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Fitness Application with Music Player & Heart Rate Measurement

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Abstract: ***After the usage of loads of health apps on a day after day foundation we started to become pissed off with all the litter and inappropriate capabilities protected with them. Some of those apps are too complicated and might do away with from the apps most important purpose. Simplicity ought to move a protracted manner in a health/health application. This is one in every of the motives we believed constructing a less complicated health app might be an excellent concept. We are very lively person who takes element in sports activities in addition to attending the fitness center regularly. There have been matters we observed myself doing on a day after day foundation which we felt ought to be protected in an app. There are such a lot of complicated and indulgent apps out there for nearly each thing of health/health and to be sincere there truly isn't much that hasn't already been carried out on this market. But we had the concept that we desired to create an app that might put into effect every of those factors simply, with a purpose to be hassle loose and now no longer do away with from the intention which the person set out withinside the first place. There is the hike in the technology where people are attracted to the health equipment such as smart watches, fitness applications and many other techs. Fitness trackers software, which works in conjunction with a wearable Fitness trackers watch that records your steps and displays your pulmonary heart rate on a video display. But, despite being in the kingdom of the art, all of those apps have one flaw in common: they're crammed with unnecessary features that detract from the initial concept and distract the user. we for one while running out need a hassle-unfastened interplay with an application, we need to get in there and get it done.***

I. INTRODUCTION

Fitness is a very important aspect that everyone should follow to remain healthy. Now-a-days due to the Covid situation most of the people are working/studying from home sitting in a particular place. This has made us lazy since there are fewer physical activities done like we used to do before. For this reason, we need something that can help us get fit by getting our body back in shape. Since phones are the simplest way of accessing everything, we have decided to create a fitness tracking application that can guide us our way to getting fit. This will provide us the fitness regime to be followed, number of steps you walk, calories burned, reminder to consume water etc. Fitness is a totally vital thing that everybody has to comply with to stay healthy. This is the dawn of a new age, one in which people rely more on their cellphones or fitness trackers to monitor their health than of visiting a doctor. An answer for such human beings can be an app which can assist them attain their health targets. Fitness apps are rather sought-after cellular packages today.

There are such a lot of complicated and lavish apps accessible for nearly each thing of health/health and to be sincere there surely isn't an awful lot that hasn't already been achieved on this market. But I had the concept that I desired to create an app that might put into effect every of those elements simply, so one can be problem unfastened and now no longer remove from the intention which the person set out withinside the first place.

II. LITERATURE REVIEW

Static permission analysis of health and fitness apps in IoT programming frameworks

The authors have briefly explained about the breach in fitness application how the private information collected from users and used as malicious purpose. The authors dis analysis on 20 different fitness application based on authorization scopes to solve the security breach.

A. Personalizing Mobile Fitness Apps using Reinforcement Learning

The authors focus on the application that consider the behavior changes of users by using the reinforcement learning algorithm. If the user diagnosed with any deceases what regiment should the user follow. The authors made a application called Cal fit which it will give the suggestion based on users behavior with different algorithm 15

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B. Smartphone Apps and the Mobile Privatization of Health and Fitness

The authors conduct extensive research on the well-known smartphone fitness apps. It points out how the apps help users to associate with the rest of the world. The authors show the implementation on the topic only a brief theory was given about the stages and phases of the idea to implement.

C. Content Analysis of Paid Health and Fitness Apps

The Authors conducts a subjective analysis of the written interpretation provided by developers. The study examines the potentiality of apps in influencing the consumer behavior. The more expensive the app, more trustworthy it is. Apps give more importance to public health behaviors and has to be developed according to such needs.

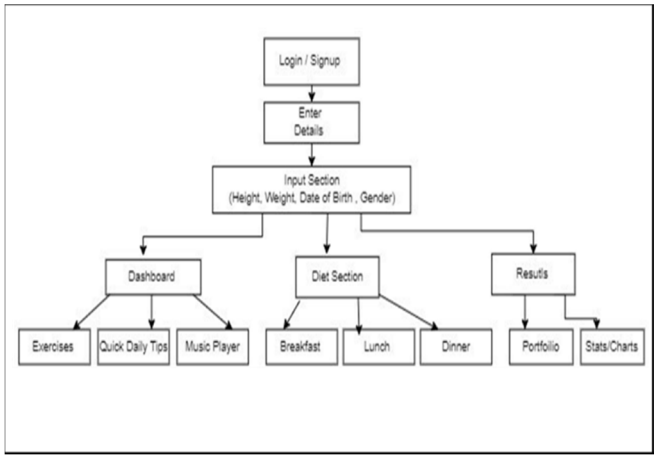
D. "User's Perspective about Mobile Fitness Applications"

The authors did the analysis which focuses on the effectiveness of fitness apps in terms of various factors like time, cost and accessibility. Also, it digs into the reasons why these apps are preferred over fitness centers.

III. PROPOSED APPROACH

A. System Architecture

A user-friendly application wherein one has to login/register an account. Enter their personal details and as per their BMI(Body Mass Index) a workout will be suggested which the user has to follow. There will be dashboard where the daily steps, calories burned, distance travelled etc. will be shown on a daily basis. A workout section will also be provided containing multiple types of workouts. User can update their weight in the profile section if in case they have gained or lost some weight



B. Modules

1) *Register:* The interested user will be registered in the system. Also, it can be used for authentication of the existing users who intend to use the system. This registration maintains the details about users.

2) *Login or Signup:* A user needs to login as to use this web application. It provides the user name, gender and DOB. For further sessions, user will log in to the system and then interact with the app according to their requirements, Registration is required.

3) *Workout:* This contains all the main windows like programs, graphs, histories, etc.

a) Music Play

b) Body/Weight Tracker

c) Stopwatch

d) Heartrate Measurement

C. System Requirements

This section will provide the user the required specification of the hardware and software components on which the proposed system is to be implemented.

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1) Hardware Requirements

This subsection will provide the minimum requirements that must be fulfilled by the hardware components. The hardware requirements are as follows: -

a) A Smartphone with

- Storage – minimum 20 megabytes free
- RAM – minimum 2 gigabytes
- Processor – minimum dual core
- Camera – minimum 2 megapixel

b) A Desktop with

- RAM – minimum 4 gigabytes
- Storage – minimum 100 gigabytes
- Processor – minimum quadcore or hexacore
- Webcam – minimum 720p

2) Software Requirements

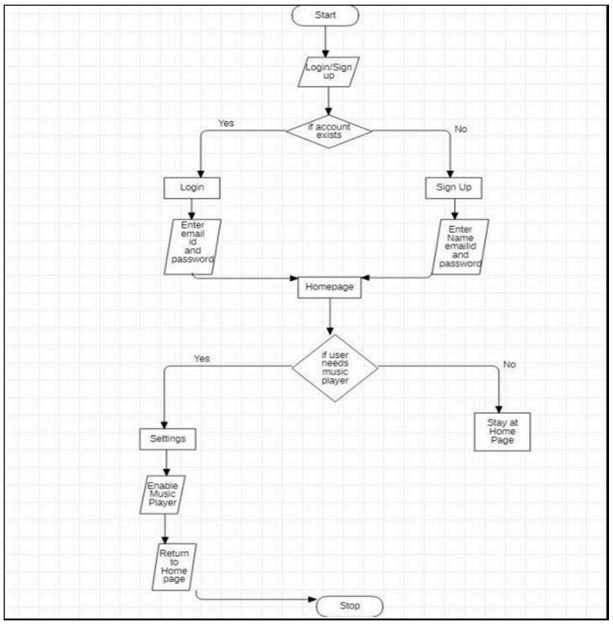
This subsection will provide the versions of software applications that must be installed.
The software requirements are as follows: -

a) Java
b) Android Studio
c) Visual Studio Code

GoFit app should be installed on the smart phone to use features of this project

D. Implementation

A consumer-pleasant software in which one has to login/sign up an account. Enter their non-public information and as according to their BMI (Body Mass Index) an exercise could be counseled which the consumer has to follow. There could be dashboard wherein the day-by-day steps, energy burned, distance travelled etc. could be proven on a day-by-day basis. User can set reminder for water intake as nicely relying on the quantity of water they need to eat in the event that they don`t drink sufficient water in a day. An exercise segment may also be furnished containing more than one sorts of workouts. User can replace their weight withinside the profile segment if in case they have got won or misplaced a few weights.



E. Fundamental Model

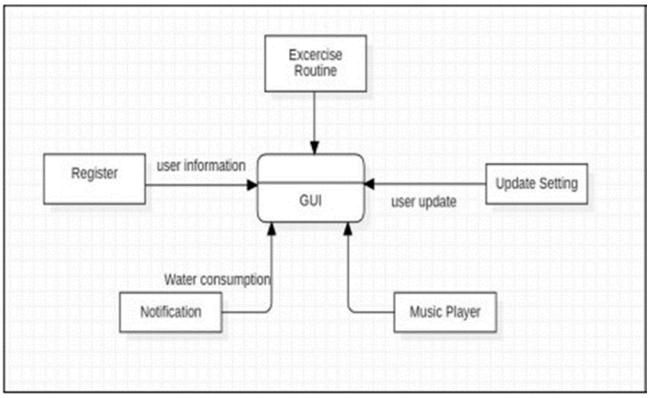
Fundamental model of the project gives overall idea about the project. How the entities are related to each other, what are the attributes of the entities, how the data flows between the entities are shown by the fundamental model.

F. Data Flow Model

Data Flow Diagram (DFD) shows graphical representation of the" flow" of data through an information system, modelling its process aspects. It includes data inputs and outputs, data stores, and the various subprocesses the data moves through. DFDs are built using standardized symbols and notation to describe various entities and their relationships.

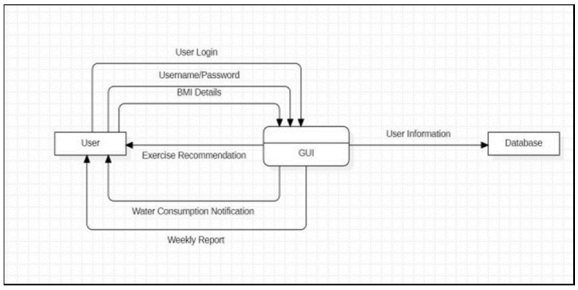
G. DFD Level 0

Figure below denotes the Level 0 Data Flow Diagram of the proposed system. It is also known as the Context Diagram. This is the most basic representation of the system. It shows a data system as a whole and emphasizes the way it interacts with external entities. It is a complex representation of entire system. It displays the most abstract form of a system It gives a quick idea about the data flow inside the system. There is only one visible process that represents the functions of a complete system. The system for simplification is divided by two entities that make up the level 0 DFD i.e. User of GoFit. There is two-way communication between the user and GoFit application.



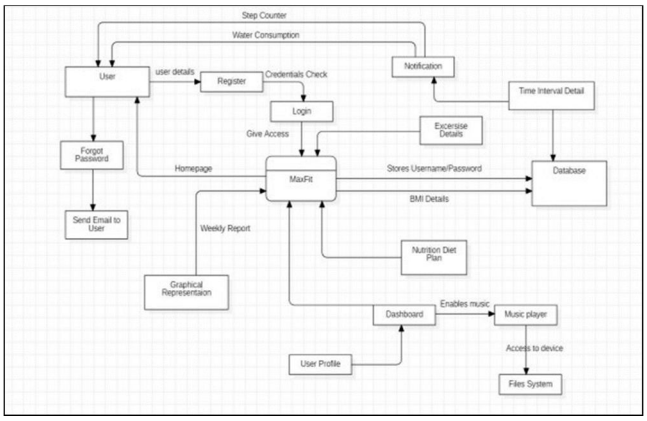
H. DFD Level 1

Figure below shows the Level 1 Data Flow Diagram of the proposed system. It is exactly the same as the Level 0 DFD, but much simplified. The Level 1 DFD shows how the system is divided into sub-systems i.e. subprocesses, each of which deals with one or more of the data flows to or from an external agent, and which together provide all of the functionality of the system as a whole. It breaks down the main processes into subprocesses that can then be analysed and improved on a more intimate level. The DFD level 0 components are broken down into sub parts.

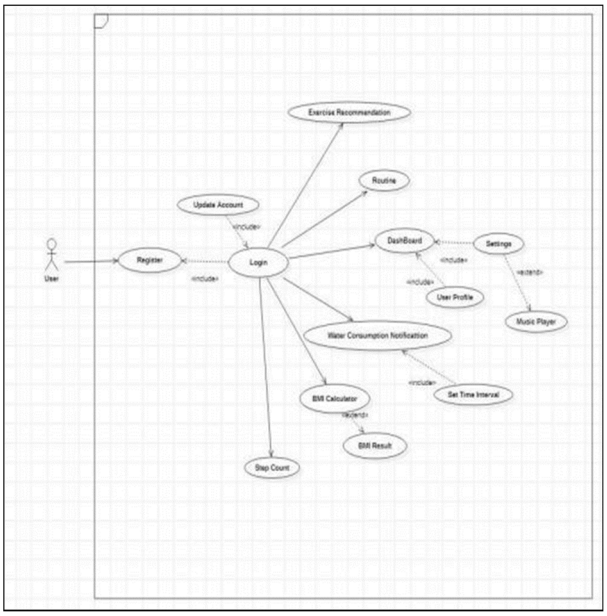


I. DFD LEVEL 2

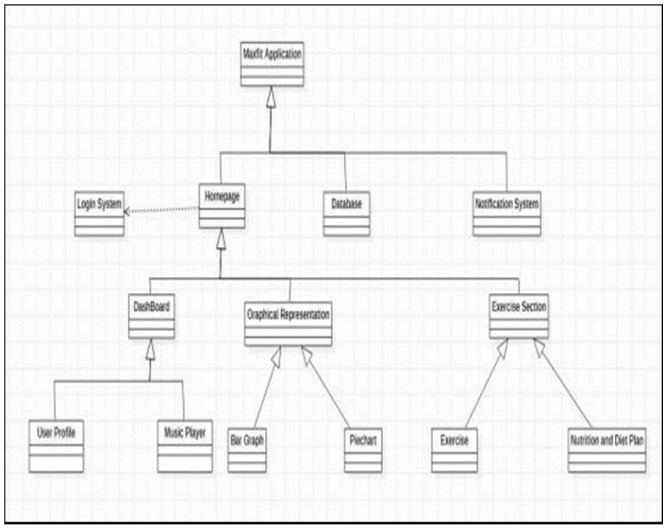
Figure below shows the Level 2 Data Flow Diagram of the proposed system. It is slightly modified from the Level 1 DFD, but much simplified. The Level 2 DFD shows how the system is divided into sub- sub systems i.e. subprocesses, each of which deals with one or more of the data flows to or from an external agent, and which together provide all of the functionality of the system as a whole. It breaks down the subprocess into subprocesses that can then be analysed and improved on a more intimate level. The DFD level 1 components are broken down into sub parts.



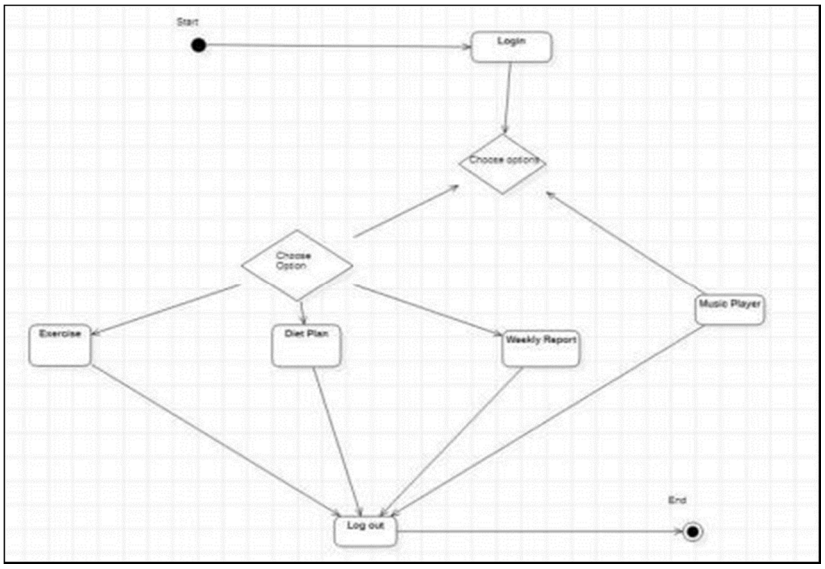
J. Use Case Diagram



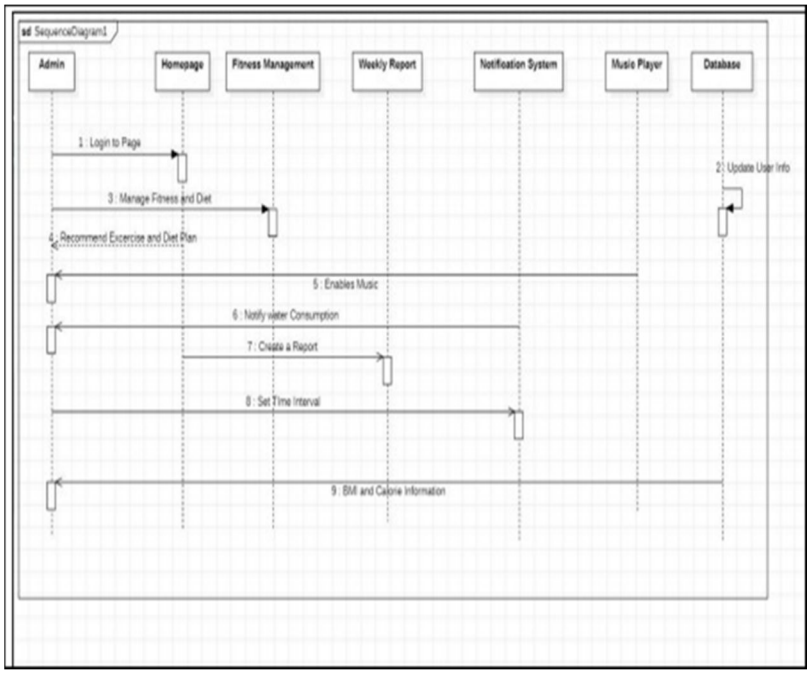
K. Class Diagram



L. Activity Diagram



M. Sequence Diagram

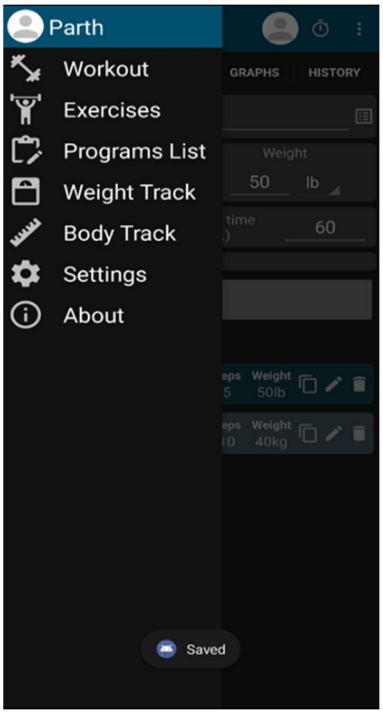


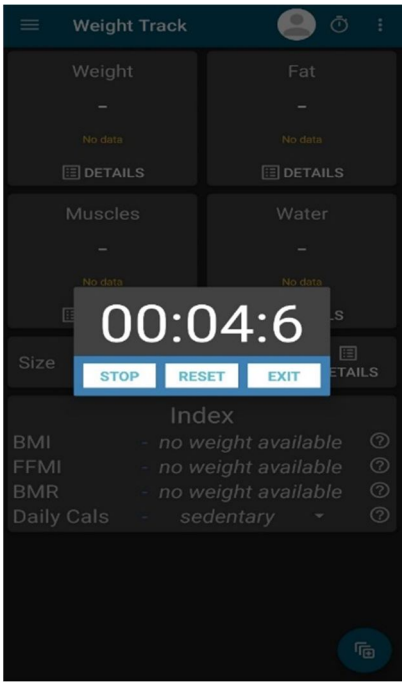
N. Heart-rate Module

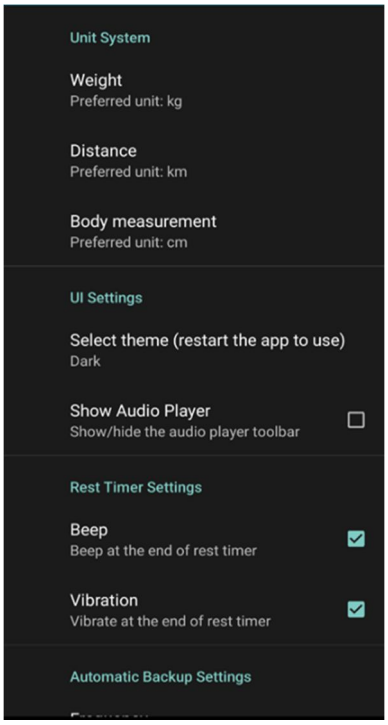
Heart-rate is measured using the camera of the device for recording a small footage of your finger and analyzing the red image.
It's essentially a rolling median of the last 4 images. You'll see a big jump to the peak value when the heart beats.
It uses PAN-THOMPKINS algorithm.

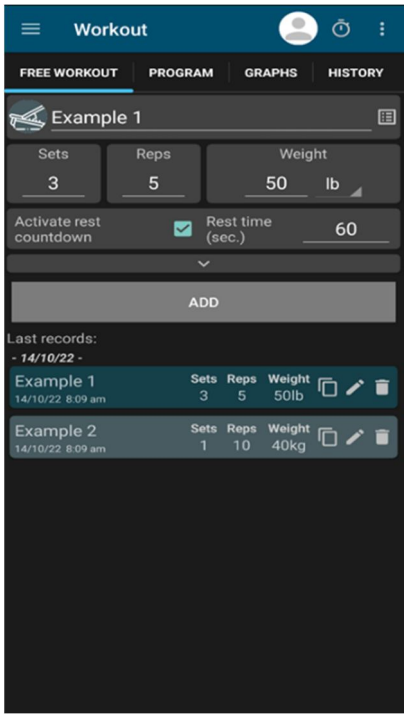
The Pan–Tompkins algorithm applies a series of filters to highlight the frequency content of this rapid heart depolarization and removes the background noise. Then, it squares the signal to amplify the QRS contribution, which makes identifying the QRS complex more straightforward. Finally, it applies adaptive thresholds to detect the peaks of the filtered signal. The algorithm was proposed by Jiapu Pan and Willis J. Tompkins in 1985, in the journal IEEE Transactions on Biomedical Engineering. The performance of the method was tested on an annotated arrhythmia database and evaluated also in presence of noise. Pan and Tompkins reported that the 99.3 percent of QRS complexes was correctly detected.

UI IMAGES

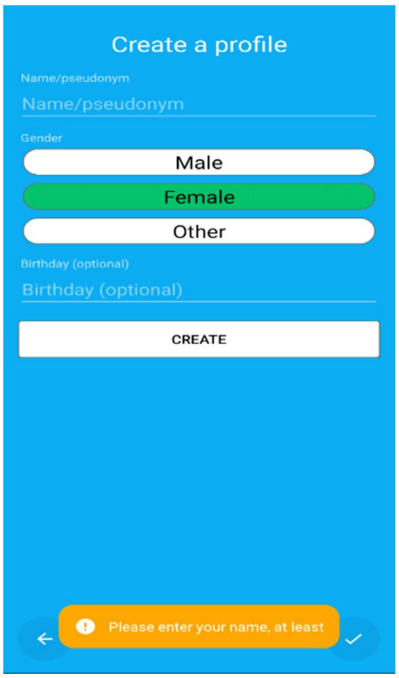


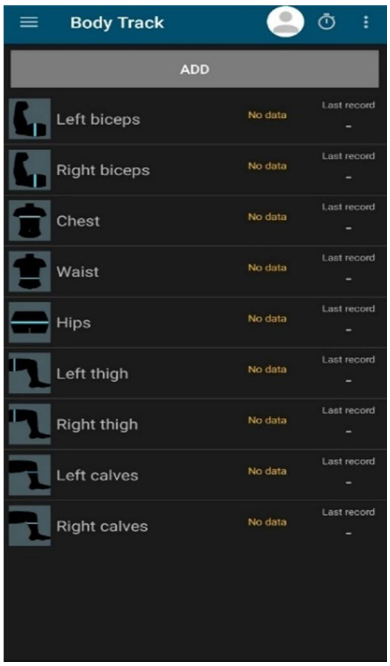






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IV. CONCLUSON

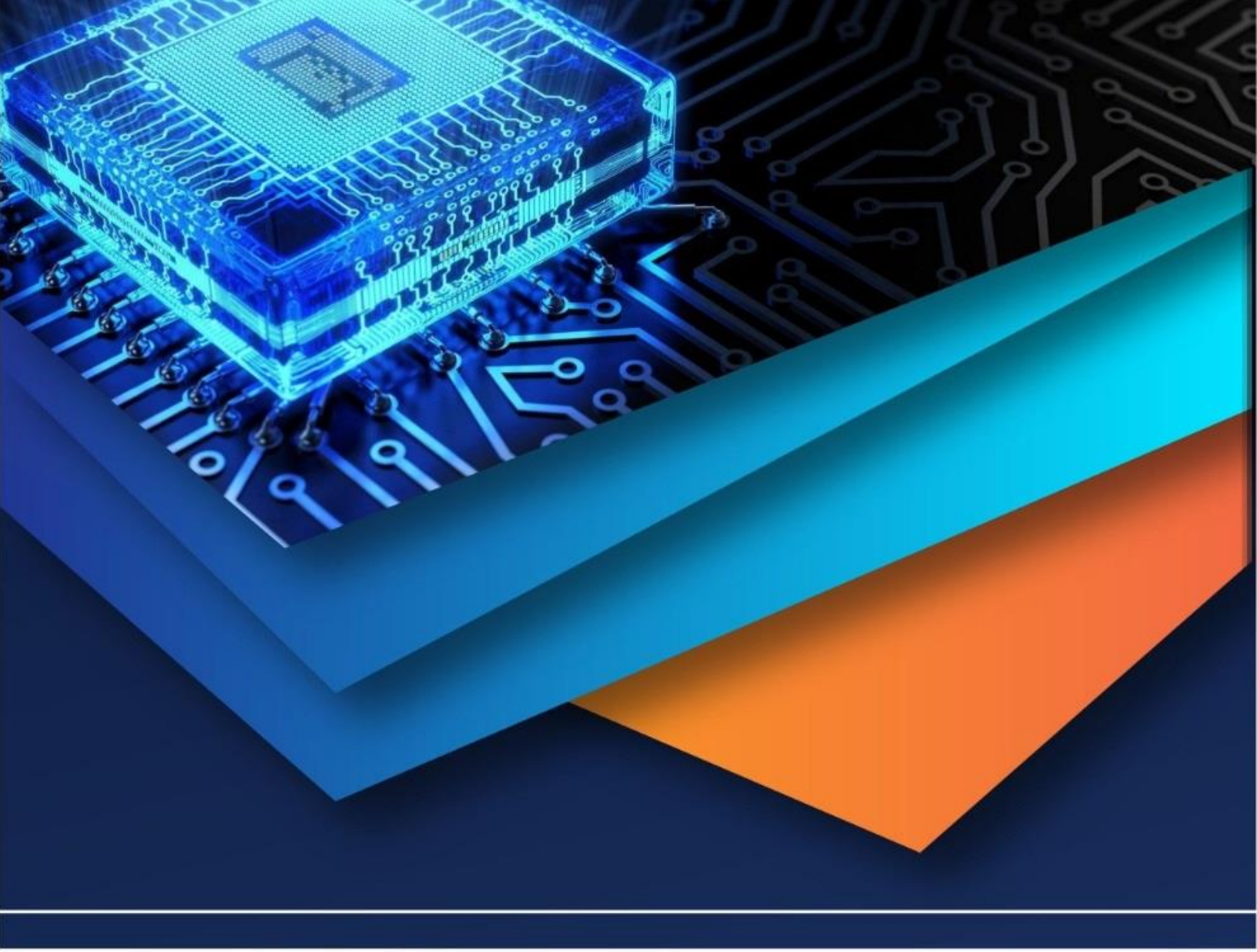
We believed that there was a problem with apps of this type and that if done a certain way this could be solved. The idea and our motivations have been stated clearly. However, there are multiple different areas which could be improved and lots of room for expansion. In the future, this application could be greatly improved and expanded to include new features. The tracker and step counter can be implemented with better GUI. We could even populate a database with vast amounts of food and nutritional data and allow the user to enter food eaten after every meal. Once entered the app takes the number of calories from their daily allowance. An exercise instruction manual which advises users of exercises and how to do them, etc.

V. ACKNOWLEDGEMENT

We take this opportunity to express our deep sense of gratitude to our project guide Ms. Tina D'abreo for his continuous guidance and encouragement throughout the duration of our Research work. It is because of his experience and wonderful knowledge; we can fulfil the requirement of completing the Research Project within the stipulated time.

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