MINI-PROJECT REPORT ON

WEB-BASED RECOMMENDATION SYSTEM FOR SMART TOURISM

Report submitted to the SASTRA Deemed to be University as

the requirement for the course

CAP510 – INFORMATION SYSTEM DEVELOPMENT LABORATORY

Submitted by

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Under the Guidance of

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DEPARTMENT OF COMPUTER APPLICATION

School of Computing

SASTRA

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THANJAVUR | KUMBAKONAM | CHENNAI

BONAFIDE CERTIFICATE

This is to certify that the report titled **"WEB-BASED RECOMMENDATION SYSTEM FOR SMART TOURISM"** submitted as a requirement for the course, CAP510 – INFORMATION SYSTEM DEVELOPMENT LABORATORY for MCA is a bonafide record of the work done by Mr. SATHISHKUMAR S (123176091), MR. SIVA S (123176099), Mr.VEERAMANI M (123176124) during the academic year 2022-23, in the School of Computing, under my supervision**.**

Signature of Project Supervisor :

Name with Affiliation :

Date :

Mini Project *Viva voc*e held on _____

Examiner 1 **Examiner 2**

ACKNOWLEDGEMENTS

We would like to thank our Honorable Chancellor **Prof. R. Sethuraman** for providing us with an opportunity and the necessary infrastructure for carrying out this project as a part of our curriculum.

We would like to thank our Honorable Vice-Chancellor **Dr. S Vaidhyasubramaniam** and **Dr. S. Swaminathan,** Dean**,** Planning & Development, for the encouragement and strategic support at every step of our college life.

We extend our sincere thanks to **Dr. R. Chandramouli,** Registrar, SASTRA Deemed to be University for providing the opportunity to pursue this project.

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We would like to extend our gratitude to all the teaching and non-teaching faculties of the School of Computing who have either directly or indirectly helped us in the completion of the project.

We gratefully acknowledge all the contributions and encouragement from my family and friends resulting in the successful completion of this project. We thank you all for providing me an opportunity to showcase my skills through project.

LIST OF FIGURES

ABBREVIATIONS

RS	Recommender system
CF	Collaborative filtering
MAS	Multiagent system
ICT	Information communication technology
ITRS	Intelligent tourism recommendation agency
TSCA	Tourism supply chain agent
TPA	Tour package agent
RA	Recommendation agent
UA	User agent
BA	Broker agent
FIPA	Foundation for Intelligent Physical Agents
R	Recall

ABSTRACT

The goal of the study is to create and implement a hybrid recommendation filtering system for the smart tourism sector based on agent and web technologies. By taking into account online connection with various sectors of the tourism business, such as the tourism supply chain, agency, etc., a recommendation system based on agent technology is created.

However, the contract net protocol is used to build and establish online communication between the sectors using agents. The design system is also implemented as a web application and developed using the agent development framework.

Keywords: smart tourism; recommendation system; multiagent system; case study

TABLE OF CONTENTS

CHAPTER 1

SUMMARY OF THE BASE PAPER

BASE PAPER DETAILS

Title	Web-Based Recommendation System For Smart Tourism
Authors	Raheleh Hassannia , Ali Vatankhah Barenji 2,3,*,Zhi Li 2 and Habib Alipour 1
Journal Name	IEEE Access
Year of Publishing	2019
Publisher	IEEE

Table 1.1 Base Paper Details

INTRODUCTION

In recent years, the tourism sector has grown enormously. The rapid advancement of communication and information technology around the world, as well as the pervasive use of the internet, have all contributed to this enormous leap. These factors have made it easier to access vast amounts of global data from potential customers (tourists) on points of interest, travel plans, and destinations. E-tourism is currently flourishing on both a social and economic level. By suggesting likely vacation packages and thrilling trips, interim agencybased software, in contrast, plays a critical role in bridging the gap between the customers and the system.

Clients with information that is helpful for planning vacations and choosing vacation places, numerous software companies have created inventive techniques to do so. Real-time data transfer and recommender systems (RS) or filtering approaches are crucial for creating effective software agencies. The level of client satisfaction can be increased in this system thanks in large part to RS. Typically, RS aggregates and analyses the demographic information from user reviews to directly aid customers in locating reliable services, hotels, trips, tickets, restaurants, and other items. By offering advice on which vacation package or tour to choose, this system uses analytical technologies to calculate the likelihood that a consumer will make the purchase.

In order to solve these issues, this article introduces a web agent-based intelligent recommendation application for the smart tourism industry that uses real-time data and a collaborative filtering system to offer tour packages in response to consumer requests. Generally speaking, the first step toward developing a smart tourism sector is real-time communication and autonomous applications. In order to increase the percentage of recommended tours that customers find acceptable, a real-time based web application is being created while taking agent technology and recommendation filtering mechanisms into consideration.

WORKFLOW

Like any other form of industry, tourism-related organisations and businesses can profit from this technology and increase efficiency. Increased customer satisfaction and improved process efficiency will result from this. By identifying the procedures, duties, and techniques used in the hotel business, we want to use workflow technology to manage hotels in this work. From the time a guest makes a reservation to the time they check out, we will first understand the procedures involved in hotel administration and then model them. Our goals are to I introduce workflow technology and (ii) apply it to the tourism industry, specifically to the hotel industry.

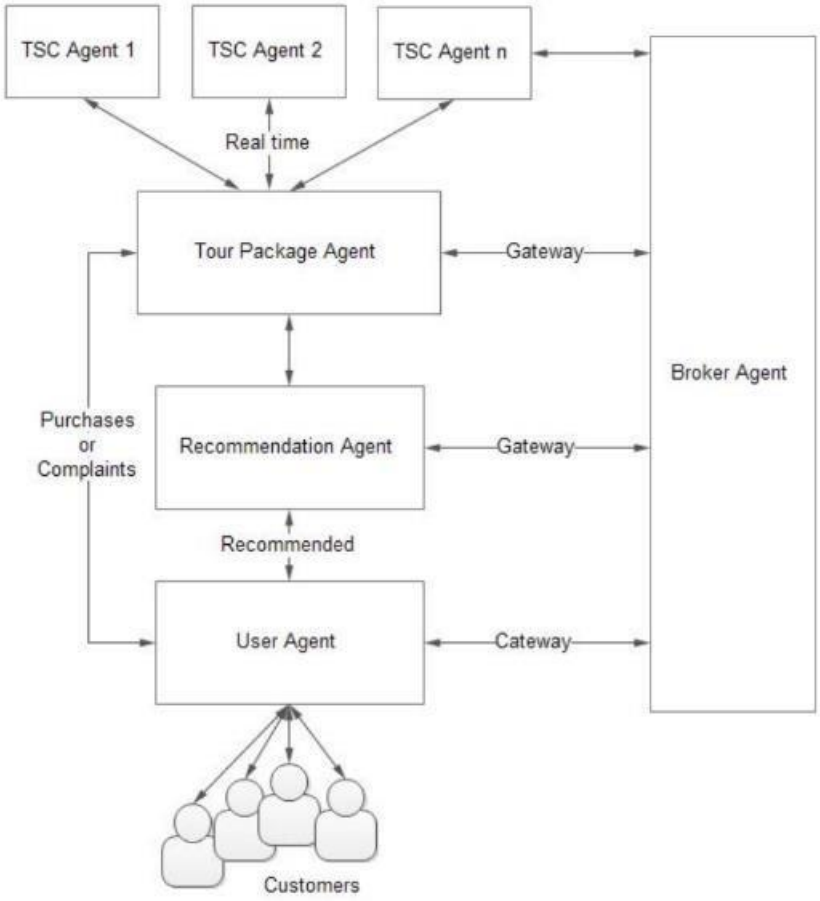


Fig. 1.2 Model workflow

CHAPTER 2

MERITS AND DEMERITS OF THE BASE PAPER

2.1 MERITS AND DEMERITS OF THE BASE PAPER

MERITS:

Not required to understand item content: The information on the objects, such as the type/genre of movies, and so on, may not always tell the complete story.

No item cold-start problem: We can anticipate an item's rating even in the absence of any available information about it, without having to wait for a user to make a purchase.

Captures the change in user interests over time: The user's viewpoint and preferences are not flexible when content is the exclusive point of focus.

Captures inherent subtle characteristics: The user's viewpoint and preferences are not flexible when content is the exclusive point of focus.

DEMERITS

Data Sparsity and cold-start problem: As a result of this CF constraint, you can struggle to provide new customers a positive impression of your company by failing to deliver a wonderful, tailored shopping experience.

Scalability: Collaborative algorithms will start to perform worse when the number of users grows and the volume of data expands because of the sheer volume of data growth.

Diversity and the long tail: A successful product will become even more popular as more customers watch and purchase it, pushing new products to the back of the pack. In other words, this strategy may lead to a lack of diversity for well-known products by having a richget-richer effect.

CHAPTER 3

SOURCE CODE

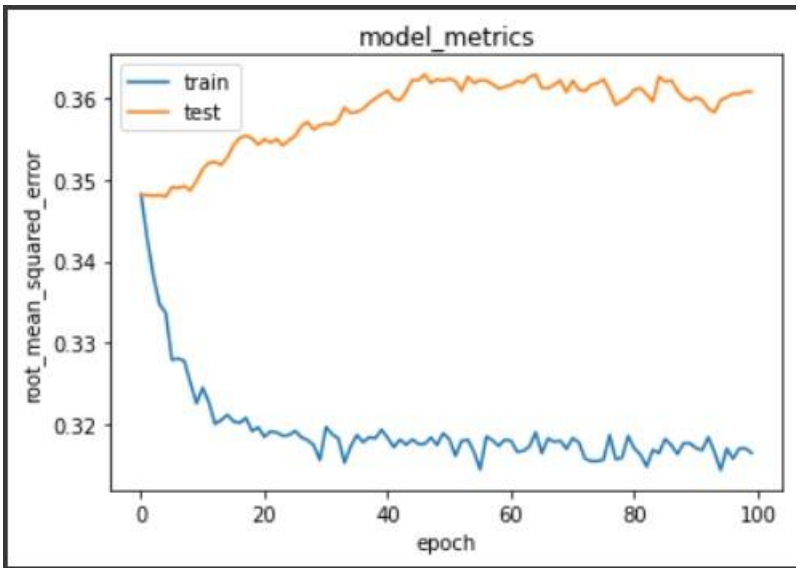
ALGORITHM CODE:

```
import pandas as pd info_tourism = pd.read_csv("tourism_with_id.csv")

tourism_rating = pd.read_csv("tourism_rating.csv") users =

pd.read_csv("user.csv") info_tourism.sample(5) tourism_rating.sample(5)

users.sample(5) print(f"Number of places in the datasets :

{len(info_tourism.Place_Id.unique())}") print(f"Number of users :

{len(users.User_Id.unique())}") print(f"The number of ratings given by the user

to the dataset :

{len(tourism_rating.User_Id)}") info_tourism.info()

info_tourism.isnull().sum() tourism_rating.info()

tourism_rating.isnull().sum() users.info() users.isnull().sum()

info_tourism.Category.unique() import numpy as np

tourism_all = np.concatenate((

info_tourism.Place_Id.unique(),

tourism_rating.Place_Id.unique()))

tourism_all = np.sort(np.unique(tourism_all)) print(f"Total number of tourism:

{len(tourism_all)}") all_tourism_rate = tourism_rating all_tourism_rate all_tourism =

pd.merge(all_tourism_rate,info_tourism[["Place_Id","Place_Name","Description","City","Ca

tegory"]],on='Place_Id', how='left')  all_tourism all_tourism.isnull().sum() preparation=

all_tourism.drop_duplicates("Place_Id") preparation place_id = preparation.Place_Id.tolist()

place_name = preparation.Place_Name.tolist() place_category = preparation.Category.tolist()

place_desc = preparation.Description.tolist() place_city = preparation.City.tolist()

city_category = preparation.city_category.tolist() tourism_new = pd.DataFrame({
```

```
    "id":place_id,
    "name":place_name,
    "category":place_category,
    "description":place_desc,
    "city":place_city,
    "city_category":city_category
})
tourism_new
collabrative fillitering import pandas as pd import numpy as np
from zipfile import ZipFile import tensorflow as tf from
tensorflow import keras from tensorflow.keras import layers from
pathlib import Path import matplotlib.pyplot as plt df =
tourism_rating df user_ids = df.User_Id.unique().tolist()
user_to_user_encoded = {x:i for i, x in enumerate(user_ids)}
user_encoded_to_user = {i: x for i, x in enumerate(user_ids)}
place_ids = df.Place_Id.unique().tolist() place_to_place_encoded
= {x: i for i, x in enumerate(place_ids)} place_encoded_to_place
= {x: i for x, i in enumerate(place_ids)} df['user'] =
df.User_Id.map(user_to_user_encoded) df['place'] =
df.Place_Id.map(place_to_place_encoded) num_users =
len(user_to_user_encoded) num_place =
len(place_encoded_to_place) df['Place_Ratings'] =
df['Place_Ratings'].values.astype(np.float32) min_rating =
min(df['Place_Ratings'])
```

```
max_rating= max(df['Place_Ratings']) print('Number of User: {}, Number of Place: {},
Min Rating: {}, Max Rating: {}'.format(     num_users, num_place, min_rating,
max_rating)) df = df.sample(frac=1,random_state=42) df x = df[['user','place']].values y
= df['Place_Ratings'].apply(lambda x:(x-min_rating)/(max_rating-min_rating)).values
train_indices = int(0.8 * df.shape[0]) x_train,x_val,y_train,y_val =
(x[:train_indices],x[train_indices:],  y[:train_indices],y[train_indices:]) print(x,y) class
RecommenderNet(tf.keras.Model):
# Insialisasi fungsi   def __init__(self, num_users, num_place,
embedding_size, **kwargs):
    super(RecommenderNet, self).__init__(**kwargs)
self.num_users = num_users     self.num_place = num_place
self.embedding_size = embedding_size
self.user_embedding = layers.Embedding(         num_users,
embedding_size,         embeddings_initializer = 'he_normal',
embeddings_regularizer = keras.regularizers.l2(1e-6)    )
self.user_bias = layers.Embedding(num_users, 1)
self.place_embedding = layers.Embedding(          num_place,
        embedding_size,         embeddings_initializer =
'he_normal',         embeddings_regularizer =
keras.regularizers.l2(1e-6)
    )
    self.place_bias = layers.Embedding(num_place, 1)
def call(self, inputs):
   user_vector = self.user_embedding(inputs[:,0]) # memanggil layer embedding 1
user_bias = self.user_bias(inputs[:, 0]) # memanggil layer embedding 2
```

```
place_vector = self.place_embedding(inputs[:, 1]) # memanggil layer embedding 3
place_bias = self.place_bias(inputs[:, 1]) # memanggil layer embedding 4
dot_user_place = tf.tensordot(user_vector, place_vector, 2)      x = dot_user_place +
user_bias + place_bias return tf.nn.sigmoid(x) # activation sigmoid model =
RecommenderNet(num_users, num_place, 100)
 # model compile model.compile(     loss =
tf.keras.losses.BinaryCrossentropy(),     optimizer =
keras.optimizers.Adam(learning_rate=0.001),
metrics=[tf.keras.metrics.RootMeanSquaredError()])
history = model.fit(x = x_train,y = y_train, batch_size = 8,
epochs = 100,validation_data = (x_val, y_val),)
plt.plot(history.history['root_mean_squared_error'])
plt.plot(history.history['val_root_mean_squared_error'])
plt.title('model_metrics')
plt.ylabel('root_mean_squared_error') plt.xlabel('epoch')
plt.legend(['train', 'test'], loc='upper left') plt.show()
```



```
place_df = tourism_new df =

pd.read_csv('tourism_rating.csv') user_id =

df.User_Id.sample(1).iloc[0]

place_visited_by_user = df[df.User_Id == user_id]

place_not_visited =
place_df[~place_df['id'].isin(place_visited_by_user['Place_Id'].values)]['id']

place_not_visited =
list(set(place_not_visited).intersection(set(place_to_place_encoded.keys())place_not_visited
= [[place_to_place_encoded.get(x)] for x in place_not_visited] user_encoder =

user_to_user_encoded.get(user_id) user_place_array = np.hstack(  ([[user_encoder]] *

len(place_not_visited), place_not_visited)

)

ratings = model.predict(user_place_array).flatten()
top_ratings_indices = ratings.argsort()[-10:][::-1] recommended_place_ids = [

place_encoded_to_place.get(place_not_visited[x][0]) for x in top_ratings_indices]

print('Showing recommendations for users: {}'.format(user_id)) print('===' * 9) print('Place

with high ratings from user') print('----' * 8)

top_place_user=(place_visited_by_user.sort_values(by =
'Place_Ratings',ascending=False).head(5).Place_Id.values) place_df_rows

= place_df[place_df['id'].isin(top_place_user)]

pd.DataFrame(place_df_rows)

print('----' * 8) print('Top 10 place

recommendation')

print('----' * 8)

recommended_place = place_df[place_df['id'].isin(recommended_place_ids)]

recommended_place
```

```
------------------------------
Top 10 place recommendation
------------------------------
```

	id	name	category	description	city	city_category
31	322	Bukit Jamur	Cagar Alam	Bukit Jamur Ciwidey adalah satu dari sekian ba...	Bandung	Bandung Cagar Alam
53	321	Glamping Lakeside Rancabali	Taman Hiburan	Glamping Lakeside Rancabali menawarkan tempat ...	Bandung	Bandung Taman Hiburan
102	97	Monumen Yogya Kembali	Budaya	Museum Monumen Yogya Kembali (bahasa Jawa: [illegible]...	Yogyakarta	Yogyakarta Budaya
226	94	Sumur Gumuling	Taman Hiburan	Sumur Gumuling adalah salah satu tempat untuk ...	Yogyakarta	Yogyakarta Taman Hiburan
258	340	Desa Wisata Lembah Kalipancur	Taman Hiburan	Wisata alam tengah menjadi sorotan bagi dunia ...	Semarang	Semarang Taman Hiburan
316	333	Kota Mini	Taman Hiburan	Destinasi yang sangat menarik bernuansa eropa ...	Bandung	Bandung Taman Hiburan
373	401	Taman Keputran	Taman Hiburan	Ntah, mengapa nama taman ini disebut dengan ta...	Surabaya	Surabaya Taman Hiburan
393	79	Taman Spathodea	Taman Hiburan	Objek Wisata Taman Spathodea di Jagakarsa DKI ...	Jakarta	Jakarta Taman Hiburan
418	387	Obyek Wisata Goa Kreo	Cagar Alam	Goa Kreo Semarang yang berada di ibukota Jawa ...	Semarang	Semarang Cagar Alam
423	314	Tafso Barn	Cagar Alam	Nama Punclut mungkin sudah cukup akrab di teli...	Bandung	Bandung Cagar Alam

SAMPLE PAGE CODE:

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>Welcome to SVS Tourism</title>
<!-- Global site tag (gtag.js) - Google Analytics -->
<script async src="id=UA-1350892-1"></script>
<script> window.dataLayer =
window.dataLayer || []; function gtag() {
dataLayer.push(arguments);} gtag('js', new
Date()); gtag('config', 'UA-1350892-1');
</script>
<script defer src="lang_switch.js"></script>
</head>
<body>
<div id="langSwitchModal" class="modal fade" role="dialog">
<div class="modal-dialog">
<div class="modal-content">
```

<h4 class="text-center" id="popup-msg">SVS Tourism</h4>

<button type="button" class="btn btn-default" data-dismiss="modal" id="sh-btn">Stay Here</button>

Redirect

<ul class="top-menu" style="font-size: 25px">

<h1>SVS EXPLORE</h1>

<ul class="top-menu" style="font-size: 14px">

EXPERIENCE WORLD

WHERE TO GO

WHERE TO STAY

THINGS TO DO

LOGIN/REGISTER

<li class="web-d-none mob-d-block">

<form action="" name="cse-search-box" id="cse-search-box" method="get" acceptcharset="utf-8">

<input name="q" value="" class="form-control search-field" type="text" placeholder="What are you looking for?">

<button class="btn btn-default searchBtn" type="submit"> </button>

</form>

<script>

$(window).click(function() {

$('#search-panel').slideUp();}); $('#search-

panel').click(function(event) {

event.stopPropagation();}); $("#search").click(function(e)

{

$(this).toggleClass("on");

$('#search-panel').slideToggle('medium'); e.stopPropagation();});

</script>

<picture>

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</picture>

<h2>Top Destinations</h2>

<picture>

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<source media="(max-width: 1023px)" srcset="malarikkal-05.jpg">

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</picture>

 Tourism

<picture>

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</picture>

Forest Areas

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Sea source

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<img loading="lazy" src="https://c4.wallpaperflare.com/wallpaper/118/95/819/close-upfocus-photo-of-a-white-petaled-flower-magnolia-magnolia-wallpaperpreview.jpg"></picture>

Mountain

<picture>

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</picture>

Biodiversity Museum

<picture>

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</picture>

Forts

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Beachs

<picture>

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<img loading="lazy" src="https://wallpaperaccess.com/full/5808.jpg" alt="Koyikkal Palace"
class="img-responsive">

</picture>

Palace

<h2>Things to do in WORLD</h2>

<picture>

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Hot Air Balloon Ride

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Camping

<picture>

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Trekking


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<div class="row">
<div class="col-md-12 section-head">
<h2>Tour Packages</h2>
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STOP. Breathe. Slow down. Embrace life. It’s time for WORLD!

Plan your trip with amazing offers and packages.

 <img loading="lazy" src="https://dynamic-media-cdn.tripadvisor.com/media/photo-o/23/6a/ff/2a/caption.jpg?w=700&h=500&s=1&cx=7014&cy=3760&chk=v1_14690e40614ca9b48b73.jpg" alt="Entire Kerala" title="Entire Kerala" class="img-responsive">Entire DUBAI<small>A Journey Through Desert To Heaven</small> INR 3,00,000to 10,00,000

 <img loading="lazy" src="https://www.tamilnadutourism.tn.gov.in/img/pages/large-desktop/discover-the-divineat-thanjavur-1658836390_3b3d1f591810747cb4a8.webp" alt="Central Kerala" title="Central Kerala" class="img-responsive">INDIA<small>Trip to the soul of INDIA</small> INR 1,00,0000 to 2,00,000

 <img loading="lazy" src="https://wallpapercave.com/wp/wp1841855.jpg" alt="Backwater" title="Backwater" class="img-responsive">SINGAPORE<small>Through the stretches of emerald</small> INR 1,000 to 60,000

 <img loading="lazy" src="https://wallpapercave.com/dwp1x/wp5018696.jpg" alt="South Kerala" title="South Kerala" class="img-responsive">LONDON<small>A journey to remember</small> INR 3,00,000 to 8,00,000

 <img loading="lazy" src="https://i0.wp.com/thegoodlifefrance.com/wp-content/uploads/2021/03/Literary-tour-ofFrance.jpg?ssl=1.jpg" alt="Hill Station" title="Hill Station" class="img-responsive">FRANCE<small>TO find a peace</small> INR 3,00,000 to 8,00,000

 <img loading="lazy" src="https://a.cdn-hotels.com/gdcs/production179/d1127/52a93d48-b9d4-4a7e-9fb7c9466da4c344.jpg?impolicy=fcrop&w=800&h=533&q=medium.jpg" alt="Honeymoon" title="Honeymoon" class="img-responsive">SWITZERLAND<small>Celebrate your romance</small> INR 2,00,000 to 4,00,000

 FIND MORE PACKAGES

<input type="hidden" name="pack_category_id" id="pack_category_id" value="" />

</form> <script> function

showPackages(val) {

document.getElementById('p

ack_category_id').value =

val;

document.frmPackage.submit

();

}

</script>

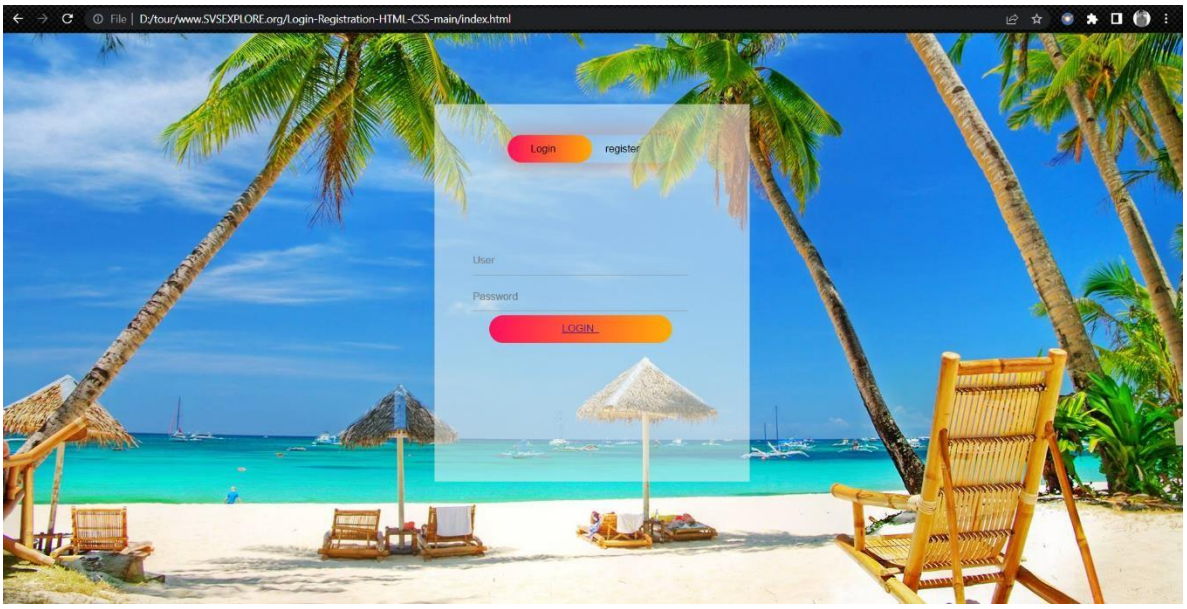
</body>

</html>

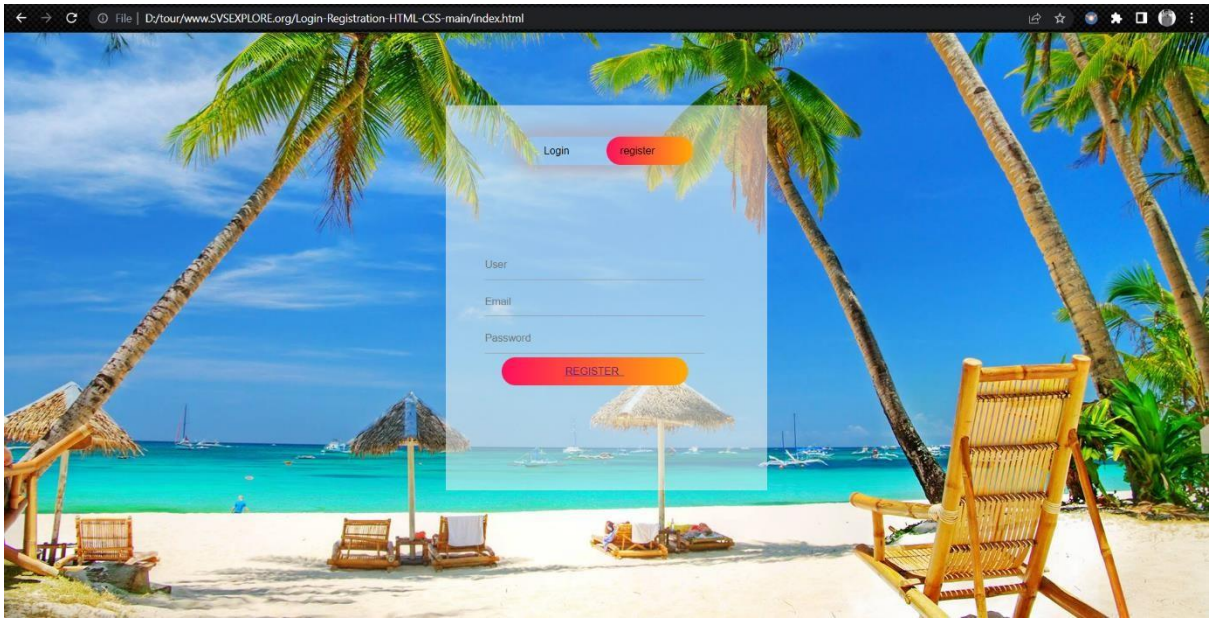
CHAPTER 4

SNAPSHOTS

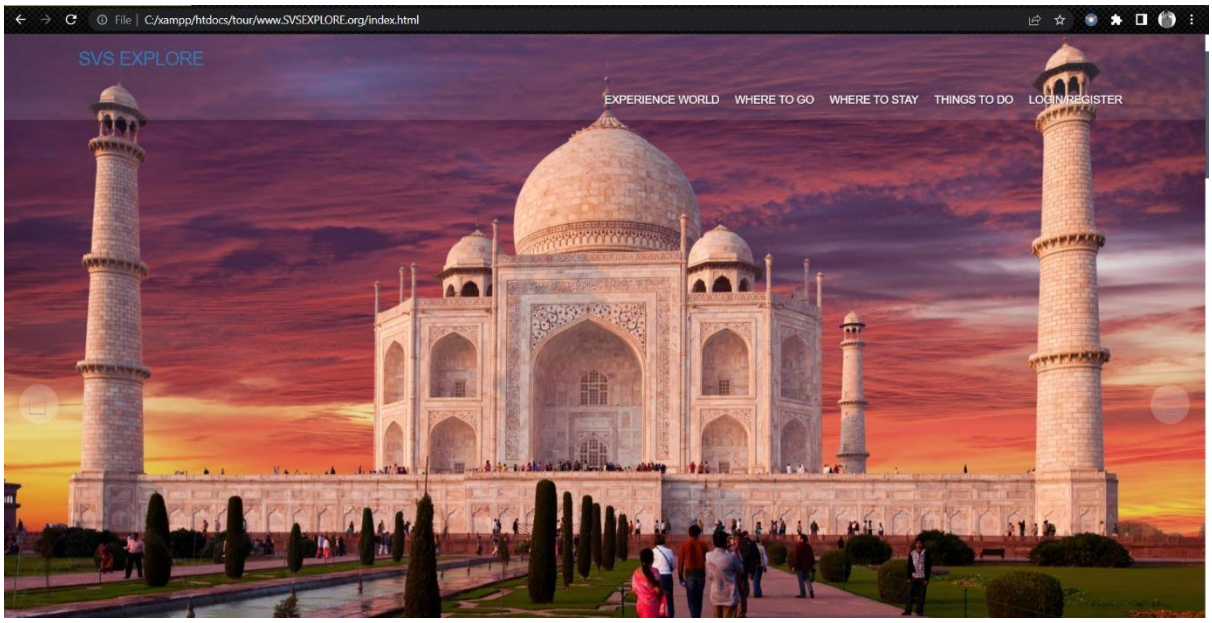
Login page:



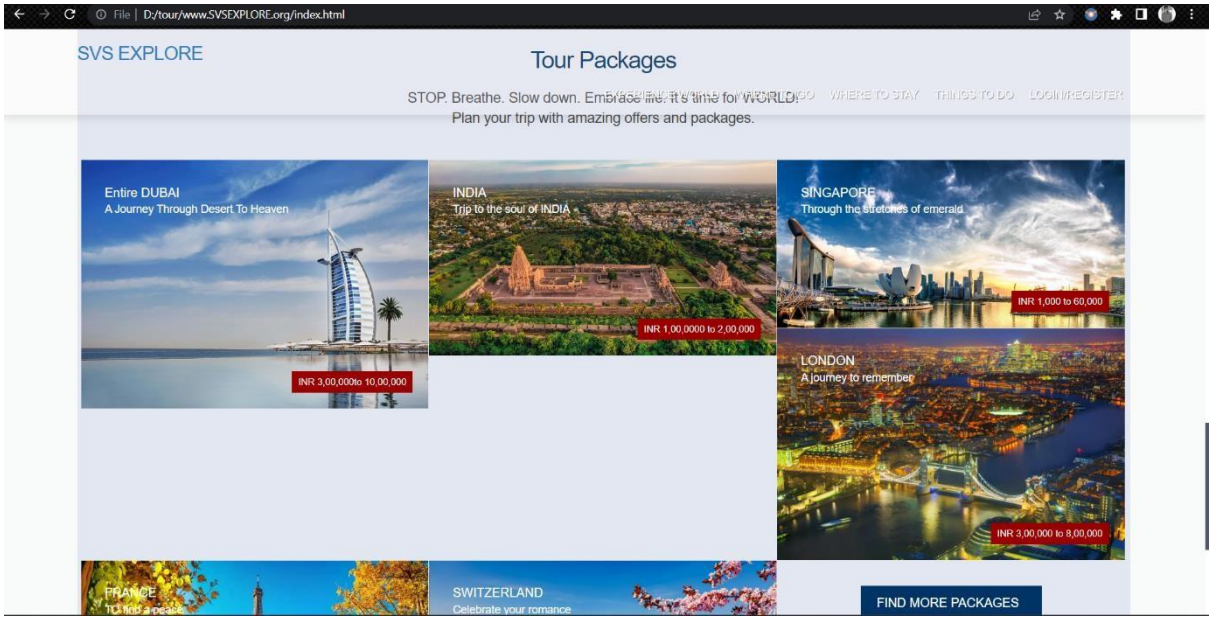
Registration page



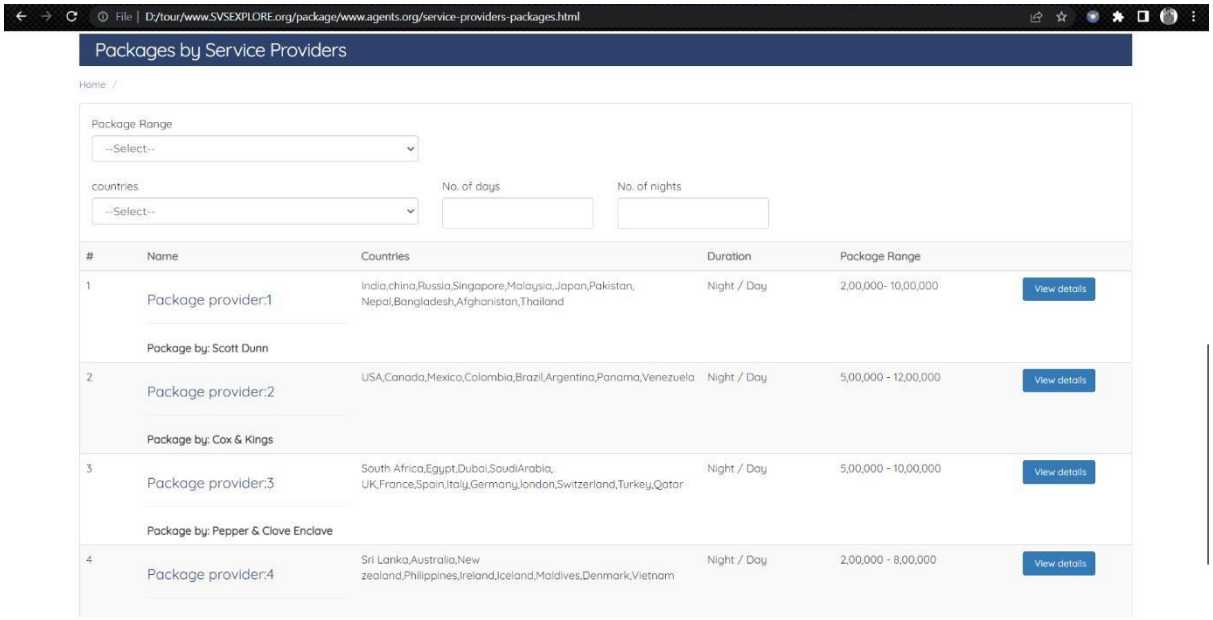
Home Page



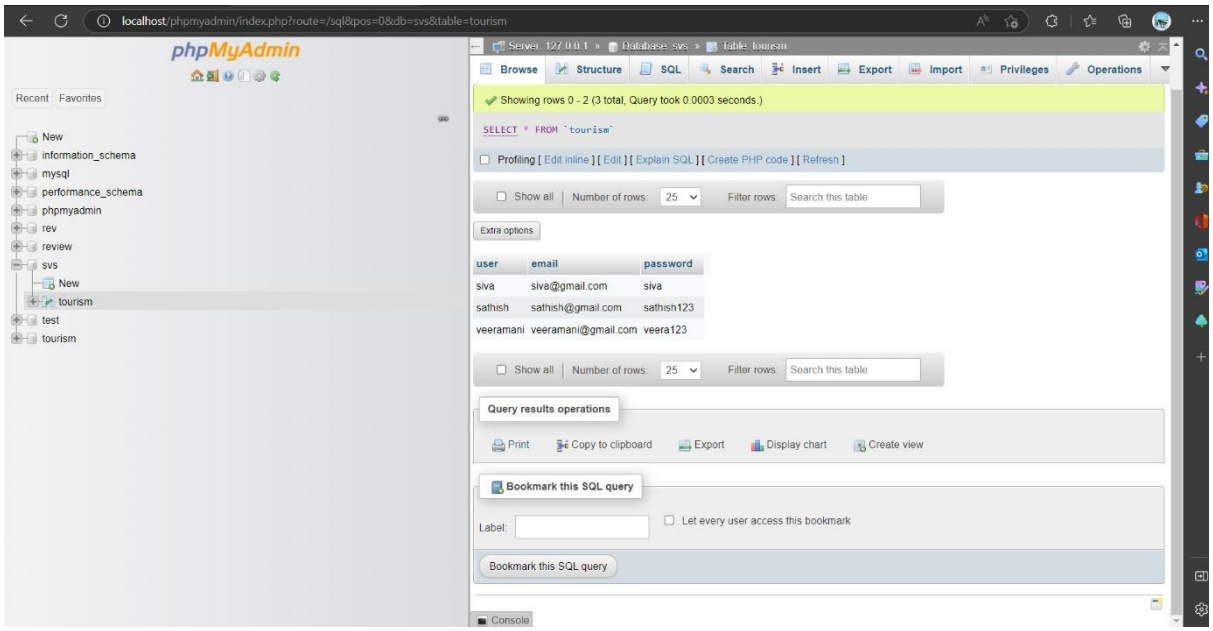
Tour packages



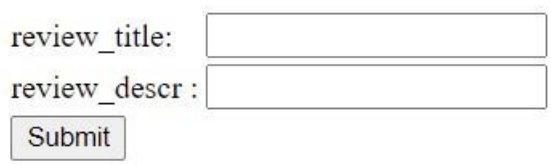
Package Providers



Registered users



Reviwes



CHAPTER 5

CONCLUSION AND FUTURE PLANS

CONCLUSION

This research paper proposed an agent-based intelligent recommendation software agency by using a collaborative recommendation approach that considered real-time communication. The software designed based on the agent technology, and its architecture was explained in detail. Four agents were defined and implemented via the web application. The communication among agents was established based on the contact net protocol. In this respect, hybrid-based recommendation system was composed of collaborative and content-based approaches.

CHAPTER 6

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