



An Interactive Knowledge Based Recommender System for Tourism

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Submitted on: April 2017

DECLARATION

We hereby declare that this work was carried out by us under the guidance and Supervision of **Suraiya Tairin**, Lecturer and **Md. Saiful Islam**, Lecturer, Department of Computer Science and Engineering, BRAC University. The period of project work is from February 2016 to April 2017. This project work is submitted to the Department of Computer Science and Engineering, School of Engineering and Computer Science, BRAC University in partial fulfilment for the requirement of Degree in Bachelor of Science in Computer Science. We declare that this work has not been submitted anywhere else for the award of any other degree.

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ACKNOWLEDGEMENT

This is the work of Wakil Ahmed, Farah Nur, Nabila Bhuyan Hema and Nasim Ahmed - students of CSE department of BRAC University. The document has been prepared as an effort to compile the knowledge obtained by us during these four years of education and produce a final thesis which innovatively address one of the very growing issue here in Bangladesh.

All thanks to almighty, the creator and the owner of this universe, the most merciful, beneficent and the most gracious, who provided us guidance, strength and abilities to complete this project. We would like to express our gratitude to our supervisor Suraiya Tairin, Senior Lecturer and Md. Saiful Islam, Lecturer, Department of Computer Science and Engineering, BRAC University for encouraging and supporting us through the development of this project. Finally, we would like to express our sincere gratefulness to our beloved parents, brother and sisters for their love and care and friends for constant support and encouragement.

ABSTRACT

The purpose of this project was to construct a centralized tourist management system that would serve as a consolidated platform to provide an effective and efficient mechanism for tourist management and means for availing various travels and booking related services. Providing optimal solution using interactive knowledge-based system using dynamic information of the users, e.g. compare different options for travelling within a budget of the user and providing recommendations. The entire system is designed to streamline the travel management system by primarily targeting all the districts and division of Bangladesh and then centralizing the process maintaining schedules, queues and confirming hotel and transport bookings. Providing optimal solution using interactive knowledge-based system using dynamic information of the users, e.g. compare different options for travelling within a budget of the user and providing recommendations. Currently operations of these procedures are of an erratic where due to delays and other factors of inefficiency management services can neither be properly availed nor be found online. Using this system, the tourism can avail services which are best suited for their need, based on different criteria including specialty, current location, queue and other aspects which are deemed to be of convenience.

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Chapter 1: Introduction

Tourism is a travel for recreation, leisure, family or business purposes, usually for a limited duration. Tourism can be domestic or international. Nowadays, tourism is one of the major source of income for many countries. There is no consensus concerning the definition of tourism; its definition varies source by source, person by person. Guyer Feuler first defined tourism in 1905. In order to prevent the disaccords to define “Tourism”, UNWTO defined it as it is indicated below: “Tourism comprises the activities of persons traveling and staying in places outside their usual environment for not more than one consecutive year for recreation, family and other purposes”. In these busy time of the new era technology is the only platform where the destinations can be found in a very short time which saves lots of energy and time. Quality and easily obtainable access to information is considered to be a fundamental right in any modern society. The need to conveniently avail services cannot be underestimated by any means. Automation of the system will reduce the hassles otherwise associated with using services, more efficient management and allocation of resources will be possible. Infrastructure and knowledge such as desktop/laptop computers, cell phones, and the internet that are already existing and are in use by the stakeholders will be used in this regard, thus requiring limited technological and skill/know how upgrades on their part.

1.1 Motivation

The reason we choose this topic was from our personal problem which we have faced while travelling or making budget for trips. As a student of limited money and less information about the travelling destination it's really hard to plan a tour. We have faced difficulties and felt dump for not doing proper budgets. Later we talked about it with friends' family & with travellers. And figure out it is a common problem and everyone in their travelling experience faced this kind of problem. They had the same complain that there are no proper travel agents or websites with all the details who can give a proper and accurate direction for a trip. Thus, from these we came up with the idea that what if there is something which people didn't think of or not doing anything in this sector. As a CSE students with advance knowledge of programming we came to realize that the people or the travel agents who are working in this area are not well educated or not have enough knowledge about technology or how the technology works rather than making money with small knowledge about the roads and some companies who are giving bus

services and hotel services. So, for the lack of their knowledge and money making system people of Bangladesh or the tourist doesn't make a proper budget and plan for a trip. This realization gives us idea about a service through which everyone can be benefitted. They don't have to think about how to go and plan for the trip rather they will just submit their budget money and the technology will tell everything. This will save a lot of time in searching, selecting places and finding the desire place for visit. For us this idea came up since we've identified this is a major hassle and the people who travel a lot don't have time for searching. We don't have any website like the other countries does. For example- OYO Rooms, GoIbibo, MakeMyTrip or Tripadvisor, Airbnb etc. Even though we have the largest beach and many travelling destinations ball around Bangladesh. We have got hotels and rest houses in every place but there is no promotion of the hotels or the destination places. Not even a proper website where travellers can get all the details about the costing, hotels, tourist spots and pictures of the places. Government websites in the sector of travel and tourism hasn't gone far in terms of technology. Only some renowned places were marked in the websites. So, to overcome the entire problem we are planning for the solution. Through this technology tourist can find their desired place to travel with the budget they've allocated for the travelling. They will get a better knowledge about places and hotel services and they can customize their travel plan changing their packages and destination. In compare to their last visit to a place they can travel more with less money and time. They don't have to bother about the travelling stress. Life will become simple. Besides, the impact of tourism over Bangladesh can bring many economic, social and environmental benefits, particularly in rural areas and developing countries.

There are economic, socio-cultural and environmental key benefits of tourism:

Economic benefit: Tourism can provide direct jobs to the community, such as tour guides and hotel housekeeping. Indirect employment is generated through other industries like agriculture, food production and retail. Infrastructure development and visitors' expenditure generates income for the local community and can lead to the alleviation of poverty.

Social benefit: In addition to the revenue, tourism can bring about a real sense of pride and identity to communities. It allows them to look at their history, and community identity. This helps the local residents to maintain their tradition and culture.

Environmental benefit: Tourism provides financial support for the conservation of ecosystems and natural resource management, making the destination more authentic and desirable to visitors.

1.2 Primary Objectives

The primary objectives of the system are:

- Modernize, streamline and case-based recommender system for tourists
- Provide a consolidated platform for improving ease of access to tourist related services

1.3 Key Features and Impact

The primary features of this system are as follows:

- Front end web interface that is user-friendly and has been logically designed.
- Detecting user's location based on request and showing possible trip places.

1.4 Overview of the Thesis

The process of our program is, it will interact with potential travellers about their needs, interest and will learn their preferences and then responds with highly targeted, relevant information and personalized recommendations, supported by rich, original and customized content. In order to show the efficient output, the system will follow knowledge based recommendations which is basically based on case based reasoning. It will solve the problems by retrieving past solved similar cases and then reusing the case for showing the best result. The system will ask for user preferences and personal data like interest, budget etc. then the system may retrieve a case base of lodging solutions a subset of cases that best match with the input description and ask user some questions in order to finally select one case in the list and to build an offer from that case. In short, this project suggests the best vacation trip for a user after finding the yearly savings of a person.

A user will input his budget for the trip and the software will find the best possible results by knowledge based reasoning of the trips available right now. It will show perfect matches for the users. To give a precise result it will show how many days the trip will be, what kind of

hotel will be available, what the places user can travel are and what are the transport user will be able to effort in the given budget.

Besides, to reduce all the hassles of the user the application/software will be able to recommend the user about the trip used by the other users in the given budget. It will also be able to show which friends of the user are taking trips for the vacation.

This software is also being able to suggest location based trip depending on the budget available of the user. It will suggest location even in the lowest possible budget input by the user. So that user of all class will get a chance to become a tourist with the help of knowledge base reasoning.

Chapter 2: Background Study

Advances have been made in the tourism industry at an increasing rate not only in the developed world, but also in the developing countries. Alongside improvements in the technology the number of travellers and tourist has also increased which can be witnessed in terms of the extent to which such services are provided as more and more people now have access to information. Bangladesh is no stranger to this phenomenon for a number of reasons which will not be discussed here since they are not relevant to the project. At the same time, another industry has significantly grown in Bangladesh which is the information technology industry; there has been a widespread introduction of devices like personal computers, laptops and smartphones throughout the country, particularly in the urban centers like Dhaka. In terms of connectivity internet penetration rate in the country has increased as a variety of internet services in the form of broadband, WiMax and 3G are being offered at gradually decreasing prices.

2.1 The Current System and Problems Faced

In the current mode tourism services, there is only website which provides information about locations and the places which are also not updated time to time. Some local tourist companies only give support to 3 or 4 locations all of over in Bangladesh. Where there are still plenty of places to visit. Most of the companies only focus on the places outside of Bangladesh where as they don't focus on the local tourist. And as there are is no proper channel or website to look for places only some handful of people knows about the places that exist here in Bangladesh. Thus, whenever there needs to plan for a trip there needs a lot of time and information about the place and how to go. Besides, security, transportation and hotel booking are another hassle for which travellers needs to look for the people who visited that place before. These are all manually done there is no proper centralize information place for local travellers not even a single website. These are the predominant problems discovered in the existing system.

Chapter 3: Requirements Analysis

This section consists of the requirements analysis of this project. The requirements analysis stage is to identify and understand the requirements that would be expected and required of the project. Included within the requirements specification are the techniques or methods to identify user requirements, functional requirements and the non-functional requirements of the system.

3.1 Fact Finding

There are a number of methods or techniques that may be used by system analysts to conduct fact-finding in order to investigate and identify system requirements. It is important to understand the functioning of the system to design and develop the proposed system through Interviews, research and observation.

3.2 Interviews

Information about current systems & existing problems may be obtained by analysts from speaking with users of the current system who are also in fact potential users of the proposed system. There are a number of reasons justifying this methodology; acquiring information, verification and clarification of information, identifying requirements, collecting opinions and ideas, getting end-user involvement, etc. In this regard as permitted by constraints, we were able to speak with several people who are actively travelling as well as a with the people who are facing difficulties while choosing a good place for travelling or vacation purpose.

3.3 Research

A standard and widely used method is to research available resources and material regarding the problem. Journal articles, publications and newspaper articles, documents and reports of existing similar and/or proposed systems are possible sources for this methodology of requirements analysis. Thus, we have carried out our research accordingly as described in more detail in the relevant section.

3.4 Observation

An essential methodology for this stage is the observation technique; where it is possible to carry out investigation by either directly participating or closely examining the focus of study. The technique may be generally used when other methodologies are not deemed to be satisfactory in terms of thoroughness and degree, or it may be used as an augmentation to them as well. In our case, we observed for a relatively short duration how the existing system is functioning and what the major limitations are apparent as per observation.

3.5 Case Study

3.5.1 MakeMyTrip

In 2000, MakeMyTrip.com India's leading online travel company was founded by Deep Kalra. It's ready to give any kind of travel service with so many comprehensive choices to empower the traveller to nurture the seed of travelling. It's the one leading company across India that diversified versatile offers with the broadest selection of travel products and services. MakeMyTrip also stayed ahead of the curve by continually evolving its technology to meet the ever-changing demands of the rapidly developing global travel market. That's why it became the most preferred choice of millions of travellers who can accomplish their travel goals by only a few mouse clicks! Today's achievement of this company also rapidly establishing for its dedicative, untiring employees with full of spirit who don't think no idea was too big and no problem is too difficult. MakeMyTrip is the dominant market-leader with 47% market-share, a fact evinced by the trust placed in it by millions of happy customers. MakeMyTrip is there for every single customer with its customer services and offices across 20 cities across India with 2 international outlets in New York and San Francisco. Here is the short illustration of its products and services.

3.5.1.1 MakeMyTrip Products:

1. International and Domestic Air Tickets, Holiday Packages and Hotels
2. Domestic Bus and Rail Tickets
3. Private Car and Taxi Rentals

3.5.1.2 International and Domestic Air Tickets

With the motto to offer best to its customer and earn satisfaction of them, MakeMyTrip the leading player in online flight bookings in India offers great offers, some of the lowest airfares,

exclusive discounts and a seamless online booking experience. With just few simple mouse clicks, customer can have the delightful experience of booking tickets through desktop or mobile sites. There are features like Instant Discounts, Fare Calendar, MyRewards Program, MyWallet and many more that adds values continuously to its potential customers.

It has a dominant position in the domestic flights sector. With the cheapest fare guarantee, experience great value at the lowest price and customers can save up to 45%, instant notifications ensure current flight status that customers can focus on other important stuff before any journey and it saves their precious time, instant fare drops, amazing discounts that makes its customer think about it on the first place always, instant refunds and rebook options make it more customer friendly, customers can go for price comparisons and can experience many more interesting features like hot deals, gift cards, customer's rewards etc.

Customers can buy international flight tickets to see the whole world that suit their potential needs with simple process that guarantee the best price. Special benefits like cash back, discount price with one piece extra free baggage and so on.

3.5.1.3 Cheap Air Tickets

MakeMyTrip is India's first online travel portal that provides cheap air tickets at a best guaranteed price. There is list of cheap flights of different routes based on cheapest fare. They separated these cheap flights analysis rigorously with respect to cheapest fare provided by the airline. For example, Air Asia is of the largest low-cost airlines in Asia.

3.5.1.4 Bus/Train Tickets

Customers can book bus and train tickets according to their budget by comparing with a lot related online sites and purpose of the tour. MakeMyTrip provides so many services to make every single customer's journey comfortable, easy, effective and simple. Print E-ticket, Refund status, cancel Bus/Rail tickets, check PNR status and possible to issue any Complaints/Problems. Important links related to desired routes can give clear and vast ideas of all necessary procedures that need to be done by customers before, during and after the specific journey. For example, proper illustration of various routes and short description of each Bus/Train stations and also:

- How can customers book and print E-Ticket?
- How can customers cancel reservation ticket?

- How can customers get refund and check refund status?
- How can I customers check PNR status?
- How can customers get specific Railway Reservation?
- What are the concession criteria?
- What are the break journey rules?
- What are the refund rules?
- Where can customers get forms for reservation, concession or cancellation?

3.5.1.5 Hotel Booking

MakeMyTrip has the largest database of hotels in the country and outside. Its user-friendly website makes online hotel booking an easy task. According to customer's choices of input it will show the desired outcome that suits the customers in every way which can be completed within single minute. For example, customer wants to travelling to Kerala, all he has to do is click on the "Hotels" tab on the homepage, and press the "Domestic" button. After typing Kerala under the "I WANT TO GO" header, select option. Then, enter the check-in and check-out dates, and tell the number of adults and children, for whom the booking is to be made. On clicking the "Search Hotels" button, all the accommodation options are displayed on a single page. To make the task easier, this portal is provided with filters that can use to narrow down individual search. One can edit the results on the basis of star category, location, area, price range and even the facilities you want. This site has all sorts of hotels from luxury to cheap to meet up every query of customers to get into them their preferable accommodation. The payment process is also safe and secure with all bank details of individuals. Also, available lots of hotel offers coupons like specific bank employee and customers can get 25% instant discount up to Rs.5000 on domestic and international hotel bookings.

3.5.1.6 Holidays

There is no better gift than a gift of beautiful memories gathers from a dreamy holiday tour. With amazing packages MakeMytrip make it possible that can cherish for a lifetime. There is huge list full of ideas and plans that can help tourist and traveller for any sort of weekend gateway and make their trip memorable with best places and packages deals. With efficient booking packages like honeymoon and beach packages, anyone can make their dream tour possible with MakeMyTrip. They suggest packages to customers based on season, price budget

and top must visit places among countries with all necessary information. There is also available gift voucher for customers according to their taste and they can pick it from the many denominations available in it!

3.5.2 Tripooly

Tripooly is here to help people make more enlightening stops along the way. It is registered Online Travel Agency that fulfil a promise of offering the single most comprehensive travel experience to users with intuitive products that have the largest selection of the best airfare, tour deals & packages, visa assistance, cruise deals and other tourism related products. It helps them have more fun dreaming and planning by offering up trip and destination ideas that range from time-tested to unexpected via inspire. It provides personal support before, during and after the trip so customers can find here all answers of their query or require assistance regarding where the next trip should be, what's the suitable place within potential budget, where to shop, where to get the best local mouth-watering food etc.

In a few clicks, customers will find:

- Best Airfare
- Visa Assistance
- Holiday Deals
- Business Deals
- Medical Tourism
- Cruise Deals
- Other Travel Related Products & Services

3.5.2.1 My Trip

They give the customized solution to customers to fulfil their travel requirements. Customers can email them and send their desired details and confirmation email from Tripooly that contains trip details. Customers can easily choose their desired trip from categorized tour like Leisure or Business Tour. Special Offers are there to add extra layer of fun on their journey. Customers can filter their search by selecting their price range and hotel ratings, property types are also become handy.

3.5.2.2 Travel Diaries

It can help customers effectively to plan their most awaited tour as it contains detailed elaboration of selected regions with necessary information. One can easily find perfect place that will match with their taste for sure. For example, if one likes to go for cool dip into the blue waters or just a ride on the soothing waves within decent budget then Thailand is the perfect match or If one wants to experience snow covered peaceful place over 6000 feet then Manali hill station in the Himalayas is true match for them.

3.5.2.3 Tripooly Tour Operator

If anyone wants to become a tour operator to provide fantastic travel deals to potential customers, they can mail their company name and contact details.

3.5.2.4 Security

Purchasing from online involves a great deal of trust always so it's been taken serious care by Tripooly and gives the highest priority to ensure the security and confidentiality of the personally identifiable information people provide. For all online card transactions, Tripooly.com uses EasyPayWay (one of the most reputable online payment gateway in Bangladesh). This site has SSL Certificate. This technology is accepted worldwide and ensures customers that the site which they are browsing is safe.

3.5.2.5 Key Problems Faced by Existing Platforms

From the above two services, what we found is that both the companies provide booking services in a nutshell. First one make my trip gives services for all the hotel bookings and transportation which reduces the hassle for the travellers on the other hand the local services that exist right now is similar to Tripooly. Tripooly helps to book hotels and transportation like make my trip, but doesn't provide any proper online solution of the problem; rather they do it manually with phone calls and using personal network with the local transport services. Both the companies have one thing in common but the fact here is no one gives a proper budget solution of the tourist. Here the major flaw is the budget that is required for a trip. Without knowing the tentative budget, it is quite impossible for a person to book transportation tickets and hotels. These parts of planning a trip require a good amount of time which most of the people doesn't have. The services mentioned above doesn't ask for budget that a tourist have for that particular trip and doesn't show any suggestion based on the fact that a tourist can

travel anywhere in that budget which the user input. Thus, whenever they are looking for hotels and tickets they need to make sure by their own that they are booking everything under the budget they have for that particular trip.

Chapter 4: System Design

4.1 Overview

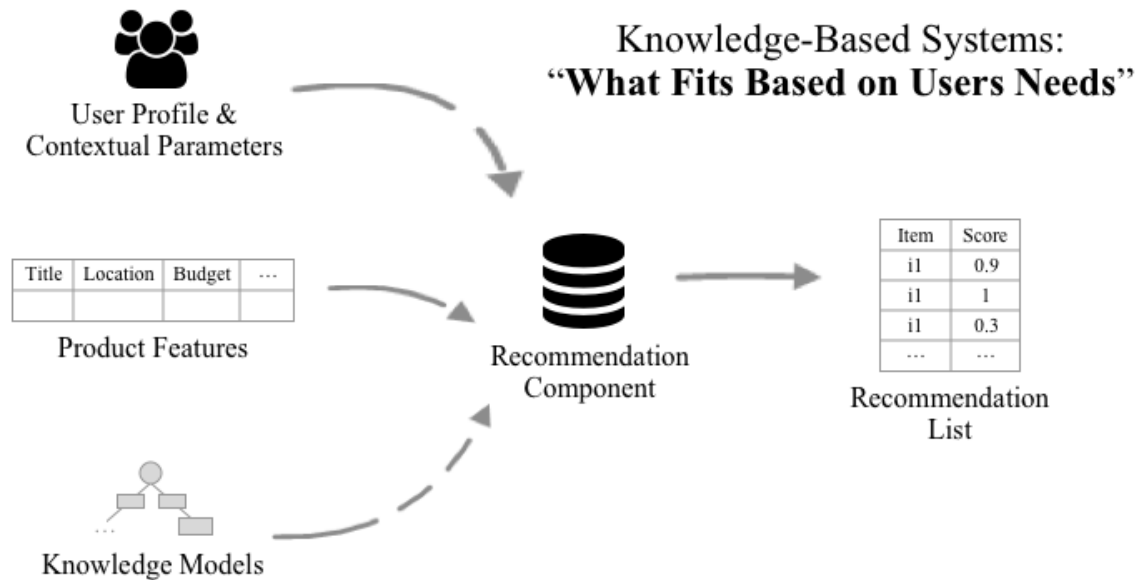


Figure 4.1: Knowledge based model

In our project, system will recommend users based on:

1. Most popular places visited by other users.
2. Nearest places to visit by detecting user’s current location and suggest by distance.
3. On the backend the software will have all the latest information available in and outside the country about the trips and will show the result to the users according to their budgets and needs.
3. After getting the budget from the user software will show the perfect result from the best to the least possible trip available in the given budget.
4. Recommended trip will also be shown to the user by highest rated places by other users.

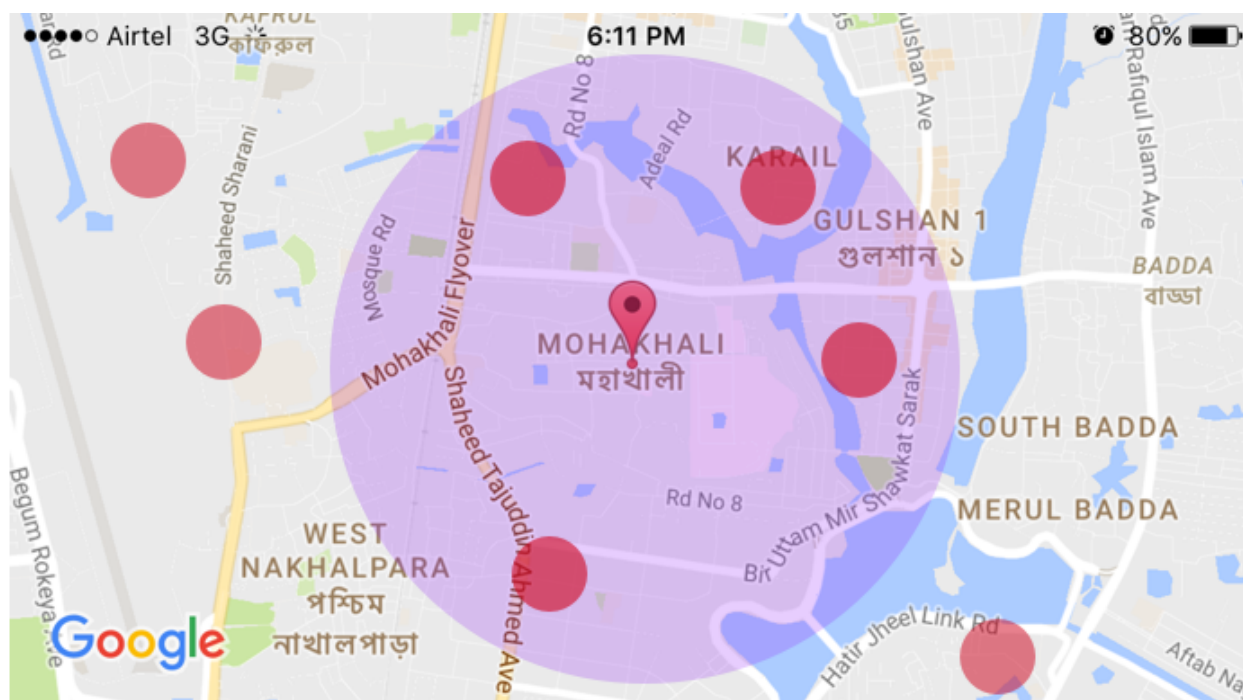


Figure 4.2: User's location & nearby places

Location based recommendation will also be available to increase tourism inside the country and area.

4.2 Data Collection

This section details the approaches that we used to coordinate the data collection. Good data are a critical component of good decision making. These data are used at many different levels and for many different purposes. It provides the basis for trend analyses and inputs to forecasting our model. They enable analysts to discern how users respond to various factors that influence the decision. We took help from several national travel surveys as well as several tourist websites. It's founded that the information is not good enough for tourist to get the clear idea. Besides no website contain all necessary information in detail.

Division	District	Upazila	Name of the Location (In English)	Name of the Location (in Bangla)	Type/Category	Transportation Cost	Short Intro

Mymensingh	Sherpur	Sherpur Sadar	Orchid Travel Center	অর্কিড পর্যটন কেন্দ্র	Travel Center	650	This is a project undertaken [..]
Mymensingh	Sherpur	Jhenaigati	Gajni Parjatan Center	গজনি পর্যটন সেন্টার	Travel Center	600	It is 220 km far from Dhaka.[..].
Mymensingh	Sherpur	Nakla	Ghazi Dargah	গাজীর দরগাহ	Monument	550	The tomb of the
Mymensingh	Sherpur	Nalitabari	Sutanala lake	সুতানাল দীঘি	Lake	550	Orange is one of the queen's historic district Nalitabari.
Mymensingh	Sherpur	Sribordi	King of the hill	রাজা পাহাড়	Hill	500	Ranisimula Union and singabarunai uniyana, Sreebordi, Sherpur.
Mymensingh	Mymensingh	Fulbaria	Orchid Garden	অর্কিড বাগান	Garden	500	20 acres of land
Mymensingh	Mymensingh	Fulbaria	Aladinas Park	আলাদিন স্পার্ক	Picnic spot	500	25 acres in size.

Table 4.1: Sample Location Data

We have accumulated data from travel agencies, websites and individual experiences. Unlike the other the core focus of our system is to cover every single detail for exploring different places efficiently, we take interview of several globetrotters and sincerely note down essential facts. We prioritize fellow travellers who seek out Bangladesh hidden gems to get the genuine information to protect the data quality. After analysing it's very clear to us that most websites and travel agencies only include the must-see places but our system acts like a smart tourist guide that has the knowledge of tiger safari in the Sundarbans swamps and also the white-knuckle rickshaw ride on the crazy streets of old Dhaka. So, it's very helpful for those who want to get their adventure juices flowing by exploring lesser known hidden gems of our country. We proposed, implemented and evaluated a number of variations that use a range personal data sources. User feedback is also taken to improve our database.

4.3 Activity Diagram

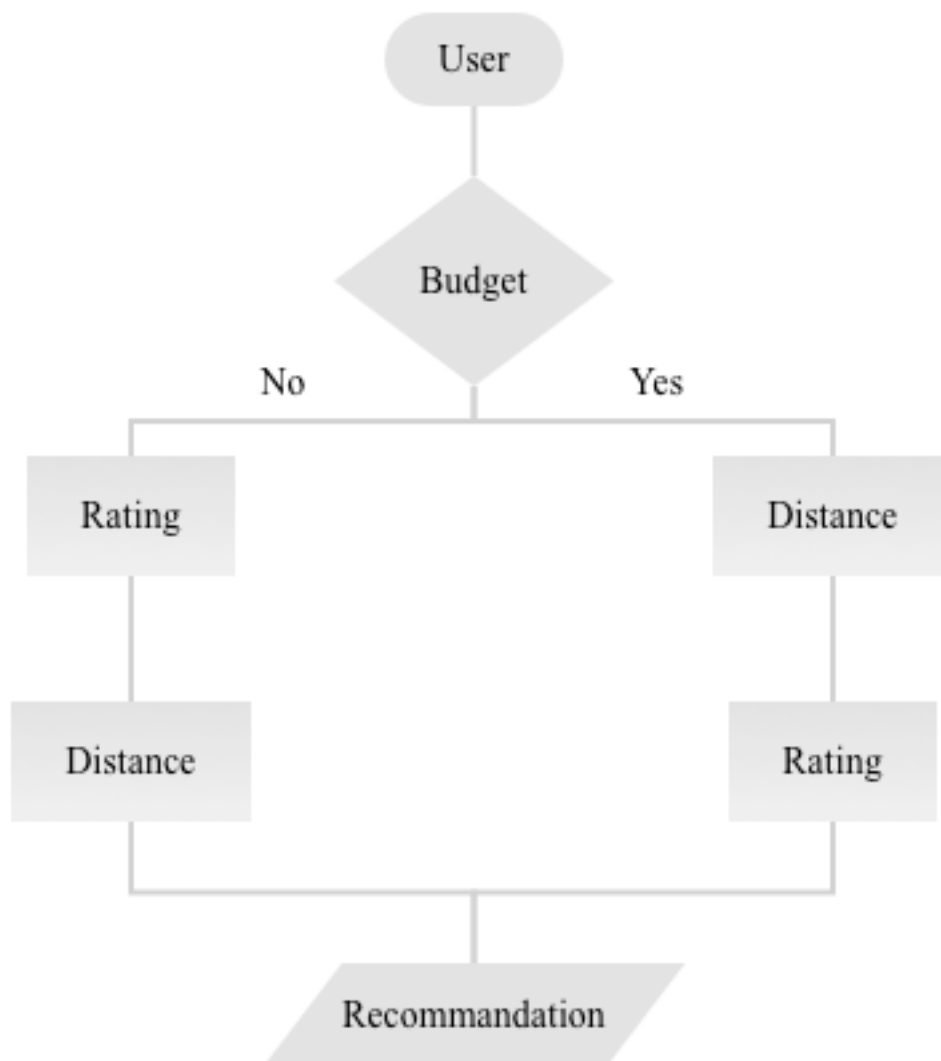


Figure 4.3: Recommendations based on budget

In above figure, our system will suggest user best places to visit based on their budget.

4.3.1 Recommendation by Nearby Places

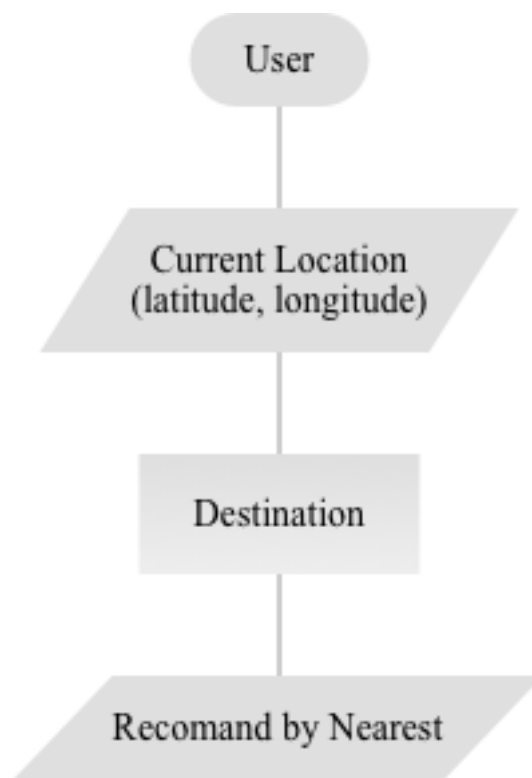


Figure 4.4: Recommendations based on nearest place

4.4 System Architecture for Geo Location Search

We use geographical location search to find nearby places like store, hospitals, hotels, etc. In our case, we search nearby places to visit from user's current given point on earth (latitude & longitude).

4.5.1 The Haversine Formula

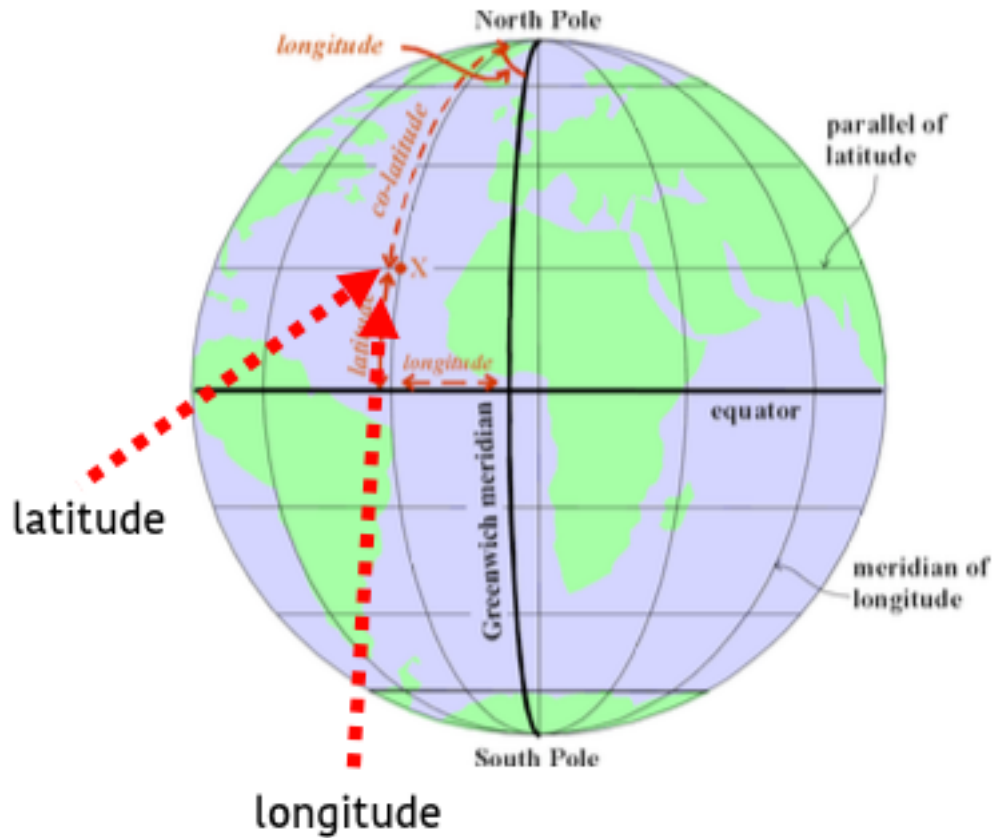


Figure 4.5: Calculate Distance by Latitude & Longitude

For two points on a sphere (of radius R) with latitudes ϕ_1 and ϕ_2 , latitude separation $\Delta\phi = \phi_1 - \phi_2$, and longitude separation $\Delta\lambda$ the distance d between the two points:

$$\text{haversin} \left(\frac{d}{R} \right) = \text{haversin}(\Delta\phi) + \cos(\phi_1) \cos(\phi_2) \text{haversin}(\Delta\lambda)$$

$$\text{haversin}(\theta) = \frac{\text{versin}(\theta)}{2} = \sin^2 \left(\frac{\theta}{2} \right)$$

$$\text{versin}(\theta) = 1 - \cos(\theta) = 2 \sin^2 \left(\frac{\theta}{2} \right)$$

Figure 4.6: The Haversine Formula

4.5.2 The Haversine Formula in MySQL

R = earth's radius (3956)

$\Delta\text{lat} = \text{lat2} - \text{lat1}$; $\Delta\text{long} = \text{long2} - \text{long1}$ $a = \sin^2(\Delta\text{lat}/2) + \cos(\text{lat1}) * \cos(\text{lat2}) * \sin^2(\Delta\text{long}/2)$

$c = 2 * \text{atan2}(\sqrt{a}, \sqrt{1-a})$; $d = R * c$

`3956 * 2 * ASIN (SQRT (POWER(SIN((orig.lat - dest.lat)*pi()/180 / 2), 2) + COS(orig.lat * pi()/180) * COS(dest.lat * pi()/180) * POWER(SIN((orig.lon - dest.lon) * pi()/180 / 2), 2))) as distance`

Some sample codes of the system have been provided in the Sample System Codes of the Appendix.

4.5 Data Dictionary

Column	Type	Attributes	Null	Default	Extra
id	int(10)	UNSIGNED	No		auto_increment
username	varchar(255)		No		
email	varchar(255)		No		
password	varchar(255)		No		
first_name	varchar(255)		Yes	NULL	
last_name	varchar(255)		Yes	NULL	
address	varchar(255)		Yes	NULL	
remember_to ken	varchar(255)		Yes	NULL	
created_at	timestamp		Yes	NULL	
updated_at	timestamp		Yes	NULL	
budget	int(11)		No	0	

Table 4.2: User Profile

Column	Type	Attributes	Null	Default	Extra
id	int(10)	UNSIGNED	No		auto_increment
location_name	varchar(255)		Yes	NULL	
location_name_bangla	text		Yes	NULL	
division_id	int(10)	UNSIGNED	Yes	NULL	
district_id	int(10)	UNSIGNED	Yes	NULL	
upazila_id	int(10)	UNSIGNED	Yes	NULL	
location_type	text		No		
location_pic	varchar(255)		Yes	NULL	
cost_transport	int(11)		Yes	NULL	
cost_accommodation	int(11)		Yes	NULL	
location_info	text		Yes	NULL	
transportation	text		No		
latitude	double		Yes	NULL	
longitude	double		Yes	NULL	
created_at	timestamp		Yes	NULL	
updated_at	timestamp		Yes	NULL	
rating	int(11)		No	0	
visited	int(11)		No	0	

Table 4.3: Locations Information

Column	Type	Attributes	Null	Default	Extra
--------	------	------------	------	---------	-------

id	int(10)	UNSIGNED	No		auto_increment
location_id	int(10)	UNSIGNED	Yes	NULL	
type_id	int(10)	UNSIGNED	Yes	NULL	
created_at	timestamp		Yes	NULL	
updated_at	timestamp		Yes	NULL	

Table 4.4: Location Types

Column	Type	Attributes	Null	Default	Extra
id	int(10)	UNSIGNED	No		auto_increment
type_name	varchar(255)		No		
created_at	timestamp		Yes	NULL	
updated_at	timestamp		Yes	NULL	

Table 4.5: Location Types Entries

Column	Type	Attributes	Null	Default	Extra	Links to
id	int(10)	UNSIGNED	No		auto_increment	
rate	int(11)		No			
user_id	int(10)	UNSIGNED	No			-> users.id ON UPDATE RESTRICT ON DELETE RESTRICT
location_id	int(10)	UNSIGNED	No			-> locations.id ON UPDATE RESTRICT ON DELETE

						RESTRICT
created_at	timestamp		Yes	NULL		
updated_at	timestamp		Yes	NULL		

Table 4.6: Locations Ratings

Column	Type	Attributes	Null	Default	Extra	Links to
id	int(10)	UNSIGNED	No		auto_increment	
hotel_name	varchar(255)		No			
upazila_id	int(10)	UNSIGNED	No			-> upazilas.id ON UPDATE RESTRICT ON DELETE RESTRICT
address	varchar(255)		No			
contact	int(11)		No			
cost	int(11)		No			
created_at	timestamp		Yes	NULL		
updated_at	timestamp		Yes	NULL		

Table 4.7: Hotel Information

Column	Type	Attributes	Null	Default	Extra
id	int(10)	UNSIGNED	No		auto_increment
division_name	varchar(255)		No		
created_at	timestamp		Yes	NULL	

updated_at	timestamp		Yes	NULL	
------------	-----------	--	-----	------	--

Table 4.8: Division List

Column	Type	Attributes	Null	Default	Extra	Links to
id	int(10)	UNSIGNED	No		auto_increment	
district_name	varchar(255)		Yes	NULL		
division_id	int(10)	UNSIGNED	Yes	NULL		-> divisions.id ON UPDATE RESTRICTION DELETE RESTRICTION
created_at	timestamp		Yes	NULL		
updated_at	timestamp		Yes	NULL		

Table 4.9: Districts List

Column	Type	Attributes	Null	Default	Extra
id	int(10)	UNSIGNED	No		auto_increment
upazila_name	varchar(255)		No		
district_id	int(10)	UNSIGNED	No		
upazila_map	varchar(255)		Yes	NULL	
upazila_web site	varchar(255)		Yes	NULL	
created_at	timestamp		Yes	NULL	

updated_at	timestamp		Yes	NULL	
------------	-----------	--	-----	------	--

Table 4.10: Upazila List

Chapter 5: System Implementation

5.1 Database Schema Design

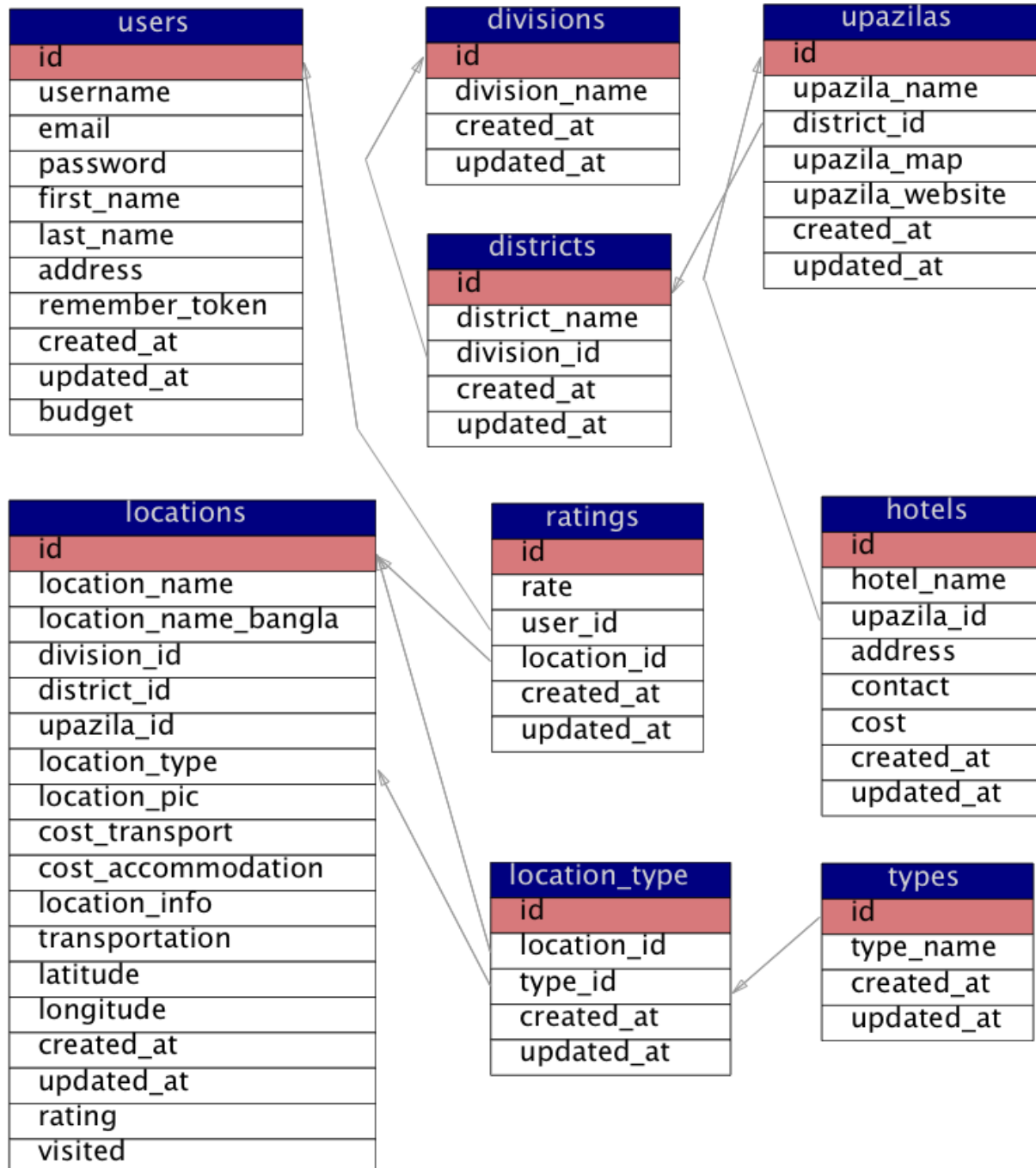


Figure 5.1: Database Schema Design

5.2 Programming Languages

Development of the system required programming of the individual components or modules in the most appropriate programming language or scripts available, further work had to be done to integrate the different modules or sub-systems to one another to provide full functionality.

To develop the front-end user interfaces, we used:

- HTML5
- CSS3
- JavaScript and jQuery
- Bootstrap Framework

To developed the back-end, we used:

- Laravel PHP Framework
- PHP 5.6
- MySQL Database
- JSON
- HTML 5 API

Additionally, some JS plugins and libraries used for making this project.

5.3 Tools Used

We used Atom Text editor due to its cross-platform text and source code editing ability and compatibility to support numerous APIs which was a useful factor considering the variety of programming languages used in making the project system.

Initially while developing the system, we used localhost server using WAMP for our development and internal testing purposes. WAMP is a free to use and open-source cross-platform web server package system within which is incorporated with:

- Apache Server
- PHP 5.6
- MySQL (database)
- phpMyAdmin

We used Git (a version control tool in a team development environment) to serve as an online repository for storing and merging our programs.

For designing, we used Photoshop & Illustrator for the UI & graphics designing for most of our visual works.

5.4 System Infrastructure

Deployment of the system for operational use definitely requires certain specific and as well as some generic elements or components which collectively can be labelled as the system infrastructure which for a project of this scope and dimension is somewhat considerable. This subsection will describe the requirements necessary for deployment of the system including hardware and system requirements for both client and server sides.

5.5 Hardware Specifications

5.5.1 Server Requirements:

Server Components	Specifications
Processor	Intel Xeon 4 cores 8 threads, 3.50Ghz, 8M Cache
RAM	2GB
Space	1000 GB, SSD
Bandwidth	1TB/month
IP Addresses	01

Table 5.1: Service Requirements

5.5.2 Web Application Requirements

In order to maintain the operations of the web based application there is need to have at least the following components installed in the server:

Components	Specifications
------------	----------------

Operation System	Linux
Apache	Version 2.2
PHP	Version 5.6.x
MySQL	Version 5.x
CURL	Enabled

Table 5.2: Web Application Requirements

5.5.3 Client Side Requirements:

Any slandered PC with internet connection and a web browser like FireFox, Google Chrome, etc.

For mobile used will need:

Mobile Components	Specifications
Operating System	Any mobile OS (iOS, Android, etc)
Processor	1.0 GHz Dual Core
RAM	512 MB
ROM	4 GB
GPS	Enable

Table 5.3: Mobile Based Application Requirements

Chapter 6: Conclusion

We are solving a problem which was never solved till now in Bangladesh. And it is requiring full phase development to make it a success. We've segmented our works into different phases which will make our easy and help us to identify how long it will take to finish. This will solve our problem which travellers faces while traveling and will allow foreigners to know more about our country and will travel frequently. This will bring foreign revenues and will help Bangladesh economically. On the other hand, our country will get more focus and get an international recognition also be of the best tourist country in near future.

6.1 Obstacles

We have already mentioned that our main motive is to create something new that will be helpful for the tourists while visiting or planning a tour. We have chosen this topic as we are facing some kind of problems personally and we are also sure that tourists are also facing this kind of problems. There are problems with selecting the appropriate place that goes with the budget, suitable hotel booking, transportation, restaurants and before all managing all these things with the budget. So, we planned to come up with something new that people did not think before and which will be helpful for the tourists who are travelling and also facing problems while traveling.

For our topic at the very beginning we had to collect information's which were authentic and accurate as we do not want people to be misguided by us. At first, we started looking for some websites from where we could get information's about this topic. After searching a lot finally, we found some helpful websites from where we could get some information which are proper. Some of those websites are OYO Rooms, Ibibo, MakeMyTrip, TripAdvisor, Tripooly etc. We went through those websites for collecting proper information and we faced some kind of problems.

While searching in the website "MakeMyTrip" we saw that they are not suggesting for any good place which people can visit. They have options for booking hotels, booking flights tickets, bus tickets, trains and they also have other booking systems. But they do not have any detail information about the place, the time it will take, the distance and finally the cost. They

are not bothered about the fact that people might have some budget for the trip and may be the result they are showing that is not appropriate for the budget. The results are showing may not match with someone's budget. They are helping visitors for booking the hotels, transports or others things but for extra information one need to contact with the office of the hotel or the transport office.

Then again, we visited another website that is "TripAdvisor". There we saw that they also have that option for booking hotels and transports but the good thing is they are showing the cost for booking. They have restaurants booking options and many more. They are more detailed with their information's. They have some detail information's about the location and also the cost for visiting that place. This is very much helpful for the visitors. From this website, we managed to collect some information's. But the problem we faced here that is they are not showing the available transport system in the location that visitor will need to go from one place to another. They are not showing any daily based cost for one people or more which is also needed while travelling. So, collecting all this information's properly was a big obstacle for us.

After searching so many websites we found one Bangladeshi website that is "Tripooly". This website is more detailed than the others. They have detail information for location, transportation, hotels and other things. In their website, they briefly described about every place that people can visit. They are showing the total cost one may need to visit a particular place and also the cost for a single day. They have some features where they have mentioned that what people need to do for visiting that place step by step. They also gave some information's about moving from one place to another. They also mentioned that what will be the cost and how much time it will take to visit the whole place which was very much helpful for us while collecting information's.

After visiting all those websites, we managed to gather some information's which were proper. After that for other information's and some more information's we had to talk with the visitor personally who have already visited those places. We gathered the information they provided us. We took their personal opinion about the trip, about the location, hotels, transport system, weather and other information's. We also took information about the total cost of the trip. For collecting more information's, we personally visited some of the places and took

important information's. We also added information from our family member, friends and also from our previous experiences.

As we are new and we are trying to do something new we are facing so many difficulties while collecting information's. Our main goal is to give the more detailed and correct information to the people which is taking a lot time and a lot of analysis. So, for now we are not able to provide much more information's as they need to be perfect. But our future plan is to develop our ideas and we will try to provide more information's which will be helpful for tourists.

6.2 Future Work

Future plan is to take it to the international level partnering up with Government. Initially we started with location based search along with budget which will give results of places and packages available in the budget they have submitted. Later they can customize each and everything and can book tickets and hotels also. For example, we will provide options to select transportation of their choices. They can either select ac service transportation or no ac service. Hotels they can select manually. Places they want to visit can be even select manually and depending on their time limit for their tour. If they want to shorten the tour they can remove the places which they don't want to go or they can also add places if they think they want to travel more or stay for few more days. This will be completely custom made website and app where they tourism will get all the advantages in their end. We will take it the international level with the help of the government. So that people all over the world can use it and we can attract more foreign people and tourist to our country. At the same time, local people will get to use it and save a budget for travelling every year. Our future plan is to expand the prototype and make a user-friendly website and app along with the increase of the user. This technology will learn from the user and whenever a person signs up and login in to their profile they will get recommendation from the site depending on their previous travelling tracks. They will also get recommendation from their friends and family. Besides, these technologies will automatically show direction of the route and take them to their destination. These technologies can also be integrated with other services and can be collaborated to expand its services.

6.3 Personal Reflection

Working on a complete system like this one has provided an opportunity for development of relevant experience and skills on our side. While working on the design and development stages of making this system we can say that we have learned a lot, we feel that the growth in human capital that has come as a result of it will be advantageous to us in our lives in the near future.

Additionally, from the external payoff point of view, our system has direct implications in the sense that it is something from which the society as a whole can be benefitted as soon as it is implemented. This fact along with a sense of achievement associated with development of the project is in our perspective an important matter to reflect on.

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Appendix


Screenshots of the system:

The screenshot displays the RSystem website interface. At the top, there is a navigation bar with links for Home, About Us, Contact Us, Register, and Login. The main content area features a large heading "Hello, Traveller!" and a sub-heading "You won't miss a thing! We listed all! All over Bangladesh!". Below this is a search bar with the placeholder text "Search Bangladesh..." and a "Find" button. The user's current location is displayed as "Rd No. 8,Block-B,Section 12,Pallabi,Mirpur,Dhaka,Tejgaon Circle,Dhaka,Dhaka,Bangladesh". A "Search Nearby" button is present below the location. A budget slider is set to "From BDT 500". Below the search filters, a message reads "For you! Here are Some places people seems to be interested in...". A table lists three recommended locations:

#	Location Name	Type	Trip Cost (BDT)	Rating	Hotel/Rest House
1	 <p>Patuakhali Science And Technology University Campus পটুয়াখালী বিজ্ঞান ও প্রযুক্তি বিশ্ববিদ্যালয় ক্যাম্পাস Division: Barisal District: Patuakhali Upazila: Dumki Visited: 34</p>	University	₹ 1800/- Living: 600/- (Per Night) Transport: 1200/-	★★★★★	View Details
2	 <p>Suhrawardy Udyan সোহরাওয়ার্দী উদ্যান Division: Dhaka District: Dhaka Upazila: Dhaka Sadar Visited: 24</p>	National Memorial	₹ 900/- Living: 800/- (Per Night) Transport: 100/-	★★★★★	View Details
3	 <p>Hussaini Dalan হোসেনী দালান Division: Dhaka District: Dhaka Upazila: Dhaka Sadar Visited: 17</p>	Islamic architecture	₹ 900/- Living: 800/- (Per Night) Transport: 100/-	★★★★★	View Details


Showing the current location of the user and most visited places.

Details of the location:

 RSys


[Home](#)
[About Us](#)
[Contact Us](#)
[Register](#)
[Login](#)

Lalbagh Fort লালবাগ কেল্লা



Division: Dhaka
District: Dhaka
Upazila: Dhaka Sadar
Visited: 13

Location Type:
Fort complex

Cost
 800/-
Living: 1500/- (Per Night)
Transport: 2000/-

Rating
★★★★☆






Location Description:

Lalbagh Fort (also Fort Aurangabad) is an incomplete 17th century Mughal fort complex that stands before the Buriganga River in the southwestern part of Dhaka, Bangladesh.[1] The construction was started in 1678 AD by Mughal Subahdar Muhammad Azam Shah who was son of Emperor Aurangzeb and later emperor himself. His successor, Shaista Khan, did not continue the work, though he stayed in Dhaka up to 1688.

Nearest Hotel

SL.	Name	Address	Phone	Cost
1	Hotel Washington Lee: 56	Gulshan South Avenue / A, Dhaka.	0	0
2	Hotel rajamina isakha International 89/3	V, I, P Road, Kakrail, Dhaka	2	0
3	Hotel Le Merediyen (Residential) House No. 11	Road, Section 1 -6 Uttara, Dhaka	0	10
4	Hotel Grand Prince	plot 06 and 11 block, Mirpur 1, Dhaka.	9012952	0
5	Six Seasons Hotel	Road 96, House 19, Gulshan 2, Dhaka, Bangladesh	0	15






Nearest Places You Could Visit in Dhaka Sadar :

- 1  **Khan Mohammad Mirza Mosque** খান মোহাম্মাদ মুহা মসজিদ ☆☆☆
- 2  **Hussaini Dalan** হোসেনী দালান ☆☆☆
- 3  **Central Shaheed Minar** কেন্দ্রীয় শহীদ মিনার ☆☆☆
- 4  **Star Mosque** তারা মসজিদ ☆☆☆
- 5  **Musa Khan Mosque** মুসা খান মসজিদ ☆☆☆

Showing the location details and nearest hotel and other places to visit.

Recommendation list based on most visited:

For you! Here are Some places people seems to be interested in...

#	Location Name	Type	Trip Cost (BDT)	Rating	Hotel/Rest House
1	 <p>Patuakhali Science And Technology University Campus পটুয়াখালী বিজ্ঞান ও প্রযুক্তি বিশ্ববিদ্যালয় ক্যাম্পাস Division: Barisal District: Patuakhali Upazila: Dumki Visited: 39</p>	University	৳ 1800/- Living: 600/- (Per Night) Transport: 1200/-	☆☆☆☆☆	View Details
2	 <p>Suhrawardy Udyan সোহরাওয়ার্দী উদ্যান Division: Dhaka District: Dhaka Upazila: Dhaka Sadar Visited: 25</p>	National Memorial	৳ 900/- Living: 800/- (Per Night) Transport: 100/-	☆☆☆☆☆	View Details
3	 <p>Hussaini Dalan হোসেনী দালান Division: Dhaka District: Dhaka Upazila: Dhaka Sadar Visited: 18</p>	Islamic architecture	৳ 900/- Living: 800/- (Per Night) Transport: 100/-	☆☆☆☆☆	View Details
4	 <p>Lalbagh Fort লালবাগ কেল্লা Division: Dhaka District: Dhaka Upazila: Dhaka Sadar Visited: 13</p>	Fort complex	৳ 900/- Living: 800/- (Per Night) Transport: 100/-	☆☆☆☆☆	View Details
5	 <p>Star Mosque তারা মসজিদ Division: Dhaka District: Dhaka Upazila: Dhaka Sadar Visited: 10</p>	Mosque	৳ 900/- Living: 800/- (Per Night) Transport: 100/-	☆☆☆☆☆	View Details





Here, recommendations are showing based on most visited place by user.

Recommendation list based on distance:

Your Location: Rd No. 8,Block-B,Section 12,Pallabi,Mirpur,Dhaka,Tejgaon Circle,Dhaka,Dhaka,Bangladesh

Search Nearby

Budget From BDT 500 Division District Upazila Search

#	Location Name	Type	Trip Cost (BDT)	Rating	Hotel/Rest House
1	 <p>Bangladesh National Zoo ঢাকা চিড়িয়াখানা Division: Dhaka District: Dhaka Upazila: Dhaka Sadar Distance: 2.4 KM</p>	Zoo	₳ 900/- <i>Living: 800/- (Per Night) Transport: 100/-</i>	★★★★☆	View Details
2	 <p>Jatiyo Sangsad Bhaban জাতীয় সংসদ ভবন Division: Dhaka District: Dhaka Upazila: Dhaka Sadar Distance: 6.7 KM</p>	Parliament of Bangladesh	₳ 900/- <i>Living: 800/- (Per Night) Transport: 100/-</i>	★★★★☆	View Details
3	 <p>Bangabandhu Museum বঙ্গবন্ধু শেখ মুজিব স্মৃতি জাদুঘর Division: Dhaka District: Dhaka Upazila: Dhaka Sadar Distance: 7.9 KM</p>	Museum	₳ 900/- <i>Living: 800/- (Per Night) Transport: 100/-</i>	★★★★☆	View Details
4	 <p>Bangladesh National Museum বাংলাদেশ জাতীয় জাদুঘর Division: Dhaka District: Dhaka Upazila: Dhaka Sadar Distance: 9.8 KM</p>	Museum	₳ 900/- <i>Living: 800/- (Per Night) Transport: 100/-</i>	★★★★☆	View Details





Here, recommendations are showing based on nearest place from user.

Recommendation list based on budget:

Your Location: Rd No. 8,Block-B,Section 12,Pallabi,Mirpur,Dhaka,Tejgaon Circle,Dhaka,Dhaka,Bangladesh


Suggest Me Search Nearby

Budget From BDT 500 Division District Upazila Search

#	Location Name	Type	Trip Cost (BDT)	Rating	Hotel/Rest House
1	 <p>National Martyr's Monument জাতীয় স্মৃতিসৌধ Division: Dhaka District: Dhaka Upazila: Savar Sadar Distance: 15.2 KM</p>	Public Monument	500/- Living: 400/- (Per Night) Transport: 100/-	★★★★★	View Details
2	 <p>Kobi Nazrul Mancha কবি-তীর্থ-দৌলতপুর Division: Chittagong District: Comilla Upazila: Muradnagar Distance: 10045 KM</p>	Historical place	1300/- Living: 800/- (Per Night) Transport: 500/-	★★★★☆	View Details
3	 <p>Musa Khan Mosque মুসা খান মসজিদ Division: Dhaka District: Dhaka Upazila: Dhaka Sadar Distance: 11.2 KM</p>	Mosque	900/- Living: 800/- (Per Night) Transport: 100/-	★★★★☆	View Details
4	 <p>Lalbagh Fort লালবাগ কেল্লা Division: Dhaka District: Dhaka Upazila: Dhaka Sadar Distance: 11.6 KM</p>	Fort complex	900/- Living: 800/- (Per Night) Transport: 100/-	★★★★☆	View Details

Here, recommendations are showing based on budget of the user and ratings.

User registration page:

 [Home](#) [About Us](#) [Contact Us](#) [Register](#) [Login](#)

Register

First Name


Last Name

Average Budget You Wish to Spend on Tours

Email address

Password

User login page:


 [Home](#) [About Us](#) [Contact Us](#) [Register](#) [Login](#)

Login

Email Address

Password


User profile page:

 Home My Profile About Us Contact Us Logout


Nasim Ahmed

Email : sykot@live.com
Budget You Specified : Tk. 2000/-


Places you seem to like



Patuakhali Science And Technology University Campus
পটুয়াখালী বিজ্ঞান ও প্রযুক্তি বিশ্ববিদ্যালয় ক্যাম্পাস
★★★★★



Lalbagh Fort
লালবাগ কেল্লা
★★★★★

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Sample System Codes:

```
<? php

namespace App;
use Illuminate\Database\Eloquent\Model;
use App\Division;
use App\District;
use App\Upazila;
use App\Type;
use App\Transport;
use App\Hotel;
use App\Rating;

class Location extends Model
{
    public function division()
    {
        return $this->belongsTo(Division::class);
    }
}
```

```
    public function district()
    {
        return $this->belongsTo(District::class);
    }

    public function upazila()
    {
        return $this->belongsTo(Upazila::class);
    }

    public function transports()
    {
        return $this->belongsToMany(Transport::class);
    }

    public function types()
    {
        return $this->belongsToMany(Type::class);
    }

    public function ratings()
    {
        return $this->hasMany(Rating::class);
    }
}
?>
```

File: location.php

```
// Distance -----

/**
```

```
* the function that takes a location
* then takes visitors/users position
* co-ordinate and calculate the
* location's distance
*/
```

```
public function haversineGreatCircleDistance
```

```
($latitudeFrom, $longitudeFrom, $latitudeTo, $longitudeTo, $earthRadius = 6371000)
```

```
{
```

```
    $latFrom = deg2rad($latitudeFrom);
```

```
    $lonFrom = deg2rad($longitudeFrom);
```

```
    $latTo = deg2rad($latitudeTo);
```

```
    $lonTo = deg2rad($longitudeTo);
```

```
    $latDelta = $latTo - $latFrom;
```

```
    $lonDelta = $lonTo - $lonFrom;
```

```
    $angle = 2 * asin(sqrt(pow(sin($latDelta / 2), 2) +
```

```
        cos($latFrom) * cos($latTo) * pow(sin($lonDelta / 2), 2)));
```

```
    return ($angle * $earthRadius)/1000;
```

```
}
```

Function: Geo Search

```
<?php
```

```
namespace App\Services\RatingService;
```

```
use App\User;
```

```
use App\Location;
```

```
use App\Rating;

class RatingService{

    public $ratingContainer;

    public function userRatedLocationBefore($u_id,$l_id)
    {
        if(Rating::Where('user_id', '=', $u_id)->Where('location_id', '=', $l_id)-
>first())
        {
            return true;
        }

        return false;
    }

    public function createNewRating($u_id,$l_id,$ur)
    {
        $rating = new Rating();
        $rating->user_id = $u_id;
        $rating->location_id = $l_id;
        $rating->rate = $ur;

        $rating->save();

        return $rating;
    }

    public function updateRating($u_id,$l_id,$ur)
    {
        $rating = Rating::Where('user_id', '=', $u_id)->
```

```
        Where('location_id', '=', $l_id)->
        update(array('rate' => $ur));

    return Rating::Where('user_id', '=', $u_id)->
        Where('location_id', '=', $l_id)->first();

}

public function calculateRating($rt)
{
    $ratings = Rating::where('location_id', '=', $rt->location_id)->get();
    $count = $ratings->count();
    $sum = $ratings->sum('rate');

    $avg = $sum/$count;
    return (int)$avg;
}

public function updateLocationRating($rate,$l_id)
{
    $loc = Location::find($l_id);
    $loc->rating = $rate;
    $loc->save();
    return $rate;
}

public function getRatingsByUserId($id,$rate=null)
{
    if($rate == null){
        $this->ratingContainer = Rating::where('user_id','=', $id)->get();
    }else{
```

```
        $this->ratingContainer = Rating::where('user_id','=',$id)-  
>where('rate','>',$rate)->get();  
        }  
  
        return $this;  
    }  
  
}  
?>
```

File: RatingService.php