Amar Bangladesh - A Machine Learning Based Smart Tourist Guidance System

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***Abstract*—Tourism is a very prominent sector for many third world countries around the world as a greater portion of their economy is dependent on it. In countries like Bangladesh, who are blessed with enriched natural beauty, are often lagging behind to attract more tourists both by private and government organizations. Amar Bangladesh is the first tourism-based smart phone application to introduce machine learning in its program. The mobile application uses the Google Maps API and finds out the location of all points of interest added to the database by the Admin. An user will be able to log in to this app using their basic information or Facebook details. Upon logging in, users will plan their day long trips starting from the nearest attraction. They can deselect attractions which they do not prefer. The ML program used in this application will find the most suitable routes to reach the destinations one by one . Suggestions developed through machine learning would appear each time while choosing their points of interest. Users will also be able to write notes as a mean of diary entry which will be saved on their phones offline database. Users may allow public access to those entries or restrict them from sharing too.**

Keywords*—*smartphone; mobile application; technology; machine learning; analysis

I. Introduction

Tourism is very popular amongst people these days. People often seek to spend their holiday in attractive destinations rather than being at home with their family. So, the initial problem they face regarding this is a proper plan. There are often both expensive and inexpensive options increasing the chance of exploitation. As a result , they become confused and suffer from hesitation. Also, not withstanding, that if they hire a tourist guide then they also have to bear a large amount of extra cost.

In this paper, we present a mobile application to solve this problem that almost all lone tourists face when they plan to travel to a new destination. The Amar Bangladesh app will help individuals to discover the closest tourism spot and information related to their plans upon checking in. The idea of Amar Bangladesh is to get the all the spots in one app and make it lesser deal to move from one spot onto the next.

This solution is possible in light of the fact that a decent number of individuals are travel parched and in the event that they discover an answer like this they we certainly utilize it as it is additionally utilize less mobile data.

In third world countries like Bangladesh, Pakistan and Myanmar, people have access to smart phones but are not completely aware of the technical advancements it carries. This paper is focused on those who are travellers and can take advantage of this advancement to know the nearest tourist spot. By using this app, travellers can easily find which place they want to visit and which tourist spot is nearest from their location. They can deselect attractions which they do not prefer to go.

This paper is centered around the individuals who are travellers and can exploit this headway to know the closest traveler spot. By utilizing this app, travellers can discover without much of a stretch that which put they need to visit and which traveler spot is the closest from their area. They can deselect attractions which they don't want to go.

II. Related works

Many tourism apps are available in the internet.But there cant provide specific spot to the user which he will like using artificial intelligence or any other method.They just show the list of spots and users can choose the spot and see details. Like Tourism [8] is an android application which provides information about any place situated in India but do not provide any information which is outside of India also it does not have any algorithm which can determine which places user will like most and which places are very near to the user so the user can easily go to that place.

Minube: travel planner guide [9] is another android application which is available in Google play store to help users for tour but it is not much efficient for using as guidance.

To reduce the difficulty of tourism guidance, the Amar Bangladesh application which is proposed in this paper can be very helpful for people. This mobile application features are very easy to use and it is totally cost free.

III. Methodology

Different types of methodologies have been taken to build Amar Bangladesh application. Since this mobile application needs GPS [2], we have used built in GPS tracker [1] from android phone which will track users location and then it will

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check our real time database which places are good near user's location and then it will show the nearest tourist spots in details.

A. UI design

UML diagram was drawn to set features for the application at the beginning.And a details work flow was designed.We have added many features which have been suggested by experts. After completing UML diagram, started to create UI design. Adobe XD, a well known designing software is used for the interface designing.Before converting it into android app we tested the UI designs various times to make it completely user friendly.Also we have chosen very good colors so that it can be very helpful for the color blinds people also.

B. Android part

After fixing problems and completing UI designing, have stated to implement it in the android platform. We have used Android studio IDE to do our full work. We have done front-end part using XML and have written back-end code in Java language.To connect with the server we have used php language.And for the database we have used MySql.We have also used Google map api to show the map in the app.

C. Map

To allow users to know about the current location and nearest tourist spot, we have used Google map API [11]. This map will show the details of places. Users can navigate by using this map. The map is made interactive for users with clickable spot. Users can save their favorite spots and also can see those spots in the map. Clustering map marker is used to make easy for users to use this app.

D. ML part

We check users usage of the app. In which spots most of the users are clicking and in which spots most of the users are marking as favourite and then we have used Linear Regression [1] to find out best place for that user and we show that in the app.By this user will get the appropriate location .Using machine learning we will show best locations. Also we have used Dijkstra algorithm[10] to find out the shortest path and route for the the user to go that place.After user select a location there is a map option where user will get the shortest route to the location.

E. Dijkstra

Dijkstras algorithm is known to be the one of the most efficient shortest path tree search amongst the other tree search algorithms. The algorithm works such that it initiates from one starting node. The initial node is said to have a weight of 0 despite the value of its connecting edges. All the other vertexes are given a value of infinity. Now, to reach to a destination node, the shortest path calculations is made in such a way that the value of infinity of the nodes met while reaching to the destination node is substituted with the value of shortest path. This calculation persists until the destination node with the shortest path is observed. Several data structures are also used in order to store mapping and GPS information, which serves as the edges during the algorithmic calculations.

F. Linear Regression

One of the most widely used statistical approach for machine learning or classifying data is the linear regression model. In such a model, generally a linear relationship is built between a result and the factors that are degerming the result. In other words, it creates a relationship between a dependent and its determinant independent variables. This comes useful in order to predict useful outcomes of behavior just by summing up coefficients of its determinant factors or its behavioral record from the past.

G. Finalization

This Amar Bangladesh app is tested in different virtual emulator. We have also tested this app in different physical android devices of various versions. After observing some problems, we have fixed all possible bugs.

IV. Model Design

A fully customized design is used in this app to make it user friendly for the users. This app starts with a login page and also has sign up option to create new account. Users all details will be stored in server by users accounts. Users can see his/her travel history in this app.

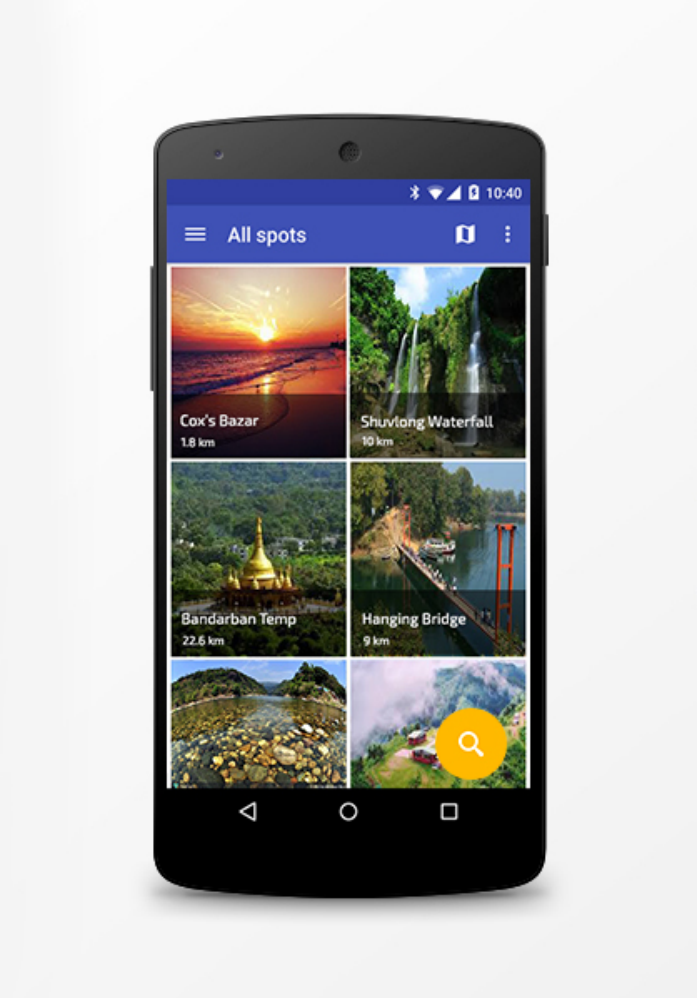

Fig. 1. Homepage of the app.

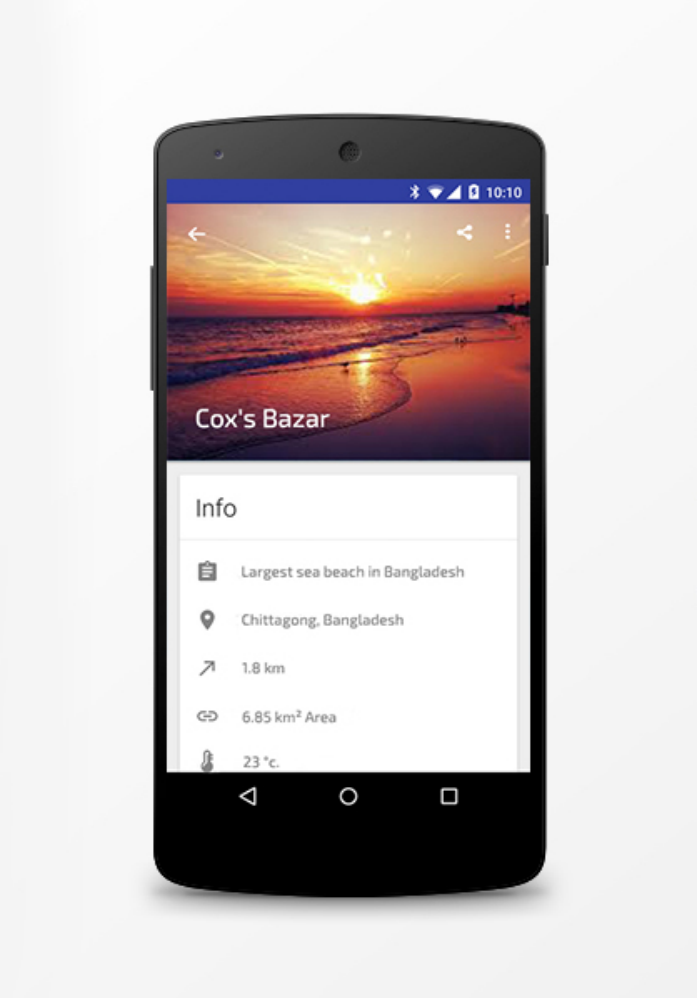

Fig. 2. Spot details.

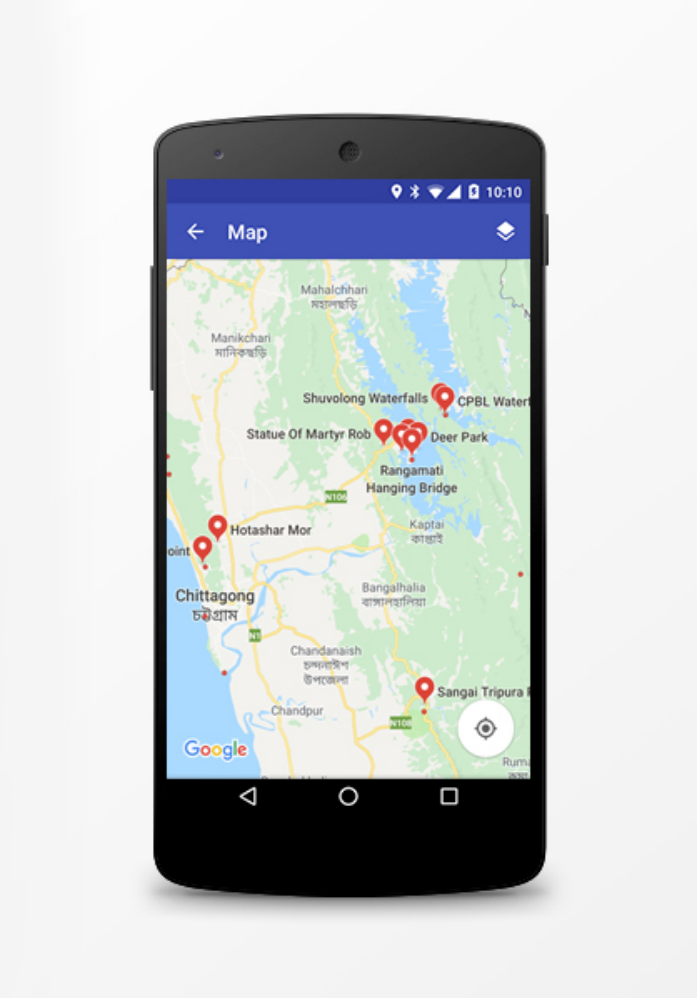

Fig. 3. Real time map.

V. Controller design and Implementation

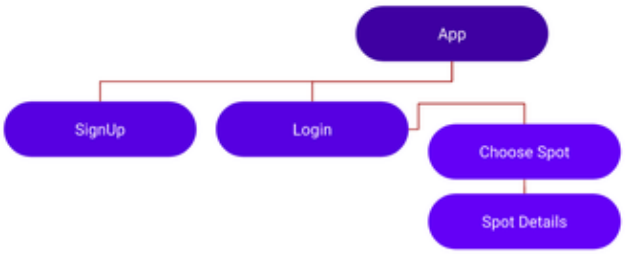

Fig. 4. Flowchart of Overall Controller Design

As previously mentioned, this Android mobile application was developed using Android studio. We used Java and PHP for programming the application. Interface was designed by android XML[5] and we used real time database for building the app. An admin panel has also been created for monitoring the contents shared by users and it additionally use for change any dynamic data in the app. The admin panel is online based and the interface is created using HTML, CSS and Java Scripts.

The most sophisticated feature of this app is its ability to find the nearest tourist spot using ML. It can give you search spot suggestion and give you the accurate distance.

VI. Testing

Before the execution of the application, the model was shown in a couple of between college ventures exhibiting shows. We got a significant number of good nourish backs from the guests and the university faculty members. Later upon

usage, approval of this application was done by permitting 100 betas clients to constantly discover new issues and blunders. In the wake of accepting a few surveys from the beta clients, the app was additionally at that point exhibited in numerous national and global displays.

VII. Feasibility and cost analysis

Smart phone performs easily at a steady speed. As days passed, the advancements of smart phones were most certainly not simply restricted to its performing speed, however there were likewise promotion advancements in inward framework to ensure that individuals have an awesome hands-on involvement.

A. Memory management

Memory administration assumes an imperative part to guarantee the smooth execution of the versatile applications. Accordingly, the significant distinction between this portable application and other accessible applications is the inward memory that assumes a critical part in dealing with the procedures, administrations and applications which are either introduced by the client or which are as of now show in the gadget.

B. Database

Databases like SQLite are all the more broadly utilized as a part of implanted framework applications. This is critical due to its information exchanges structure which enables the information to be all the more productively oversaw inside the telephone and the application.

C. Different Platform Versions

This application works flawlessly in all the android forms with next to zero slacks by any means. As specified before about its highlights, clients can record pictures and recordings to send it to their friends and family. They can record this sight and sound specifically from the application or then again, they can essentially transfer from the phones stockpiling. Once the undertaking is done, the clients are allowed to erase them from their phones memory which will in the long run spare telephone stockpiling.

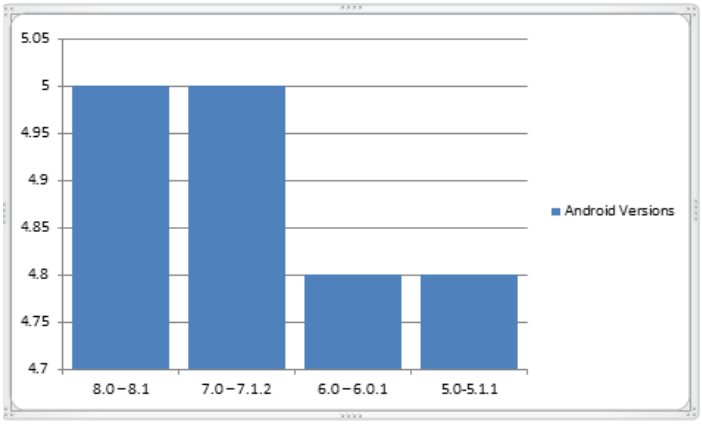

Fig. 5. Performance of the app in different android version.

The improvement of Amar Bangla versatile application was done in the Software Development Kit (SDK) [4] adaptation 27. SDK form 27 is known to be the most recent adaptation of the Android programming improvement instrument set. In spite of the fact that, the base SDK required to run this application is 15, this application will run easily in all SDK forms between 15 to 27.

D. Cost

The most imperative and one of a kind establishment of our application is its simple highlights and similarly minimal effort of utilization. The client will simply bear the cost of purchasing information benefits on their phone in the event that they are not accessible to Wi-Fi.

Up until now, we can state that the plausibility and cost investigation of this mobile application can be controlled calm because of its easy to understand UI plan and ease of upkeep. The table beneath demonstrates the evaluated cost examination of android advanced mobile phones and web bundles from various administrators accessible in Bangladesh.

Smart phone	Price Range	Internet packages	Package price
Walton	$15	Grameenphone	$1
Symphony	$10	Airtel	$1
Lava	$12	Robi	$1

Fig. 6. Smart phone and internet package cost.

VIII. Conclusion

The objective of Amar Bangladesh is to ensure that every one of the travellers around the globe can enjoy tour without much of a stretch get profited from it. Explorers will be more intrigued to go for a trek on the off chance that they have a legitimate rule. To give a most limited way and appropriate rule is the fundamental motivation behind this app. This app has all the vital highlights that a traveller needs with a specific end goal to guarantee a best visit. To guarantee Amar Bangladesh use among all explorers, it is an exceptionally easy to understand application which comes at a similarly bring down cost. This app can additionally be produced by permitting its help capacity on numerous

Acknowledgment

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