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Marqur - A Social Platform for Location-based Content Aggregation and Discussion

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Abstract

This project aims to realize a free, community- driven platform for hosting and promoting location based content. Users are given the freedom to create and place digital content virtually at real, physical locations using GPS coordinates. Through this platform, we can post digital images, videos or other information users may want to share, linked to that location. A new store opening, a lost pet, a music event or any other type of news or announcement can be made through this application quickly and easily. Advertisers can put up image or video ads around their service area. Significant events that happened at a street or venue can be relived through photos and videos posted there. Most importantly, all this information is contributed and curated by everyday users. Thus, we can now see a digital snapshot of any location as depicted by its residents. This gives us an authentic look at places without having to visit them first. The proposed system is developed by having a combination of geo-location, social networks, connected apps and various web services. Malicious or harmful content that violates platform policies can be reported and removed. Other content can be up-voted or down-voted by users. The more voted a post is, the more visible it is compared to the others nearby. This helps in hiding spam or posts of poor quality, while making useful posts more visible. There is also the possibility of adding live automated data feeds, such as traffic and weather, making this a complete solution for location based awareness. If needed, posts can also be set a fixed visibility duration after which they are automatically hidden. The service is free to the general public but can still generate revenue by charging advertisers, adding to its feasibility.

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1. Introduction

The highlights of this project are its low cost and ease of use, as all users need to access the service is a smartphone with GPS and internet connectivity. Therefore, such a service might be readily accepted by the general public, leading to a significant change in the way we share information. We would also see a significant cut in pollution levels, as ad agencies turn to these services instead of printing material that will litter the streets. The user driven curation will curb bad advertising and promote healthy social trends. As people are increasingly using their mobile phones for taking pictures and social networking, this system provides them a way to use those activities for the betterment of the community. When it comes to information, visitors and tourists can now easily learn about various places and their highlights. This will undoubtedly boost tourism and businesses in the state. Moreover, when people are more informed, they are less likely to fall for misinformation and scams. They can make educated decisions in various spheres of life. Thus, we would be seeing a much more informed and connected community which lead to progress down the road.

2. Related works

Rui Nobrega et al. [1] stated that location-based storytelling is a powerful tool for tourism destinations to draw people in and make them understand the places they visit in a more interactive way than just presenting bare facts. The demand for these

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AR gamming apps are increasing and they require new approaches such as geo-location, to gather points of interest (POI) and mining social networks, to get collaborative feedback from other tourists or visitors. GPS-technology and built-in camera in their smartphones, enable players to use the real world as the playground.Junaio1 and Wikitude2 are best examples of AR apps that creates a deeper understanding and distinct experiences for the tourist with his immediate environment applying playful and gamely concepts.The game- base storytelling system has a well-designed strategy and all technologies were tested and implemented. The next stage will be the improvement of the user interface with additional user studies in order to deploy a final version, which will be used to create more engaging tourist experiences with the city.

Lis Tussyadiah clarified about the LSN applications[2]on cell phones that are turning into the new standard for individuals to encounter what urban communities have to bring to the table. An improvements model of LSN promoting is conceptualized dependent on the bits of knowledge from the center gathering conversations. The way to LSN marketing is joining pertinence and liveliness into a persuasive bundle that animates shoppers' dependability and variety conduct and, thus, shapes their versatility within the urban areas. The advertising upgrades distinguished are the ability of the framework to give quick rewards empowered by the technology highlights of LSN applications: setting awareness, social organization, and social gaming. One of the successful stimuli to change shoppers' conduct and versatility is the area pertinent shipper rewards, which may incorporate financial and non-money related advancements. Rivalry based prizes are the remarkable showcasing upgrades encouraged by the combination of each of the three innovation highlights of LSN applications. It influence purchasers to change genuine into a game, Theoretical—This task expects to understand a free, network is an amazing asset for the travel industry objections to attract individuals interest (POI) and mining interpersonal organizations, to get shared criticism from different sightseers or guests. GPS-innovation and making versatility and encounters more fun loving and fun. The last advertising boosts are the association based rewards, which are conceived from the mix of setting mindful and social network highlights of the applications. LSN marketing persuades purchasers to remain associated and widen their social network by sustaining correspondence and interaction among individuals from the interpersonal organization through moment updates and important proposals.

Sneha Kasetty Sudarshan explained about the issues and future scope of AR. Recent advancement in smartphone technology has fuelled the popularity of Augmented Reality in mobile devices. Though MAR has many challenges like navigation and tracking, environmental issues, hardware problems, usability, it is found to have a lot of future scopes. [3] This paper clearly defines Mobile Augmented Reality, describe its challenges and concerns. It describes the generic framework required to develop an Augmented Reality application. The existing Mobile Augmented Reality application available in different fields and available Augmented Reality software platforms are discussed. The important role of cloud computing in the future development of Augmented Reality applications along with other key technologies required are stated in this paper. Cloud services can operate as caches, decreasing the computational cost for both cloud services as well MAR applications and thereby saving energy and extending the battery life of the mobile device. Mobile cloud computing seems as a promising new technology for promoting the development of MAR applications. We hope more research on the topic will lead to the development of amazing Augmented Reality application without compromising user's privacy and comfort.

Jonathan Rodriguez and Ching-Yu Huang depicted the geolocation framework and AR [4].To become acquainted with the subject of GIS and AR, a few assets that have extraordinarily improved the aptitudes required for this task are the Google Maps API [5]. As geo-based applications are getting famous and getting more presentation, this examination shows how geolocation can be utilized to make frameworks that permit more vivid encounters with the environmental factors around an individual. This investigation has helped us see how geolocation functions and how we can utilize places like structures and construct elements on top of them. This examination extraordinarily enables the comprehension of how to manufacture a geolocation to support for customers. This is a work in progress, and is required is to completely rejuvenate this undertaking and test a pilot with the Open House occasions to give imminent understudies a vivid encounter of the grounds.

3. Existing System

Google Maps is an existing system that implements several facets of our project and is widely popular among mobile applications. It presents users with detailed geographical infor- mation about any location they wish to look up. Moreover, it encourages user-added content including reviews, imagery and other media. The key difference between our project and this existing system is that our platform favours more current and relevant information. We aim to create

a social network where users share current events and subjective opinions rather than permanent and objective facts. Thus the nature of the content is dynamic and changes with time. This allows users to learn about current happenings in a place instead of just information about the place. They can get familiar with the community and sentiment of people at that location, something that is not possible with the existing system. The addition of voting based discovery further improves the quality of information obtained.

4. Proposed System

The proposed system is an application that runs on the user's phone. It communicates with an online back-end service that provides markers and other requested information to the client. The system must be responsive and offer seamless updating of content to ensure a smooth experience. The figure shows the basic system design.

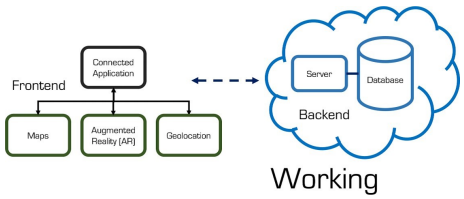

Figure 1. Working of Proposed System

The proposed system consists of four phases:

- Android Application
- Backend Design
- Geoquerying
- AR Display

4.1. Android Application

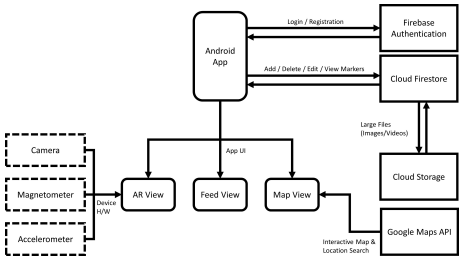

Figure 2. . Block Diagram

An Android app is a software application running on the Android platform. Because the Android platform is built for mobile devices, a typical Android app is designed for a smartphone or a tablet PC running on the Android OS [6] [7]. In this project, we developed an android application named Marqur. The UI of this application is very simple and user friendly. The users need to sign in to use the application. The app has three basic views: list, map and AR. In the list view, all the posts made by users at nearby locations will be visible. These posts can be sorted based on the no of votes, the date of posting, user's interests etc. It is desirable to make a post with more votes, more visible than the ones nearby. This helps in hiding spams or posts with poor quality. If needed a post can be set a fixed visibility duration after which they are automatically hidden. Any malicious or harmful content that violates platform policies can be reported and removed. In the map view, all the marqurs posted around the world can be seen. People can navigate to different locations in the map and easily get a location based awareness [8]. The AR view maps the marqurs on the map to real world location, making it further easier for people to reach the desired destination.

4.2. Backend Design

Firebase is used to provide a real-time database as well as back-end services. It is bascically an application development platform. The back end service provides an API that allows application data to be synchronized across clients and stored on Firebase's cloud.

Cloud Firestore is the successor to Firebase's original databasing system, Real-time Database, and allows for nested documents and fields rather than the tree-view provided in the Realtime Database. The user and marqur data are stored in two separate folders in the database. In the marqur folder, all the marqurs created so far will be listed. For each marqur, datas such as its author, comments, date of creation, last modified date, geohash, location, and media (any digital information) will be saved here. The user folder holds the information of all authenticated users which include, the unique user id,user name, email address, location, list of all the marqur the user created etc. Firebase Storage allow all files of the Firebase apps ,to be used for storing images, audio, video, or other user-generated content, to be securely uploaded and downloaded regardless of the network quality . It is backed by Google Cloud Storage.

Firebase Authentication is one of the Firebase services used at the backend. This service allow authentication of users using client-side code through any of the social login providers like Facebook, GitHub, Twitter, Google or other service providers like Google Play Games, Apple, Yahoo, and Microsoft. It also includes a user management system whereby user authentication can

be enabled with email and password login stored with Firebase. Once the user sign in, all the information including the provider, date of creation etc. For each user a unique user id will be generated.

Firebase function are codes defined by the application designers to trigger firebase services. In the developed application, we mainly use three firebase functions; addUserToFirestore and removeUserFromFirestore. When a user signup in the application, the addUserToFirestore function will be called. This function creates a folder (in the users folder) in the database and all the data corresponding to the user will be saved. Whenever an authenticated user deletes his/her account, the user folder associated with it will also be deleted by the removeUserFromFirestore function.

4.3. Geoquerying

Geo-querying is a special type of database query supported by geodatabases and special databases [9]. These queries differ from non-spatial SQL queries in several important ways; they allow the use of geometry data types such as points, lines and polygons and these queries consider the spatial relationship between these geometries.

Since we have used firebase, geo-hashing is necessary for optimal query results. Geohash was invented by Gustavo Niemeyer in 2008. It is a public domain geocode system used to encode a geographic location into a short string of letters and digits. This spatial data structure subdivides space into hierarchical buckets of grid shape. Geohashes have arbitrary precision. Gradually removing characters from the end of the code to reduce its size leads to gradual precision lose. As a result of this precision degradation, the nearby places will present similar prefixes, the longer their shared prefix is, the closer two places are. Each marqur need be geohashed [10]. To obtain the Geohash, the user provides an address to be geocoded, or latitude and longitude coordinates, in a single input box, and performs the request. The main usage of geohashes are as a unique identifier and as a representation of point data. The geo hashed marqurs are used for querying.

Structurally the geohashed data has two advantages, when used in a database; all points for a given rectangular area in continuous slices will be included in the data indexed by geohash (the number of slices depends on the precision required and the presence of geohash "fault lines"). This is especially useful in database systems where multiple-index queries are not supported. Another advantage is that, this index structure can be used for a quick-and-dirty proximity search: the closest points are often among the closest geohashes.

4.4. AR Display

Augmented reality (AR) refers to the technology that can overlay computer generated virtual information onto a real world environment in real time [3]. In AR the user gets to experience a real world environment (rather than a virtual world) which is extended to include computer generated information and imagery. In other words, AR connects the virtual and real worlds and thereby creating an enhanced exprience.

Recent enhancements in smartphone technology has fuelled the popularity of AR in mobile devices. Markless AR [11]is used in the application, giving an interactive experience to the user. Markless AR is less complicated in terms of algorithm but more complicated when it comes to hardware sensors. Sensors like accelerometer, gyroscope etc. make it possible to calculate the exact rotation of each axis in 3D space. In many cases it is also necessary to use GPS data to place digital information at some distance. Computer vision (camera) is used to access the real world. The markers can be easily mapped to the real world objects with the aid of sensor values from the user's mobile device [12]. The position of the markers on the device screen depend on the distance between the device and the marker in the physical environment; if the device is 1m apart, the marker will appear at the bottom of the screen and if its 10m apart, the marker will appear at the top of the screen.

5. Result and Discussion

We developed an android application named marqur that give users the freedom to create and place digital content at real, physical locations. It can be used to host advertisements or digital images, videos, or other information users may want to share, linked to that location. The UI of this application is very

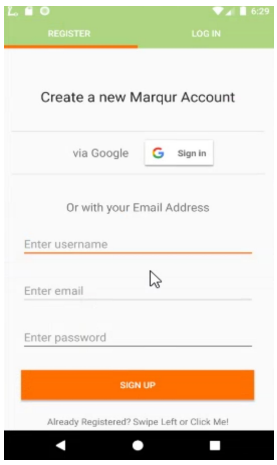

Figure 3. Signup page

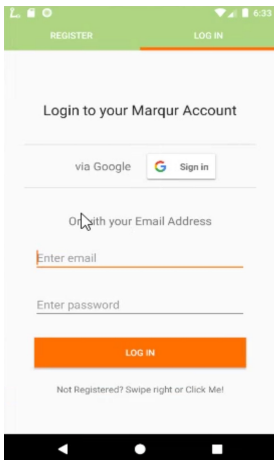

Figure 4. Sign-in page

simple and user friendly. The users need to sign in to use the application. Authentication services provided by firebase allow user registration and login. All the marker and user information are stored in cloud firestore and larger fields such as visual data to be displayed at each markers are stored on cloud storage.

The app has three basic views: feed view, map view and AR view. In the feed view, all the posts made by uses at nearby locations will be visible. These posts can be sorted based different criteria. In the map view, all the markers posted around the world can be seen. API of Google maps is used to provide this view. People can navigate to different locations in the map and easily get a location based awareness. The AR view maps the markers on the map to real world location, making it further easier for people to reach the desired destination. The device's sensors are used to determine the exact location of the device in the physical environment. Compass measurement and Y-axis rotation are taken to calculate the accurate position of the device in the physical environment. The magnetometer is a sensor that acts as the digital compass. It provide mobile phones with a simple orientation (in degrees) in relation to the Earth's magnetic field. Accelerometer measures the force of acceleration caused by movement or by gravity or by vibration and the value of each axis and the camera is used to access the real world .With all these sensor values The markers can be easily mapped to the real world objects.

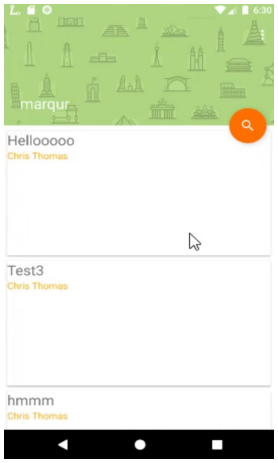

Figure 5. List View

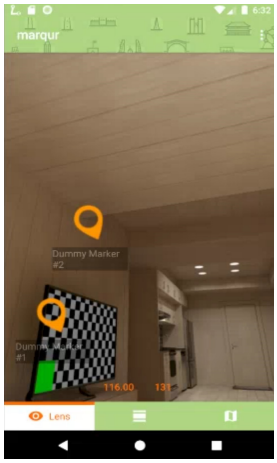

Figure 6. AR view

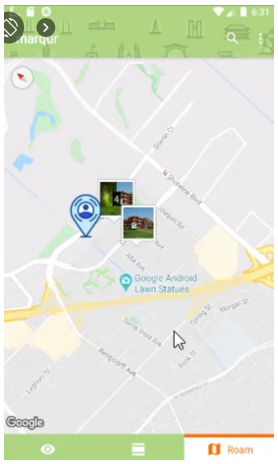

Figure 7. Map View

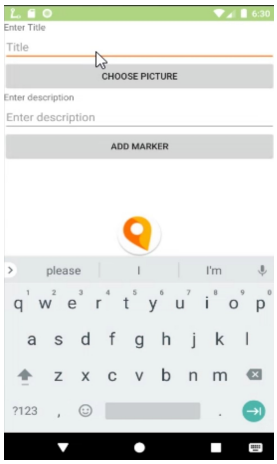

Figure 8. Add marker

6. Conclusion

The proposed system gives users a place to share location based news and updates while promoting discussions and close-knit communities around the world. It gives users a general awareness of their surroundings and helps them scope out places before visiting them in person. In this way, it empowers people by giving them useful information on the go.

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