Data science essentials

PROJECT TOPIC:

Search engine for restaurants in Ahmedabad

PGDM 2015-17
Decision science

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About project

In day to day life we face many problems to take decision when we have multiple choices in front of us. The number of restaurants in Ahmedabad are increasing day by day and so people also want to opt for the best restaurant. In this project a search engine is provided and the search can be on various criteria such as cuisine selection, type of food available and type of roof top. For cuisines three cuisines were taken that is Gujarati, North Indian and south Indian, for food availability there are two types of food that is vegetarian and non-vegetarian and for roof top people can search for open and close roof top restaurants.

Objective

To provide users to know the best restaurant they can go for where they can search on various criteria and system will interact with them accordingly.

Data collection

People's voice can reveal many things about any organisation. Thus lot of textual data was collected for that purpose. For each cuisine 10 restaurants were taken, thus there were 30 restaurants of Ahmedabad whose comments were taken and this unstructured data was converted to structured data with the help of various techniques and finally those data were used for search engine according to various criteria where people could find the best of their restaurant.

Techniques

After collecting comments from various sources, the unstructured data was converted to structured data with the help of text mining, emotion measurement, sentiment analysis and cluster analysis.

1. Text mining
    - Text mining helps us to find frequency of words.
    - The data collected as a text, will give frequency of words.
    - Code:

```
setwd("D:\\PGDM\\sysem1\\DSE\\text mining")
library(tm)
library(qdap)
library(qdapDictionaries)
library(dplyr)
library(RColorBrewer)
library(ggplot2)
library(scales)
library(RgraphViz)
library(tm)
```

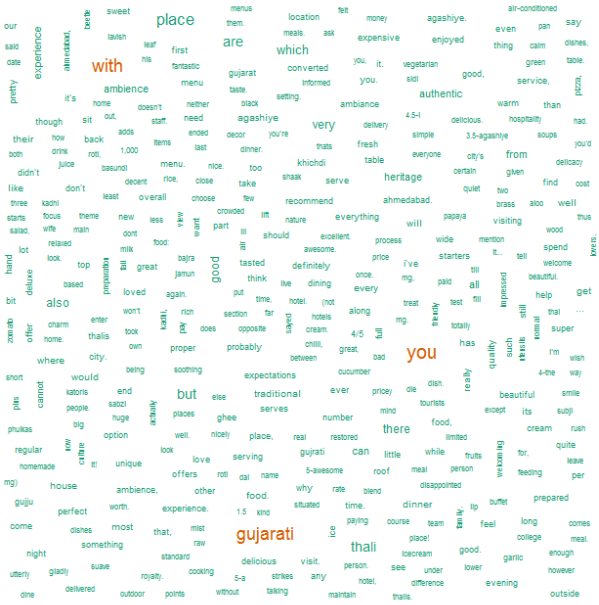
- #part 1
- #using document term matrix to get frequencies of words
- myCorpus <- read.csv("AGASHIYEmain.csv")
- corpus <- Corpus(VectorSource(myCorpus))
- dtm=DocumentTermMatrix(corpus)
- dtm
- sav1=inspect(dtm)
- freq1=colSums(as.matrix(dtm))
- freq1
- length(freq1)
- table(freq1)
- ord=order(freq1)
- 8
- freq1[head(ord)]
- freq1[tail(ord)]
- n=as.matrix(sav1)
- write.csv(n,file=" AGASHIYEmainDTM.csv")
- #part 2
- #word cloud to know highest frequencies of words
- wf=data.frame(words=names(freq1),freq=freq1)
- wf
- library(wordcloud)
- set.seed(123)
- wordcloud(names(freq1),freq1,min.freq = 2,colors=brewer.pal(6, "Dark2"))
- #part 3
- #graph
- library(ggplot2)
- subset(wf, freq>1) %>%
- ggplot(aes(words, freq)) +
- geom_bar(stat="identity") +
- theme(axis.text.x=element_text(angle=45, hjust=1))

- Result:
  - With the help of this code, it gave 3 results.
  - In the first part of code, a new file called “AGASHIYEmainDTM.csv” was wrote and it gave frequencies of all words.
  - The following is the screen shot where there are words and frequencies are beside them

A	B	C	D
	Words	Frequency	
	'fanasi'	1	
	'gourmet'	1	
	'peeve'	1	
	- terrace	1	
	#NAME?	1	
	1.5-	1	
	1.5-i	1	
	2-i	1	
	4-i	1	
	4-it	1	
	4.5-order	1	
	on	1	
	!!.	1	
	!!manage	1	
	!it	1	
	!you	1	
	"gujarati	1	
	"terrace"	1	
	"thali"	1	
	(agashiye	1	
	(around	1	
	(as	1	

AGASHIYEmainDTM

- In second part of code, word cloud was generated which showed the picture of words where every words were clouded and the size of words vary according to frequencies.
- The higher the frequencies the big is the picture of that word.
- The following is the word cloud.



- The third part gives graphical representation of words.
- It gives graph showing highest word in text data.
- Thus a structured data was formed where there were words and frequencies associated with each word.

- Thus with the help of this code, text mining of 30 restaurants were done and frequency of each word was found for further analysis.

2. Emotion measurement
    - Code:

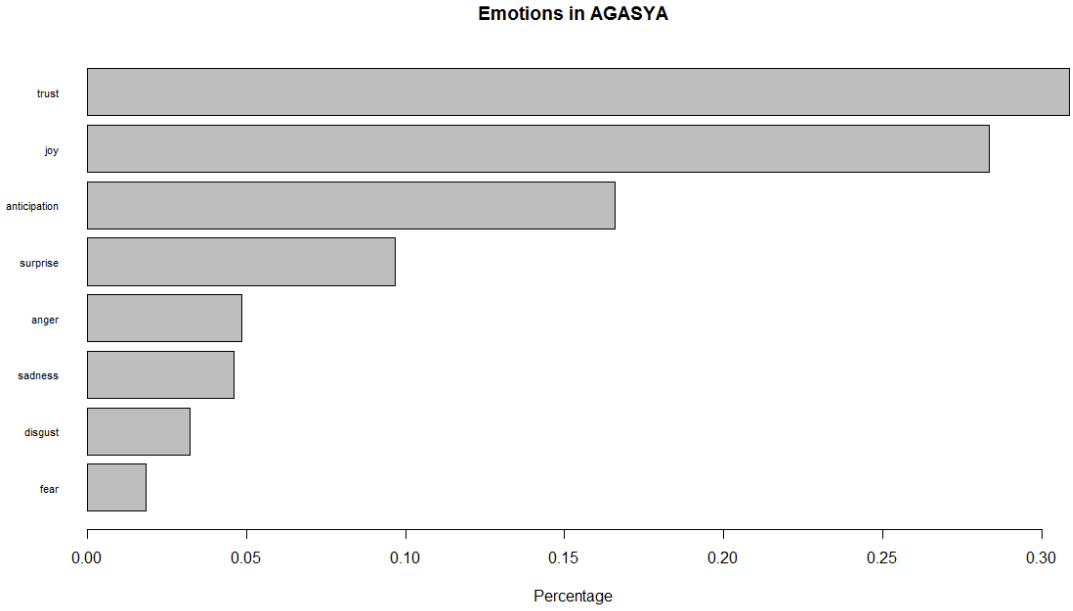
```
library(syuzhet)
textdata=get_text_as_string("D:\\PGDM\\sysem1\\DSE\\text mining\\AGASHIYEmain.txt")
s_v = get_sentences(textdata)
s_v
syuzhet_vector = get_sentiment(s_v,method = "syuzhet")
syuzhet_vector
bing_vector <- get_sentiment(s_v, method="bing")
afinn_vector <- get_sentiment(s_v, method="afinn")
nrc_vector <- get_sentiment(s_v, method="nrc")
bing_vector
afinn_vector
nrc_vector
rbind(
  sign(head(syuzhet_vector)),
  sign(head(bing_vector)),
  sign(head(afinn_vector)),
  sign(head(nrc_vector))
)
s_v_sentiment <- get_sentiment(s_v)
plot(
  s_v_sentiment,
  type="l",
  main="Example Plot Trajectory",
  xlab = "Narrative Time",
  ylab= "Emotional Valence"
)
plot(
  syuzhet_vector,
  type="h",
  main="Example Plot Trajectory",
  xlab = "Narrative Time",
  ylab= "Emotional Valence"
)


percent_vals <- get_percentage_values(syuzhet_vector)
plot(
  percent_vals,
  type="l",
  main="Joyce's Portrait Using Percentage-Based Means",
  xlab = "Narrative Time",
  ylab= "Emotional Valence",
  col="red"
)

nrc_data=get_nrc_sentiment(s_v)
nrc_data
```

```
write.csv(nrc_data,"agasya.csv")

angry_items <- which(nrc_data$anger > 0)
s_v[angry_items]

library(pander)
pander::pandoc.table(nrc_data[, 1:8], split.table = Inf,style="grid")

pander::pandoc.table(nrc_data[, 9:10])
valence <- (nrc_data[, 9]*-1) + nrc_data[, 10]
valence

barplot(
  sort(colSums(prop.table(nrc_data[, 1:8]))),
  horiz = TRUE,
  cex.names = 0.7,
  las = 1,
  main = "Emotions in Sample text", xlab="Percentage"
)



joyces_portrait <- textdata
poa_v <- get_sentences(joyces_portrait)
poa_values <- get_sentiment(poa_v, method="syuzhet")

#path_to_a_text_file <- system.file("extdata", "bovary.txt", package = "syuzhet")
bovary <- textdata
bovary_v <- get_sentences(bovary)
bovary_values <- get_sentiment(bovary_v)
poa_values
bovary_values
```

- Result:
  - Emotion measurement is useful to classify emotions in 8 ways and they are anger, anticipation, disgust, fear, joy, sadness, surprise and trust
  - It also classify in positive and negative emotions associated with data.
  - With the help of this code it will generate frequency of emotions associated with each comment
  - This output is then wrote to csv file.
  - The following is the output.

	anger	anticipation	disgust	fear	joy	sadness	surprise	trust	negative	positive
1	0	0	0	0	0	0	0	0	0	0
2	0	1	0	0	1	0	1	1	0	1
3	0	1	0	0	1	0	1	2	0	1
4	0	0	0	0	0	0	0	0	0	0
5	2	0	3	1	1	0	0	1	3	1
6	0	0	1	0	0	0	0	0	1	0
7	1	0	1	1	0	0	0	0	1	0
8	0	0	0	1	0	0	0	0	1	0
9	0	1	0	0	0	0	0	0	0	0
10	0	0	0	1	0	1	0	0	1	1
11	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	2
13	0	0	0	0	0	0	0	1	0	1
14	1	1	0	1	1	0	0	3	1	3
15	0	0	0	0	0	0	0	1	0	0
16	0	0	0	0	0	0	0	0	0	0
17	2	3	0	1	2	0	1	2	0	3
18	0	0	0	0	0	0	0	1	0	1
19	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	1
21	1	1	0	0	1	0	1	2	0	7
22	1	0	1	1	0	1	0	0	1	0

- With the help of this code barplot is also generated which shows which emotions has highest frequency
- The following is the bar plot



- Thus different emotions of people can be analysed with the help of emotions.
- The emotions of 30 hotels was analysed which was used for further interpretations and decisions.

3. Sentiment analysis
   - Code:
     - setwd("D:\\PGDM\\sysem1\\DSE\\text mining")
     - install.packages(c("rmsfact", "testthat"))
     - library(rmsfact)
     - library(testthat)
     - library(cognizer)
     - SERVICE_API_KEY = "7860a207acbe0a9e793e230cb4de3a0eba2e1e0a"
     - sent<-read.csv("D:\\PGDM\\sysem1\\DSE\\text mining\\AGASHIYEmain.csv")

```
result<-
text_sentiment(sent$Comments,"7860a207acbe0a9e793e230cb
4de3a0eba2e1e0a")
str(result)
result
write.csv(result,"sentiscore.csv")
#code for average of sentiment score

setwd("D:\\PGDM\\sysem1\\R\\Big Basket")
red=read.csv("sentiscorebigbasket.csv")
df=data.frame(red)
for(v in 1:241)
 {
  d=df[v,2]

  z=d+e;
  e=z
  }
print(z)
```

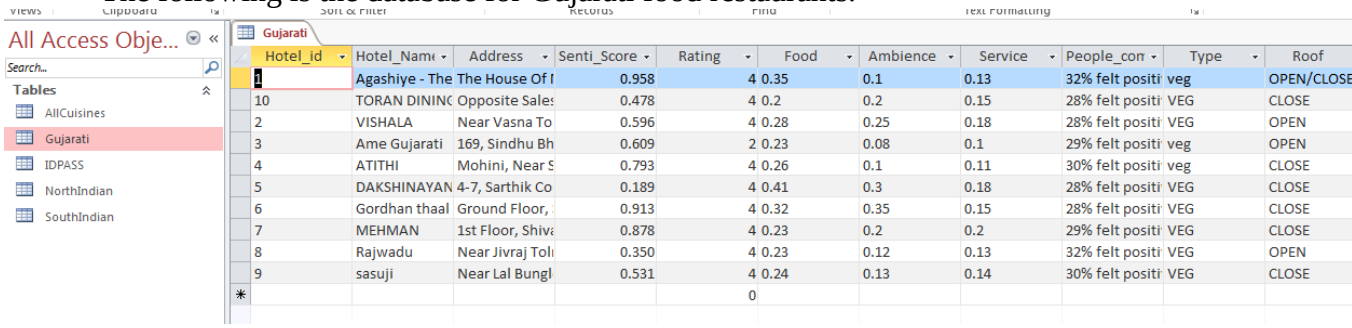
- Result:
  - Ibm watson was used as a platform to get sentiment score
  - Ibm Watson gave sentiment score according to comments.
  - Thus each comment has positive or negative score associated with it
  - With the help of Code each score of comment was summed up and average was taken.
  - The average score of every restaurant was taken
  - Sentiment score would help to identify positive and negative sentiment score of each restaurant.
  - Thus sentiment score of 30 hotels were taken which would help for further classification and interpretation.

4. Cluster analysis
   - After getting structured data, that is words and frequencies of words, similar words are grouped into clusters.
   - Three clusters were decided and on basis of their characteristics those clusters were named as food, ambience and service.
   - Thus for all the 30 hotels there were 3 groups and that was food, ambience and service.
   - The frequencies of each group were converted to percentage for each category in group.

Database

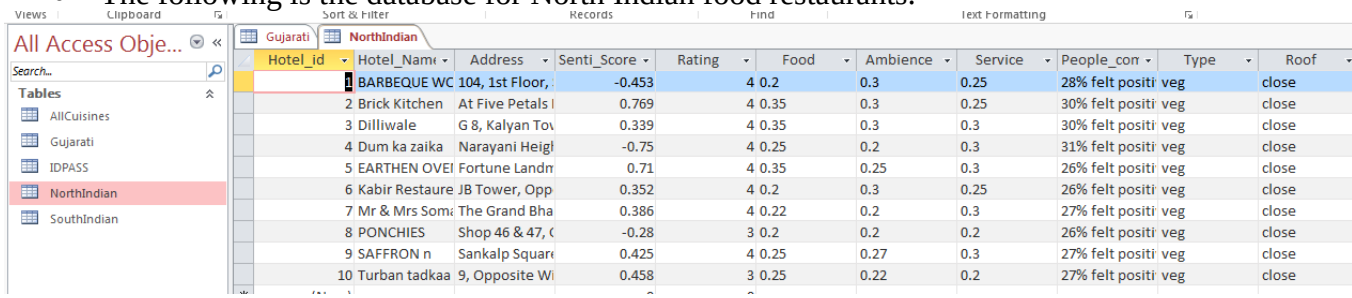
- The data was generated with the help of above techniques.
- The data had various variables and following are various variables:
- Hotel_id which shows “ID” associated with each restaurant.
- Hotel_Name which shows name of restaurant
- Address which shows location of restaurant
- Senti_score is the score associated with each restaurant.
- Rating shows how much maximum rating is given by people for each restaurant.

- Food shows percentage of people talking about good and tasty food for each restaurant.
- Ambience shows percentage of people talking about good and awesome ambience for each restaurant.
- Service shows percentage of people talking about good and satisfactory Service for each restaurant.
- People_comments will include the output of emotion measurement.
- Type shows the type of food available in restaurant that is vegetarian and non-vegetarian.
- Roof shows the open and close roof top restaurant.
- The following is the database for Gujarati food restaurants.



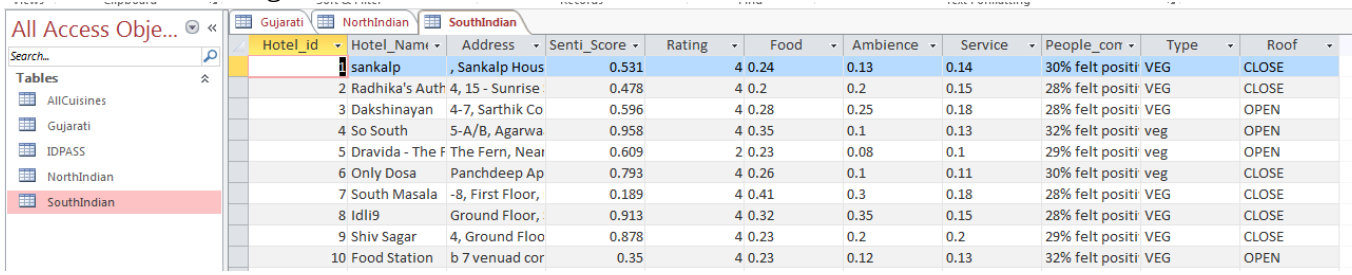
Hotel_id	Hotel_Name	Address	Senti_Score	Rating	Food	Ambience	Service	People_com	Type	Roof
1	Agashiye - The	The House Of I	0.958	4	0.35	0.1	0.13	32% felt positi	veg	OPEN/CLOSE
10	TORAN DININ	Opposite Sales	0.478	4	0.2	0.2	0.15	28% felt positi	VEG	CLOSE
2	VISHALA	Near Vasna To	0.596	4	0.28	0.25	0.18	28% felt positi	VEG	OPEN
3	Ame Gujarati	169, Sindhu Bh	0.609	2	0.23	0.08	0.1	29% felt positi	veg	OPEN
4	ATITHI	Mohini, Near S	0.793	4	0.26	0.1	0.11	30% felt positi	veg	CLOSE
5	DAKSHINAYAN	4-7, Sarthik Co	0.189	4	0.41	0.3	0.18	28% felt positi	VEG	CLOSE
6	Gordhan thaal	Ground Floor,	0.913	4	0.32	0.35	0.15	28% felt positi	VEG	CLOSE
7	MEHMAN	1st Floor, Shiva	0.878	4	0.23	0.2	0.2	29% felt positi	VEG	CLOSE
8	Rajwadu	Near Jivraj Toll	0.350	4	0.23	0.12	0.13	32% felt positi	VEG	OPEN
9	sasuji	Near Lal Bungl	0.531	4	0.24	0.13	0.14	30% felt positi	VEG	CLOSE
*				0						

- The following is the database for North Indian food restaurants.



Hotel_id	Hotel_Name	Address	Senti_Score	Rating	Food	Ambience	Service	People_con	Type	Roof
1	BARBEQUE WC	104, 1st Floor,	-0.453	4	0.2	0.3	0.25	28% felt positi	veg	close
2	Brick Kitchen	At Five Petals I	0.769	4	0.35	0.3	0.25	30% felt positi	veg	close
3	Dilliwale	G 8, Kalyan Tov	0.339	4	0.35	0.3	0.3	30% felt positi	veg	close
4	Dum ka zaika	Narayani Heigh	-0.75	4	0.25	0.2	0.3	31% felt positi	veg	close
5	EARTHEN OVE	Fortune Landm	0.71	4	0.35	0.25	0.3	26% felt positi	veg	close
6	Kabir Restaure	JB Tower, Opp	0.352	4	0.2	0.3	0.25	26% felt positi	veg	close
7	Mr & Mrs Soma	The Grand Bha	0.386	4	0.22	0.2	0.3	27% felt positi	veg	close
8	PONCHIES	Shop 46 & 47, (	-0.28	3	0.2	0.2	0.2	26% felt positi	veg	close
9	SAFFRON n	Sankalp Square	0.425	4	0.25	0.27	0.3	27% felt positi	veg	close
10	Turban tadkaa	9, Opposite Wi	0.458	3	0.25	0.22	0.2	27% felt positi	veg	close

- The following is the database for South Indian food restaurants.

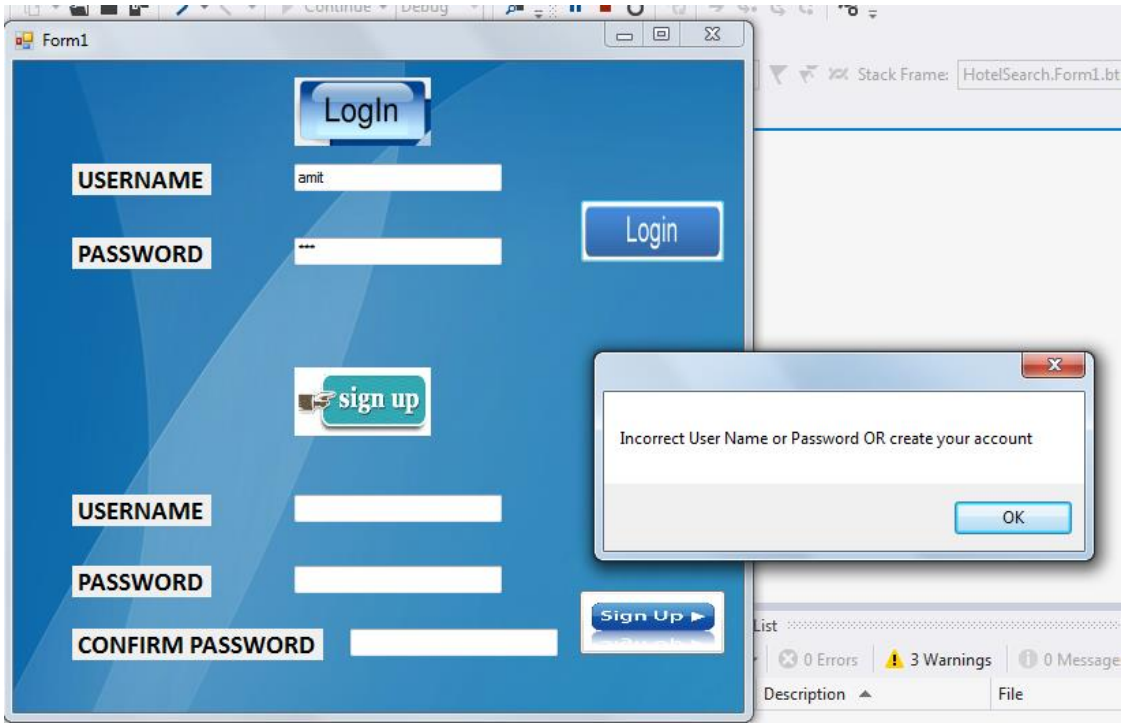


Hotel_id	Hotel_Name	Address	Senti_Score	Rating	Food	Ambience	Service	People_con	Type	Roof
1	sankalp	, Sankalp Hous	0.531	4	0.24	0.13	0.14	30% felt positi	VEG	CLOSE
2	Radhika's Auth	4, 15 - Sunrise	0.478	4	0.2	0.2	0.15	28% felt positi	VEG	CLOSE
3	Dakshinayan	4-7, Sarthik Co	0.596	4	0.28	0.25	0.18	28% felt positi	VEG	OPEN
4	So South	5-A/B, Agarwa	0.958	4	0.35	0.1	0.13	32% felt positi	veg	OPEN
5	Dravida - The F	The Fern, Near	0.609	2	0.23	0.08	0.1	29% felt positi	veg	OPEN
6	Only Dosa	Panchdeep Ap	0.793	4	0.26	0.1	0.11	30% felt positi	veg	CLOSE
7	South Masala	-8, First Floor,	0.189	4	0.41	0.3	0.18	28% felt positi	VEG	CLOSE
8	Idli9	Ground Floor,	0.913	4	0.32	0.35	0.15	28% felt positi	VEG	CLOSE
9	Shiv Sagar	4, Ground Floo	0.878	4	0.23	0.2	0.2	29% felt positi	VEG	CLOSE
10	Food Station	b 7 venuad cor	0.35	4	0.23	0.12	0.13	32% felt positi	VEG	OPEN

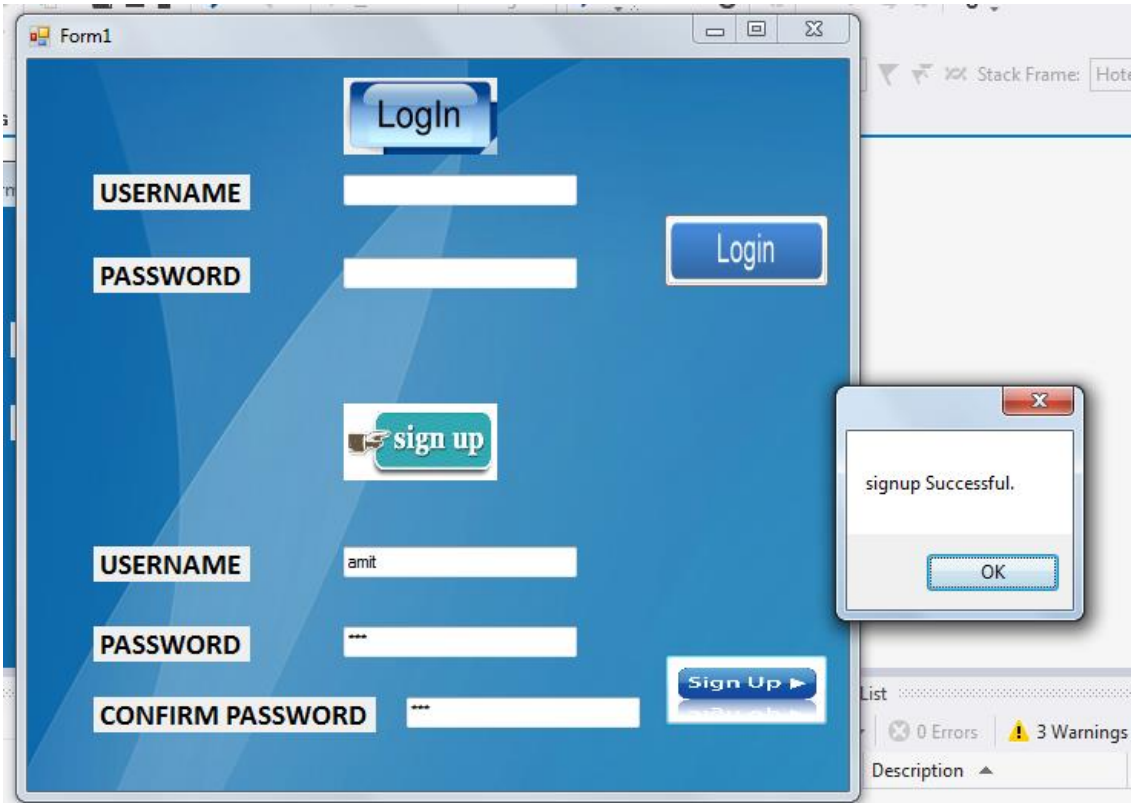
Functioning of Search Engine

- Visual studio was taken as a platform and entire coding was done in C#.
- Users has to login in their account for authentication and if they have not created their account they have to sign up and has to login.
- The following is the GUI of login page

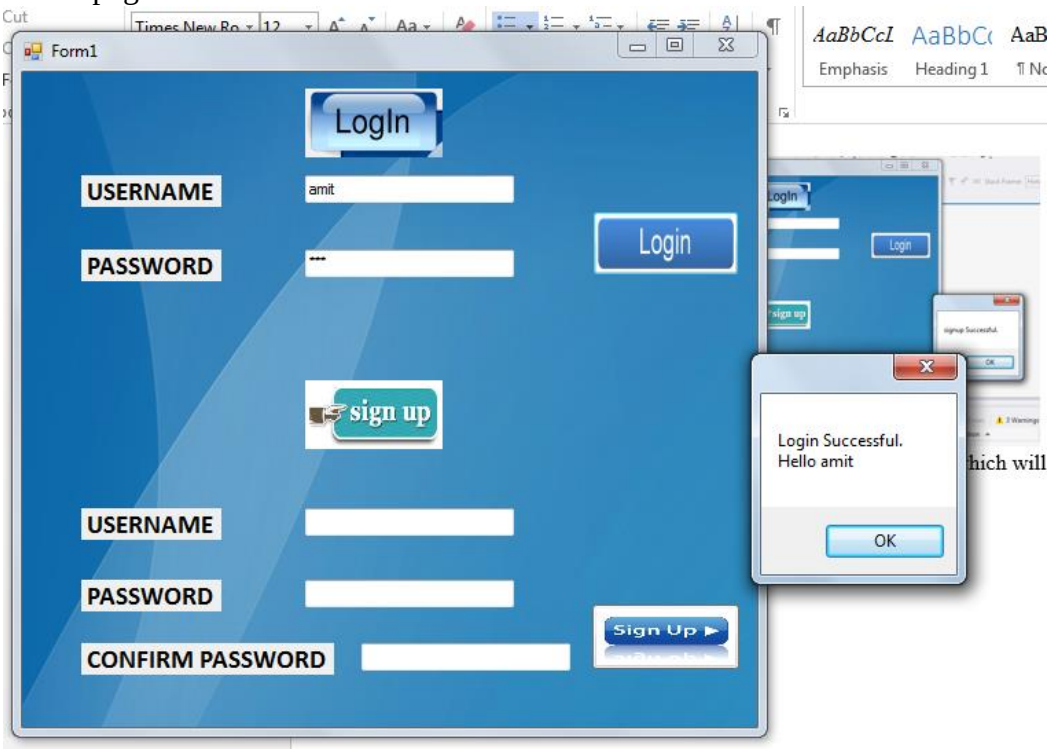
- If username doesn't exist then it will throw error message



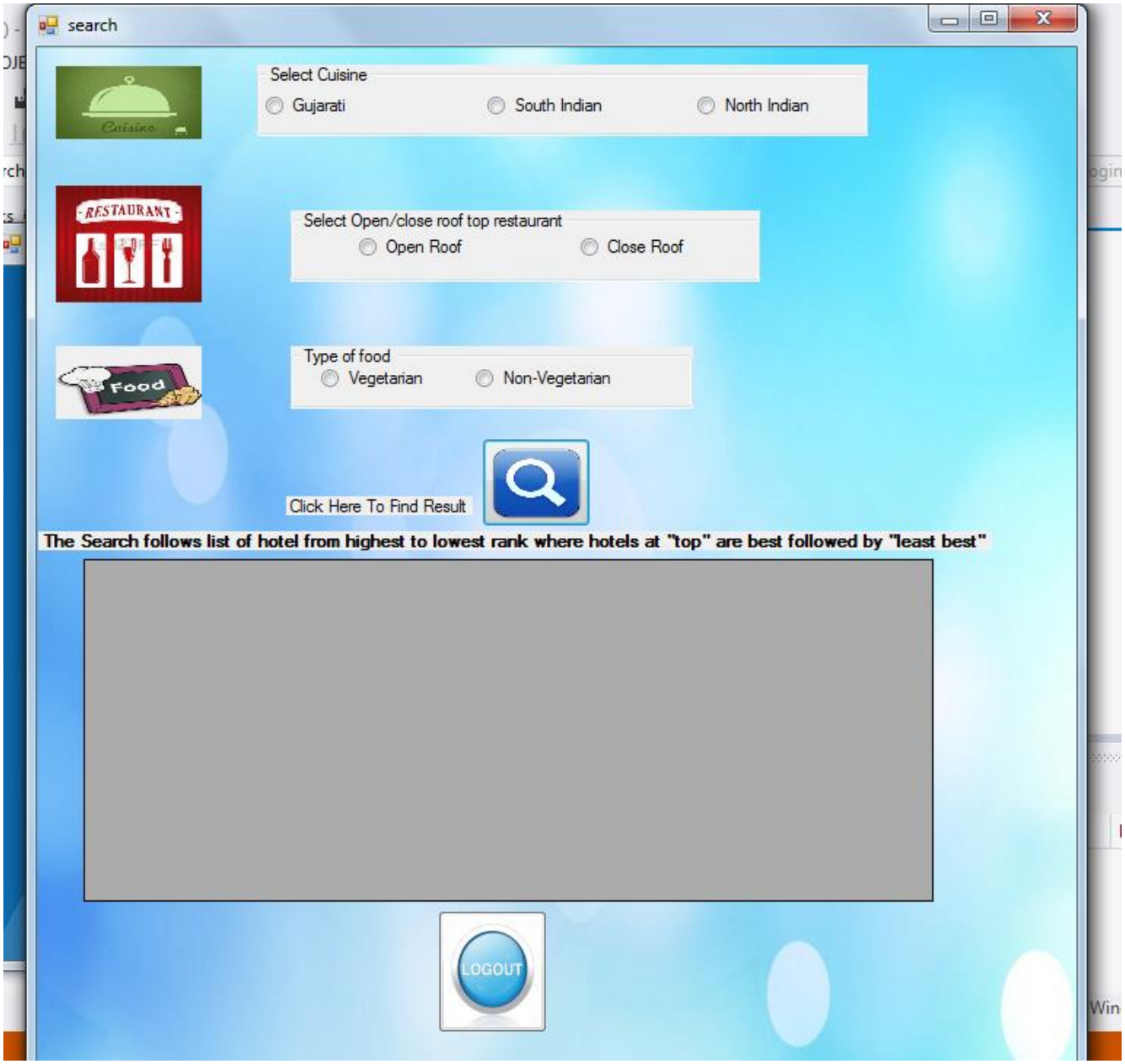
- So now account has to be created which will show message box that sign up is successful



- Now after creating account, login has to be done which will directly take to search page

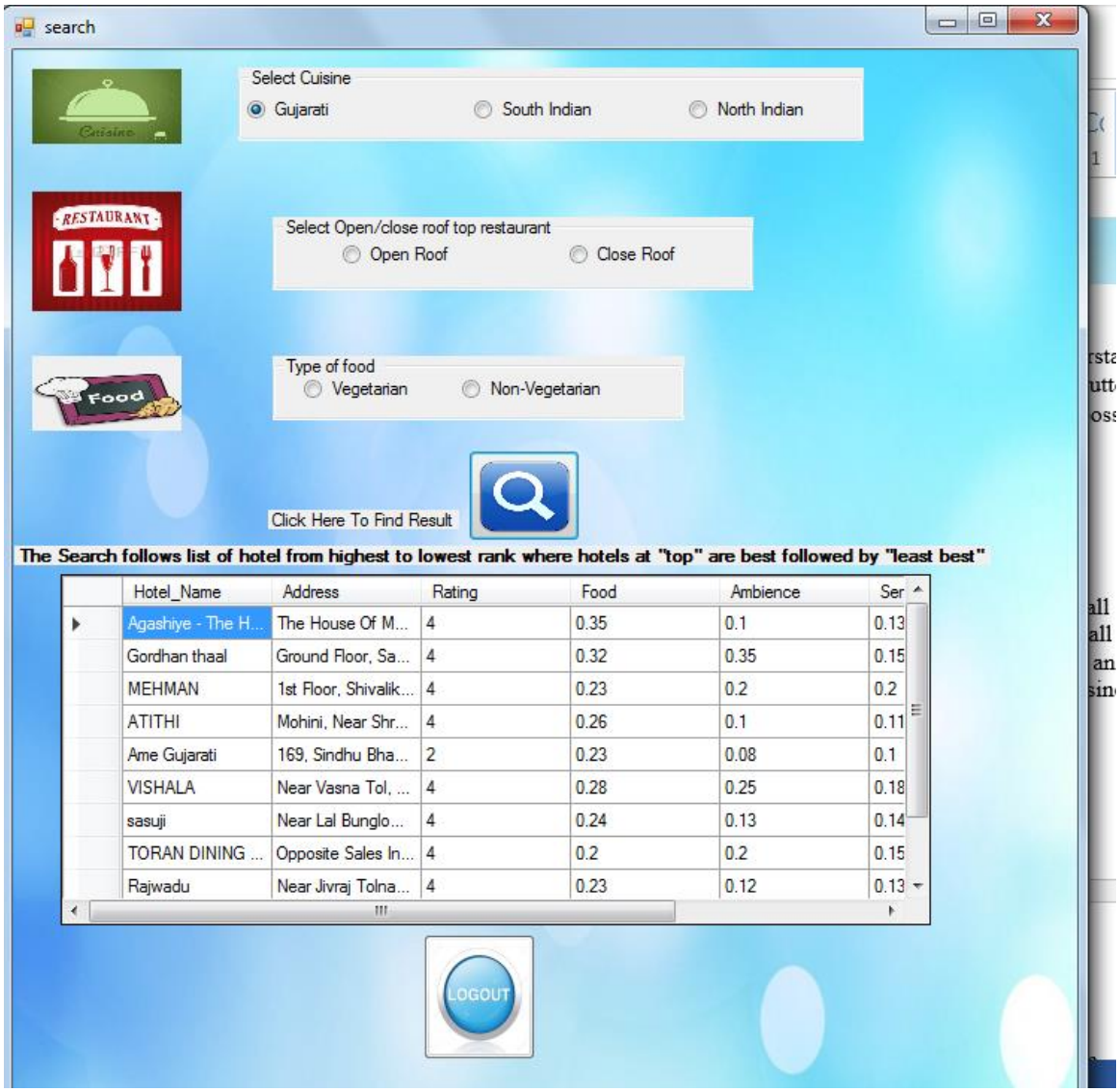


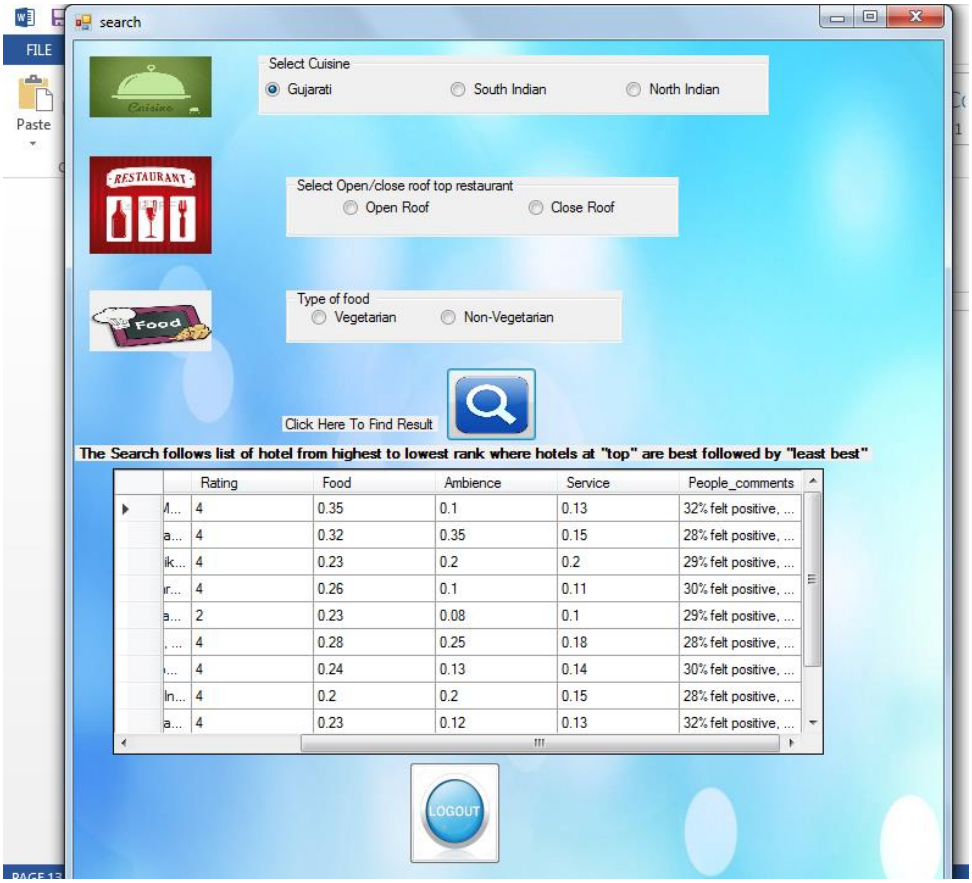
- The above image shows that now login is successful and by clicking on “OK”, it will take directly to search page



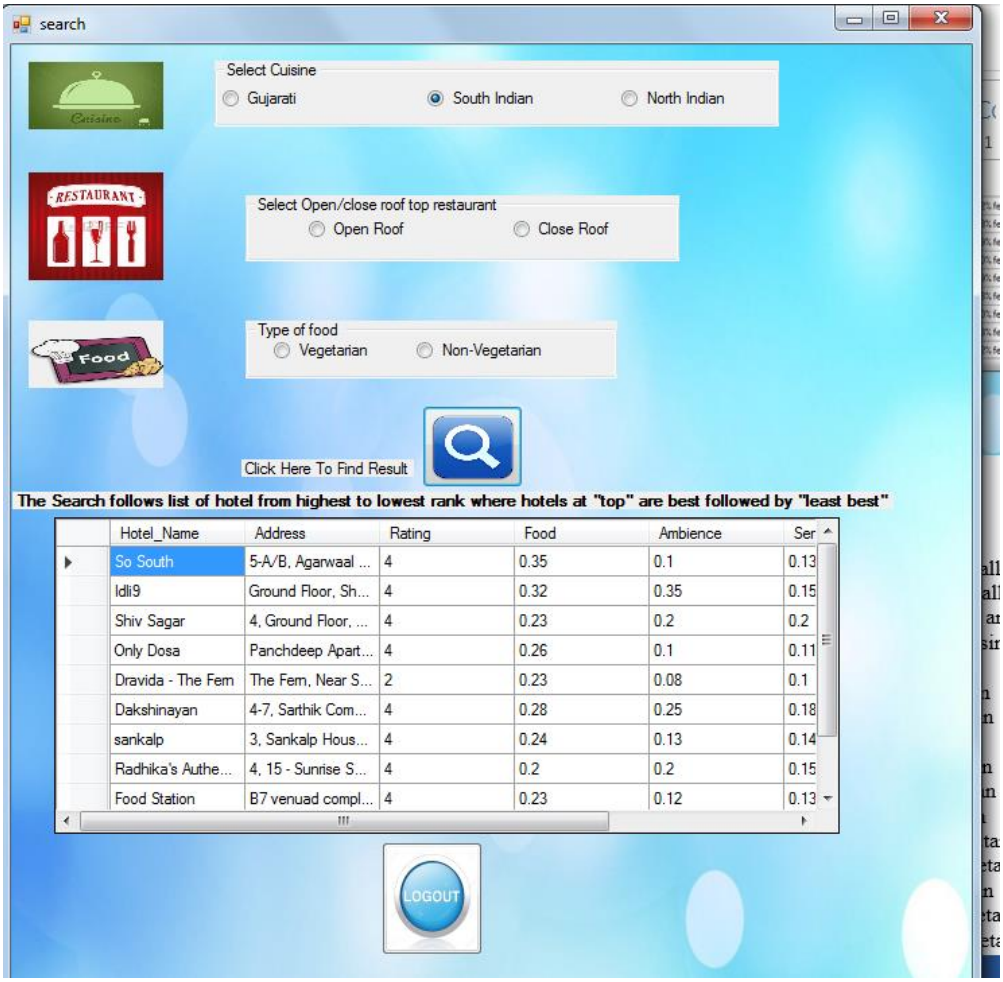
- The search page shows GUI which are easy to understand for end users.
- The grey box shows the search results when the search button is pressed
- The results of search are arranged in descending order of their sentiment score.
- The search follows top to bottom approach for search results, where the restaurant in first row is best followed by second best and list of all the restaurants are displayed in that manner.
- The following are various ways in which search is possible

1. Search Gujarati cuisine restaurant



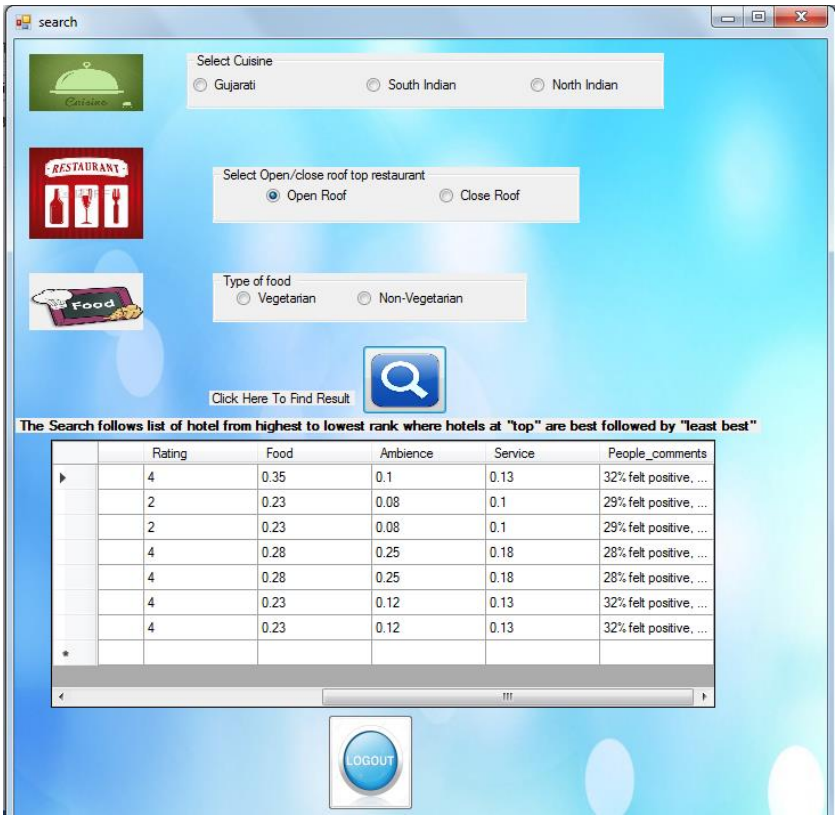

search
Select Cuisine
Gujarati
South Indian
North Indian
Select Open/close roof top restaurant
Open Roof
Close Roof
Type of food
Vegetarian
Non-Vegetarian
Click Here To Find Result
The Search follows list of hotel from highest to lowest rank where hotels at "top" are best followed by "least best"
Rating
Food
Ambience
Service
People_comments
LOGOUT

2. Search south Indian cuisine restaurant

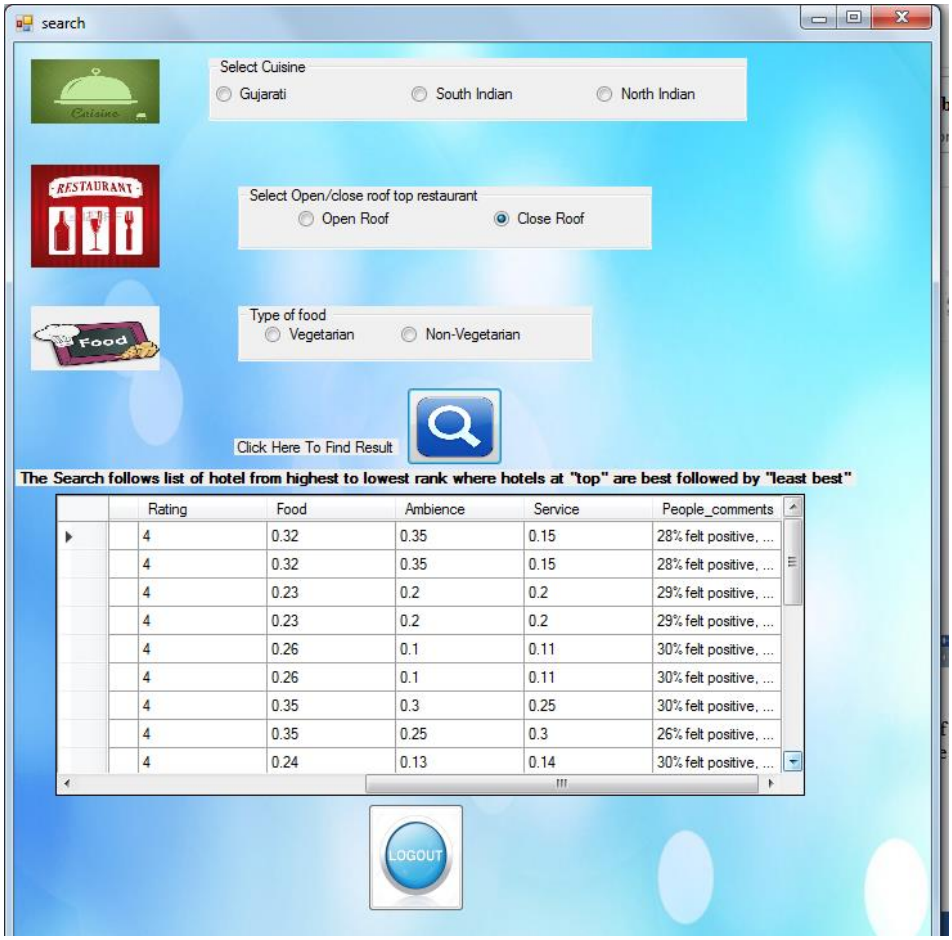


3. Search north Indian cuisine restaurant

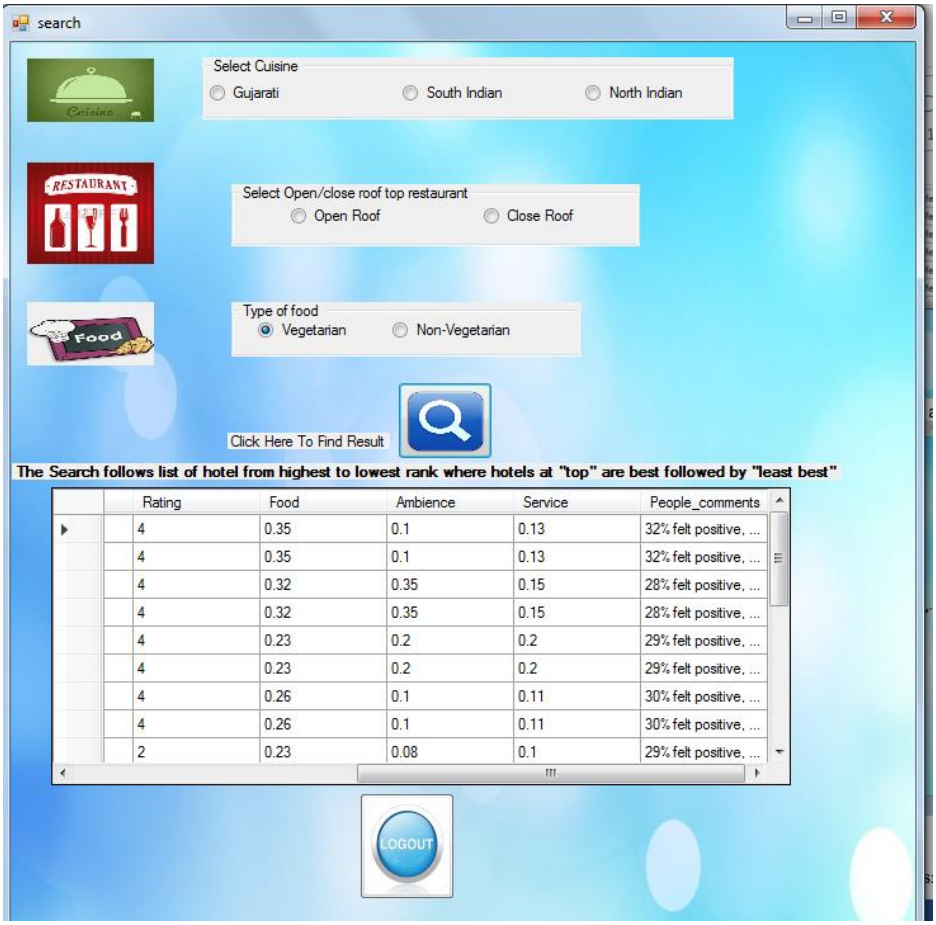
4. Search open roof restaurants of all cuisines and all food types



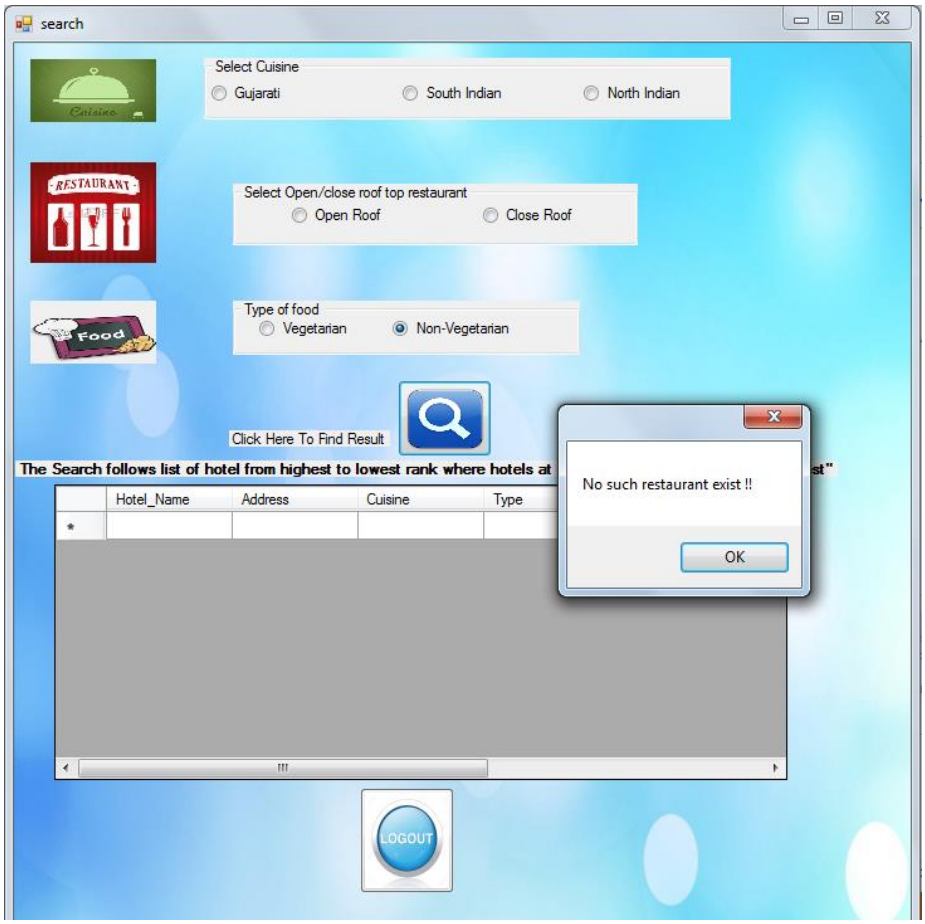
5. Search close roof restaurants of all cuisines and all food types


search
Select Cuisine
Gujarati
South Indian
North Indian
RESTAURANT
Select Open/close roof top restaurant
Open Roof
Close Roof
Food
Type of food
Vegetarian
Non-Vegetarian
Click Here To Find Result
The Search follows list of hotel from highest to lowest rank where hotels at "top" are best followed by "least best"
Rating Food Ambience Service People_comments
4 0.32 0.35 0.15 28% felt positive, ...
4 0.32 0.35 0.15 28% felt positive, ...
4 0.23 0.2 0.2 29% felt positive, ...
4 0.23 0.2 0.2 29% felt positive, ...
4 0.26 0.1 0.11 30% felt positive, ...
4 0.26 0.1 0.11 30% felt positive, ...
4 0.35 0.3 0.25 30% felt positive, ...
4 0.35 0.25 0.3 26% felt positive, ...
4 0.24 0.13 0.14 30% felt positive, ...
LOGOUT

6. Search vegetarian food restaurant of all cuisines and open/close roof


search
Select Cuisine
Gujarati
South Indian
North Indian
RESTAURANT
Select Open/close roof top restaurant
Open Roof
Close Roof
Food
Type of food
Vegetarian
Non-Vegetarian
Click Here To Find Result
The Search follows list of hotel from highest to lowest rank where hotels at "top" are best followed by "least best"
Rating Food Ambience Service People_comments
4 0.35 0.1 0.13 32% felt positive, ...
4 0.35 0.1 0.13 32% felt positive, ...
4 0.32 0.35 0.15 28% felt positive, ...
4 0.32 0.35 0.15 28% felt positive, ...
4 0.23 0.2 0.2 29% felt positive, ...
4 0.23 0.2 0.2 29% felt positive, ...
4 0.26 0.1 0.11 30% felt positive, ...
4 0.26 0.1 0.11 30% felt positive, ...
2 0.23 0.08 0.1 29% felt positive, ...
LOGOUT

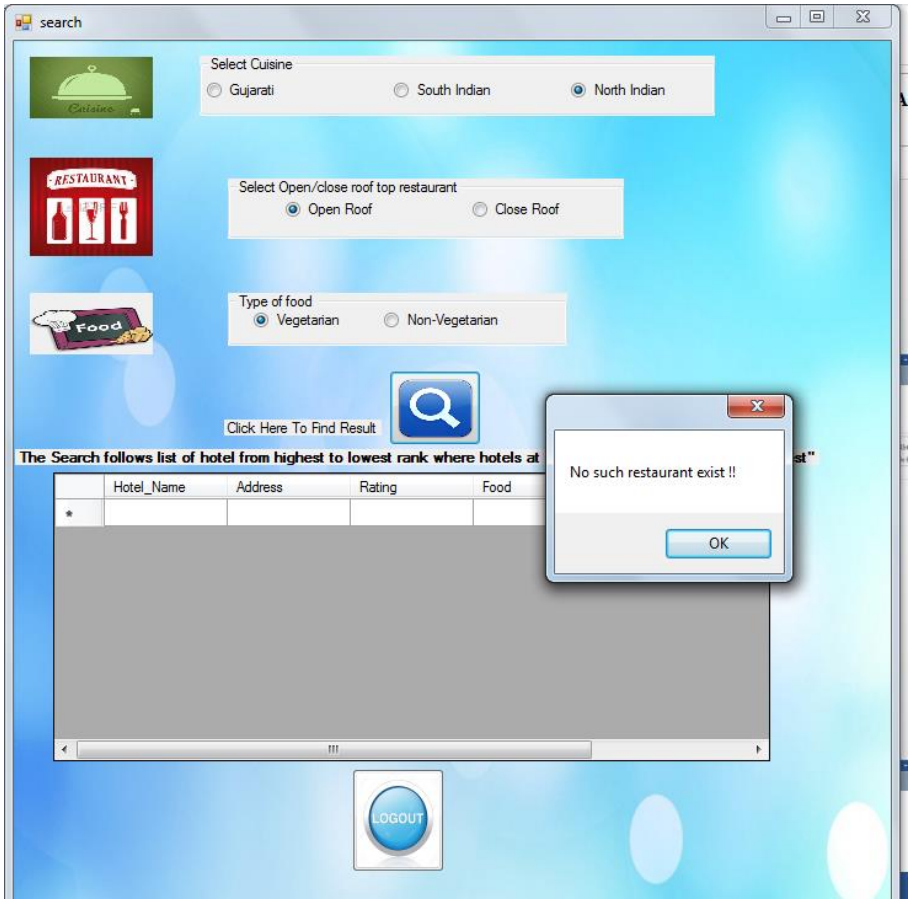
7. Search Non vegetarian food restaurant of all cuisines and open/close roof



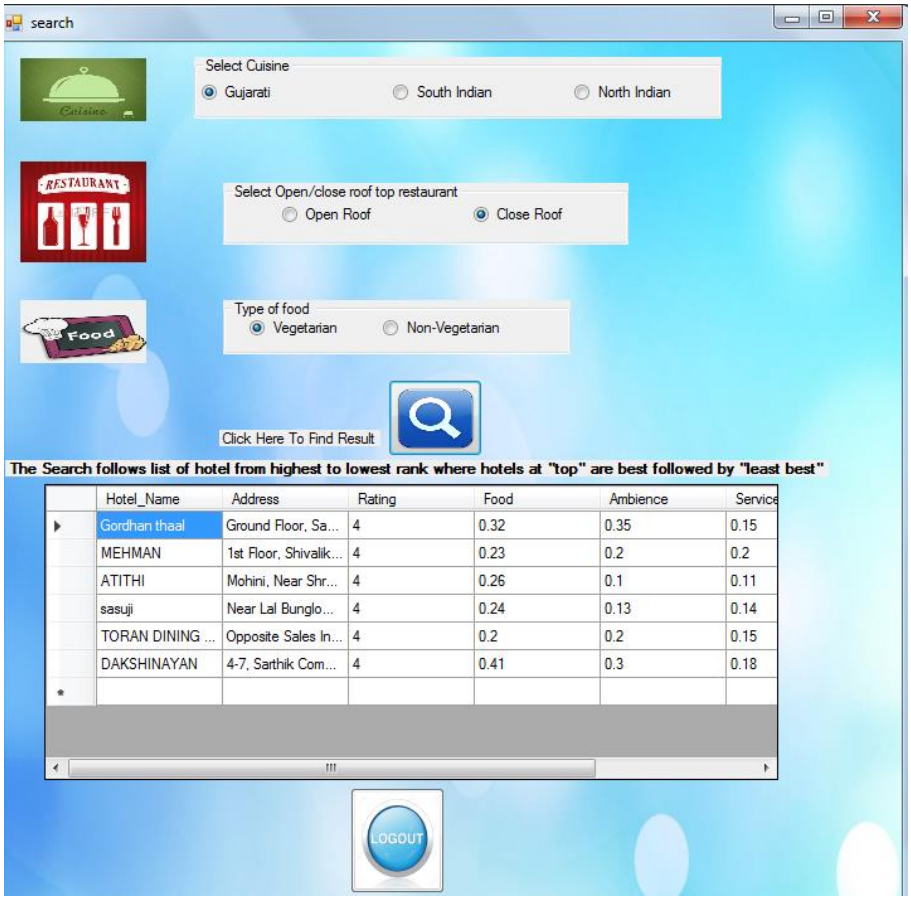
8. Search on gujarati,open roof and vegetarian

9. Search on south Indian, open roof and vegetarian

10. Search on North Indian, open roof and vegetarian



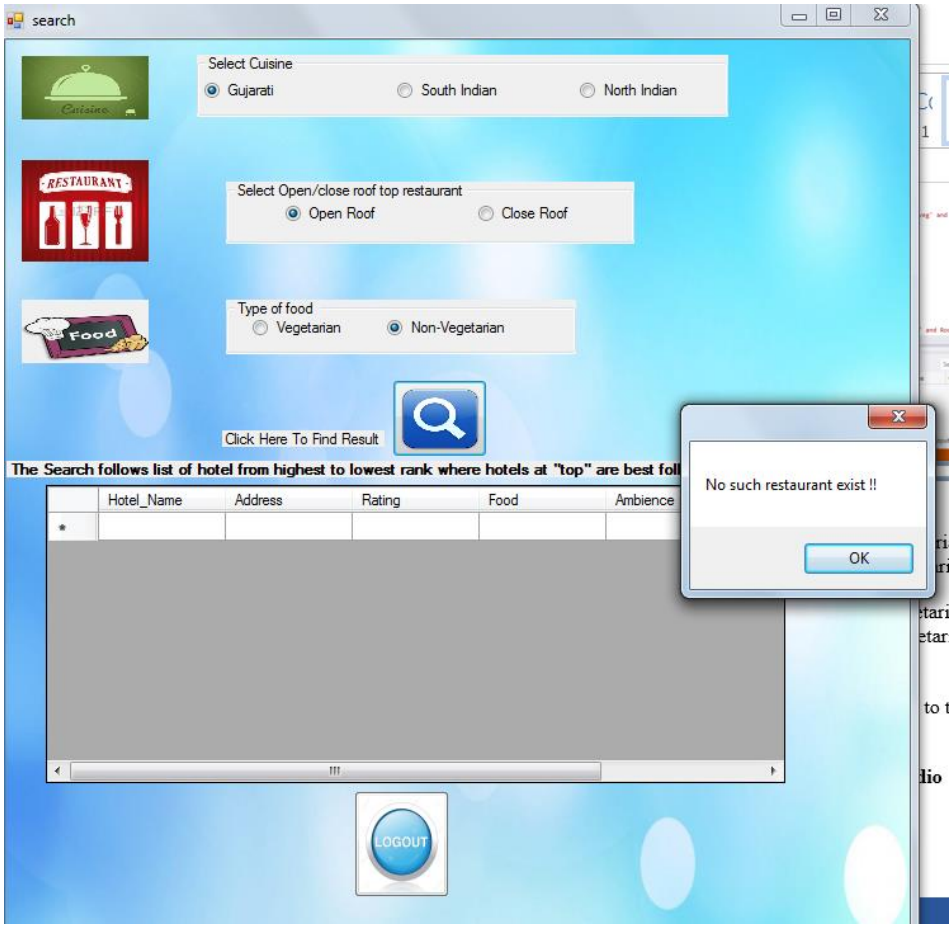
11. Search on gujarati, close roof and vegetarian



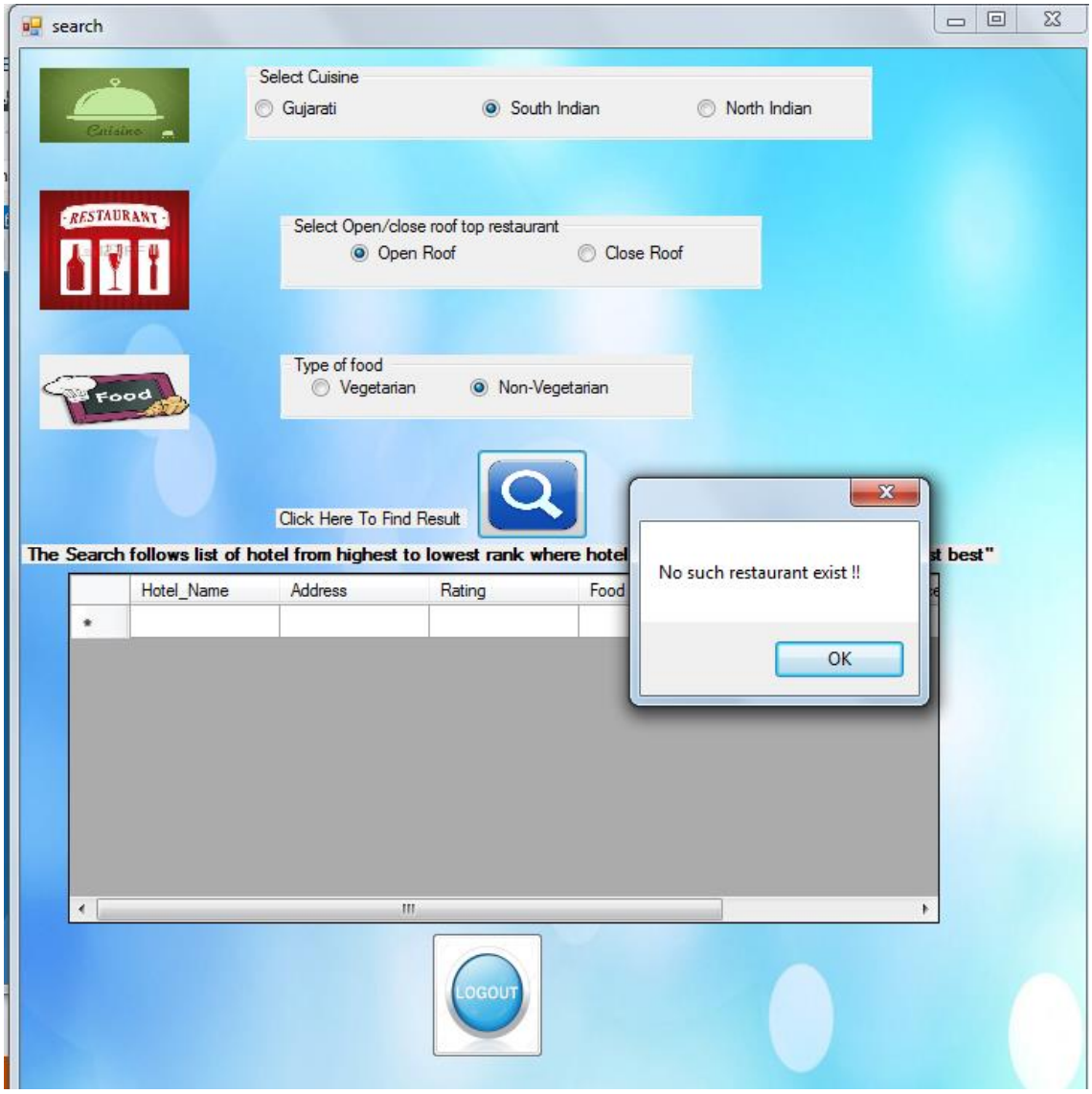
12. Search on south Indian, close roof and vegetarian

13. Search on North Indian, close roof and vegetarian

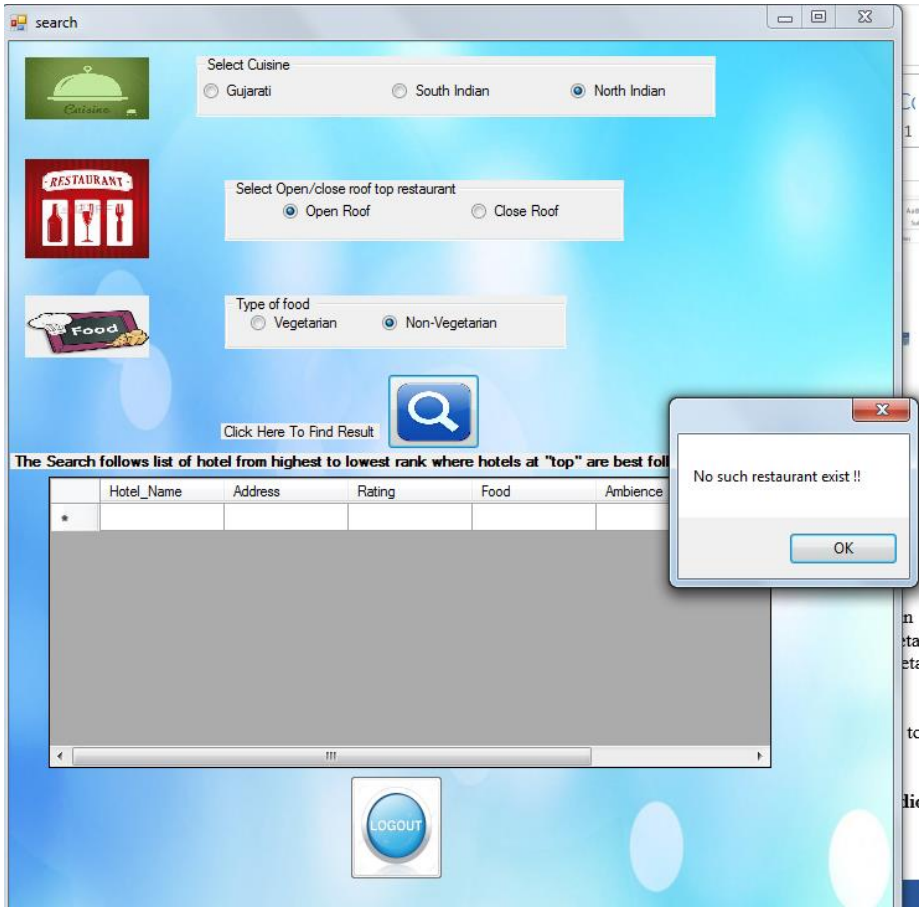
14. Search on gujarati,open roof and Non vegetarian



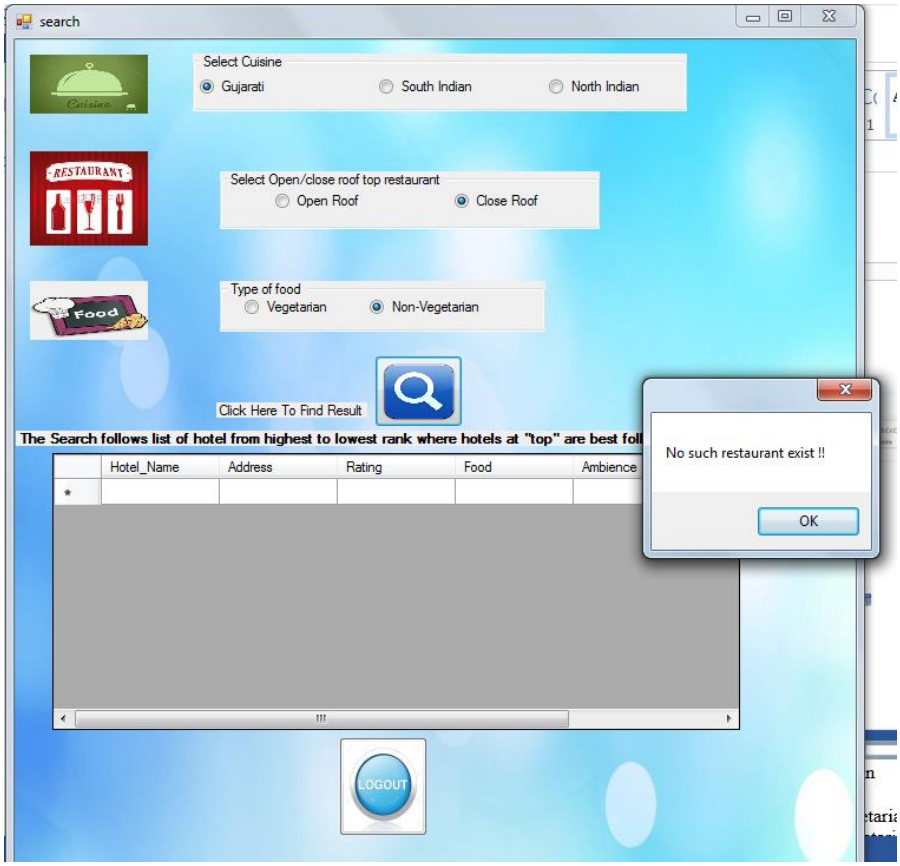
15. Search on south Indian, open roof and Non vegetarian



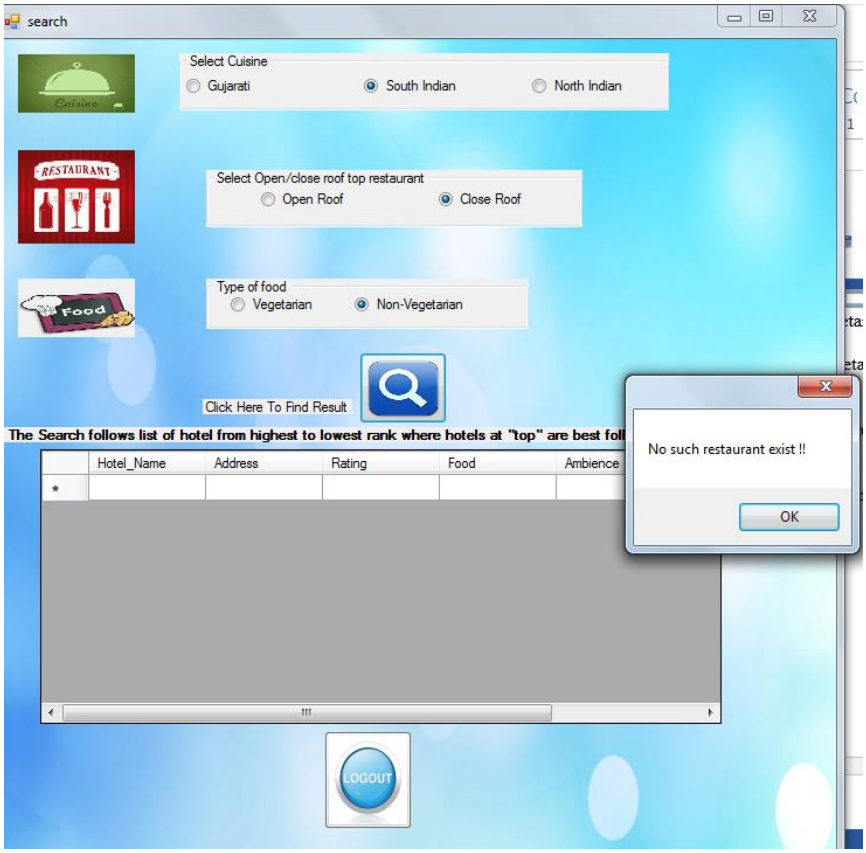
16. Search on North Indian, open roof and Non vegetarian



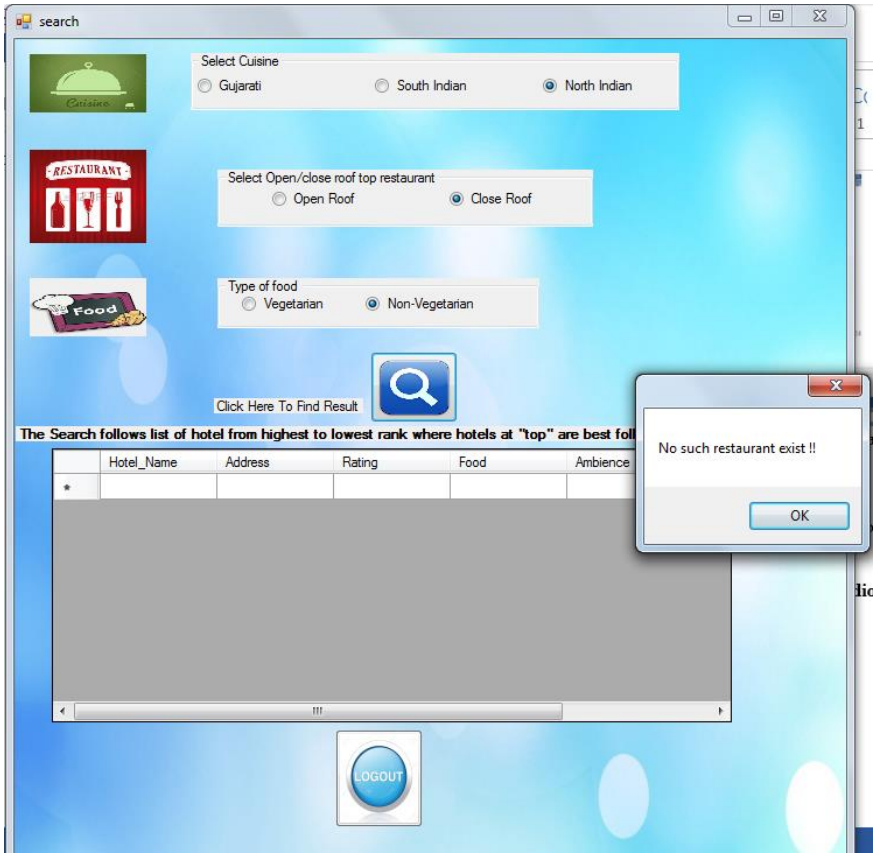
17. Search on gujarati, close roof and Non vegetarian



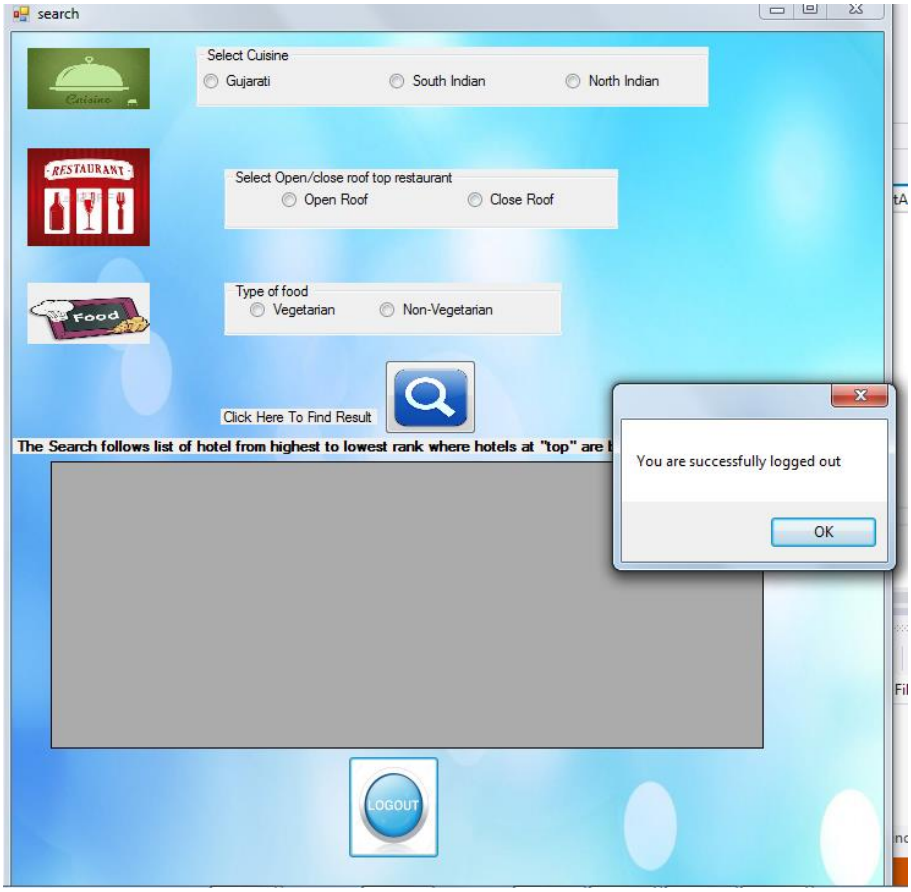
18. Search on south Indian, close roof and Non vegetarian



19. Search on North Indian, close roof and Non vegetarian



- There is a logout button, which will take back again to the login page.



Back end coding in C# visual studio

- Code for login authentication and sign up

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.Windows.Forms;
using System.Data.OleDb;

namespace HotelSearch
{
    public partial class Form1 : Form
    {
        OleDbCommand cmd;
        OleDbConnection con;
        OleDbDataReader dr;
        OleDbDataAdapter adp;
        DataSet ds;
        public Form1()
```

```
        {
            InitializeComponent();
        }

        private void pictureBox1_Click(object sender, EventArgs e)
        {

        }

        private void btnlogin_Click(object sender, EventArgs e)
        {
            con = new OleDbConnection();
            cmd = new OleDbCommand();
            if (txtusername.Text.Length == 0 || txtpasswd.Text.Length == 0)
            {
                MessageBox.Show("Please Enter Both username and passwords");
            }
            else
            {
                con.ConnectionString = "Provider=Microsoft.ACE.OLEDB.12.0;Data Source=D:\\PGDM\\sysem1\\DSE\\Hotels.accdb";
                con.Open();
                int PASS = int.Parse(txtpasswd.Text);
                cmd.CommandText = "select * from IDPASS where UserName='" + txtusername.Text + "' and Password=" + PASS + ";";
                cmd.CommandType = CommandType.Text;
                cmd.Connection = con;

                dr = cmd.ExecuteReader();


                if (dr.HasRows)
                {
                    dr.Read();
                    MessageBox.Show("Login Successful." + Environment.NewLine + "Hello " + dr[0]);
                    search aa = new search();
                    aa.Show();
                    txtusername.Text = "";
                    txtpasswd.Text = "";
                    txtpasswd.Text = "";
                    txtconfirmpasswd.Text = "";
                    txtentusername.Text = "";

                }
                else
                {
```

```
                MessageBox.Show("Incorrect User Name or Password OR
create your account");
                txtusername.Text = "";
                txtpasswd.Text = "";
                txtpasswd.Text = "";
                txtconfirmpasswd.Text = "";
                txtentusername.Text = "";
            }
            con.Close();

        }
    }

    private void pictureBox2_Click(object sender, EventArgs e)
    {

    }

    private void btnsignup_Click(object sender, EventArgs e)
    {


        con = new OleDbConnection();
        cmd = new OleDbCommand();
        if (txtentpaswd.Text.Length == 0 ||
txtconfirmpasswd.Text.Length == 0)
        {
            MessageBox.Show("Please Enter Both username and
passwords");
        }
        else
        {
            con.ConnectionString =
"Provider=Microsoft.ACE.OLEDB.12.0;Data
Source=D:\\PGDM\\sysem1\\DSE\\Hotels.accdb";
            con.Open();
            cmd.Connection = con;
            cmd.CommandText = "insert into IDPASS values ('" +
txtentusername.Text + "','" + txtconfirmpasswd.Text + "')";
            cmd.CommandType = CommandType.Text;


            int x = cmd.ExecuteNonQuery();


            if (x >= 1)
            {
                MessageBox.Show("signup Successful.");
                txtconfirmpasswd.Text = "";
                txtentusername.Text = "";
```

```
                txtusername.Text = "";
                txtpasswd.Text = "";
                txtentpaswd.Text = "";
            }
            else
            {
                MessageBox.Show("some values missing for signup");
            }
            con.Close();
        }

    }
  }
}
```

- Code for search engine

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.Windows.Forms;
using System.Data.OleDb;

namespace HotelSearch
{
  public partial class search : Form
  {
    OleDbCommand cmd = new OleDbCommand();
    OleDbConnection con = new OleDbConnection();
    OleDbDataReader dr;
    public search()
    {
      InitializeComponent();
    }

    private void search_Load(object sender, EventArgs e)
    {

    }
    public void openconnection()
    {
      con.ConnectionString =
"Provider=Microsoft.ACE.OLEDB.12.0;Data
Source=D:\\PGDM\\sysem1\\DSE\\Hotels.accdb";
      con.Open();

    }
```

```
        private void btnsearch_Click(object sender, EventArgs e)
        {
           try
           {
              if (rdbtgujarati.Checked == true)
              {
                 openconnection();
                 cmd.Connection = con;
                 cmd.CommandText = "select Hotel_Name,Address,Rating,Food,Ambience,Service,People_comments from Gujarati order by Senti_Score desc";
                 cmd.CommandType = CommandType.Text;
                 OleDbDataAdapter adp = new OleDbDataAdapter();
                 adp.SelectCommand = cmd;
                 DataSet ds = new DataSet();
                 adp.Fill(ds);
                 DataTable dt = ds.Tables[0];
                 dataGridView1.DataSource = dt;
                 con.Close();
              }
              if (rdbtpunjabi.Checked == true)
              {
                 openconnection();
                 cmd.Connection = con;
                 cmd.CommandText = "select Hotel_Name,Address,Rating,Food,Ambience,Service,People_comments from NorthIndian order by Senti_Score desc";
                 cmd.CommandType = CommandType.Text;
                 OleDbDataAdapter adp = new OleDbDataAdapter();
                 adp.SelectCommand = cmd;
                 DataSet ds = new DataSet();
                 adp.Fill(ds);
                 DataTable dt = ds.Tables[0];
                 dataGridView1.DataSource = dt;
                 con.Close();
              }
              if (rdbtsouthindian.Checked == true)
              {
                 openconnection();
                 cmd.Connection = con;
                 cmd.CommandText = "select Hotel_Name,Address,Rating,Food,Ambience,Service,People_comments from SouthIndian order by Senti_Score desc";
                 cmd.CommandType = CommandType.Text;
                 OleDbDataAdapter adp = new OleDbDataAdapter();
                 adp.SelectCommand = cmd;
                 DataSet ds = new DataSet();
                 adp.Fill(ds);
                 DataTable dt = ds.Tables[0];
```

```
            dataGridView1.DataSource = dt;
            con.Close();
        }
        else if (rdbtveg.Checked == true)
        {
            openconnection();
            cmd.Connection = con;
            cmd.CommandText = "select Hotel_Name,Address,Cuisine,Type,Rating,Food,Ambience,Service,People_comments from AllCuisines where Type like 'veg' order by Senti_Score desc";
            cmd.CommandType = CommandType.Text;
            OleDbDataAdapter adp = new OleDbDataAdapter();
            adp.SelectCommand = cmd;
            DataSet ds = new DataSet();
            adp.Fill(ds);
            DataTable dt = ds.Tables[0];
            dataGridView1.DataSource = dt;
            con.Close();
        }
        if (rdbtnonveg.Checked == true)
        {
            openconnection();
            cmd.Connection = con;
            cmd.CommandText = cmd.CommandText = "select Hotel_Name,Address,Cuisine,Type,Rating,Food,Ambience,Service,People_comments from AllCuisines where Type like 'Nonveg' order by Senti_Score desc"; ;
            cmd.CommandType = CommandType.Text;
            OleDbDataAdapter adp = new OleDbDataAdapter();
            adp.SelectCommand = cmd;
            DataSet ds = new DataSet();
            adp.Fill(ds);
            DataTable dt = ds.Tables[0];
            dataGridView1.DataSource = dt;
            con.Close();
        }
        if (rdbtopenroof.Checked == true)
        {
            openconnection();
            cmd.Connection = con;
            cmd.CommandText = cmd.CommandText = "select Hotel_Name,Address,Cuisine,Type,Rating,Food,Ambience,Service,People_comments from AllCuisines where Roof like 'Open' order by Senti_Score desc";
            cmd.CommandType = CommandType.Text;
            OleDbDataAdapter adp = new OleDbDataAdapter();
            adp.SelectCommand = cmd;
            DataSet ds = new DataSet();
            adp.Fill(ds);
```

```
                DataTable dt = ds.Tables[0];
                dataGridView1.DataSource = dt;
                con.Close();
            }
            if (rdbtcloseroof.Checked == true)
            {
                openconnection();
                cmd.Connection = con;
                cmd.CommandText = cmd.CommandText = "select Hotel_Name,Address,Cuisine,Type,Rating,Food,Ambience,Service,People_comments from AllCuisines where Roof like 'close' order by Senti_Score desc";
                cmd.CommandType = CommandType.Text;
                OleDbDataAdapter adp = new OleDbDataAdapter();
                adp.SelectCommand = cmd;
                DataSet ds = new DataSet();
                adp.Fill(ds);
                DataTable dt = ds.Tables[0];
                dataGridView1.DataSource = dt;
                con.Close();
            }
            if (rdbtgujarati.Checked == true && rdbtveg.Checked == true && rdbtopenroof.Checked == true)
            {
                openconnection();
                cmd.Connection = con;
                cmd.CommandText = "select Hotel_Name,Address,Rating,Food,Ambience,Service,People_comments from Gujarati where Type like 'veg' and Roof like 'open' order by Senti_Score desc";
                cmd.CommandType = CommandType.Text;
                OleDbDataAdapter adp = new OleDbDataAdapter();
                adp.SelectCommand = cmd;
                DataSet ds = new DataSet();
                adp.Fill(ds);
                DataTable dt = ds.Tables[0];
                dataGridView1.DataSource = dt;
                con.Close();
            }


            if (rdbtpunjabi.Checked == true && rdbtveg.Checked == true && rdbtopenroof.Checked == true)
            {
                openconnection();
                cmd.Connection = con;
                cmd.CommandText = "select Hotel_Name,Address,Rating,Food,Ambience,Service,People_comments from NorthIndian where Type like 'veg' and Roof like 'open' order by Senti_Score desc";
```

```
            cmd.CommandType = CommandType.Text;
            OleDbDataAdapter adp = new OleDbDataAdapter();
            adp.SelectCommand = cmd;
            DataSet ds = new DataSet();
            adp.Fill(ds);
            DataTable dt = ds.Tables[0];
            dataGridView1.DataSource = dt;
            con.Close();
        }

        if (rdbtsouthindian.Checked == true && rdbtveg.Checked ==
true && rdbtopenroof.Checked == true)
        {
            openconnection();
            cmd.Connection = con;
            cmd.CommandText = "select
Hotel_Name,Address,Rating,Food,Ambience,Service,People_commen
ts from SouthIndian where Type like 'veg' and Roof like 'open' order by
Senti_Score desc";
            cmd.CommandType = CommandType.Text;
            OleDbDataAdapter adp = new OleDbDataAdapter();
            adp.SelectCommand = cmd;
            DataSet ds = new DataSet();
            adp.Fill(ds);
            DataTable dt = ds.Tables[0];
            dataGridView1.DataSource = dt;
            con.Close();
        }
        if (rdbtgujarati.Checked == true && rdbtnonveg.Checked ==
true && rdbtcloseroof.Checked == true)
        {
            openconnection();
            cmd.Connection = con;
            cmd.CommandText = "select
Hotel_Name,Address,Rating,Food,Ambience,Service,People_commen
ts from Gujarati where Type like 'Nonveg' and Roof like 'Close' order
by Senti_Score desc";
            cmd.CommandType = CommandType.Text;
            OleDbDataAdapter adp = new OleDbDataAdapter();
            adp.SelectCommand = cmd;
            DataSet ds = new DataSet();
            adp.Fill(ds);
            DataTable dt = ds.Tables[0];
            dataGridView1.DataSource = dt;
            con.Close();
        }
        if (rdbtpunjabi.Checked == true && rdbtnonveg.Checked ==
true && rdbtcloseroof.Checked == true)
        {
            openconnection();
```

```
            cmd.Connection = con;
            cmd.CommandText = "select Hotel_Name,Address,Rating,Food,Ambience,Service,People_comments from NorthIndian where Type like 'Nonveg' and Roof like 'Close' order by Senti_Score desc";
            cmd.CommandType = CommandType.Text;
            OleDbDataAdapter adp = new OleDbDataAdapter();
            adp.SelectCommand = cmd;
            DataSet ds = new DataSet();
            adp.Fill(ds);
            DataTable dt = ds.Tables[0];
            dataGridView1.DataSource = dt;
            con.Close();
        }
        if (rdbtsouthindian.Checked == true && rdbtnonveg.Checked == true && rdbtcloseroof.Checked == true)
        {
            openconnection();
            cmd.Connection = con;
            cmd.CommandText = "select Hotel_Name,Address,Rating,Food,Ambience,Service,People_comments from SouthIndian where Type like 'Nonveg' and Roof like 'Close' order by Senti_Score desc";
            cmd.CommandType = CommandType.Text;
            OleDbDataAdapter adp = new OleDbDataAdapter();
            adp.SelectCommand = cmd;
            DataSet ds = new DataSet();
            adp.Fill(ds);
            DataTable dt = ds.Tables[0];
            dataGridView1.DataSource = dt;
            con.Close();
        }
        if (rdbtsouthindian.Checked == true && rdbtnonveg.Checked == true && rdbtopenroof.Checked == true)
        {
            openconnection();
            cmd.Connection = con;
            cmd.CommandText = "select Hotel_Name,Address,Rating,Food,Ambience,Service,People_comments from SouthIndian where Type like 'Nonveg' and Roof like 'open' order by Senti_Score desc";
            cmd.CommandType = CommandType.Text;
            OleDbDataAdapter adp = new OleDbDataAdapter();
            adp.SelectCommand = cmd;
            DataSet ds = new DataSet();
            adp.Fill(ds);
            DataTable dt = ds.Tables[0];
            dataGridView1.DataSource = dt;
            con.Close();
        }
```

```
            if (rdbtpunjabi.Checked == true && rdbtnonveg.Checked ==
true && rdbtopenroof.Checked == true)
            {
                openconnection();
                cmd.Connection = con;
                cmd.CommandText = "select
Hotel_Name,Address,Rating,Food,Ambience,Service,People_commen
ts from NorthIndian where Type like 'Nonveg' and Roof like 'open' order
by Senti_Score desc";
                cmd.CommandType = CommandType.Text;
                OleDbDataAdapter adp = new OleDbDataAdapter();
                adp.SelectCommand = cmd;
                DataSet ds = new DataSet();
                adp.Fill(ds);
                DataTable dt = ds.Tables[0];
                dataGridView1.DataSource = dt;
                con.Close();
            }
            if (rdbtgujarati.Checked == true && rdbtnonveg.Checked ==
true && rdbtopenroof.Checked == true)
            {
                openconnection();
                cmd.Connection = con;
                cmd.CommandText = "select
Hotel_Name,Address,Rating,Food,Ambience,Service,People_commen
ts from Gujarati where Type like 'Nonveg' and Roof like 'open' order by
Senti_Score desc";
                cmd.CommandType = CommandType.Text;
                OleDbDataAdapter adp = new OleDbDataAdapter();
                adp.SelectCommand = cmd;
                DataSet ds = new DataSet();
                adp.Fill(ds);
                DataTable dt = ds.Tables[0];
                dataGridView1.DataSource = dt;
                con.Close();
            }
            if (rdbtgujarati.Checked == true && rdbtveg.Checked == true
&& rdbtcloseroof.Checked == true)
            {
                openconnection();
                cmd.Connection = con;
                cmd.CommandText = "select
Hotel_Name,Address,Rating,Food,Ambience,Service,People_commen
ts from Gujarati where Type like 'veg' and Roof like 'close' order by
Senti_Score desc";
                cmd.CommandType = CommandType.Text;
                OleDbDataAdapter adp = new OleDbDataAdapter();
                adp.SelectCommand = cmd;
                DataSet ds = new DataSet();
                adp.Fill(ds);
```

```
                DataTable dt = ds.Tables[0];
                dataGridView1.DataSource = dt;
                con.Close();
            }


            if (rdbtpunjabi.Checked == true && rdbtveg.Checked == true
&& rdbtcloseroof.Checked == true)
            {
                openconnection();
                cmd.Connection = con;
                cmd.CommandText = "select
Hotel_Name,Address,Rating,Food,Ambience,Service,People_commen
ts from NorthIndian where Type like 'veg' and Roof like 'close' order by
Senti_Score desc";
                cmd.CommandType = CommandType.Text;
                OleDbDataAdapter adp = new OleDbDataAdapter();
                adp.SelectCommand = cmd;
                DataSet ds = new DataSet();
                adp.Fill(ds);
                DataTable dt = ds.Tables[0];
                dataGridView1.DataSource = dt;
                con.Close();
            }

            if (rdbtsouthindian.Checked == true && rdbtveg.Checked ==
true && rdbtcloseroof.Checked == true)
            {
                openconnection();
                cmd.Connection = con;
                cmd.CommandText = "select
Hotel_Name,Address,Rating,Food,Ambience,Service,People_commen
ts from SouthIndian where Type like 'veg' and Roof like 'close' order by
Senti_Score desc";
                cmd.CommandType = CommandType.Text;
                OleDbDataAdapter adp = new OleDbDataAdapter();
                adp.SelectCommand = cmd;
                DataSet ds = new DataSet();
                adp.Fill(ds);
                DataTable dt = ds.Tables[0];
                dataGridView1.DataSource = dt;
                con.Close();
            }
        else
            {
                MessageBox.Show("No such restaurant exist !!");
            }
          }
          catch
```

```
            {
                MessageBox.Show("No such restaurant exist !!");
            }


        }

        private void btnlogout_Click(object sender, EventArgs e)
        {
          MessageBox.Show("You are successfully logged out");
            Form1 FF = new Form1();
            FF.Show();
        }
    }
}
```