FitTrack BloodLink

Android Application to Ease Fitness Tracking and Blood Donation

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Abstract:- FitTrack BloodLink is an innovative Android application designed to enhance users fitness tracking experience by seamlessly integrating it with life-saving blood donation and request functionalities. This comprehensive app automatically determines the user's starting point as their current location and sets the destination point upon finishing the run. Utilizing GPS tracking, FitTrack BloodLink monitors users routes throughout their runs, capturing essential fitness metrics like distance covered, calories burned, average speed, and total duration in real time. Additionally, users can register as blood donors through the app, making it easier for those needing donations. FitTrack BloodLink also includes a map feature displaying nearby blood donors, allowing users to view donor details and contact them directly via phone with a single click on the marker.

I. INTRODUCTION

FitTrack BloodLink addresses critical issues faced by both the healthcare sector and individuals. In India, the demand for blood units exceeds the supply, as only 1% of the population donates blood. Which ultimately leads to an annual shortage of 2 million units according to World Health Organization(WHO) Concurrently, on a global scale, physical inactivity is responsible for approximately 3.2 million deaths each year.FitTrack BloodLink aims to tackle these challenges by merging fitness tracking with blood donation functionalities. Through its intuitive platform, FitTrack BloodLink streamlines the process for potential blood donors to register their details, including location, thus simplifying the search for nearby donors for those in urgent need. An integral feature of FitTrack BloodLink is its interactive map interface, which visually represents nearby blood donors through markers. This innovative tool enables users to easily access donor details and initiate direct contact through phone calls with just a click. Additionally, the app incorporates a built-in Google Maps interface, further enhancing the user experience by facilitating seamless route planning and navigation during fitness activities. Using GPS tracking, FitTrack BloodLink keeps track of users routes as they run, recording important fitness data such as distance traveled, calories burned, average speed, and total duration instantly. What sets FitTrack BloodLink apart is its accessibility and convenience. Unlike other fitness tracking apps that may require external devices such as smartwatches or Fitbits, FitTrack BloodLink operates directly from users Android devices, ensuring accessibility for all users regardless of additional hardware.

II. LITERATURE SURVEY

In recent years, the integration of technology into healthcare and fitness domains has led to the development of various mobile applications aimed at improving health outcomes and addressing critical issues such as blood donation management and fitness tracking. A comprehensive review of existing literature reveals several noteworthy contributions in this regard. The "LiveFit: A Smart Fitness App" by Kavitha R et al. [1] focuses on promoting a healthy lifestyle by offering features such as daily calorie tracking, Body Mass Index (BMI) calculation, steps counting, and chat with advisors. This application utilizes accelerometer and orientation sensors for tracking. In the work "Blood Donation And Life Saver-Blood Donation App" proposed by Anish Hamlin M R et al. [2] offers a novel approach to blood donation management. The application facilitates easy registration of donors and enables quick access to nearby donors during emergencies through GPS technology. Chandradeep Bhatt et al. [3] present an insightful study on the "Implementation of Fitness Application Using Flutter," offering a detailed analysis of a fitness app's efficacy in delivering customized training regimens. The research emphasizes the importance of user research in evaluating the app's impact on fitness levels, motivation, and adherence to exercise regimens .In the realm of blood donation applications, "BDoor App-Blood Donation Application " by S Periyanayagi et al. [4] addresses privacy concerns and donor safety by utilizing the J48 decision tree algorithm to protect donor identities. The application connects blood banks, donors, and recipients through authorized channels, ensuring efficient blood donation management and distribution while safeguarding user privacy. In the work by Sankalp Mathur et al.'s on "Mobile Fitness Application" [5] offers valuable insights into the significance of centralized systems for blood donation management. The proposed solution includes a SQLite database to store historical donation data, enabling efficient donor registration and blood type matching during emergencies. In addition to this the study highlights the importance of user-friendly interfaces and real-time updates in enhancing user engagement and

participation in blood donation activities. In a systematic review conducted by Lin Li et al. [6], various mobile health applications aimed at encouraging blood donation are analyzed, showcasing different technologies and services utilized in donor recruitment and retention. The study emphasizes the potential of mobile apps in increasing donor participation and highlights the need for further research in this area. Furthermore, "Android Based Health Care App" by Vishnu Murti Pandey et al. [7] and "Blood donor searching android application" by Sangeetha M et al. [8] both contribute to addressing critical healthcare needs through innovative mobile applications. These applications offer features such as information on Covid-19, vaccine access, blood donation, and plasma donation, providing users with essential healthcare services and resources at their fingertips.

III. EXISTING SYSTEM PROBLEMS

There is no integration among existing fitness and blood donation apps, making it necessary to use several platforms for health monitoring and exploration. This results in a disconnected user experience. Now there are present day fitness applications which can be so irritating that you have to switch up between various platforms just to track your well-being. And the worst part is that many of these apps require you to purchase expensive gadgets like smartwatches or Fitbits.You need them; otherwise, it is tough luck.Poor integration causes disjointed user experiences, thereby reducing efficiency and usability. Furthermore, failure to maximize on GPS technology makes it difficult to swiftly locate nearby blood donors thus potentially having implications on critical health situations. The current methods also often involve using smart watches or Fitbits to follow activities such as running around or walking, introducing further obstacles in accessibility for some people who do not own such devices.Also the existing systems doesn't use architecture like MVVM which protects the application from configuration changes .These gaps indicate the need for more comprehensive and effective strategies that capitalize on available technologies towards improving user experiences while responding to pressing social concerns.

IV. PROPOSED SYSTEM

FitTrack BloodLink is not your average fitness app – it's a game changer! Imagine going for a run or walk, and instantly knowing how far you've gone, calories you burned, and how long you exercised. FitTrack BloodLink does just that, thanks to its real-time tracking with GPS. But it's not just about tracking; FitTrack BloodLink brings everything together in one place.It brings together both blood donars and receivers at same place.Who are in need of blood can search for donars nearby. The application utilizes GPS to fetch nearby available blood donars . By clicking on the marker which belongs to corresponding blood donar we can contact them throught our app .It calculates your BMI, estimates your daily calorie needs .No need to switch between different apps for different things. And here's the best part – you don't need fancy gadgets like

smartwatches or Fitbits. FitTrack BloodLink keeps it simple and accessible for everyone. After your workout, FitTrack BloodLink gives you a detailed report on how you did. It's not just numbers; it helps you understand your progress, set goals, and keep improving.

V. SYSTEM OVERVIEW

➢ *MVVM(Model - View - ViewModel) Architecture:*
In FitTrack BloodLink, the MVVM (Model-View-ViewModel) architecture organizes the codebase as follows:

- *Model:* Manages data related to user profiles, fitness metrics, and workout records.
- *View*: Represents the user interface elements, such as screens and UI components.
- *View Model*: Acts as an intermediary, handling presentation logic and data interaction between the View and Model layers. MVVM ensures separation of concerns, scalability, and flexibility, enhancing the app's maintainability and user experience.
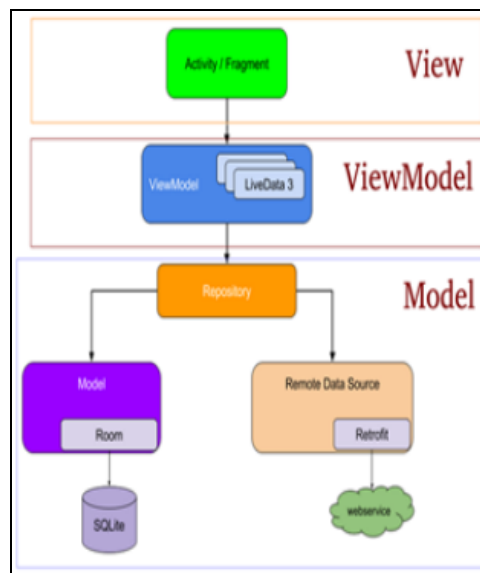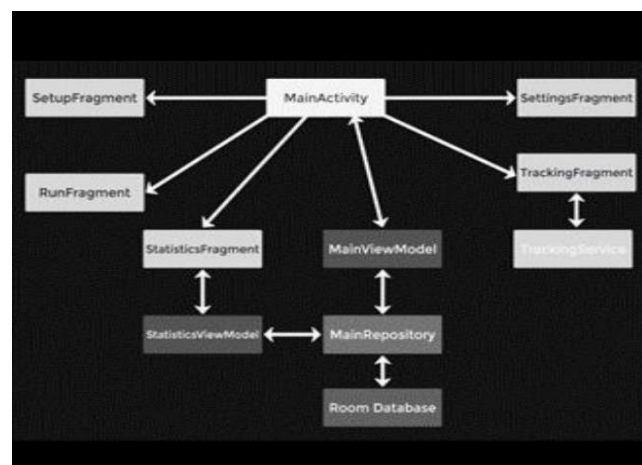

Fig 1 Architecture Overview of MVVM

Fig 2 MVVM with Fragments and
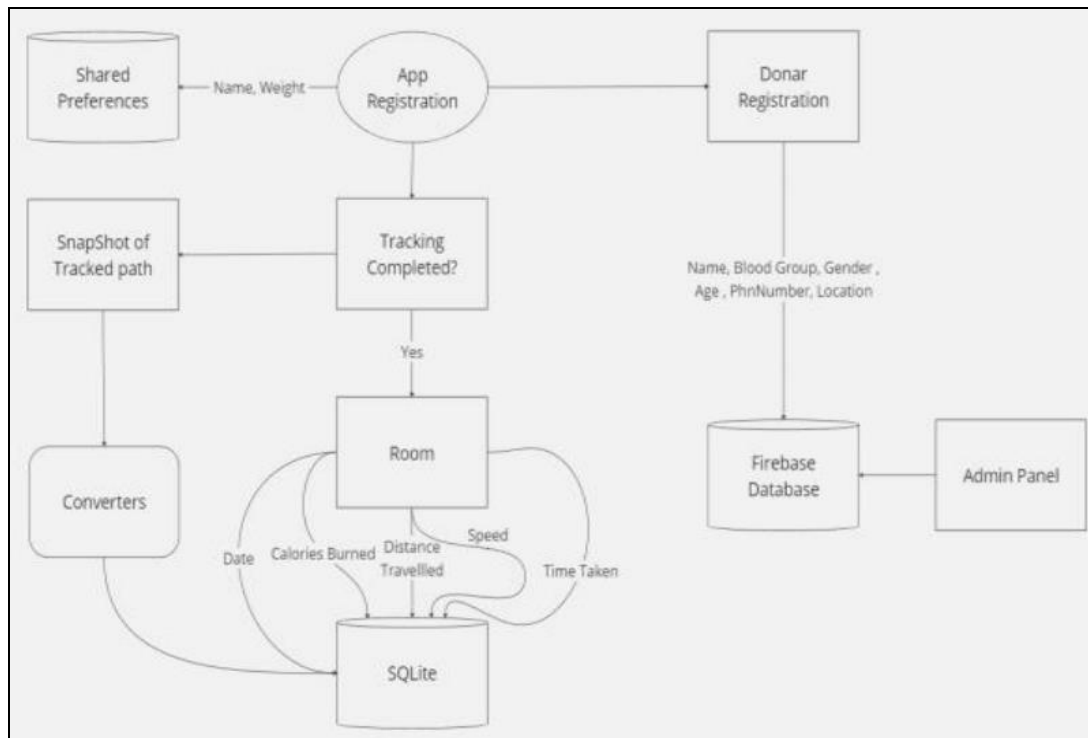Activities in the Application
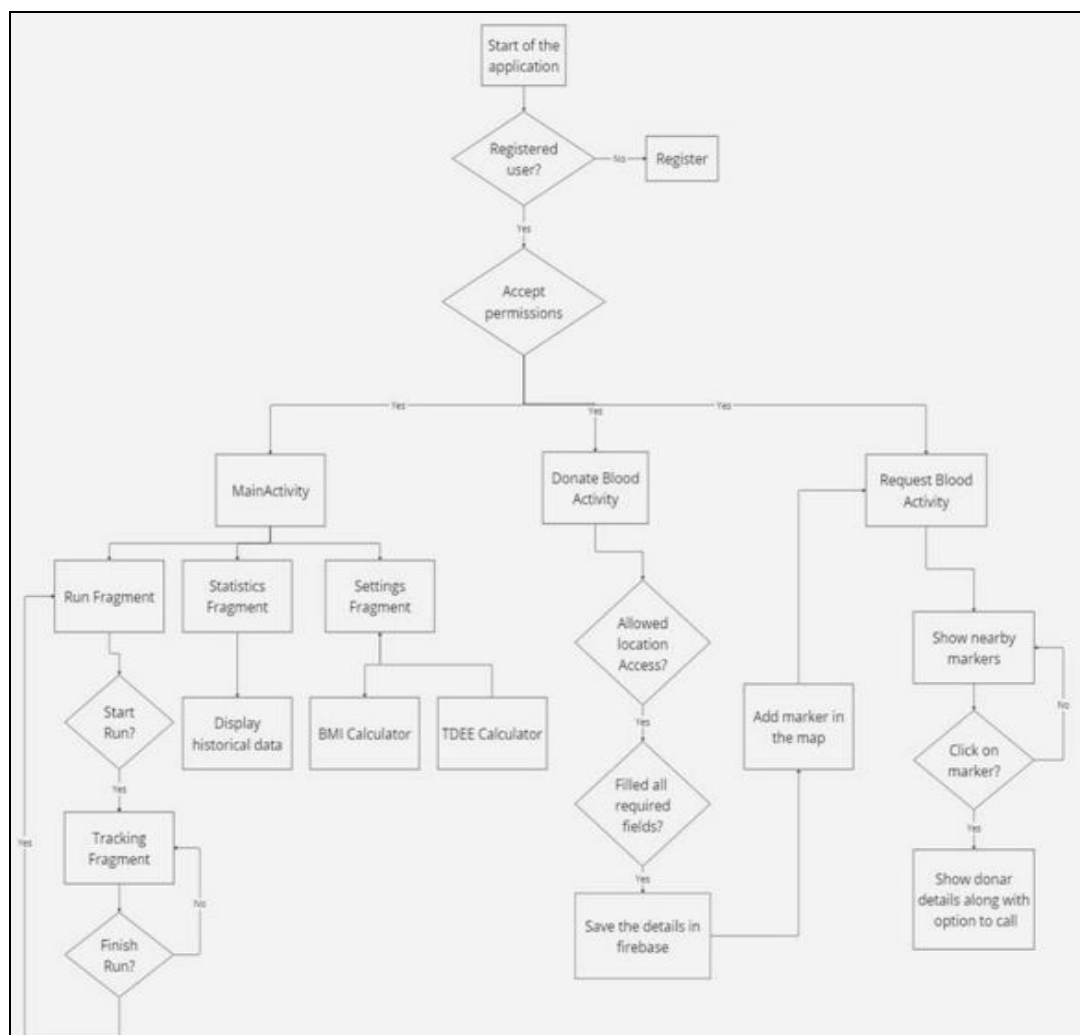
Fig 3 DataFlow Representation of the Application

Fig 4 Complete Application Flowchart of FitTrack BloodLink

VI. SYSTEM REQUIREMENTS AND DESIGN

➢ *Software Requirements:*

- Android Operating System: FitTrack BloodLink is compatible with Android devices running Android 7.0 (Nougat) or higher.
- Development Environment: Android Studio IDE for development and debugging of the application.
- Third-party Libraries: Integration of Kotlin programming language, XML for UI layout, Glide for image loading, Google Maps API for map features.

➢ *Hardware Requirements:*

- Processor: Quad-core 1.5 GHz or higher for optimal performance.
- Memory (RAM): Minimum 2 GB RAM for smooth operation.
- Storage: At least 50 MB of available storage space for installation and app data.
- GPS: Devices with built-in GPS capability for accurate route tracking during running or walking activities.
- Display: Screen size of 4.7 inches or larger with a resolution of 720x1280 pixels or higher for optimal user experience.

➢ *Modules :*

- *Setup Module / Fragment:*
      This Setup Fragment is shown to the user only during the first time registration and basic details such as Name and Weight are stored in SharedPrefrences. These details will be stored as long as app data is not cleared.

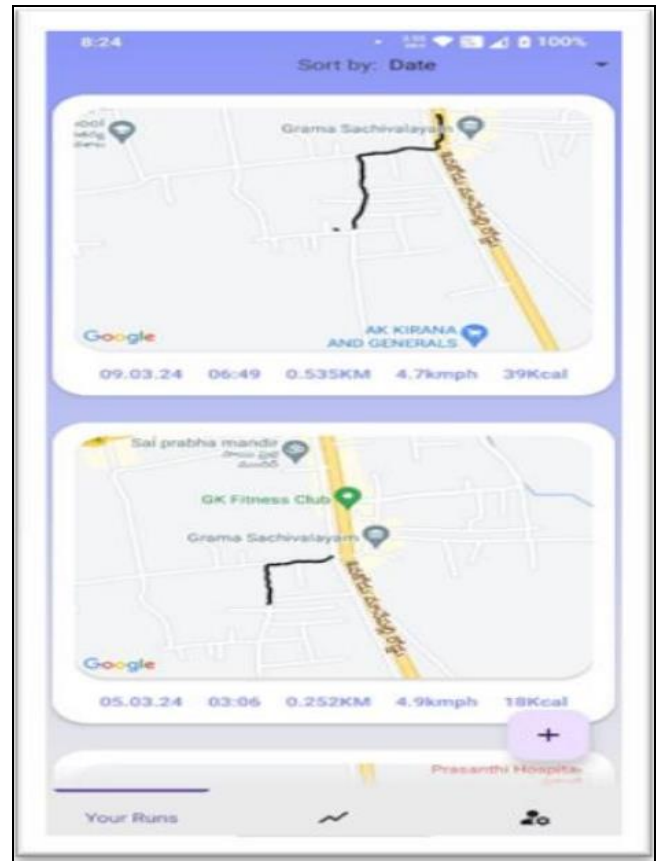Fig 5 Setup Fragment in the Application

➢ *Run Module/ Fragment :*

Fig 6 Run Fragment in the Application

- *Run Module / Fragment Consists of the all the Previous Records with Information Like*

✓ Date
✓ Time Taken
✓ Distance Travelled (in kms)
✓ Average Speed (in kmph)
✓ Calories Burned

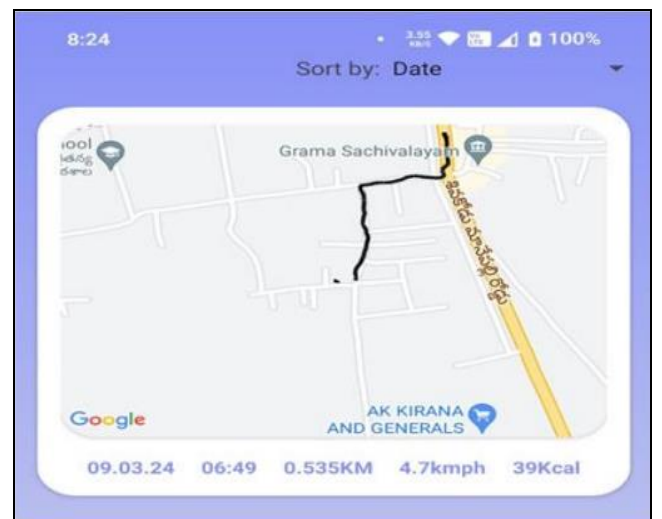- *We can also Sort the Records using the Same Options*

Fig 7 Black Line Showing Tracked Path

Run Fragment consists of Floating Action Button(FAB) in the bottom which redirects to tracking fragment.

➢ *Tracking Module /Fragment:*
The core functionality of tracking takes place in this fragment. This module consists of Gogle MapView , Timer , Tracking Service (Running in Background), Options to pause, resume, finish and cancel runs. Once users start their run the application uses GPS sensor to track the movement and draws a black line along the path dynamically.
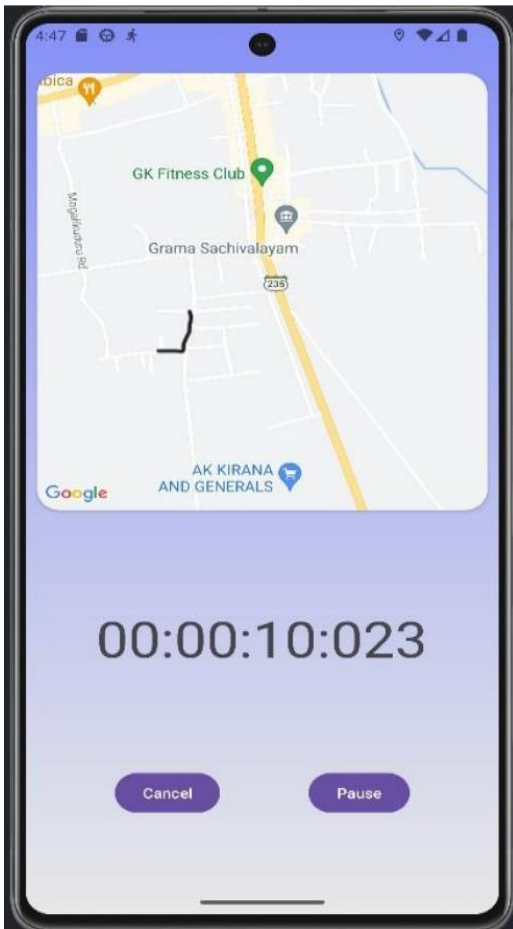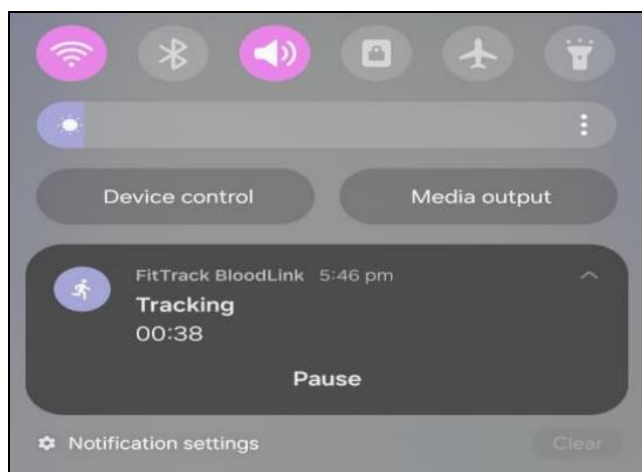

Fig 8 Timer and Tracking in Action

Fig 9 Tracking Service in Action

Traking service continuously sends live location (latlng) so that it gets updated in the map view.

➢ *Statistics Module / Fragment :*
Users can know about their historical data in this statistics module / fragment **,** This fragment consists of

- Total time
- Total Distance
- Total Calories Buned
- Averge Speed
- Bar Graph showing Average speed over time
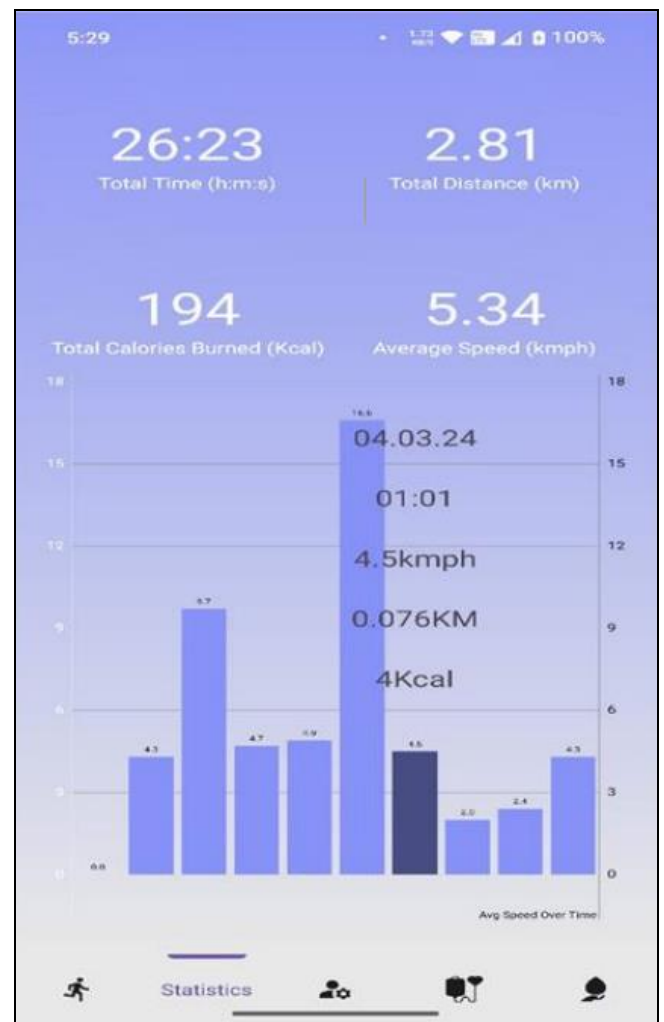- All these data will be stored locally in the device itself with the help of Room and Sqlite.

Fig 10 Statistics Fragment in Action

Clicking on each stack we see corresponding details of the run as shown in the figure.

➢ *Settings Module / Fragment:*
In settings module users can perform various tasks like

- Calculate BMI (Body Mass Index)
- Calculate TDEE (Total Daily Energy Estimate)
- Update the personal details

Fig 11 Settings Fragment in the Application
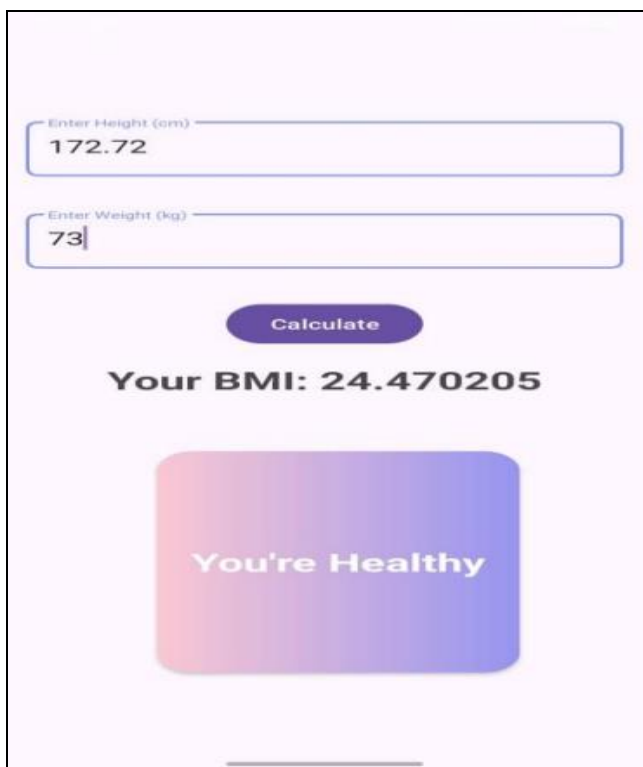
➤ *BMI Activity:*

Fig 12 BMI Activity in Action

➤ *Donate Blood Activity:*

In this activity the users of the application can register themselves as blood donar by providing following information.

- Name
- Blood Group
- Gender
- Age
- Phone Number
- Location(Automatically takes donar current location)

FusedLocationClientProvider provides the current location of the user

All the information that the donar provides will be stored in firebase realtime database
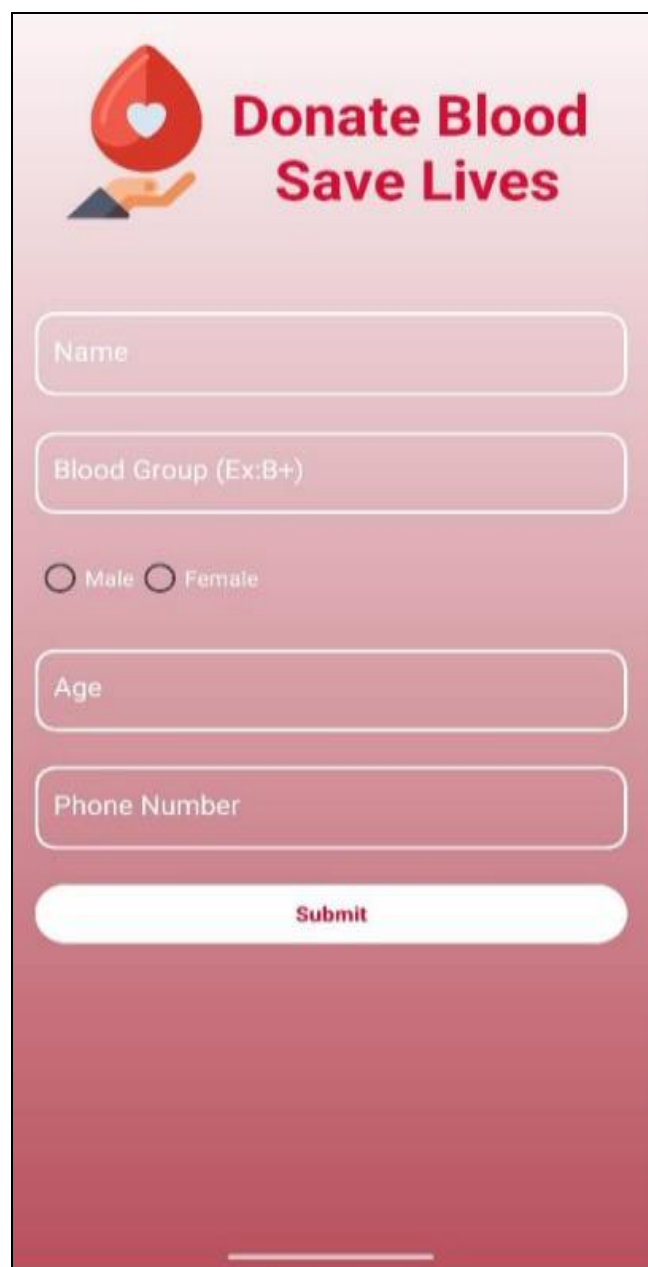

Fig 13 Donate Blood Activity with Required Details

➤ *Request Blood Activity*

In this activity users can find blood donars near to their location . Blood donars are represented with a red marker on the map.

By clicking on the marker one in need of blood can contact the corresponding blood donar through a phone call from the application itself.
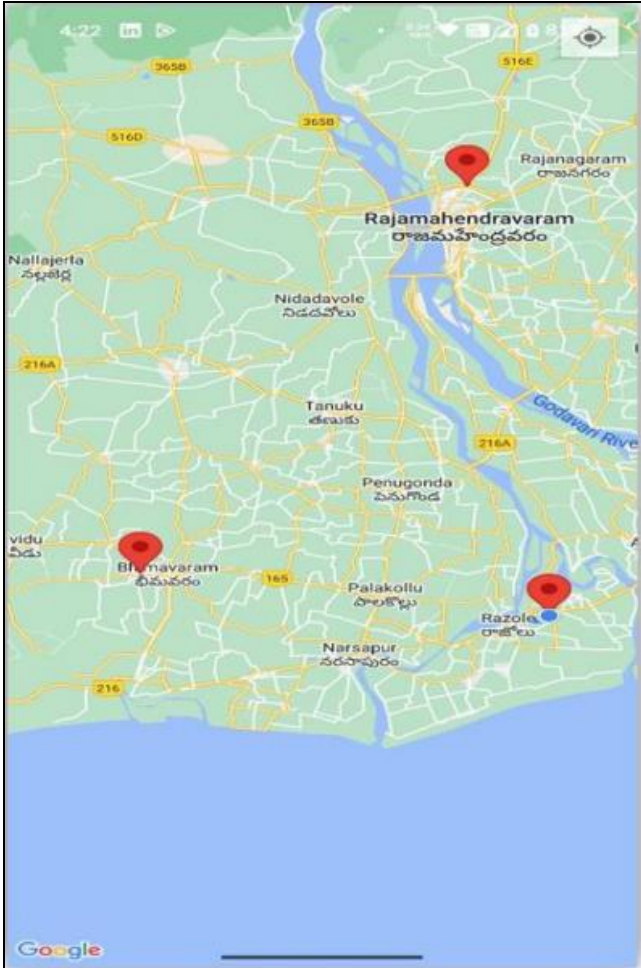

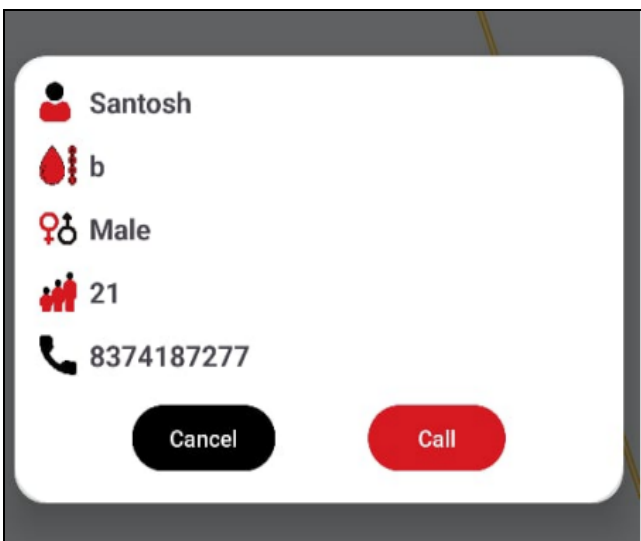Fig 14 Map Showing Nearby Blood Donars (Red Marker)

Fig 15 Dialog Box which Opens on the Click of Marker

VII. CONCLUSION

In conclusion, FitTrack BloodLink offers a groundbreaking solution by seamlessly integrating fitness tracking with life-saving blood donation functionalities. By eliminating fragmentation and leveraging GPS technology, our app simplifies access to nearby blood donors while providing essential fitness metrics. With no need for additional gadgets, FitTrack BloodLink ensures accessibility for all users, empowering them to monitor their health and contribute to saving lives.

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