AROUND ME

ABSTRACT

Android devices have become an essential part of daily life. People go to various locations, but they often need to figure out where they are going or how to get there. We need to understand the directions to avoid going in the wrong direction. Numerous smartphone apps are created to assist individuals in finding the correct routes in order to avoid this problem. In this study, a mobile application for Android devices is introduced. It allows users to add, remove, and review individual locations on an online map. People rely on smartphone apps to locate places like hotels, hospitals, businesses, bus stops, banks, restaurants, pharmacies, hospitals, libraries, and other places. Mobile devices' location-based services are among their most significant applications. Due to a unique internal chip that supports the Global Positioning System, the location of a Smartphone may be easily determined. Applications that do these tasks are widely available on the market. There are several applications, each of which serves a variety of goals. A new application is required to make each software less complex and memory-intensive. The application is thorough and all-encompassing. In this application, all data is linked through a real-time database. Various tools, including Android Studio and Firebase, will be used to create the app for the Android operating system. The complex algorithm and programming are done by using eclipse software. Java is the primary coding language used. This app allows us to use our GPS location to identify nearby necessary locations. Customer feedback and star ratings are also integrated into this place's program. People who are attempting something new can benefit from this review. An application that satisfies our daily needs was proposed in this project.

INTRODUCTION

In order to develop open standards for mobile devices, Google introduced Androids in 2007. Androids is a Linux-based mobile device platform developed by Apache that is free to use. The application framework established the standard structure of programs in a particular domain. The Android software development kit enables the creation of applications with a wide range of features. People today aspire to change their living environment to an intelligent environment, which comprises vital infrastructure and particular intelligent objects. People use an intelligent environment to carry out their tasks. Because there can be a lot of services available to consumers, it raises the question of how to manage the complexity and tailor computing activities to what users desire. End users are regarded as non-IT professionals. Developers should then offer tools for customers to compose services on their own. The Around Me android app's sole objective is this. The problem is that the service composition framework must be powerful enough to facilitate proper service composition and simple enough for average end users to understand. Imagine traveling to a new city or location you are unfamiliar with, and you want to discover everything there is to know about it. How can we find out everything? The best spot to find all the information about an unfamiliar place is nearby. You can identify places close to your location and learn your way around a strange city with it, making it an excellent navigational tool to bring on vacation. Around me will show you every place close to you and provide information about each.

LITERATURE REVIEW

Location features enhance the performance of the majority of current programs. You have probably encountered an application like Apple Maps that says, "Allow AppX to access the device's location." Once you select the 'Allow' or 'Enable' option, the geolocation feature is activated. For optimal performance, some well-known businesses like Foursquare, Airbnb, and Uber Eats rely on geolocation-based apps. These location-based apps can all detect the surrounding items, structures, services, and companies. Even the dating app Happn matches users depending on their area.

Technologies that make it possible for geolocation to function

1. **GPS module:** The term "GPS" refers to the Global Positioning System, a satellite navigation system that offers time and location-based information. With a few meters of accuracy, the most modern GPS technology provides geolocation data. You can now download navigators with GPS coordinates already built in.

2. **Cell ID:** Cellular ID is specific to each device, making it a crucial component of geolocation. Furthermore, information from cell towers can still be used to approximate location even in the lack of real-time data from the mobile device. You can therefore find your present location without a WiFi connection.

3. **Geofencing:** A geo-fence is a virtual perimeter wherein an app executes a straightforward or intricate pre-programmed operation. *Geofencing* is a method used by businesses like Uber. A modified version of geofencing is used by child-monitoring software to track the movements of young children.

4. **Geolocation for IOT:** Geolocation coordinates are used by IoT-enabled devices to track routes. The IoT device may quickly gather information (signals) from device sensors that resemble radio antennae. The device's coordinates can then be determined using this data.

Tech tools help to create a location-based app

1. **Maps:** Maps are essential to any conversation about "location," and Google Maps is undoubtedly the most well-known. With the aid of trackers and geolocation features, this application determines and displays a user's current location.
2. **Routes:** This API makes it possible to find the most direct routes between specified points on a map. This application can also be used to keep track of current traffic reports like accidents and congestion on the roads.

3. **Places:** Over 100 million places are accessible to users using the Places API. They can also use phone numbers and GPS addresses to locate locations. This API can be used by users of the photo location finder for both indoor and outdoor navigation.

PROBLEM DEFINITION

In this project, we will look into how nearest-places information and directions are implemented on the Android platform. The Android app for Around Me should have features like automatic localization, navigation support, information retrieval from sites of interest, review addition, communication support, and so forth. The project should also incorporate many of the most cutting-edge technologies currently available as building blocks, such as Google Maps. The project must also determine how they might be combined and customized. The project's outcome will be the unveiling of the Around Me prototype.

PROJECT SCOPE

PROJECT OVERVIEW

The main aim of the project is to demonstrate an in-depth knowledge of how to implement the nearest places on the new mobile platform Android. Many realizations of nearby locations are now visible on other platforms, including Windows Mobile, the iPhone, and others. The finished prototype includes the bare essentials for finding the closest places, including showing a map, finding points of interest on it, finding the user's location, retrieving information about those points of interest, adding reviews, showing route directions to those points of interest, adding reminders, and selecting different types of points of interest to display on the map.

- Suggested App Name: AROUND ME.
- Project Time Frame: Its deadlines are the current fall 2022 semester and the end of Spring 20223.

TARGET AUDIENCE

The target audience will include tourists, travelers, students, and anyone else.
Desire to find out more about the locations that are close by.

LIMITATION

1. A device with the Android operating system installed is necessary.

2. It could only pinpoint the spot the developer had tagged with a unique marker on the map.

3. Constant internet, GPS, and cellular data access are essential.

4. It cannot be used without a virtual device on personal computers.

RELATED WORK

The growing desire to use the Google Maps API to develop location-based applications or mobile mapping services. It ranges from straightforward applications to showing just a few points of interest with information windows to

complex maps. Scholefield used the Google Map API to create a web-based map service for tourists visiting Edinburgh in the eighteenth and nineteenth centuries.

Using Google Map API, Pejic et al. created an eTourism application to display key tourist attractions.

Bildirici and Ulugtekin employed points, polylines, and polygons from the previously stored data in their demonstration of an online mapping service using Google Maps (API V2) mashups. JavaScript code overlays Google Maps with Keyhole Markup Language (KML), XML, and Geodatabase formats.

Using nearly real-time and publicly available data sources, Liu and Palen research the application of Google Maps mashups in crisis management for nine natural catastrophes, such as earthquakes, fires, etc.

In order to find the closest hotels to the user's location on the Android platform, Wayne and Suresh from the University of the West Indies in Jamaica created an artificial intelligence technique.

Vaishali and Dr. P. N. Chatur, for the Missouri region in the United States, developed navigation and travel software for the Android operating system.

In order to assist tourists in locating themselves, Nyoman et al. from the University of (Udayana in Indonesia) developed an online system.

PROJECT METHODOLOGY

Creating mobile applications is a difficult task. Each software is developed with great expectations of success. However, how can you guarantee the highest output? By choosing a clear-cut methodology. What is the best methodology to develop an app? Waterfall and Agile are two of the most widely used methodologies for developing mobile apps. Agile approaches have proven effective and beneficial in developing mobile applications. It is more adaptable than traditional methods, which are expensive and have little room for adjustment; thus, it fits these features appropriately. Being more adaptable than traditional methodologies, the agile approach aids in developing seamless, and rapid, compact, and simple-to-maintain apps. The app's quality rises due to agile development's increased app stability and reduced error rate.

How does Agile Methodology work?
Since agile app development methodology consists of a few short cycles, there is a risk minimization. Each agile application development lifecycle includes the following stages

1. Planning.
2. Requirement Analysis.
3. Design
4. Development.
5. Testing.
6. Documentation

The concept of the proposed system was first discussed, followed by benefits that could be derived from it once developed. Deliberations were held on project scope, and potential issues were argued, including the business requirements, functional requirements, and user preferences. At the end of the Analysis phase clear proposal of the new system was produced as a deliverable. All the requirements specifications defined from the planning phase, such as

1. Android SDK
2. Android Build Tools
3. Android Support Repository
4. Google Map API
5. Google place API

In the design stage, the new system was transformed from a concept to a detailed design by adopting object-oriented concepts using unified modeling language UML tools, which has become a standard modeling language for objected oriented development. During the development phase, the new system was built in Android Studio, where the codes were written and compiled into an operational application. Database Moreover, text files were also created based on the design specified in

previous phases. During the testing phase, the resulting application was tested to verify all components' working and ensure that the system met the original requirement specifications. All errors discovered were corrected to ensure the proper functioning of the resulting application. A fully operational application was produced by the end of the testing phase. A typical agile practice is to defer the creation of all deliverable documentation as late as possible, creating the docs just before you need to deliver them. For example, system overviews and support documentation are best written toward the end of the software development life cycle. Agile development includes various methodologies that can vary widely in nature. However, at the core of the term agile, there are four values. These are:

Individuals and interactions over processes and tools

People are the most critical assets of the project, and it is essential to remember that people are different and that there are no universal processes and tools. Projects benefit from good communication and should be held as more important than, for example, documentation.

Working software over comprehensive documentation

While documentation is vital at several stages, requirements gathering, the working system is the only accurate measure of what has been done. Documentation used moderately in conjunction with running code will show how well a project is doing.

Customer collaboration over contract negotiation

There should be no “us” and “them” in a project with good collaboration. Instead, the developer and customer should be considered as one. While the need for traditional artifacts such as the contract might still exist and be helpful, good collaboration is generally more critical and can reduce unnecessary conflicts.

Responding to change over following a plan

Flexibility is essential as the project often changes as the development process progresses. The relatively short (2 - 4 weeks) iterations of many agile methodologies help the project respond to change. A project plan, therefore, needs to be adaptable to change in order to work in conjunction with the agile approach.

PROJECT REQUIREMENT SPECIFICATION

Functional Requirement

- **Search nearby places:** The user should be able to choose a search perimeter and be given/shown a list of nearby places on the map that are within this perimeter.

- **Select and View Site Information:** Users should be able to choose the desired site (by clicking on a flag in the map or an icon in a list) and then be taken to an activity where the site's details (photos, a description, and statistics) are displayed.

- **Register/Login/Authentication:** Users can sign up or log in (if they have already registered) with their email address and password or by utilizing a third-party website for authentication, such as Facebook or Google+.

- **Log off:** After authenticating themselves, users have the option to log out of the app.

- **Unregister/Unsubscribe:** Registered users can choose to unsubscribe from the app. By doing so, their records are deleted from the database: Wish-list, Favorites, and Visited-Places.

- **Bookmark**: Registered users will be able to bookmark a site as either Favorite, Visited.

- **View Bookmarks:** The users will be able to view their lists of Favorite List, visited represented using different flags or icons, either on a list-like format or on a map.

Non-Functional Requirement

The following list of non-functional requirements must be met by the app.

Performance: In terms of response and processing times, utilization, and throughput, the application should ensure optimal performance.

Usability: The user should have a pleasant, problem-free, and simple to master experience when using the program.

Scalability: The application must be scalable and permit expansion without jeopardizing its criteria for performance, dependability, and availability.

Availability: The app should make sure that the data is always accessible, even when the app is offline.

Maintainability & Extensibility: The software should be simple to maintain and have minimal room for future functional expansion.

Reliability: By ensuring that the service is provided whenever needed without any incidence of mistakes or system breakdowns, the app should ensure a high level of reliability.

Security & Privacy: The software must provide data security (Confidentiality, Availability and Integrity).

Other:

- The Material design concepts and guidelines for Android and Google should be followed while creating UI

- **Time constraint:** By the deadline previously mentioned, the app should be prepared for release.

Project Design

Technology enablers

As mentioned earlier, we decided to create this mobile application on the Android operating system and to make it dynamic or to be developed on two fronts: a server-side and a client-side. The rationale for this decision is apparent; we wanted the app to have capabilities like authentication and access to a shared dynamic database in addition to being as light as feasible in terms of storage. Additionally, as potential future work, we would like to have the choice to continue with the creation of the web app and one for the IOS operating system, both of which will have access to the same database as the android app.

For the front and back ends, the following technological enablers were carefully chosen.

Client Side: The front end of the application was built using this IDE. Launched by Google in 2013, Android Studio is the official IDE for developing Android-based mobile applications. This IDE was the best option because it was explicitly created to help developers of android-based mobile devices complete their work more quickly and easily. Along with other related tools, it is also made open source to promote the creation of more and more android apps. This makes it easier for newcomers to learn Android, particularly in light of the large android development community, which offers countless platforms and thousands of free online tutorials.

The applications client-side were created using the Java programming language (version 8). Java is the preferred programming language for Android development. It is portable, secure, and object-oriented. Due to Java's ability to run on a virtual machine that converts Java bytecode into native code specific to the computer organization and architecture was chosen as the programming language for Android since it runs on several platforms with various configurations. Additionally, I am familiar with Java because I have used it for several class projects throughout my academic career at the university. Additionally, extensive

open-source support with various tools and frameworks is available to help developers use them.

XML, which stands for extensible Markup Language, was initially created for storing, describing, and transmitting data across the Internet. Along with the screen elements they contain, I used XML in my project to develop the user interface and layout of the activities.

Server Side: Google offers a complete Backend as a Service solution and packages for creating mobile and online applications called Firebase. With the help of this platform, the complexity involved in creating dynamic apps that rely on server-side and database connections is significantly reduced. It enables developers to make money off of their app while concentrating on the wants and needs of their customers and the app's functionality without having to worry about the expense of backend development. Firebase offers various capabilities for the creation and testing of apps, including Real-Time Database, Authentication, Crash Reporting, Cloud Storage, Hosting, Test Lab, Crash lytic, and others. Additionally, it offers audience interaction and growth through tools like Cloud Messaging, Invites, Remote Configure, Add Mob, and more. The essential Firebase functionalities for this project are described in the section below.

Real Time Database: Firebase's original and critical functionality allows Android, IOS, and Web platform users to store and synchronize data in "real-time" or milliseconds. To do this, a NoSQL Document Database is employed, which organizes and saves the data as JSON objects (vs. the usual tabular format used with SQL relational databases). It may be compared to a JSON tree stored on the cloud, where each time new data is added, a new node is added to the tree along with a key that is either user-defined or automatically produced by the push() method. The following image shows a JSON sample. By saving the data to the local Database SDK cache, Firebase makes it possible for the data to be accessible even when the system is offline. Once the network connection is made, the data is synchronized.

The Database can be accessed directly from client devices, including mobile and web browsers, without going through a server. Using its security rules, which are expression-based rules that get run a read-anytime or write operation is conducted, Firebase Real-Time provides the necessary security and data validations.

Authentication: Users are securely and quickly authenticated through Firebase. User authentication is required whether or not it is essential to the app context since it enables apps to identify their users, provides increased security, and gathers analytics data relevant to app usage and user engagement. The Firebase Authentication service accepts several different forms of identification, including phone, email, and password, and third-party sources, including Facebook, Gmail, Twitter, and GitHub.

Google Maps API: By integrating Google Maps into our applications and using the data and other capabilities this service offers, we may access Google Maps Web Services and servers.

Use of Google Map API

It's crucial to efficiently complete the following activities while utilizing the Google Map API:

1. To indicate a direction from point A to point B
2. To put a marking on a map based on GPS coordinates
3. Set up numerous markers using the GPS data.
4. Include an additional layer (such as the traffic layer)
5. Adjust the map to the boundaries

App Screenshots:

Future work

However, we could not achieve the outcome we had envisioned for this project due to time restrictions. However, this does not mean that the project has reached its conclusion, as there are still several features and components that must be included for the app to assume the form we had in mind. The acts that will be taken as part of this continual progress, which falls under the area of future work, are as follows:

· **Configure Google and Facebook Sign in Methods**
· **Expand the Database:** Adding increasingly more data to our database
· **Expand App coverage:** We enable broader coverage of the entire region by growing the database.

· **Admin Platform**: Instead of the developer, the admin will manage the app and the nearby locations. The admin will be in charge of administering the following tasks and will need an administration platform. It will likely be a web or desktop app connected to Firebase.

1. Add Site: The name, description, and coordinates of the items we want to create for our site should all be filled in.

2. Remove Site: The administrator will have the ability to delete sites for conditions such as the site's nonexistence or inaccurate information, among others.

3. Update Site: The administrator will be able to change relevant attributes like the description or rating.

4. Send Notification.

The future work is not restricted to these actions; as we know, a software lifespan is a cycle of continuous refinement and prototyping into improved products, and so will be the case for this app.

FEATURES

1. Find nearby Bus stands, Banks, Hotels, Restaurants, Pharmacies, Hospitals, Libraries, or any other place you want to search.
2. Each place details include address, phone number, images, distance from your.
3. Add places to your Favorite list.
4. Share the place with your friends.
5. Category based Filter Option. Current location.

BENEFICIARY

Mobile location-based apps have significantly altered daily living. Based on location, one of the most effective ways to customize mobile services. Mobile positioning serves as a means of delivering location-based services (LBS), such as wireless emergency services. What motivates the development of these apps? Location-based services are it. As the name suggests, location-based services are associated with the capability to find out the location of mobile users and provide services based on this location. Except for privacy issues, LBS and location-based apps have simplified our lives. These apps can serve as portable guides as we travel on an adventure journey or wander through urban jungles.

Location-based apps increase the value of any business in practically every industry sector. Marketers can gain a deeper understanding of diverse customer demographics with location-based services. Here are a few significant examples of location-based application services being used in various fields

1. Banking and Finance: Locate the closest ATM or branch that offers a particular service.
2. Navigation: To reach the specific location
3. Quickly locate nearby bus stops, banks, hotels, restaurants, pharmacies, hospitals, libraries, and any other location
4. Get location information, such as the address, phone number, pictures, and distance from
5. Sharing location with others

CONCLUSION