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REQUIREMENT BASED SERVICE PROVIDING SYSTEM

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Abstract:
In a rapidly changing and often unpredictable world, the need for efficient and timely access to essential services during emergencies has become increasingly crucial. This abstract outlines the problem statement for the development of a Requirement-Based Service Providing System, a digital platform designed to connect individuals with urgent requirements to service providers capable of addressing their needs. The system's primary objectives encompass a wide range of necessities, including medical assistance, roadside support, emergency services, home repairs, and more. Key features and functional requirements include user registration, real-time service matching, geolocation integration, rating and review systems, payment processing, 24/7 support, data privacy, provider verification, emergency communication, and reporting and analytics tools. In this System, recommendation plays a vital role in suggesting a new user for the best service and existing user for the additional service based on their requirement. This System uses CBCF (Content Based Collaborative Filtering) algorithm for recommendation. The Requirement-Based Service Providing System aims to provide a reliable and user-friendly solution to ensure the well-being and safety of individuals in times of need.

Key-words: Recommendation, real-time service matching, geolocation integration, review and rating system, payment processing, Content Based system, Collaborative Filtering System.

I. INTRODUCTION

The Requirement-Based Service Providing System is envisioned as a digital platform that connects individuals in need of essential services with providers who can offer immediate assistance. In the ever-evolving landscape of modern businesses and services, meeting the diverse and dynamic needs of customers is an imperative that has given rise to the concept of the Requirement-Based Service Providing System. The Requirement-Based Service Providing System, at its core, is a framework that harnesses the power of Machine Learning (ML) to discern, interpret, and satisfy user needs. This system, driven by data analytics, intelligent algorithms, and advanced computing technologies enables service providers to provide tailored services, making the customer experience more efficient, effective, and ultimately, more satisfying. In this paper we have used Flutter, Dart, Firebase and Android Studio for the implementation of this system [1].

This system uses recommendation algorithms for recommending the services to the user based on their like and dislikes [2]. We are using Content Boosted Collaborative filtering in this

application [4]. It is a Hybrid approach in which both the algorithms: Content Based and Collaborative filtering are used [3]. Content based system is an algorithm which does not require the dataset. It is an algorithm in which recommendation systems are specific to the users. It depends on the user's profile, their likes and the service they are more interested in [5]. This system studies the user's history and recommends further services. The content-based recommendation requires proper techniques for representing the items and creating the user profiles, along with an algorithm for matching a user profile with an item's representation.[3].

Collaborative filtering uses the group of users to give proper suggestions to the other new users. It mostly focuses on the review and rating system. The main theme of collaborative filtering is that if a person has similar requirements as another person, then he is more likely to use another person's used service than that of randomly chosen person[3]. One of the examples would be recommendations of friends on Instagram. It uses collaborative filtering and suggests the friends of the users' friends. As the service will be used by more users, more precise recommendations would be suggested to the user.

This system combines the benefits of both of these algorithms and makes a hybrid solution for the better recommendation system.[5]. This method firstly uses the content based algorithm ,if the user already exists, using which the users most required services are filtered. Later, it uses the Collaborative Filtering technique, in which the ratings are calculated from the group of users and the category of services that are filtered from a content based algorithm. Services are filtered using these both algorithms which makes the recommendation more precise and accurate. If the new user login to the system, services which are passed through collaborative filtering and which have a higher user rating and review is shown to the user.[5] This recommendation system gives the appropriate and precise suggestions to the particular type of the person.

After the user's request for the service, the service provider will receive the notification, if the service provider accepts it then the user will be provided with the successful service. Payment gateway will be used for the payment of the service after which the user can share the feedback of the service on the app, so that it will help the other users for the best service recommendation. .

II. METHODOLOGY

The methodology for developing an application that provides services as per requirements typically follows a systematic process. It begins with thorough requirements gathering, where the needs and expectations of users are identified. The next step involves detailed planning and design, outlining the app's architecture, user interface, and feature set. Development commences, following best practices and utilizing the appropriate technology stack, which may include languages and frameworks like Flutter, for multi-platform mobile app development. Rigorous testing is integral to the process, encompassing unit testing, integration testing, and user testing to ensure the application functions smoothly and meets user demands. Regular feedback and iteration are incorporated to refine the application continuously. This iterative and

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user-centric approach ensures that the application consistently delivers the desired services in line with user expectations.

Phase 1: Component selection for application development

Developing an application to provide services in accordance with user requirements requires a well-structured methodology that encompasses various stages of planning, development, testing, and deployment. The process begins with an extensive phase of requirements gathering and analysis. This involves engaging with stakeholders and potential users to understand their needs, expectations, and pain points. Comprehensive documentation of these requirements is crucial to ensuring that the final application aligns closely with user demands.

The next step involves planning the project and designing the application. During this phase, the app's architecture is outlined, specifying how data will be stored, processed, and accessed. The user interface (UI) and user experience (UX) design are crucial aspects, ensuring that the application is intuitive and visually appealing. Feature sets are defined, and wireframes or prototypes are created to visualize the app's flow.

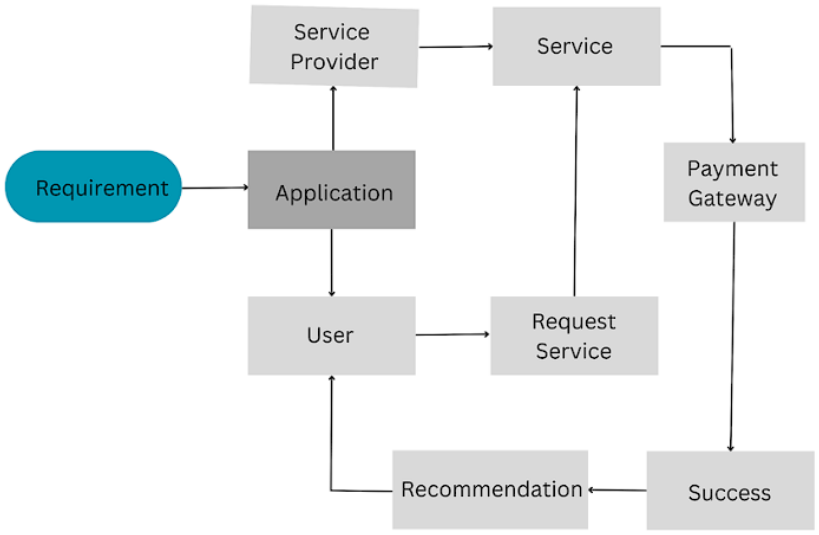

FIGURE 1: SYSTEM ARCHITECTURE DIAGRAM

Phase 2: System and software requirement and installation

The development environment should be equipped with a modern operating system, such as Windows, macOS, or Linux, to support Flutter and Firebase. A development machine with a minimum of 4GB RAM and a multi-core processor is recommended for smooth operation.

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Install the Flutter software development kit, which includes the Flutter framework and Dart programming language. Choose an IDE for Flutter development, with popular options being Android Studio, Visual Studio Code, or IntelliJ IDEA, each of which supports Flutter plugins for efficient coding, debugging, and testing.

To integrate Firebase services seamlessly, install the FlutterFire plugins. These plugins include Firebase Authentication, Cloud Firestore, and Cloud Messaging. Configure the Firebase project with the desired authentication methods, database, and cloud messaging settings. Install the Firebase CLI to interact with Firebase services from the command line. The CLI allows for features like deploying applications and managing Firebase projects.

Phase 3: Prototyping and Developing system architecture

The prototype for the application designed to provide services as per user requirements serves as a preliminary model that demonstrates the core functionality and user interface design. The prototype focuses on key features and user interactions to visualize the application's flow and layout

It includes a user-friendly and intuitive interface that allows users to perform essential actions. These actions may include user registration and authentication, service selection, and viewing recommended services based on user preferences and behavior. Users will be able to interact with the prototype to simulate the process of requesting services and receiving recommendations.

The user interface will feature essential components, such as navigation bars, forms for user input and service listings which can be built with Flutter framework. User authentication will be simulated to showcase the security and personalization aspects of the application. Additionally, it will exhibit the integration of Firebase for backend services, demonstrating real-time data synchronization, data storage, and authentication. It will have a recommendation system to recommend the services to the user.

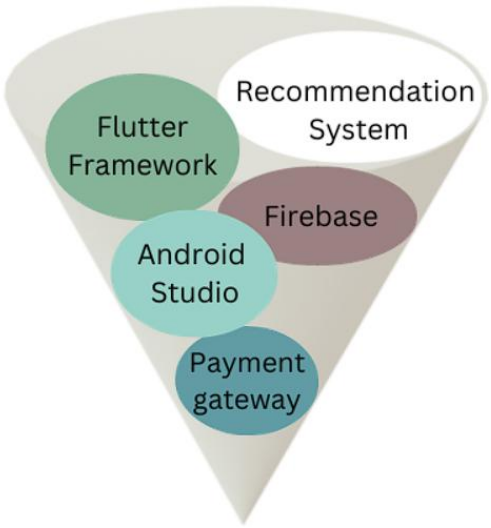

FIGURE 2: PROTOTYPE COMPONENTS

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Phase 4: Integrating machine learning for recommendation and application development

Integrating machine learning models into this application can significantly enhance its functionality and user experience. The process of integrating machine learning involves several key steps. First, there is a need to train and fine-tune the machine learning models using relevant data, which may include user interactions, preferences, or any other data necessary for making recommendations. The trained models can then be serialized and deployed on a backend server.

Content Based Collaborative Filtering can be used for recommending the services to the user based on several factors. It combines the benefits of both Content Based and Collaborative filtering systems. Content based algorithms use the user's history and recommend similar services to the user. Collaborative Filtering uses the rating system. It combines and analyzes the ratings and reviews given by the active users and provides the recommendation.

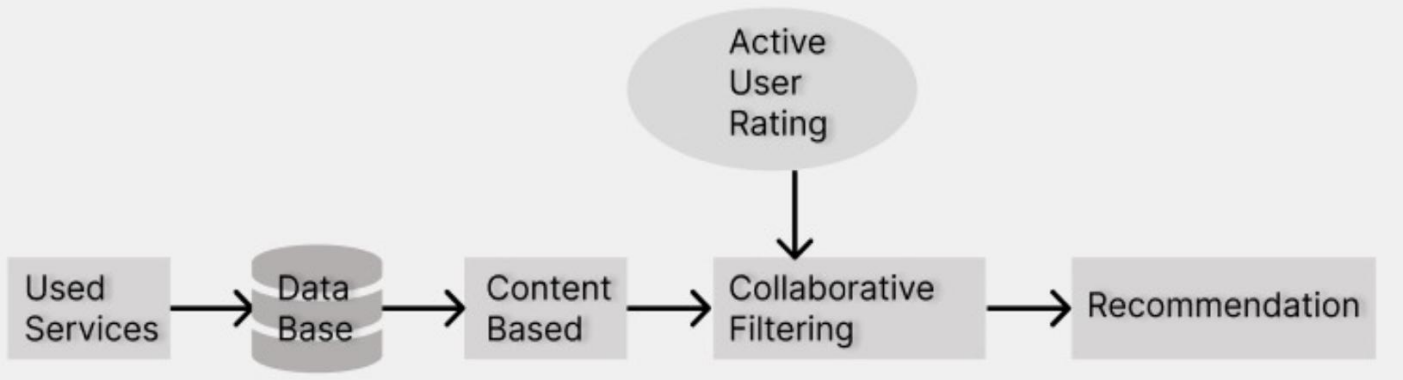

FIGURE 3: RECOMMENDATION SYSTEM WORKFLOW ARCHITECTURE.

Phase 5: Testing and deployment

Testing is a vital part of the methodology. Rigorous testing is carried out at various levels, including unit testing to verify individual components, integration testing to ensure the different parts of the application work together seamlessly, and user testing to get feedback from real users. The application should be thoroughly tested for functionality, performance, security, and compatibility on various devices and platforms.

For Android deployment, there is a need to create a release build of Flutter app, which involves generating an APK (Android Package) file. Using Flutter, compile an app for iOS and create an IPA (iOS App Store Package) file for iOS deployment download. Regardless of the platform, thorough testing and quality assurance are essential to ensure that the deployed application functions correctly and provides a smooth user experience. Furthermore, ongoing maintenance and updates will be necessary to address any issues, add new features, and keep the application up-to-date with evolving user requirements and platform changes.

III. CONCLUSION

In a broader context, this application not only enhances the convenience and efficiency of service discovery but also offers several technical advantages with the potential to advance society. Its utilization of machine learning, specifically Collaborative Filtering, contributes to more accurate and personalized recommendations, improving the user experience. The application's integration of cloud-based services, such as Firebase, ensures data security, real-time updates, and scalability, which are crucial technical considerations in modern app development. Moreover, its reliance on Flutter for cross-platform development allows for a cost-effective and time-efficient approach, ensuring that the application is accessible to a wider user base, regardless of their device or operating system.

Furthermore, this application has the capacity to collect and analyze data on user interactions and feedback, providing valuable insights into user behavior and service preferences. These insights can inform the optimization of the recommendation system, resulting in more precise and responsive recommendations. Additionally, the application can facilitate robust data-driven decision-making, not only for individual users but also for service providers and policymakers who can harness the data to improve service quality, resource allocation, and innovation.

In summary, this application marries technical innovation with user-centric design, offering personalized recommendations, data security, cross-platform accessibility, and data-driven insights. By doing so, it not only simplifies service discovery but also contributes to a more efficient, secure, and informed society, benefiting both individual users and the broader community.

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