

A Mobile based Travelling Recommendation Framework with the Big Five Personality Model

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Abstract

Currently, a lot of travelling recommendation systems use reviews and ratings to give a recommendation. Some of the reviews are paid reviews. This paper aims at presenting a personality based recommendation framework in travelling that recommends places of interest based on the user's personality. The items to be recommended can be any objects such as hotels, restaurants, attraction places, etc. We applied the Big Five Personality test which consists of openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism to capture the personality of the users. The Big Five Personality test has 15 statements and a scale of 1 to 7 on how much the user agrees with the statement. At the end of the test, a score is calculated for each trait by calculating its mean value. The similarity between the user's personality score with other users' personality scores is then measured. Places of interest are recommended based on the personality similarities between the users.

Keywords; Big Five Personality model, Recommendation system, Similarity score.

I. INTRODUCTION

Due to the prevalence of the Internet, there are a lot of choices that are available to choose from. Recommendation systems solve this by filtering out the information and give user personalised content and services. Recommendation systems are used in a lot of industry such as entertainment and e-commerce. Several recommendation systems and applications have been proposed and developed. The recommended items are various that include movie, news, hotels, places of interest, etc.

In this paper, we proposed a mobile based travelling recommendation framework with the Big Five Personality model (MTRF-B5). The user's personality trait and location are context data that are used to narrow down the items for recommending purposes. It uses a collaborative filtering method where the framework compares the user to the other users' past behaviours. The items that will be recommended are hotels, restaurants,

and attractions which have been visited by similar users. In identifying the user's personality trait, the Big Five Personality model is used to calculate the personality score of the user. The Big Five Personality model consists of openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. We use personality traits as context data to give a more meaningful recommendation to the user. Ishanka and Yukawa [5] have found that the personality of the user can widely affect user attitude, taste, and behaviour. They also state that users with different personality traits prefer items comprised of different features, which can provide valuable information for a personalised recommendation.

This paper is organised as follows: Section II gives the background of the study that covers the motivation of the study, the Big Five Personality model, the main challenges of recommendation systems, and some examples of existing travelling recommendation applications. This is then followed

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by the explanation of the proposed framework in Section III. Section IV elaborates on the findings of the study. In this section, we present the design and some sample of cases that have been conducted in realising the idea of the proposed framework. This is then followed by a summary of the paper.

II. BACKGROUND

A. Motivation

Most travellers have a hard time planning their trip because they do not have any or have little knowledge about the travel destination such as places of interests, available activities, and hotel offers. Well-organised planning is when most places of interest are covered within budget and time. It is important to plan thoroughly to avoid overbudget, loss time, and loss of energy. Research must be done on the travel's destination to help in planning. A recommendation application such as TripAdvisor [9] can help in planning a trip. However, most recommendation systems recommend items totally based on ratings and reviews. The top-rated items do not necessarily apply to all travellers. In addition, the ratings and reviews are sometimes biased as there are some businesses that pay for reviews. Thousands of items will then be arranged according to the most rated to the least rated. Travellers will then have to analyse each item one by one. Usually, travellers tend to pick the top one as they become tired to analyse the rest. Travellers might miss an item that is relevant to them. On the other hand, new emerging items would not be recommended as there are no reviews or ratings on the item. This is known as a cold start problem which is a common problem for most recommendation systems. To overcome this problem, this paper attempts to use user's personality traits as a context data to recommend items to the user by comparing it with other user's personality traits. In addition, similar personality trait or behaviour shows a consistent trend. For example, people with extrovert personality likes to socialise and loud places while people with introvert

personality likes to spend time being alone and quiet places.

B. The Big Five Personality Model

Bentaleb et al. [2] presents an analysis on improving the accuracy of a recommender system by considering context data such as weather, time, and location. Context is defined as any information that can be used to characterise the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application including the user and application themselves [2]. As an overview, the Big Five Personality model consists of openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism [3, 6]. These personality traits represent a range between two extremes [3]. The characteristics of each trait are as follows:

Openness – Those who have high in this trait are more adventures and creative while those who have low are more traditional and might struggle with abstract thinking.

Conscientiousness – A high conscientiousness suggests that they are more organised and mindful of details.

Extraversion – People with high extraversion are outgoing and gain energy in social situations while low extraversion or known as introverts are more reserved and expend energy in social settings.

Agreeableness – High agreeableness tends to be more cooperative while low agreeableness is more competitive and sometimes manipulative.

Neuroticism – Those have high in this trait tend to have move swings, anxiety, irritability, and sadness. Those that have low are more stable and emotionally resilient.

Fig. 1 shows the Big Five Personality test (<https://www.psychtoolkit.org/survey-library/big5-bfi-s.html>). There are 15 statements with a scale of 1 to 7. The scale shows how much the user agrees with that statement. Scale 1 reflects strongly disagree, 2 reflects disagree, 3 somewhat disagree, 4 neither agree nor disagree, 5 somewhat agree, 6 agree, and 7 strongly agree. While statements related to the characteristics of each trait are as follows:

Openness – worries a lot; gets nervous easily; remains calm in tense situations.

Conscientiousness – is talkative; is outgoing, sociable; is reserved.

Extraversion – is original, comes up with new ideas; values artistic, aesthetic experiences; has an active imagination.

Agreeableness – is sometimes rude to others; has a forgiving nature; is considerate and kind to almost everyone.

Neuroticism – does a thorough job; tends to be lazy; does things efficiently.

```
scale: agree
- stronglydisagree
- disagree
- somewhatdisagree
- neither agree nor disagree
- somewhatagree
- agree
- stronglyagree

Belowyouseeanumberofstatements,eachof which
starts with "I see myself as someone who".
For each statement, indicate how much you
agree with this.

I see myself as someone who ...
- worries alot
- gets nervouseasily
- remains calm in tense situations
- istalkative
- is outgoing, sociable
- isreserved
- is original, comes up with newideas
- values artistic, aestheticexperiences
- has an activeimagination
- is sometimes rude toothers
- has a forgivingnature
- isconsiderateandkindtoalmosteveryone
- does a thoroughjob
- tends to belazy
- does thingsefficiently
```

Figure 1: The Big Five Personality Test

C. The Challenges of Recommendation Systems

There are several challenges outlined in previous studies in achieving an accurate and efficient recommendation system [1]. Among them are as listed below:

- Inefficient algorithm: The used algorithm requires more time to execute and is difficult to program.
- Cold start problem: There is little information about items about every user which causes the system could not make a conclusion.
- Data sparsity: The database does not contain enough information which causes the recommender system less effective.
- Absence of review: Past users' feedbacks cannot be considered for the next user.
- Need a slight change of course as the route recommended does not cover most or some of the desired destination.
- Consider various factors from different users from the past to present data to recommend the route but still not very efficient, useful and analysed information data that can be used for recommending.
- GPS information retrieval: The data are dynamic in nature and hard and tough to retrieve.
- Scalability: Collaborative filtering has scalability problem as the number of items and users increase which effect the recommendations.

D. Examples of Travelling Recommendation Applications

This subsection presents some of the travelling recommendation applications that are available and commonly used by users in searching for information related to their travelling activities.

TripAdvisor [9] is a web-based and mobile-based application that helps in planning and booking trips online. It provides millions of travellers' reviews

and photos, bookable tours, and attractions, and recommended restaurants. It can save and organise travel ideas for plans and bookings. The saved travel idea can be shared with other users. The application has a forum for users to share their experiences and travel to other users. The items are recommended based on ratings and reviews. The items that are recommended are hotels, holiday rentals, things to do, flights, restaurants, and cars for hire.

Google Trips [4] is a mobile application developed by Google. It manages essential information such as booking details, hotels reservation, and trip details. The travel reservation is automatically collected from Gmail and organised into individual trips. The trip will have day plans, things to do, food and drink suggestions, hotels, flights, and need to know information. It can recommend items from categories such as selfie spots, dance clubs, and top spots. The application can also be used offline.

Sygy Travel [8] is a mobile application that shows important locations and helps in travel planning. The application shows the best attractions and the information in the city. Users can also create trips and download an offline map of the area. The items that will be recommended are restaurants, hotels, and attractions. Users can also search for an item based on categories such as city, sightseeing, shopping venues, and museums. The application has a navigate function where it will show the map and show the direction to the destination. However, the user must use a separate application to use the navigate function.

Yelp [10] is a mobile application that recommends restaurants worldwide. The application shows reviews, photos, menus, order takeout, make reservations, see opening hours, and locations. The application also shows shops that are nearby to the user. The items are recommended by categories such as neighbourhood, distance, rating, price, location, and operation hours.

III. THE PROPOSED FRAMEWORK

Our proposed framework, a Mobile based Travelling Recommendation Framework with the Big Five Personality model (MTRF-B5), consists of four main components, namely: Registration, Personality Test, Recommendation, and Searching. The flowchart shown in Fig. 2 presents the processes in the MTRF-B5. This is further explained in the following subsections.

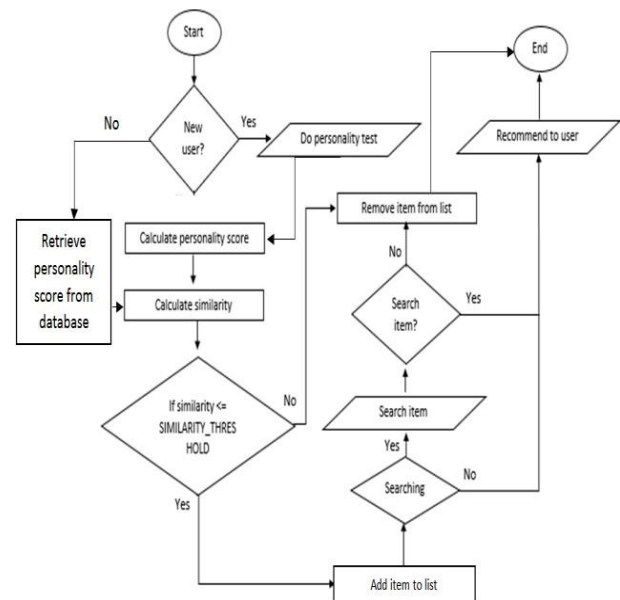


Figure 2: The flowchart of the proposed framework

A. Registration Component

Similar to other recommendation systems, user will have to login or create an account. This is performed by the Registration component. The profile of the user is saved into a database to be used later by the other components in the subsequent interactions.

B. Personality Test Component

New user will have to perform a personality test while for existing users their personality scores will be retrieved from the database. Based on the Big Five Personality test which consists of 15 statements and a scale of 1 to 7 as shown in Figure 1, the user will choose a scale to show how much the user agrees with that statement. Each of the Big Five Personality traits has a total of 3 statements. From

the scale of each of the statements, the component calculates the average for each trait and stores it into a database. The lowest average score is 0, i.e. no scale is selected, while the highest average score is 7. Fig. 3 shows some samples of users' scores saved in the database. Each user has an id, username, password, and scores on openness, conscientiousness, extraversion, agreeableness, and neuroticism. For instance, the score 5.0 presented in the figure indicates the averaged score of three statements related to a trait.

id	username	password	Openness	Conscient	Extroversi	Agreeable	Neuroticis
1	asd	asd	5.0	5.0	5.0	5.0	5.0
2	rty	rty	4.0	4.0	4.0	4.0	4.0
3	test	123	3.0	3.0	3.0	3.0	3.0
4	rere	rere	3.0	4.0	3.0	3.0	3.0
5	lolo	lolo	4.0	4.0	2.0	4.0	4.0

Figure 3: Users table

C. Recommendation Component

From the personality score of the user, the Recommendation component calculates the similarity between the user and the other users. The user's personality score is first normalised based on the following equation:

$$X_{normalised} = (X - X_{minimum}) / (X_{maximum} - X_{minimum}) \quad (1)$$

where $X_{normalised}$ is the normalised score of a user's personality score for a given trait, $X_{minimum}$ is 0 in our study as it indicates no rating is made and $X_{maximum}$ is 7 in our study as it is the maximum scale that a user can choose from. For instance, if the average score of openness for a given user is 3, then the normalised score = $(3 - 0) / (7 - 0) = 0.43$. The scores are first normalised to make them easier to compare to the values of other users' scores saved in the *Users* dataset. To calculate the similarity, the component subtracts each of the user's personality trait score to the other users' personality trait score. The algorithm to calculate the similarity between users is based on K-Nearest Neighbour. The system will take any values of similarity that are below the SIMILARITY_THRESHOLD that is already set earlier. The threshold value is set to 2.0 for

openness, conscientiousness, extraversion, and agreeableness while for neuroticism the value is set to 0.08. This is because neuroticism does not influence the recommendation that much compare to other traits. User with low similarity value will be added to a list of usernames. The list of usernames is used to retrieve the visited places of the user from the *Reviews* dataset. The visited places of the similar users will be added to the recommended list for the user to view. The items are categorised as hotels, restaurants, and attractions. The items are sorted by rating from the *Reviews* dataset.

A sample of the *Users* dataset is given in Fig. 4. The dataset is taken from <https://www.twin-persona.org/#publications> [7]. It consists of 6 columns that are *username*, *openness*, *conscientiousness*, *extroversion*, *agreeableness*, and *neuroticism*. The total number of users in the dataset is 1098.

	username	Openness	Conscienti	Extroversio	Agreeabler	Neuroticism
1	007solotraveler	0.63272	0.55666	0.5636	0.58108	0.45881
2	0BK10	0.64006	0.55189	0.5622	0.57943	0.46188
3	10179k79	0.66435	0.56099	0.5688	0.58187	0.45011
4	124_10	0.66003	0.57005	0.57221	0.59019	0.4486
5	12ReasonsWhy	0.65036	0.55429	0.5651	0.58271	0.45919
6	14beacon	0.64359	0.56584	0.56965	0.59001	0.45454
7	150NightsPerYear	0.64723	0.56101	0.56812	0.5868	0.45754
8	1771	0.6425	0.56661	0.56833	0.58737	0.4563
9	186402Sarah1984	0.64739	0.55803	0.56643	0.58308	0.45631
10	1969ws	0.63786	0.56099	0.56748	0.58927	0.45958
11	1975mark	0.64677	0.55168	0.56126	0.57491	0.46268
12	19822011	0.64988	0.56369	0.56874	0.58583	0.45308
13	1984travel	0.65541	0.5623	0.56972	0.58719	0.4505
14	19Cam	0.64198	0.55524	0.56619	0.58622	0.46087
15	19katy80	0.6448	0.55656	0.5665	0.58612	0.45836
16	1Angie	0.64168	0.55672	0.56658	0.58755	0.45987
17	1KathrynK	0.65033	0.5682	0.57021	0.5865	0.44882
18	1ManhattanBeach	0.53302	0.461	0.51717	0.5334	0.53638
19	1NicePerson	0.6547	0.56117	0.56939	0.58548	0.45193
20	1VAnurse	0.64105	0.56638	0.56915	0.59073	0.456
21	1Vegas2008	0.64974	0.55777	0.56574	0.58108	0.45854
22	1happygolucky	0.64429	0.55972	0.56775	0.58965	0.46192
23	1oldseagull	0.64249	0.56435	0.56671	0.58414	0.45906
24	2000AtlanticGT	0.6448	0.55186	0.56297	0.5787	0.46457
25	2008travellover	0.64894	0.55619	0.56583	0.57877	0.45764
26	2011ChgoWanderer	0.64974	0.55596	0.56484	0.58153	0.4596
27	2093	0.65093	0.56162	0.56747	0.58341	0.45337
28	209967Jenny	0.64941	0.55863	0.5673	0.58478	0.45333
29	2156Michael	0.65127	0.55904	0.56655	0.5826	0.45612
30	23betty	0.64511	0.55366	0.56423	0.58042	0.46032

Figure 4: Users dataset

The *Reviews* dataset is as shown in Fig. 5. The dataset is also taken from <https://www.twin-persona.org/#publications> [7]. This dataset contains the *id*, *username*, *type*, *date*, *title*, *text*, *rating*, *helpfulness*, *total_points*, *taObject*, *taObjectUrl*, and *taObjectCity* columns. The *id* and *username* represent the user that has made the review. The *type* denotes the type of object being reviewed. There are three types, namely: hotels, attractions, and restaurants. *Date* represents the date the review is submitted. *Title* gives a brief description of the review. The *text* column is the review written by the user. *Rating*, *helpfulness*, and *total_points* are the scores given by the user, while *taObject*, *taObjectUrl*, and *taObjectCity* represent the name of the object, its url, and city, respectively. For instance, the user with username *007solotraveler* has submitted 12 reviews, 10 of them are reviews on hotels, while others are on attraction and restaurant. The personality trait scores for *007solotraveler* are given in the *Users* dataset shown in Fig. 4, i.e. openness = 0.63272, conscientiousness = 0.55666, extraversion = 0.5636, agreeableness = 0.58108, and neuroticism = 0.45881. A user with similar personality trait scores to the user *007solotraveler* and satisfies the SIMILARITY_THRESHOLD elaborated above, will be recommended the following list of objects = {*Radisson Blu Royal Viking Hotel*, *Radisson Blu Waterfront Hotel*, *Vasa Museum*, *Hilton Miami Airport*, *Hunter Steakhouse*, *Crowne*

Plaza Hotel San Diego – Mission Valley, *Hilton San Francisco Union Square*, *BEST WESTERN PLUS Cavalier Oceanfront Resort*, *Sofitel London Gatwick*, *Holiday Inn London Sutton*, *Radisson Blu Edwardian Vanderbilt*, *Hilton London Kensington*}.

id	username	type	date	title
1	007solotraveler	Hotels	8/4/2013	Good Choice and would be suitable for a family
2	007solotraveler	Hotels	8/4/2013	Modern and Chic - suitable both family and busine...
3	007solotraveler	Attractions	20/2/2013	Brilliant - Well worth a visit(s)
4	007solotraveler	Hotels	9/7/2012	Family stay
5	007solotraveler	Restaurants	7/9/2011	Great Prime Rib!
6	007solotraveler	Hotels	7/9/2011	Great Hotel - but is in need of some T&C!
7	007solotraveler	Hotels	6/9/2011	Great Location and fab hotel
8	007solotraveler	Hotels	6/9/2011	Great Hotel: wished had stayed longer
9	007solotraveler	Hotels	7/7/2011	Great Hotel & really convenient for North terminal
10	007solotraveler	Hotels	6/7/2011	Good hotel, whilst not central london a great altern...
11	007solotraveler	Hotels	6/7/2011	Great Location, some quirky rooms - Reasonably ...
12	007solotraveler	Hotels	9/3/2011	Great Hotel, Great Prices but not central!
13	OBKIO	Restaurants	28/9/2015	Unhygienic & terrible service
14	OBKIO	Restaurants	30/6/2015	Beautiful restaurant overlooking the beach and sea!
15	OBKIO	Restaurants	30/6/2015	Fantastic food & lovely staff
16	OBKIO	Restaurants	28/4/2015	Food was ok...expected better!
17	OBKIO	Restaurants	28/4/2015	Amazing restaurant for sushi lovers!
18	OBKIO	Restaurants	8/1/2015	Great food & great value!
19	OBKIO	Hotels	8/1/2015	Lovely hotel & great location
20	OBKIO	Hotels	26/6/2014	Very modern & friendly hotel
21	OBKIO	Hotels	26/12/2013	Lovely Hotel - Very relaxing
22	OBKIO	Hotels	8/10/2013	Great location!
23	OBKIO	Restaurants	4/6/2013	Fantastic spot for food & drinks
24	OBKIO	Hotels	4/6/2013	Perfect location & fantastic staff
25	OBKIO	Hotels	19/1/2013	Didn't want to leave!
26	OBKIO	Hotels	3/1/2013	Good Value & Basic Rooms
27	OBKIO	Hotels	2/2/2012	Treehouse - Magical and relaxing
28	OBKIO	Hotels	15/10/2010	Fantastic Hotel
29	OBKIO	Hotels	20/8/2010	Relaxing & Beautiful Location

text	rating	helpfulne	total point
Decent Hotel next to station so good location for getting round Stockholm - room a littl...	4	1	101
Excellent Hotel - well situated for getting round stockholm - right by the station so easy...	5	0	100
Great Museum - absolutely worth making the time to visit - I spent just over an hour ther...	5	1	101
Stayed for 3 nights in Miami - stayed here due to a very early morning departure so I ne...	4	0	100
I always visit Hunters when in San Diego. The restaurant is family friendly and the food i...	5	1	101
Having read numerous poor reviews I was going to cancel my reservation but in the end...	4	3	103
I've stayed here a few times over the last few years - so having read recent review...	5	1	101
Great Hotel - was travelling with family and had had two rooms- both very spacious, cle...	4	1	101
Connected to North Terminal and adjacent to tram link - so great for an early morning fl...	4	0	100
Although not central London this is a great alternative - at a good price the hotel is only...	4	0	100
Recently one of my regular haunts in London - some 7 stays totalling 21 nights over the ...	4	2	102
Great Hotel - rooms are decent and furnished well and quiet - executive lounge with its ...	4	0	100
I have visited this restaurant twice before and loved the food, however after my visit on ...	1	0	100
If you are in Alvor you must visit Canico! Beautiful setting in the cliff overlooking a smal...	5	1	101
The food here was fantastic - we visited twice during our week long stay in Alvor, the tig...	5	2	102
The food here is good, however nothing special like you would expect being one of Jam...	3	0	100
Loved this restaurant and can't wait to return! Shared a variety of dishes with my ...	5	2	102
Loved this little place! Was staying next door at the Sherlock Holmes hotel and came he...	5	0	100
This is a lovely hotel in a great location - within walking distance of Oxford Street and o...	4	0	100
This was a lovely modern hotel in a great location, it was a short walk from the undergro...	4	2	102
A group of us stayed here for one night in November for a girly spa break and we all lov...	4	1	101
I loved the location of this hotel plus it was great value for money! It is so easy to walk ar...	4	0	100
I loved this place while we were in Sorrento! Each time we ordered coffee it came out wi...	5	0	100
The staff at Zi Teresa really made this a fantastic holiday from the beginning to the end! T...	4	3	103
This is most definitely the best hotel I have ever stayed in. To start the staff are extremel...	5	0	100
I stayed at the Thistle City Barbican for two nights in December 2012. Three of us shared ...	3	0	100
I have just come back from staying at the Treehouse at Harptree court for two nights an...	5	0	100
The staff were all extremely friendly and helpful, there were plenty of places near by to h...	5	0	100
This was a lovely campsite in a brilliant location, surrounded by trees with a stream goin...	4	1	101

taObject	taObjectUrl	taObjectCity
Radisson Blu Royal Viking Hotel, Stockholm	http://www.tripadvisor.com/Hotel_Review-g189852-d207022-Reviews...	Stockholm
Radisson Blu Waterfront Hotel	http://www.tripadvisor.com/Hotel_Review-g189852-d1879047-Reviews...	Stockholm
Vasa Museum	http://www.tripadvisor.com/Attraction_Review-g189852-d208277-Reviews...	Stockholm
Hilton Miami Airport	http://www.tripadvisor.com/Hotel_Review-g34438-d85193-Reviews-H...	Miami
Hunter Steakhouse	http://www.tripadvisor.com/Restaurant_Review-g60750-d493258-Reviews...	San Diego
Crown Plaza Hotel San Diego - Mission Valley	http://www.tripadvisor.com/Hotel_Review-g60750-d80131-Reviews-C...	San Diego
Hilton San Francisco Union Square	http://www.tripadvisor.com/Hotel_Review-g60713-d81295-Reviews-H...	San Francisco
BEST WESTERN PLUS Cavalier Oceanfront Resort	http://www.tripadvisor.com/Hotel_Review-g33039-d80074-Reviews-B...	San Simeon
Sofitel London Gatwick	http://www.tripadvisor.com/Hotel_Review-g2667189-d243420-Reviews...	Gatwick
Holiday Inn London Sutton	http://www.tripadvisor.com/Hotel_Review-g504182-d199118-Reviews...	Sutton
Radisson Blu Edwardian Vanderbilt	http://www.tripadvisor.com/Hotel_Review-g186338-d192118-Reviews...	London
Hilton London Kensington	http://www.tripadvisor.com/Hotel_Review-g186338-d195185-Reviews...	London
Wahaca Bristol	http://www.tripadvisor.com/Restaurant_Review-g186220-d8449505-Reviews...	Bristol
Canico Restaurant	http://www.tripadvisor.com/Restaurant_Review-g642199-d1146080-Reviews...	Alvor
A Lota	http://www.tripadvisor.com/Restaurant_Review-g642199-d1821174-Reviews...	Alvor
Jamie's Italian Bristol	http://www.tripadvisor.com/Restaurant_Review-g186220-d2067227-Reviews...	Bristol
NOA Japanese Restaurant	http://www.tripadvisor.com/Restaurant_Review-g186220-d1841923-Reviews...	Bristol
106 Baker St.	http://www.tripadvisor.com/Restaurant_Review-g186338-d7001968-Reviews...	London
Park Plaza Sherlock Holmes London	http://www.tripadvisor.com/Hotel_Review-g186338-d193047-Reviews...	London
Hotel OTTO	http://www.tripadvisor.com/Hotel_Review-g187323-d617398-Reviews...	Berlin
Bedruthan Hotel & Spa	http://www.tripadvisor.com/Hotel_Review-g528856-d279581-Reviews...	Mawgan Porth
Sloane Square Hotel	http://www.tripadvisor.com/Hotel_Review-g186338-d195285-Reviews...	London
Fauno Bar	http://www.tripadvisor.com/Restaurant_Review-g187782-d1200454-Reviews...	Sorrento
Hotel Zi Teresa	http://www.tripadvisor.com/Hotel_Review-g187782-d578848-Reviews...	Sorrento
The Magdalen Chapter	http://www.tripadvisor.com/Hotel_Review-g186254-d3246823-Reviews...	Exeter
Thistle City Barbican	http://www.tripadvisor.com/Hotel_Review-g186338-d193098-Reviews...	London
Harpree Court	http://www.tripadvisor.com/Hotel_Review-g1214736-d982463-Reviews...	East Harptree
Hotel Diana Pompei	http://www.tripadvisor.com/Hotel_Review-g187786-d563645-Reviews...	Pompeii
Mill Park Camping and Caravan Park	http://www.tripadvisor.com/Hotel_Review-g191252-d668182-Reviews...	Ilfracombe

Figure 5: The Reviews dataset

D. Searching Component

The Searching component searches for any items as specified by the user. It makes use of the title, text column, taObject, and taObjectCity in the Review dataset in the process of matching.

IV. RESULTS

A. Design of the Framework

The following figures 6, 7, and 8 present the use case diagram, activity diagram, and entity relationship diagram, respectively, of the proposed framework. As the processes involved have been elaborated in great details in Section III, thus we will not explain the figure.

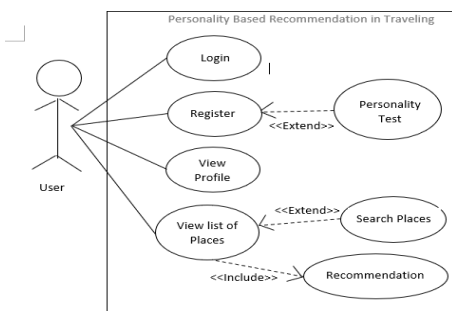


Figure 6: The use case diagram of the proposed framework

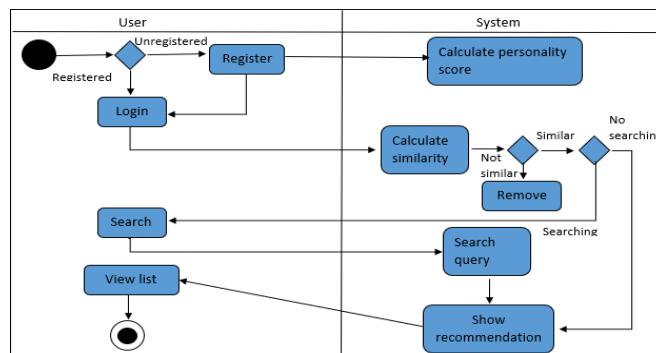


Figure 7: The activity diagram of the proposed framework

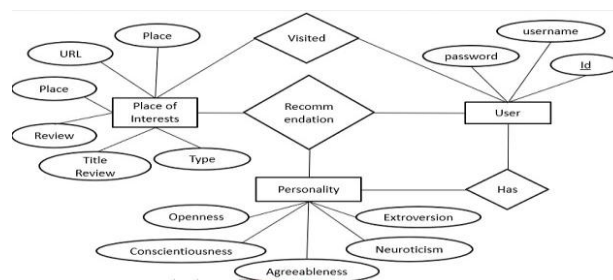


Figure 8: The entity relationship diagram of the proposed framework

B. Sample of Results

We have tested our framework with several cases. The following figures 9-11 present some of the results produced based on our proposed framework.

Profile	MainPage
Username: rene	Search AC Hotel Carlton Madrid by Marriott Madrid
Personality Score:	Adi Dharma Hotel Kuta
① Openness: 3.0	Albergo San Martino Lucca
② Conscientiousness: 4.0	Alla Vite Dorata Venice
③ Extroversion: 3.0	Almyra Hotel Paphos
④ Agreeableness: 3.0	Amalika Villa - Gili T's Most Luxurious Gili Trawangan
⑤ Neuroticism: 3.0	Ameristar Casino Hotel East Chicago East Chicago
	Anastasia Hotel Stalis

Figure 9: User 1's personality scores and sample of recommended list

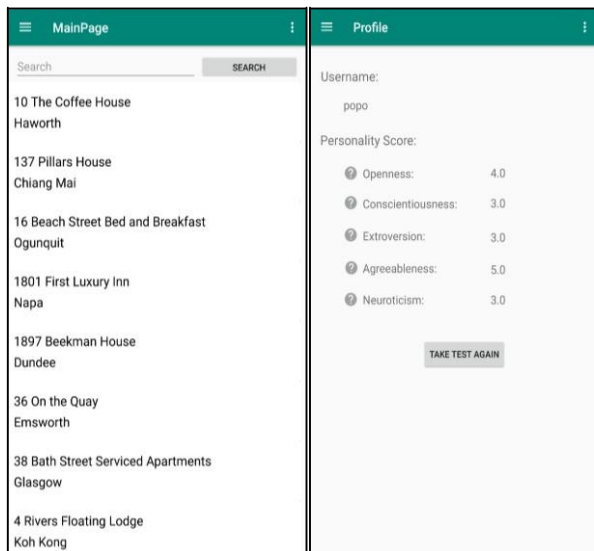


Figure 10: User 2's personality scores and sample of recommended list

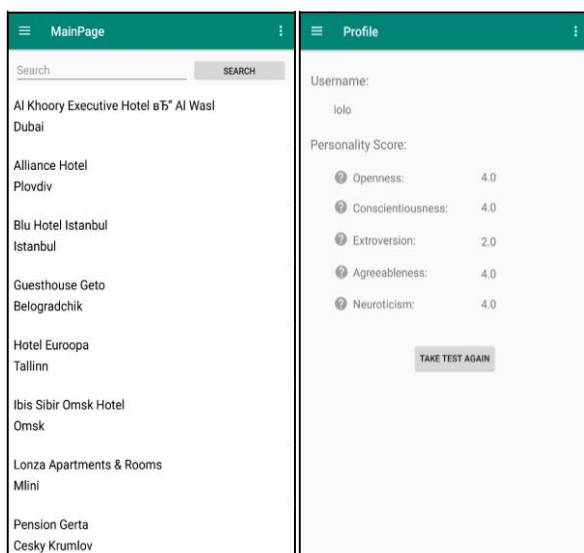


Figure 11: User 3's personality scores and sample of recommended list

CONCLUSION

In this paper, we proposed a mobile based travelling recommendation framework with the Big Five Personality model (MTRF-B5). The user's personality trait and location are context data that are used to narrow down the items for recommending purposes. There are several limitations of the proposed framework that can be considered for future works. These include: (i) The proposed framework depends totally on the available Users dataset in searching for similar

users, (ii) it does not analyse the reviews written by the user, either positive or negative review, before recommending the items, and (iii) further evaluation on the accuracy of the recommended items need to be conducted.

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