

**CSP 584 – Enterprise Web Applications**

**Final Project – Phase 3**

**Recommenders for Social places**

**(Social Recommendation System –**

**Using Recombee API & Surprise library Python)**

- Registration – This page allows registration for User and Admin in the website. In the Registration page , google API is used using which address is made autocomplete and data is filled automatically.

# Social Recommendation

*\*\* Recommends social places \*\**

[Login](#)

## Registration

Userid	user6		
Password	.....		
Confirm Password	.....		
Email(Username)	user6		
User Type	User		
Address	2901 South King Drive, Chicago, IL, USA		
Street No	2901		
Street	South King Drive		
City	Chicago		
State	IL		
Zipcode	60616		
Country	United States		
Latlong	41.8415411, -87.6164589		
Preference	<input type="checkbox"/> Amusement Park <input checked="" type="checkbox"/> Shopping Mall <input checked="" type="checkbox"/> Night Club <input checked="" type="checkbox"/> Restaurant <input type="checkbox"/> Tourist Attraction <input type="checkbox"/> Museum <input checked="" type="checkbox"/> Cafe <input type="checkbox"/> Bar		
<a href="#">Create User</a>			

On successful creation of user / admin , records are inserted into the table “registration”. For the registration page, servlet has been used.

Result Grid														
Filter Rows:		Search	Edit:		Export/Import:									
userid	email	username	password	streetaddress	city	state	zipcode	country	preference	created_date	longlat	userType		
► admin	admin@gmail.com	admin@gmail.com	admin	2901 South King Drive	Chicago	IL	60616	United States	NULL	11-19-2019	41.8415411,-87.6164589	admin		
admin1	admin1@gmail.com	admin1@gmail.com	admin1	2901 South King Drive	Chicago	IL	60616	United States	NULL	11-22-2019	41.8415411,-87.6164589	admin		
ashok	ashok@gmail.com	ashok@gmail.com	ashok	2901 South King Drive	Chicago	IL	60616	United States	NULL	11-19-2019	41.8415411,-87.6164589	user		
test	test@gmail.com	test@gmail.com	test	2901 South King Drive	Chicago	IL	60616	United States	NULL	11-19-2019	41.9648575999999,-87.83... user			
test1	test1@gmail.com	test1@gmail.com	test1	3201 South State Street	Chicago	IL	60616	United States	NULL	11-22-2019	41.8356712,-87.625815399... user			
user1	user1@gmail.com	user1@gmail.com	user1	East 29th Street	Chicago	IL	60616	United States	NULL	11-19-2019	41.8420212,-87.620374999... user			
user2	user2@gmail.com	user2@gmail.com	user2	2602 West Devon Avenue	Chicago	IL	60659	United States	NULL	11-19-2019	41.9978188,-87.695053499... user			
user3	user3@gmail.com	user3@gmail.com	user3	4701 Dempster Street	Skokie	IL	60076	United States	NULL	11-19-2019	42.04069310000001,-87.74... user			
user4	user4@gmail.com	user4@gmail.com	user4	830 West Golf Road	Schaumburg	IL	60194	United States	NULL	11-19-2019	42.0489969,-88.101142299... user			
user5	user5@gmail.com	user5@gmail.com	user5	1568 Ogden Avenue	Naperville	IL	60540	United States	NULL	11-19-2019	41.768536,-88.18476900000... user			
user6	user6@gmail.com	user6@gmail.com	user6	2901 South King Drive	Chicago	IL	60616	United States	NULL	11-22-2019	41.8415411,-87.6164589	user		
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL		

- Yelp API is used for searching social places near.

Yelp Fusion Fusion API GraphQL Manage App

**General**

Manage App Client ID

Email / Notifications API Key

Display Requirements

Terms of Use

FAQ

**Yelp Fusion**

Introduction Business Endpoints

Event Endpoints Category Endpoints

Changelog Fusion VIP

**GraphQL**

Guides Query

Objects GraphQL Console

Changelog

**Yelp Developers**

Yelp Platform

Yelp Knowledge

Yelp Open Source

Yelp Engineering

**My App**

App Name Recommendation System

App Website Optional

Industry School / Education

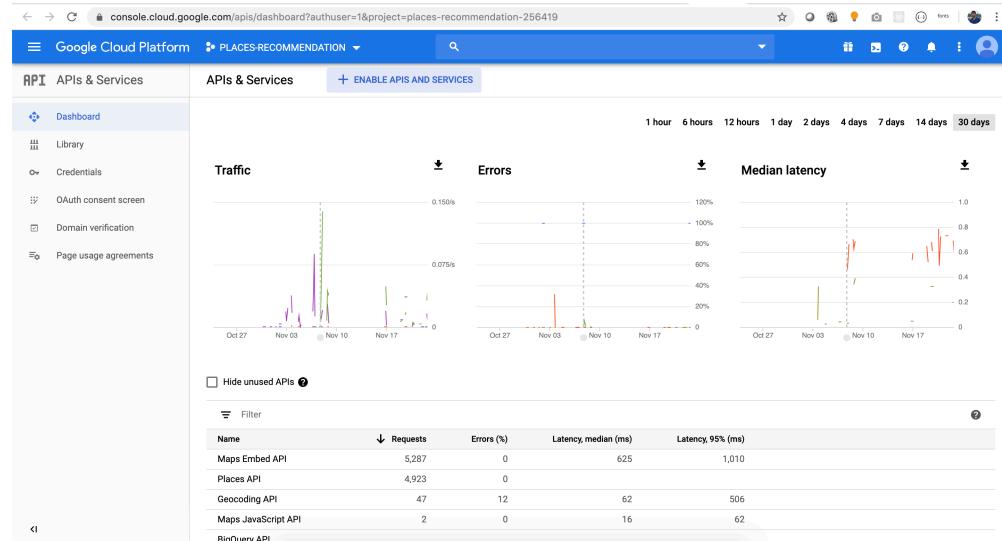
Company Optional

Contact Email ashok.kumar.kit@gmail.com

Description Required for School Project - Social Recommendation System

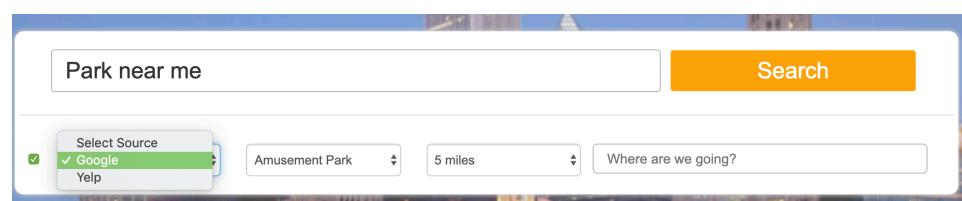
Save Changes Cancel Delete App

- Google Places API used for searching social places.

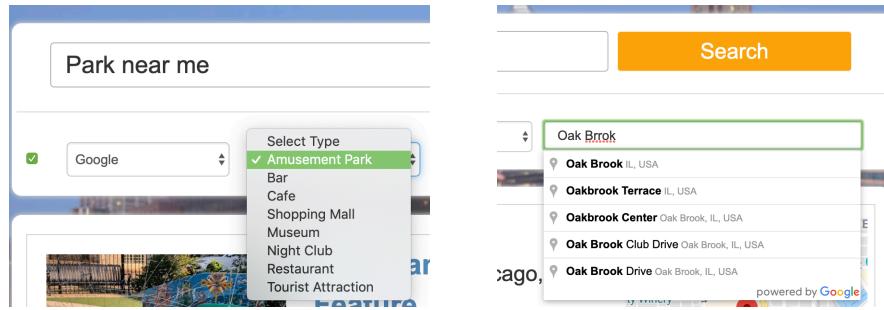


- Advance Search Filters

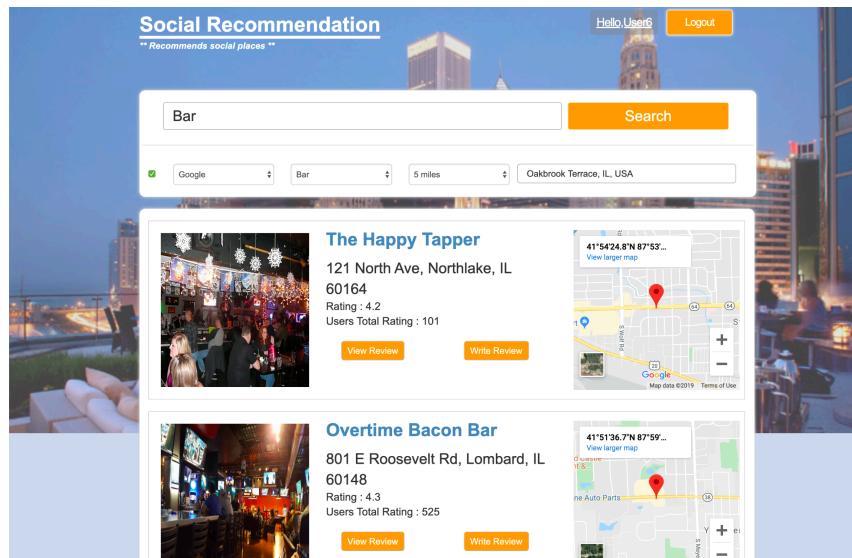
Source – Google Places API or YELP.



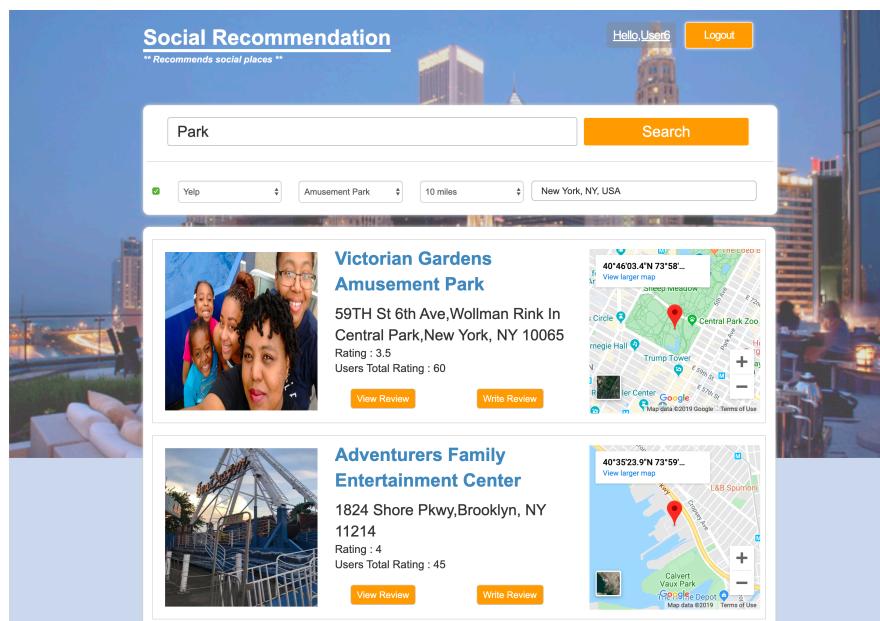
- Type of Search and places search.



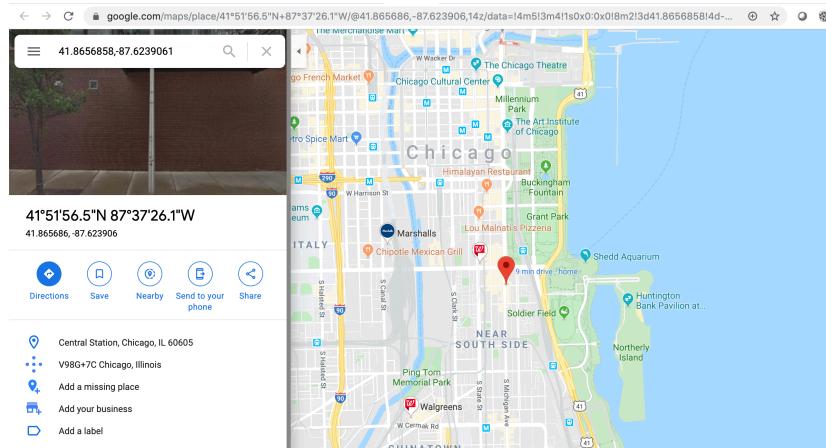
- Searching Social Place like Bar using Google as the searching source, type as bar, radius for search as 5 miles and location is Oak Brook, Illinois.



- Searching Social Place like Park using Yelp as the searching source, type as Amusement Park, radius for search as 10 miles and location is New York.



- On clicking, the map, it opens on the larger window and pointing to the selected location.



- Screen to write review for selected social place and message on successful review post.

localhost/SocialRecommendationSystem/WriteReview

## Social Recommendation

**\*\* Recommends social places \*\***

Hello,User6 Logout

**Write Review**

Name:	Nepal House Indian Nepalese Restaurant
Street Address:	1301 S Michigan Ave, Chicago, IL 60605, United States
Review Rating:	<input type="text" value="5"/>
Comment:	<input type="text" value="Good Place to visit"/>

**SubmitReview**

localhost/SocialRecommendationSystem/SubmitRecommendReview

## Social Recommendation

**\*\* Recommends social places \*\***

Hello,User6 Logout

**Review for Nepal House Indian Nepalese Restaurant Stored**

- Screen to view all the review entered by the users.

localhost/SocialRecommendationSystem/ViewReview

## Social Recommendation

**\*\* Recommends social places \*\***

Hello,User6 Logout

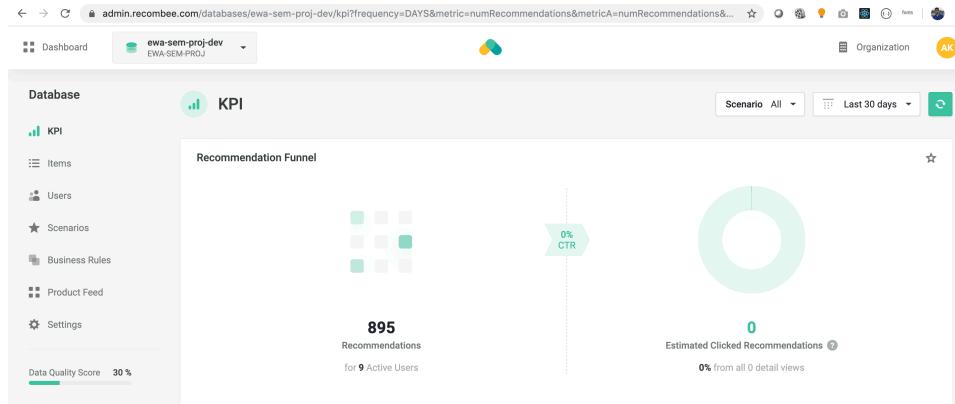
**View Review**

**Nepal House Indian Nepalese Restaurant**

1301 S Michigan Ave, Chicago, IL 60605, United States

Userid:	user6
Review Rating:	5
Reviews:	Good Place to visit

- For recommendation using Recombee, I have created an account on the Recombee portal and below is the screenshots of Account and data on which recommendation is done.



- The below data shown is entered on Recombee server from MYSQL database for recommendation. Every time the current data is overwritten.

The screenshot shows the Recombee 'Items' page for the 'ewa-sem-proj-dev' project. The sidebar includes links for Database, KPI, Items, Users, Scenarios, Business Rules, Product Feed, and Settings. A 'Data Quality Score' is shown as 30%. The main table lists 18 items with the following columns: itemID (String), name (String), reviewRating (String), and userId (String). The items listed include Bar\_Louie\_-, Naperville, Bombay\_Wraps, Captains\_Walk\_Shopping\_Mall, Chicago\_Curry\_House\_Restaurant, India\_House\_Restaurant\_-, Chicago, Jewel-Osco, Lickity\_Split\_Frozen\_Custard, Millennium\_Park, Nepal\_House\_Indian\_Nepalese\_Restaurant, Parivar\_Grocers, Patel\_Brothers, Pita\_Inn, Pub\_56, Quigley, Shedd\_Aquarium, Skokie\_Fashion\_Square, Stateway\_Park, and Taste\_of\_Peru. Each item has a corresponding URL link next to its name.

itemID	name	reviewRating	userId
Bar_Louie_-, Naperville >	Bar_Louie_-, Naperville	4	user5
Bombay_Wraps >	Bombay_Wraps	5	user1
Captains_Walk_Shopping_Mall >	Captains_Walk_Shopping_Mall	4	user3
Chicago_Curry_House_Restaurant >	Chicago_Curry_House_Restaurant	5	test1
India_House_Restaurant_-, Chicago >	India_House_Restaurant_-, Chicago	4	user1
Jewel-Osco >	Jewel-Osco	4	user4
Lickity_Split_Frozen_Custard >	Lickity_Split_Frozen_Custard	3	user2
Millennium_Park >	Millennium_Park	5	user1
Nepal_House_Indian_Nepalese_Restaurant >	Nepal_House_Indian_Nepalese_Restaurant	5	user6
Parivar_Grocers >	Parivar_Grocers	5	user4
Patel_Brothers >	Patel_Brothers	5	user4
Pita_Inn >	Pita_Inn	5	user3
Pub_56 >	Pub_56	3	user5
Quigley >	Quigley	5	user5
Shedd_Aquarium >	Shedd_Aquarium	5	user5
Skokie_Fashion_Square >	Skokie_Fashion_Square	4	user3
Stateway_Park >	Stateway_Park	4	test
Taste_of_Peru >	Taste_of_Peru	4	user2

- Below screen shows the Python code for doing recommendation using Recombee API.
  - First the connection is established using Recombee API.
  - Two files are generated using MySQL connection for getting user list in “**data\_train\_users.json**” and reviews from users in “**data\_train.json**”.
  - Data of the review is pushed on the Recombee server.
  - For each user, recommendation is done and data is stored in “**output\_recombee.csv**”.
  - Application uses “**output\_recombee.csv**” for displaying the recommendation.

Jupyter RecombeeRecommender Last Checkpoint: a few seconds ago (autosaved)

File Edit View Insert Cell Kernel Help Trusted Python 3

### Connecting to Recombee using Recombee Client API

```
In [11]: #Python Recombee
from recombee_api_client.api_client import RecombeeClient
from recombee_api_client.api_requests import *
import json

client = RecombeeClient('ewa-sem-proj-dev', '')
#print(client);
```

**Connecting to MySQL database to get the data and save it as JSON. For this Pandas has been used.**

```
In [12]: import json
import pymysql
import pandas

conn = pymysql.connect(host='127.0.0.1', port=3306, user='root', password='root', database='SocialRecommendation')
cursor = conn.cursor()

# Querying data for getting the revies data for recommendation
query = "select distinct(userid) as _userid, REPLACE(LTRIM(RTRIM(name)), SPACE(1), '_') as _name, reviewrating as _revie
results = pandas.read_sql_query(query, conn)
results.to_json("data_train.json", orient='records')

# Getting the list of distinct users from review table.
query_users="select distinct(userid) as _userid from review"
results = pandas.read_sql_query(query_users, conn)
results.to_json("data_train_users.json", orient='records')

In [3]: #client.sendDeleteItem('SamsungOLED')
#client.sendAddItemProperty('_userid','string')
#client.sendAddItemProperty('_name','string')
#client.sendAddItemProperty('_reviewrating','string')

Out[3]: 'ok'
```

**Inserting data to Recombee server that will be used further for recommendation.**

```
In [13]: requests = []
with open('data_train.json') as f:
    data = json.loads(f.read())
    for item in data:
        print("Data added to request - "+ item['_name'])
        r = SetItemValues(item['_name'], item, cascade_create=True)
        requests.append(r)

res = client.send(Batch(requests))
print("Data successfully pushed to Recombee server.")

Data added to request - Millennium_Park
Data added to request - India_House_Restaurant_-_Chicago
Data added to request - Bombay_Wraps
Data added to request - Lickity_Split_Frozen_Custard
Data added to request - Taste_of_Peru
Data added to request - Pita_Inn
Data added to request - Captains_Walk_Shopping_Mall
Data added to request - Skokie_Fashion_Square
Data added to request - Jewel-Osco
Data added to request - Parivar_Grocers
Data added to request - Patel_Brothers
Data added to request - Shedd_Aquarium
Data added to request - Bar_Louie_-_Naperville
Data added to request - Pub_56
Data added to request - Quigley
Data added to request - Stateway_Park
Data added to request - Chicago_Curry_House_Restaurant
Data added to request - Nepal_House_Indian_Nepalese_Restaurant
Data successfully pushed to Recombee server.
```

**Performing recommendation for each user based on the data that was pushed and the recommended data is being stored as csv file.**

```
In [14]: import csv

out = open('output_recombee.csv','w',newline='')
output = csv.writer(out)
name = '''

# Fetching the list of users from Json File
with open('data_train_users.json') as g:
    users = json.loads(g.read())
    for user in users:
        #print(user['_userid'])

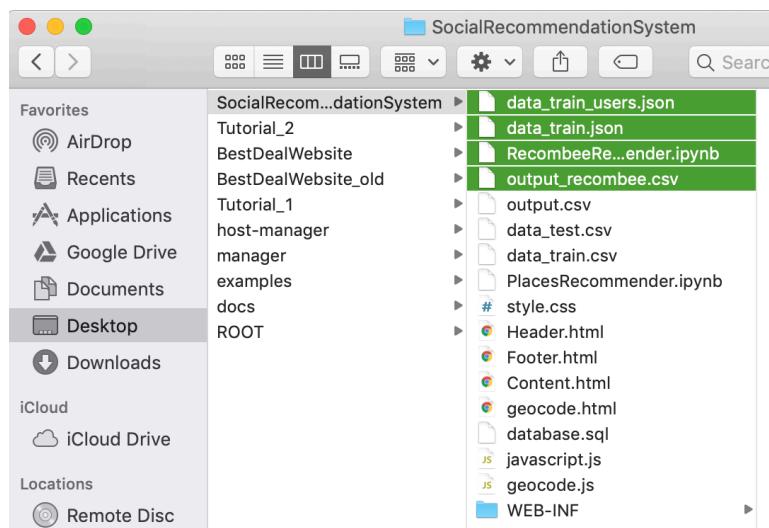
        # For each user, perform the recommendation
        with open('data_train.json') as f:
            interactions = json.loads(f.read())
            for item in interactions:
                if(user['_userid']==item['_userid']):
                    recommended = client.send(RecommendItemsToItem(item['_name'], item['_userid'], 10, cascade_create=True))
                    name += '['
                    end = ']'
                    for re in recommended['recomms']:
                        name += '\''+re['id']+'\','
                    name+=end
                    name=name.replace(",","")
                    name=name.replace("[","")
                    print(item['_userid'],name)
                    output.writerow([item['_userid'],name])
                    break;
out.close()

user1 ['Bombay Wraps','India House Restaurant - Chicago','Nepal House Indian Nepalese Restaurant','Pita Inn','Parivar Grocers','Patel Brothers','Chicago Curry House Restaurant','Quigley','Shedd Aquarium','Pub 56']
user2 ['Pub 56','Taste of Peru','Nepal House Indian Nepalese Restaurant','Parivar Grocers','Millennium Park','Bar Louie - Naperville','Stateway Park','Patel Brothers','Quigley','Bombay Wraps']
user3 ['Captains Walk Shopping Mall','Skokie Fashion Square','Nepal House Indian Nepalese Restaurant','Parivar Grocer s','Millennium Park','Patel Brothers','Chicago Curry House Restaurant','Quigley','Bombay Wraps','Shedd Aquarium']
user4 ['Parivar Grocers','Patel Brothers','Stateway Park','Captains Walk Shopping Mall','Skokie Fashion Square','Tast of Peru','Bar Louie - Naperville','India House Restaurant - Chicago','Pub 56','Nepal House Indian Nepalese Restaura nt']
user5 ['Quigley','Pub 56','Bar Louie - Naperville','Nepal House Indian Nepalese Restaurant','Pita Inn','Parivar Groce rs','Millennium Park','Patel Brothers','Chicago Curry House Restaurant','Bombay Wraps']
test ['Captains Walk Shopping Mall','Skokie Fashion Square','Taste of Peru','Bar Louie - Naperville','Jewel-Osco','In dia House Restaurant - Chicago','Pub 56','Nepal House Indian Nepalese Restaurant','Pita Inn','Parivar Grocers']
test1 ['Nepal House Indian Nepalese Restaurant','Pita Inn','Parivar Grocers','Millennium Park','Patel Brothers','Quig ley','Bombay Wraps','Shedd Aquarium','Pub 56','Bar Louie - Naperville']
user6 ['Pita Inn','Parivar Grocers','Millennium Park','Patel Brothers','Chicago Curry House Restaurant','Quigley','Bo mbay Wraps','Shedd Aquarium','Pub 56','Bar Louie - Naperville']
```

- Structure of the “output\_recombee.csv” file.

	A	B	C	D	
1	user1	["Bombay Wraps','India House Restaurant - Chicago','Nepal House Indian Nepalese Restaurant','Pita Inn','Parivar Grocers','Patel Brothers','Chicago Curry House Restaurant','Quigley','Shedd Aquarium','Pub 56']			
2	user2	["Pub 56','Taste of Peru','Nepal House Indian Nepalese Restaurant','Parivar Grocers','Millennium Park','Bar Louie - Naperville','Stateway Park','Patel Brothers','Quigley','Bombay Wraps']			
3	user3	["Captains Walk Shopping Mall","Skokie Fashion Square",'Nepal House Indian Nepalese Restaurant','Parivar Grocers','Millennium Park','Patel Brothers','Chicago Curry House Restaurant','Quigley','Bombay Wraps','Shedd Aquarium']			
4	user4	["Parivar Grocers','Patel Brothers','Stateway Park','Captains Walk Shopping Mall','Skokie Fashion Square','Taste of Peru','Bar Louie - Naperville','India House Restaurant - Chicago','Pub 56','Nepal House Indian Nepalese Restaurant']			
5	user5	["Quigley','Pub 56','Bar Louie - Naperville','Nepal House Indian Nepalese Restaurant','Pita Inn','Parivar Grocers','Millennium Park','Patel Brothers','Chicago Curry House Restaurant','Bombay Wraps']			
6	test	["Captains Walk Shopping Mall","Skokie Fashion Square",'Taste of Peru','Bar Louie - Naperville','Jewel-Osco','India House Restaurant - Chicago','Pub 56','Nepal House Indian Nepalese Restaurant','Pita Inn','Parivar Grocers']			
7	test1	["Nepal House Indian Nepalese Restaurant','Pita Inn','Parivar Grocers','Millennium Park','Patel Brothers','Quigley','Bombay Wraps','Shedd Aquarium','Pub 56','Bar Louie - Naperville']			
8	user6	["Pita Inn','Parivar Grocers','Millennium Park','Patel Brothers','Chicago Curry House Restaurant','Quigley','Bombay Wraps','Shedd Aquarium','Pub 56','Bar Louie - Naperville']			
9					

- Project structure showing all the files related top Recombee Recommendation.

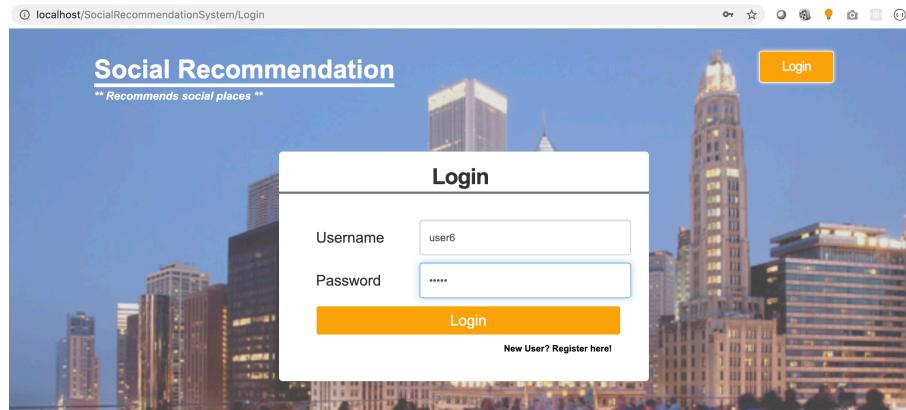


- Admin page used for changing the configuration of the application to recommend using Recombee.

- Database configuration table showing, Recombee is enabled.

recommendationsource	activeflag
recombee	true
surprise	false

- Logging using newly created user i.e. "user6" to display the recommendation using Recombee.



- Below is the output of the recommendation for "user6" that needs to be matched with the data being recommended on user homepage.

```
test ['Captains Walk Shopping Mall', 'Skokie Fashion Square', 'Taste of Peru', 'Bar Louie - Naperville', 'Jewel-Osco', 'India House Restaurant - Chicago', 'Pub 56', 'Nepal House Indian Nepalese Restaurant', 'Pita Inn', 'Parivar Grocers']
test1 ['Nepal House Indian Nepalese Restaurant', 'Pita Inn', 'Parivar Grocers', 'Millennium Park', 'Patel Brothers', 'Quigley', 'Bombay Wraps', 'Shedd Aquarium', 'Pub 56', 'Bar Louie - Naperville']
user6 ['Pita Inn', 'Parivar Grocers', 'Millennium Park', 'Patel Brothers', 'Chicago Curry House Restaurant', 'Quigley', 'Bombay Wraps', 'Shedd Aquarium', 'Pub 56', 'Bar Louie - Naperville']
```

**Pita Inn**  
4710 Dempster St, Skokie, IL 60076  
Rating : 4.5  
Users Total Rating : 548

**Parivar Grocers**  
715 W Golf Rd, Hoffman Estates, IL 60169, United States  
Rating : 4.1  
Users Total Rating : 45

**Millennium Park**  
201 E Randolph St, Chicago, IL 60602  
Rating : 4.5  
Users Total Rating : 1208



**Patel Brothers**  
830 W Golf Rd, Schaumburg, IL 60194, United States  
Rating : 4.2  
Users Total Rating : 3022

[View Review](#) [Write Review](#)



**Chicago Curry House Restaurant**  
899 S Plymouth Ct, Chicago, IL 60605, United States  
Rating : 3.9  
Users Total Rating : 737

[View Review](#) [Write Review](#)



**Quigley**  
43 E Jefferson Ave, Naperville, IL 60540, United States  
Rating : 4.5  
Users Total Rating : 554

[View Review](#) [Write Review](#)



**Bombay Wraps**  
122 N Wells St, Chicago, IL 60606, United States  
Rating : 4.1  
Users Total Rating : 470

[View Review](#) [Write Review](#)



**Shedd Aquarium**  
1200 S Lake Shore Dr, Chicago, IL 60605, United States  
Rating : 4.6  
Users Total Rating : 21836

[View Review](#) [Write Review](#)



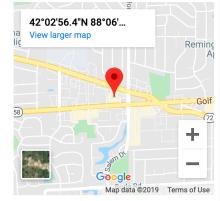
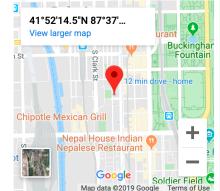
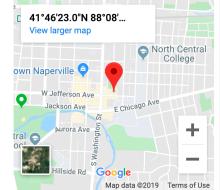
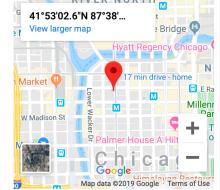
**Pub 56**  
1555 Butterfield Rd, Aurora, IL 60502, United States  
Rating : 4.3  
Users Total Rating : 620

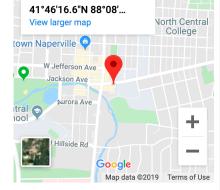
[View Review](#) [Write Review](#)



**Bar Louie - Naperville**  
22 E Chicago Ave, Naperville, IL 60540, United States  
Rating : 4.3  
Users Total Rating : 734

[View Review](#) [Write Review](#)

- Other recommendation logic that have been implemented is using surprise library available in scikit learn.
  - First the connection is established using MySQL database to pull the data from reviews table and will be used for training the model.
  - Using “data\_train.csv”, “data\_test.csv” is generated that will be used for training and testing the model.
  - Lastly the recommendation is performed and the output is saved in “output.csv file”.

jupyter PlacesRecommender Last Checkpoint: a few seconds ago (autosaved) Logout

File Edit View Insert Cell Kernel Help Trusted Python 3

**Imports used for recommendation using Scikit-Surprise library**

```
In [10]: import os
import csv
from surprise import BaselineOnly
from surprise import Dataset
from surprise import Reader
from surprise import SVD
from surprise import accuracy
from surprise.model_selection import cross_validate
from surprise.model_selection import train_test_split
from collections import defaultdict
```

**Exporting data by pulling data from MySQL as csv file**

```
In [11]: # File Path where the files for train ,test and output needs to be stored.
# pr_file_path="/Users/ashokkumar/Desktop/ApacheTomcat/apache-tomcat-7.0.34/webapps/BestDealWebsite"

# Location of the mongoexport that is used to export data from mongo DB
#os.chdir('/Users/ashokkumar/Desktop/MongoDB/mongodbs-x86_64-3.2.22/bin')
#os.system('./mongoexport --db CustomerReviews --collection myReviews --type csv --fields userName,productName,reviewR

In [12]: import pymysql
import pandas

conn = pymysql.connect(host='127.0.0.1', port=3306, user='root', password='root', database='SocialRecommendation')
cursor = conn.cursor()
query = 'select userid, name, reviewrating from review'

results = pandas.read_sql_query(query, conn)
results.to_csv("data_train.csv", index=False)
```

**Iterating over the exported file from mongo DB to generate test file.**

```
In [13]: # Loop over the trainb file exported from mongo DB to generate test file.
with open("data_train.csv", "r") as f:
    reader = csv.DictReader(f, delimiter=',')
    with open("data_test.csv", "w", newline='') as f_out:
        writer = csv.DictWriter(f_out, fieldnames=reader.fieldnames, delimiter=",")
        for row in reader:
            writer.writerow(row)

file_path = os.path.expanduser('data_test.csv')
```

**Recommendation logic using surprise library and predicting top 3 results**

```
In [14]: # As we're loading a custom dataset, we need to define a reader.
reader = Reader(line_format='user item rating', sep=',')

def get_top_n(predictions, n=10):
    """Return the top-N recommendation for each user from a set of predictions.

    Args:
        predictions(list of Prediction objects): The list of predictions, as
        returned by the test method of an algorithm.
        n(int): The number of recommendation to output for each user. Default
        is 10.

    Returns:
        A dict where keys are user (raw) ids and values are lists of tuples:
        ... ((raw item id, rating estimation), ...) of size n.

    # First map the predictions to each user.
    top_n = defaultdict(list)
    for uid, iid, true_r, est, _ in predictions:
        top_n[uid].append((iid, est))

    # Then sort the predictions for each user and retrieve the k highest ones.
    for uid, user_ratings in top_n.items():
        user_ratings.sort(key=lambda x: x[1], reverse=True)
        top_n[uid] = user_ratings[:n]

    return top_n

# First train an SVD algorithm on the movielens dataset.
data = Dataset.load_from_file(file_path, reader=reader)
trainset = data.build_full_trainset()
algo = SVD()
algo.fit(trainset)

# Then predict ratings for all pairs (u, i) that are NOT in the training set.
testset = trainset.build_anti_testset()
predictions = algo.test(testset)

top_n = get_top_n(predictions)

# Print the recommended items for each user
for uid, user_ratings in top_n.items():
    print(uid, [iid for (iid, _) in user_ratings])

out = open('output.csv', 'w', newline='')
output=csv.writer(out)

for uid, user_ratings in top_n.items():
    output.writerow([uid, [iid for (iid, _) in user_ratings]])

out.close()

user6 ['Millennium Park', 'Patel Brothers', 'Parivar Grocers', 'Pita Inn', 'Chicago Curry House Restaurant', 'Quigley', 'Taste of Peru', 'Skokie Fashion Square', 'Bombay Wraps', 'Lickity Split Frozen Custard']
user3 ['Parivar Grocers', 'Millennium Park', 'Shedd Aquarium', 'Nepal House Indian Nepalese Restaurant', 'Bombay Wrap s', 'Bar Louie - Naperville', 'Quigley', 'Stateway Park', 'Patel Brothers', 'Chicago Curry House Restaurant']
user4 ['Bombay Wraps', 'Skokie Fashion Square', 'Stateway Park', 'Nepal House Indian Nepalese Restaurant', 'Pita In n', 'Bar Louie - Naperville', 'Shedd Aquarium', 'Chicago Curry House Restaurant', 'Millennium Park', 'Quigley']
test1 ['Bar Louie - Naperville', 'Patel Brothers', 'Bombay Wraps', 'Shedd Aquarium', 'Pita Inn', 'Millennium Park', 'Captains Walk Shopping Mall', 'Nepal House Indian Nepalese Restaurant', 'Stateway Park', 'Jewel-Osco']
test2 ['Shedd Aquarium', 'Patel Brothers', 'Pita Inn', 'Quigley', 'Millennium Park', 'Chicago Curry House Restaurant', 'Bar Louie - Naperville', 'Parivar Grocers', 'Nepal House Indian Nepalese Restaurant', 'Taste of Peru']
user2 ['Bombay Wraps', 'Nepal House Indian Nepalese Restaurant', 'Parivar Grocers', 'Millennium Park', 'Quigley', 'Skokie Fashion Square', 'Shedd Aquarium', 'Pita Inn', 'Chicago Curry House Restaurant', 'Patel Brothers']
user5 ['Nepal House Indian Nepalese Restaurant', 'Bombay Wraps', 'Parivar Grocers', 'Millennium Park', 'Pita Inn', 'Patel Brothers', 'Chicago Curry House Restaurant', 'Taste of Peru', 'Skokie Fashion Square', 'India House Restaurant - Chicago']
user1 ['Shedd Aquarium', 'Nepal House Indian Nepalese Restaurant', 'Patel Brothers', 'Skokie Fashion Square', 'Chicago o Curry House Restaurant', 'Pita Inn', 'Pub 56', 'Captains Walk Shopping Mall', 'Jewel-Osco', 'Taste of Peru']
```

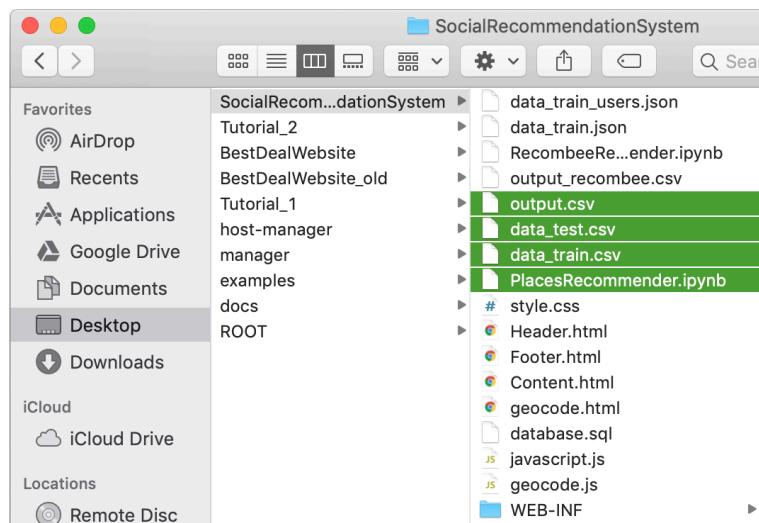
- Data used to generate “data\_train.csv”. These are the reviews users have given to places.

name	streetaddress	reviewrating	comment	user_id	internetRating	userTotalRating	photoURL	latitude	longitude
Millennium Park	201 E Randolph St,C...	5	Best place i...	user1	4.5	1208	https://s3-media3...yelpcdn.com/bphoto/...	41.88339	-87.6218446
India House Restaurant - Chicago	59 W Grand Ave, Chic...	4	Good Place	user1	4	1434	https://media-cdn...tripadvisor.com/media/...	41.891475	-87.63043160000001
Bombay Wraps	122 N Wells St, Chica...	5	Too Good a...	user1	4.1	470	https://media-cdn...tripadvisor.com/media/...	41.8940432	-87.6341051
Lickity Split Frozen Custard	105 N Broadway Ave, ...	3	Ok Place...	user2	4.5	502	https://s3-media4...yelpcdn.com/bphoto/...	41.99257490007852	-87.6605764912861
Taste of Peru	6050 N Clark St, Chica...	4	Good food...	user2	4	3037	https://s3-media1...yelpcdn.com/bphoto/...	41.992504048183	-87.713513324772
Pita Inn	4710 N Lincoln Ave, Oshk...	5	Tasty food...	user3	4.5	545	https://s3-media1...yelpcdn.com/bphoto/...	43.0499549	-87.71710000000001
Captains Walk Shopping Mall	603 N Sheridan Rd, ...	4	Good Place	user3	4	26	https://media-cdn...tripadvisor.com/media/...	41.9918688	-87.6547516
Skokie Fashion Square	9412-9468 Skokie Blv...	4	All iuseful s...	user3	4.1	163	https://s3-media1...yelpcdn.com/bphoto/...	42.0527792	-87.7489807
Jewel-Osco	1069 N Roselle Rd, H...	4	Good	user4	4	519	https://i.pinimg.com/originals/1374/09/13...	42.047693	-88.07775379999998
Parivar Grocers	715 W Golf Rd, Hoffm...	5	Best for Ind...	user4	4.1	45	https://s3-media1...yelpcdn.com/bphoto/...	42.0477552	-88.0797883
Patel Brothers	830 W Golf Rd, Scha...	5	Too Good a...	user4	4.2	3022	https://s3-media1...yelpcdn.com/bphoto/...	42.0490105	-88.10114299999999
Shedd Aquarium	1200 N Lake Shore Dr, ...	5	Good Place	user5	4.6	21836	https://s3-media1...yelpcdn.com/bphoto/...	41.9917679	-87.6218446
Bar Louie - Naperville	22 E Chicago Ave, Nap...	4	Good	user5	4.3	794	https://media-cdn...tripadvisor.com/media/...	41.7112687	-88.14800000000001
Pub 56	1558 Butterfield Rd, A...	3	ok place	user5	4.3	620	https://s3-media1...yelpcdn.com/bphoto/...	41.8131135	-88.27493759999999
Quigley	43 S Jefferson Ave, N...	5	Good and...	user5	4.5	554	https://s3-media1...yelpcdn.com/bphoto/...	41.730569	-88.14631309999999
Stateway Park	3658 S State St, Chic...	4	Test Review	test1	4.1	45	https://assets.chicagoparkdistrict.com/s...	41.8252149	-87.6281683
Chicago Curry House Restaurant	899 S Plymouth Ct, C...	5	Best Place	test1	3.9	737	https://maps.googleapis.com/maps/api/pl...	41.8707004	-87.62837890000003
Nepal House Indian Nepalese Re...	1301 S Michigan Ave,...	5	Good Plac...	user6	4	616	https://maps.googleapis.com/maps/api/pl...	41.8656858	-87.6239061

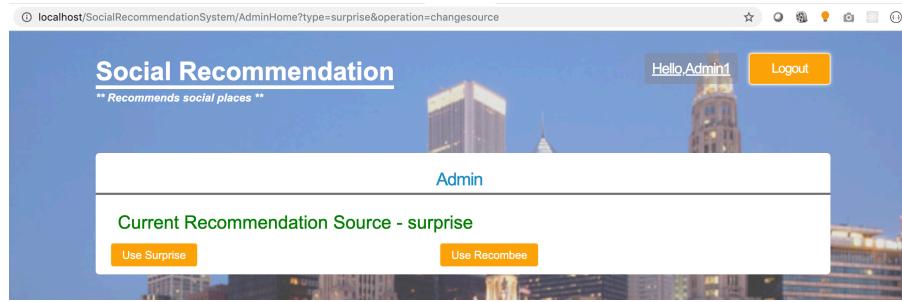
- Screen shot for the “output.csv” file that is generated after executing python script.

1 user6	['Millennium Park', 'Patel Brothers', 'Parivar Grocers', 'Pita Inn', 'Chicago Curry House Restaurant', 'Quigley', 'Taste of Peru', 'Skokie Fashion Square', 'Bombay Wraps', 'Bombay Wraps', 'Lickity Split Frozen Custard']
2 user3	['Parivar Grocers', 'Millennium Park', 'Shedd Aquarium', 'Nepal House Indian Nepalese Restaurant', 'Bombay Wraps', 'Bar Louie - Naperville', 'Quigley', 'Stateway Park', 'Patel Brothers', 'Chicago Curry House Restaurant']
3 user4	['Bombay Wraps', 'Skokie Fashion Square', 'Stateway Park', 'Nepal House Indian Nepalese Restaurant', 'Pita Inn', 'Bar Louie - Naperville', 'Shedd Aquarium', 'Chicago Curry House Restaurant', 'Millennium Park', 'Quigley']
4 test1	['Bar Louie - Naperville', 'Patel Brothers', 'Bombay Wraps', 'Shedd Aquarium', 'Pita Inn', 'Millennium Park', 'Millennium Park', 'Captains Walk Shopping Mall', 'Nepal House Indian Nepalese Restaurant', 'Stateway Park', 'Jewel-Osco']
5 test	['Shedd Aquarium', 'Patel Brothers', 'Pita Inn', 'Quigley', 'Millennium Park', 'Chicago Curry House Restaurant', 'Bar Louie - Naperville', 'Parivar Grocers', 'Nepal House Indian Nepalese Restaurant', 'Taste of Peru']
6 user2	['Bombay Wraps', 'Nepal House Indian Nepalese Restaurant', 'Parivar Grocers', 'Millennium Park', 'Quigley', 'Skokie Fashion Square', 'Shedd Aquarium', 'Pita Inn', 'Chicago Curry House Restaurant', 'Patel Brothers']
7 user5	['Nepal House Indian Nepalese Restaurant', 'Bombay Wraps', 'Parivar Grocers', 'Millennium Park', 'Pita Inn', 'Patel Brothers', 'Chicago Curry House Restaurant', 'Taste of Peru', 'Skokie Fashion Square', 'India House Restaurant - Chicago']
8 user1	['Shedd Aquarium', 'Nepal House Indian Nepalese Restaurant', 'Patel Brothers', 'Skokie Fashion Square', 'Chicago Curry House Restaurant', 'Pita Inn', 'Pub 56', 'Captains Walk Shopping Mall', 'Jewel-Osco', 'Taste of Peru']

- Below screenshots show the project directory and files generated and used in surprise recommendation.



- Admin page used for changing the configuration of the application to surprise using Surprise button.



- Database configuration table showing, surprise is enabled.

The screenshot shows a MySQL query results grid. The query executed was:

```

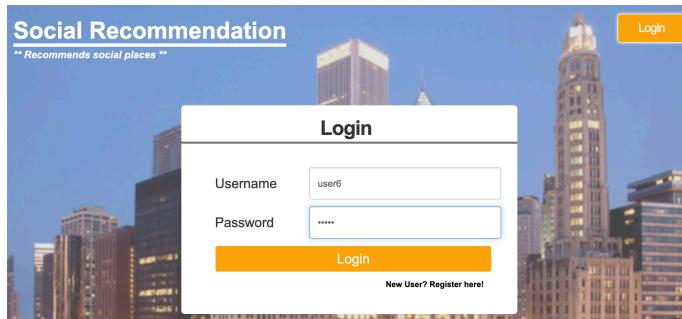
89
90 •  select * from registration;
91 •  select * from review;
92 •  select * from configuration;
93

```

The results show a single row in the configuration table:

recommendationsource	activeflag
recombee	false
surprise	true

- Logging using newly created user i.e. "user6" to display the recommendation using Surprise



- Below is the output of the recommendation for "user6" that needs to be matched with the data being recommended on user homepage.

```

user6 ['Millennium Park', 'Patel Brothers', 'Parivar Grocers', 'Pita Inn', 'Chicago Curry House Restaurant', 'Quigley', 'Taste of Peru', 'Skokie Fashion Square', 'Bombay Wraps', 'Lickity Split Frozen Custard']
user3 ['Parivar Grocers', 'Millennium Park', 'Shedd Aquarium', 'Nepal House Indian Nepalese Restaurant', 'Bombay Wraps', 'Bar Louie - Naperville', 'Quigley', 'Stateway Park', 'Patel Brothers', 'Chicago Curry House Restaurant']
user4 ['Bombay Wraps', 'Skokie Fashion Square', 'Stateway Park', 'Nepal House Indian Nepalese Restaurant', 'Pita Inn', 'Bar Louie - Naperville', 'Shedd Aquarium', 'Chicago Curry House Restaurant', 'Millennium Park', 'Quigley']
test1 ['Bar Louie - Naperville', 'Patel Brothers', 'Bombay Wraps', 'Shedd Aquarium', 'Pita Inn', 'Millennium Park', 'Captains Walk Shopping Mall', 'Nepal House Indian Nepalese Restaurant', 'Stateway Park', 'Jewel-Osco']
test ['Shedd Aquarium', 'Patel Brothers', 'Pita Inn', 'Quigley', 'Millennium Park', 'Chicago Curry House Restaurant', 'Bar Louie - Naperville', 'Parivar Grocers', 'Nepal House Indian Nepalese Restaurant', 'Taste of Peru']
user2 ['Bombay Wraps', 'Nepal House Indian Nepalese Restaurant', 'Parivar Grocers', 'Millennium Park', 'Quigley', 'Skokie Fashion Square', 'Shedd Aquarium', 'Pita Inn', 'Chicago Curry House Restaurant', 'Patel Brothers']
user5 ['Nepal House Indian Nepalese Restaurant', 'Bombay Wraps', 'Parivar Grocers', 'Millennium Park', 'Pita Inn', 'P

```

# Social Recommendation

\*\* Recommends social places \*\*

Hello,User6

[Logout](#)

Search here

[Search](#)

Select Source

Select Type

5 miles

Where are we going?



## Millennium Park

201 E Randolph St, Chicago, IL  
60602

Rating : 4.5  
Users Total Rating : 1208

[View Review](#)

[Write Review](#)



## Patel Brothers

830 W Golf Rd, Schaumburg, IL  
60194, United States

Rating : 4.2  
Users Total Rating : 3022

[View Review](#)

[Write Review](#)



## Parivar Grocers

715 W Golf Rd, Hoffman Estates,  
IL 60169, United States

Rating : 4.1  
Users Total Rating : 45

[View Review](#)

[Write Review](#)



## Pita Inn

4710 Dempster St, Skokie, IL  
60076

Rating : 4.5  
Users Total Rating : 548

[View Review](#)

[Write Review](#)



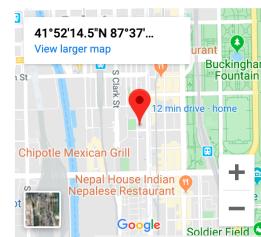
## Chicago Curry House Restaurant

899 S Plymouth Ct, Chicago, IL  
60605, United States

Rating : 3.9  
Users Total Rating : 737

[View Review](#)

[Write Review](#)



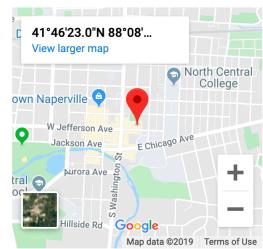


## Quigley

43 E Jefferson Ave, Naperville, IL 60540, United States

Rating : 4.5

Users Total Rating : 554

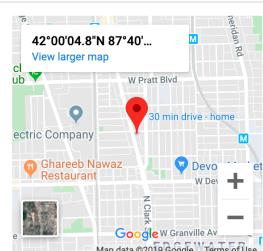
[View Review](#)[Write Review](#)

## Taste of Peru

6545 N Clark St, Chicago, IL 60626

Rating : 4

Users Total Rating : 537

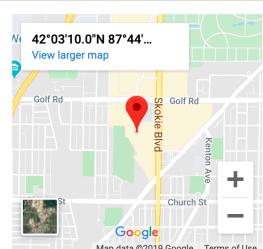
[View Review](#)[Write Review](#)

## Skokie Fashion Square

9412-9466 Skokie Blvd, Skokie, IL 60077, United States

Rating : 4.1

Users Total Rating : 163

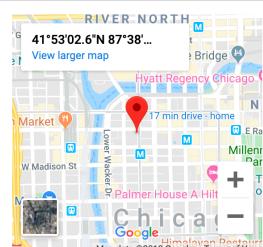
[View Review](#)[Write Review](#)

## Bombay Wraps

122 N Wells St, Chicago, IL 60606, United States

Rating : 4.1

Users Total Rating : 470

[View Review](#)[Write Review](#)

## Lickity Split Frozen Custard

6056 N Broadway Ave, Chicago, IL 60660

Rating : 4.5

Users Total Rating : 502

[View Review](#)[Write Review](#)