCain ""by voting to give George Bush the benefit of the doubt on Iran.""""	Real News	3.076923076923077
Health care reform legislation is likely to mandate free sex change surgeries.	Fake News	0.7692307692307693
The economic turnaround started at the end of my term.	Real News	0.9090909090909092
The Chicago Bears have had more starting quarterbacks in the last 10 years than the total number of tenured (UW) faculty fired during the last two decades.	Real News	1.3333333333333333
Jim Dunnam has not lived in the district he represents for years now.	Real News	2.142857142857143
"I'm the only person on this stage who has worked actively just last year passing, along with Russ Feingold, some of the toughest ethics reform since Watergate."	Real News	1.5151515151515151
"However, it took $19.5 million in Oregon Lottery funds for the Port of Newport to eventually land the new NOAA Marine Operations Center-Pacific."	Real News	2.142857142857143
Says GOP primary opponents Glenn Grothman and Joe Leibham cast a compromise vote that cost $788 million in higher electricity costs.	Real News	2.1739130434782608
"For the first time in history, the share of the national popular vote margin is smaller than the Latino vote margin."	Fake News	0.8
"Since 2000, nearly 12 million Americans have slipped out of the middle class and into poverty."	Real News	1.5
"When Mitt Romney was governor of Massachusetts, we didnt just slow the rate of growth of our government, we actually cut it."	Real News	2.2222222222222223
The economy bled $24 billion due to the government shutdown.	Fake News	0.8333333333333333
Most of the (Affordable Care Act) has already in some sense been waived or otherwise suspended.	Real News	2.1052631578947367
"In this last election in November, ... 63 percent of the American people chose not to vote, ... 80 percent of young people, (and) 75 percent of low-income workers chose not to vote."	Real News	0.9756097560975610

Screenshot 5.6 Result page



Screenshot 5.7 Fake or real news results

6.TESTING

6.TESTING

6.1 INTRODUCTION TO TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the

Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

6.2 TYPES OF TESTING:

6.2.1 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration.

Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

Unit testing is usually conducted as part of a combined code and unit test phase of the software lifecycle, although it is not uncommon for coding and unit testing to be conducted as two distinct phases.

Test strategy and approach

Field testing will be performed manually and functional tests will be written in detail.

Test objectives

- All field entries must work properly.
- Pages must be activated from the identified link.
- The entry screen, messages and responses must not be delayed.

Features to be tested

- Verify that the entries are of the correct format
- No duplicate entries should be allowed
- All links should take the user to the correct page.

6.2.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

Software integration testing is the incremental integration testing of two or more integrated software components on a single platform to produce failures caused by interface defects.

The task of the integration test is to check that components or software applications, e.g. components in a software system or – one step up – software applications at the company level – interact without error.

Test Results: All the test cases mentioned above passed successfully. No defects encountered.

6.2.3 FUNCTIONAL TEST

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.

Invalid Input : identified classes of invalid input must be rejected.

Functions : identified functions must be exercised.

Output : identified classes of application outputs must be exercised.

Systems/Procedures: interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

6.2.4 SYSTEM TEST

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

6.2.5 WHITE BOX TESTING

White Box Testing is a testing in which in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level.

6.2.6 BLACK BOX TESTING

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box .you cannot “see” into it. The test provides inputs and responds to outputs without considering how the software works.

ACCEPTANCE TESTING

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

6.3 TEST CASES

6.3.1 TEST CLASSIFICATION

TEST CASE ID	TEST CASE NAME	PURPOSE	INPUT	OUTOUT
1	Login test	To check the login	Username and password	Login page
2	Password and username check	Avoid invalid login	Username and password	valid or invalid login
3	Upload data set	To check whether dataset uploaded or not	Article dataset	Uploaded or error
4	Alogrithm check	To check whether the alogrithm is working or not	Dataset	Display output or error
5	run the code	To check the bugs and fix them	Code	Running successfully or error
6	Predict the result	By executing the algorithm predict the result	Article dataset	Fake
7	Predict the result	By executing the algorithm predict the result	Article dataset	Real

7.CONCLUSION

7.CONCLUSION & FUTURE SCOPE

7.1 CONCLUSION

This project presented the results of a study that produced a limited fake news detection system. The work presented herein is novel in this topic domain in that it demonstrates the results of a full-spectrum research project that started with qualitative observations and resulted in a working quantitative model. The work presented in this project is also promising, because it demonstrates a relatively effective level of machine learning classification for large fake news documents with only one extraction feature. Finally, additional research and work to identify and build additional fake news classification grammars is ongoing and should yield a more refined classification scheme for both fake news and direct quotes.

7.2 FUTURE SCOPE

The detection of fake news is an evolving field with ongoing research and technological advancements. Analysis of various modalities, advancements in deep learning architecture such as graph neural network and reinforcement learning.

- Multimodal Analysis
- Deep learning architectures
- Explainable AI
- Adversarial Robustness
- Collaborative filtering and Network analysis
- Ethical and Societal implications

8.BIBLIOGRAPHY

8.BIBLIOGRAPHY

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8.3 GITHUB LINK

https://github.com/Ravikumar1018/fake-reviews detection