

Modern Trip Assistant System

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***Abstract*— Modern Trip Assistant System is an advanced tour planning guide for tourists who wish to travel historical and popular tourist places in Sri Lanka. The system is designed to help tourists to plan a day-based trip with all the facilities. More specifically, the flow of the proposed system is when a user opens this application for the first time, a login/signup interface will be displayed. After that user has to specify the no of days or total duration of the trip. Then in the next screen user can choose all the tourist places and our system will plan the trip according to the tourist places. Our system will notify tourists according to the trip plan in order to prevent time lack. Duration for each tourist place will be determined with the help of the data provided by the tourist guides when registering to our system. At the end of the trip, the system will charge for the entire trip with all the expenses as a single payment. All the payment-related information can be accessed using the web interface of Modern Trip Assistant System.**

I. INTRODUCTION

During late years tourism has turned out to be one of the world's most intense ventures in terms of revenue creation. This Industry becoming more and stronger considering the global economy which expanded with the increment of tourist arrival. In recent times Sri Lanka able to expand the tourism sector and able to attract foreign investors and local people who are interested in contributing. By being a tropic country, helps to attract a lot of European people who love to enjoy the climate here in Sri Lanka. Also, the location and beauty of the country further help in attracting process of tourists which also encouraged by the ending of 30 years of war.

Sri Lankan Economy is mostly depending on the Service Sector which is around 60% of the entire Production. So, the government also very much interested in providing facilities and uplift the tourism sector to earn more and more profits. With the enlargement of the tourist industry, it brings some common problems which require the attention of all of us. So, we come up with a solution to one such problem through this Research project. With the development of technology, it is easier for any tourist to access any location and get details of what they want [1].

Nowadays' wireless networks like mobile phones, internet and numerous other new technologies together gives different functionalities which are significantly making impact on our day to day activities. In this manner, mobile tourism spread rapidly among tourists which becomes a self-navigation to them. It does not help to tourist other than hotel owners and trip advisor [2].

The System covers project areas like Hotel room booking prediction, Virtual guide, and tourist place identifies and entertainment sector. Prediction help to hotel owner make sure to ready for each month. This given to option found suitable accommodation for tourist budget. Virtual guide done through the image process technology. it is the most important feature because normally tourists not comfortable with unknown tourist guides with them so a virtual guide will provide the most comfortable and secure traveling to tourists. Place identify done through the image process technology. it will be providing identify unknown tourist place. Partly system cover entertainment perspective as well. The system will provide a 3D map using argumentative reality [3].

II. RELATED WORK

There are several researches have been done related to tourism, but they did not provide enough specific functionality to the tourist to satisfy their journey. A machine learning-based smart tourist guidance system has been used with Google maps API to point out places which they

preferred. When tourist starts the journey, it helps to find the most suitable routes to direct trip [4]. Here, only ML algorithms used to predict the exact route by using Google Maps API.

Different types of researches carried out through the domain of sharing tourist experience via albums and videos, it helps those who passionate to visit tourist places. Here, they didn't ensure the tourist's privacy when sharing experiences [5]. Only focusing to promote tourist places. In the tourism domain, some researches have been done to collect photos, videos, posts and calculate estimations about attractions attended by the tourist [13].

Very few researches have been done and build a mobile application to know information about tourism and cultures in different provinces of a country [6]. Here, objects and videos displayed virtually, and user interaction with application when select the province.

The popular recommender system which has been seen respective collaborative filtering methods based on tourists' historical behaviors. Predict the customer's historical information [7]. Collaborative travel app in the tourism domain have been designed, built and tested for smartphone technology helps to identify current and anticipate future patterns [8] and virtual reality (VR) technology used to explore any destination or location in real-time but it was in internet-based virtual system [9] main disadvantage of this system cannot use offline.

Android-based mobile application which provides geographic services and tourism in Istanbul city. It has an internal database and represents the possibilities of searching places of interest using Variable-neighborhood algorithm [10]. There are very few numbers of application which is on windows phone 7 application that provides the photos to the users around user's location [11], photos are automatically downloaded from Flickr and Panoramio and shows to the user.

Hence, an innovative museum guidance system, where determines the user's position information by using the ZigBee protocol [12]. Tourist use tablets to interact with elements in the environment and receive personalized information. This system gets a location precision of less than one meter. There is another mobile application for tourist that makes context-aware recommendation respective to tourist's interest and context [14] which is built on the WSAP platform and it represents generic supporting services combined with the semantic web technology.

Classification of mobile applications accessible under tourism domain there are four different categories "Online Booking", "Information Resources", "Location-based service" and "Trip Journals" which are combined together in

one single application [14], but there are no any Machine Learning algorithms used predict the data easily. Only using individual database to keep the record and identify the tourist request.

Tour planning support system provides a way to combined tour planning in a tour and it guides tourist respective their specific profile which is interest, wishes, personal values, disabilities and constraints also transportation schedules based on tour planning [15]. Interact the system through the web or mobile according to the tourist preference.

III. METHODOLOGY

The process of the trip assistant system contains the sequences of process as follows. First, the user registers our application and we provide login change password delete account and more other basic options. All the register user details are stored in our main system and we save all those details with encrypted format.

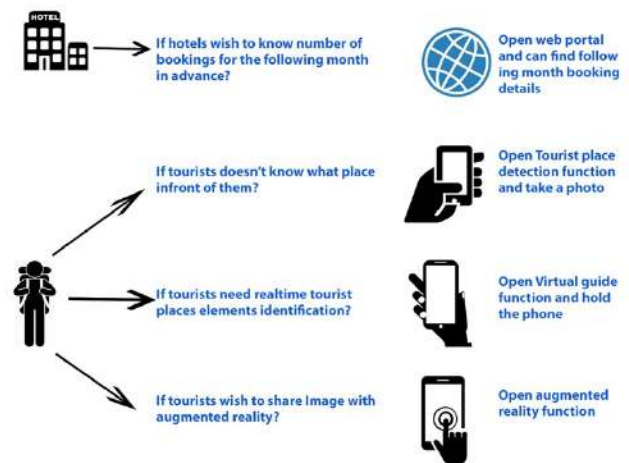


Figure 1: System overview

A. Tourist place detection (TPD)

This functionality will detect tourist places in front of tourists or tourists place pictures they wish to identify, also it will give description about identified tourist place to the user as text output. This functionality will be developed through machine learning techniques and description data will be load from the firebase database. To achieve this functionality tourist places pictures are collected and trained an image classification machine learning model to predict the tourist places. The user can take pictures of tourist places in whatever the angle, so

the tourist place detection component is developed to identify the tourist places in whatever the angle.

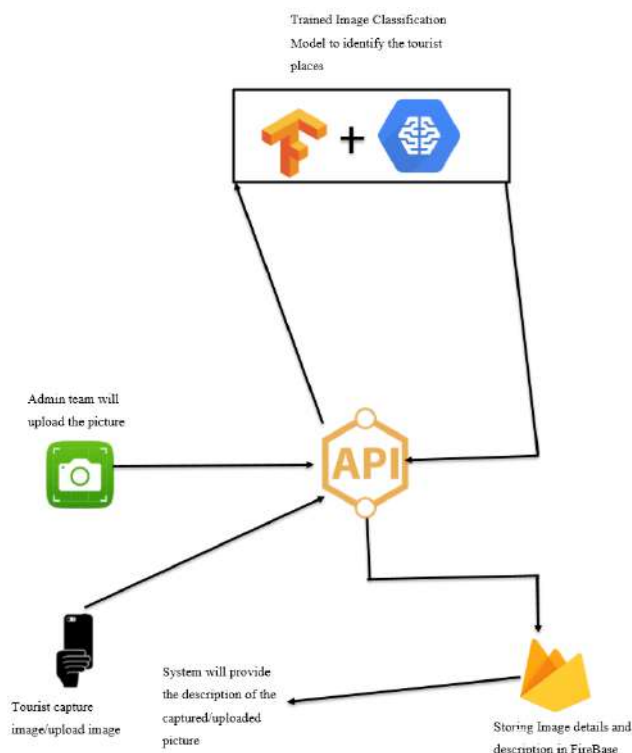


Figure 2: System Diagram
(Tourist place detection component)

B. Virtual guide

This is a Real-time process and it is identifying the elements of the tourist places offered by the application and it is providing real-time information and voice-activated information. Image processing and Machine learning plays key aspects in this. Considering the application size, the data needed for this virtual guide will be obtained from time to time from the cloud database. User can get information in any vies or angles so that will provide a comfortable user experience. There are some issues in this virtual guide function. Any changes in the surrounding or any changes in the actual state of the element and lighting conditions might cause trouble in identifying it properly. This function is highly depending on both the processing speed and network speed.

The specific goals of the virtual guide functionality are given below.

I. Recognizing important element in real-time while the user is moving around with the virtual guide feature turned on, in service offered tourist locations in any position or angles.

II. Providing real-time information about recognized tourist elements both as text and voice-activated outputs to the user.
III. Providing timely alerts for the user for avoiding the tourist run out of time by spending more time in a place than allocated.

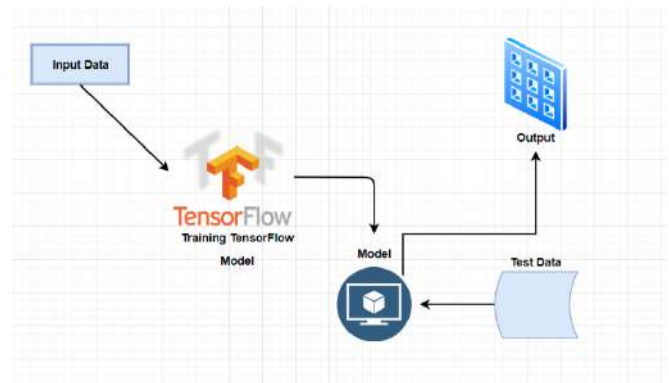


Figure 3: Virtual guide system overflow

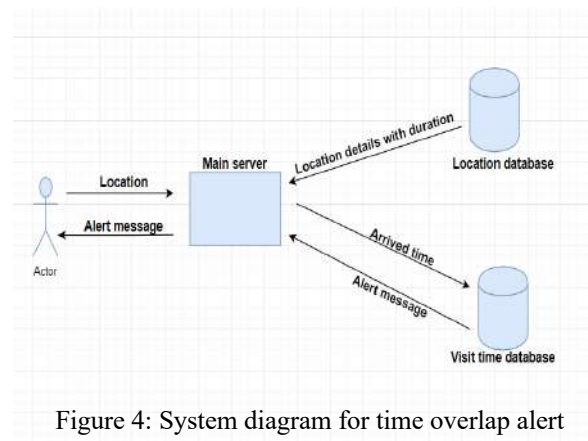


Figure 4: System diagram for time overlap alert

C. Hotel booking prediction

The hotels will use web interface to register their hotels and using web portal hotels can manage all the booking related activities. Using our booking prediction facility, hotels can see the number of bookings for the following month in advance

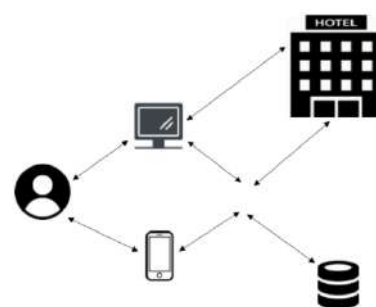


Figure 5: System Diagram (Booking prediction component)

D. 3D map with augmented reality

Augmented reality is the technology that improves our world by adding some digital information on it. Tourist guide map is very important for the tourist they can find the places through the maps. In this research, we create a 3D map using augmented reality. Through this 3D map function, users can view their actual location with the 3D view and users can get this map on any other surface. This application is the real-time application and its get a user's location from the phone GPS. This application used unity C# and the map box for that develop purposes.

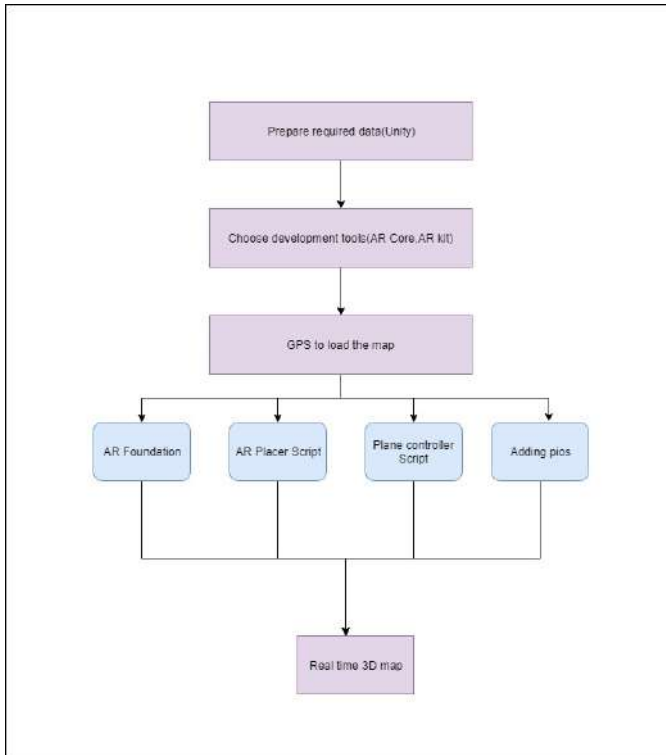


Figure 6: 3D map workflow

We have collected 500 photos to train our virtual assistant where it detects tourist places and guides tourist in real-time and the system provides result with accuracy of 85 – 95% and our image recognition system will provide result with an accuracy of ~90% where it gives the information about the historical place once you upload the image to our system. Hotel booking prediction helps tourists to avoid accommodation related issues. It helps to predict the number of bookings for the following month. So that the hotel management can do the needful to allocate rooms for the tourists. We have collected 5 years of booking data to train and test our system. It provides results with an accuracy of 88 - 90%.

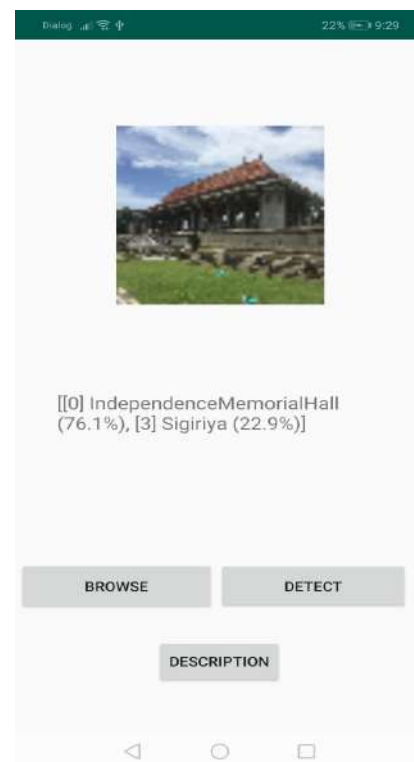


Figure 7: Upload Image of tourist place Interface

IV. RESULTS

Once mobile application is launched it displays an interface to register user. User must provide email address and password to register themselves to our system. Once it is done an email will be sent to the registered email address. After confirming the registration user can login to our system and a map with search bar will be displayed as an initial screen.

Users can search for a tourist place and the system will get the shortest path for the destination while covering other tourist places nearby. Tourists can plan a trip by providing the duration they are going to spend on a trip. According to that our system will plan the trip. And the system will notify a user to maintain their plan by sending notifications when allocated time is exhausted.



Figure 8: Description of Identified tourist place Interface

Through the 3D map interface, users can get the map any other surface. This 3D MAP has a feature of zooming in and out. It will help the user to get a correct idea of the wanted place with the roads and buildings. The lanes are in red and the buildings are in ash color.



Figure 9: 3D map view

Our web application we designed a component to upload booking summary dataset which will help to predict the booking count for the following month. We implemented Time Series Analysis technique to predict booking count for the following month. For testing purposes, we gathered a 10-year dataset from a hotel and predicted the booking count for the next month and compared the predicted result with the actual result. Our system predicts the booking count with an accuracy of 85 – 95%.

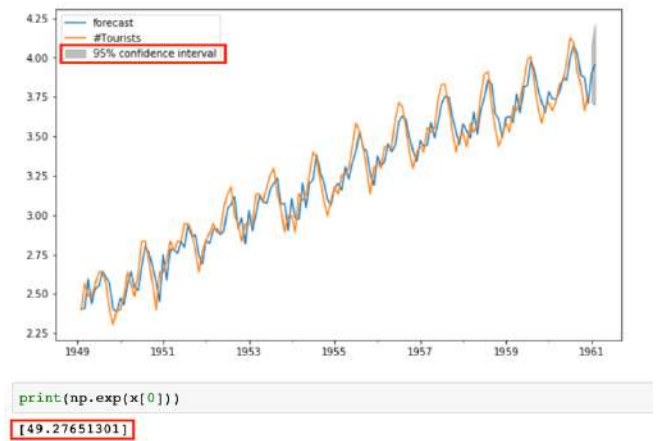


Figure 10: Booking prediction confidence interval

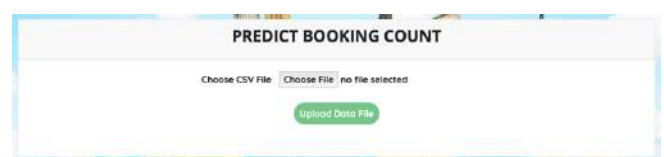


Figure 11: Interface to upload dataset

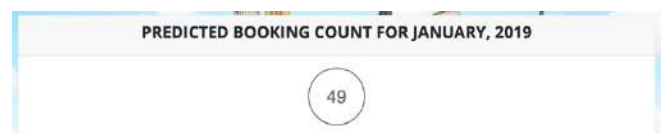


Figure 12: Predicted booking in the interface



Figure13: Virtual guide image prediction

V. FUTURE WORK

We planned to implement multi-language support and improved navigation facility in the future.

VI. CONCLUSION

The bulk of research based on tourist guide mainly focuses on finding the shortest path, Bookings, Location & Navigation, Automated tour plan, and Calculating Budgets. Also, many types of research projects focused on consolidating machine learning, Image processing and augmented reality with software development techniques. Even though, the combination of both the above-mentioned domains software products are very low in the market.

The main goal of the system is by using the machine learning technique to predict hotel bookings, Tourist place detection, virtual guide and by using augmented reality technology to 3D map through AR. Above mentioned functionalities will be improved the experience and happiness of tourists.

By using booking prediction facility, the hotels can see the number of bookings for the following month in advance. By using tourist place detection, it will detect tourist places in front of tourists, and it will give a description of identified tourist places to the user both as text and voice outputs. By virtual guide, it will identify the elements in the tourist places offered by the application, and it will provide real-time information on that element. AR technology is used to view the reallocation

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