A Project Report on

“Yoga Tracker”

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CERTIFICATE

This is to certify that the project entitled

“Yoga Tracker”

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In partial fulfillment of the degree of **B.E**. in **Information Technology** for term work of the MAD Mini Project is approved.

External Examiner _____

Internal Examiner _____

External Guide _____

Internal Guide _____

Head of the Department _____

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Date: -

College Seal:

ABSTRACT

The fitness industry has been continuing to grow year after year with more individuals becoming health conscious. Today's apps currently don't have a simple all-in-one application in helping users to truly track and verify their exercise (yoga) progress at their homes.

As a result, we have developed an Android application to help users track and verify their exercise (yoga) progress at their homes. We will be able to identify and verify the type of yoga pose performed by the user using the live camera feed from the user's mobile phone passed as input into our yoga pose classification model. The user will be able to track workouts for a particular day with the ability to learn new yoga poses using animated videos and step-by-step instructions for performing a particular yoga pose. The user can also set a minimum time duration for a particular yoga pose as in their weekly and daily goals.

Regular use of this yoga tracker will boost user daily workouts and makes the unachievable goals eventually achievable

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1. Introduction

Over the last few decades, there has been an upsurge in the prevalence of yoga. Medical professionals and celebrities are also adopting and recommending the regular practice of yoga due to its various benefits. While some regard yoga as simply one more prevailing fashion and associate it with the new age mysticism, others vouch for how astonishing this form of exercise feels. Many people feel the burden of multiple responsibilities and constantly lament the lack of time to hit the gym every day. Besides, not all have a gym near their places, which deprives them of daily exercise.

Health practitioners recommend they practice yoga exercises daily. For increased strength and greater flexibility, it is important to try hitting the mat to do yoga daily. Also, when practiced regularly, will you be able to master the necessary poses that improve both physical and mental health in the long run.

1.1 Problem Statement

Build an at-home workout app that can accurately track whether a user (who worked out) has exercised or not, using a live camera feed from a mobile phone to identify and keep track of practiced yoga poses by the user.

2. Literature Review

2.1 Existing System

1) Yoga Pose Detection and Classification Using Deep Learning

In the paper *"Yoga Pose Detection and Classification Using Deep Learning"* the authors Mr. Deepak Kumar, Mr. Anurag Sinha [1] proposes a system wherein the user can select the pose that he/she wishes to practice. He/she can then upload a photo of themselves doing the pose. The pose of the user is compared with the pose of the expert and the difference in angles of various body joints is calculated. Based on this difference of angles feedback is provided to the user so that he/she can improve the pose.

The use of this posture assessment in wellness and sports can help forestall wounds and improve the execution of individuals' exercise recommendations, yoga self-guidance frameworks convey the potential to make yoga famous alongside ensuring it is acted correctly. The proposed models right now are limited to just characterize 6 yoga asanas.

2) *Yoga Asana Identification: A Deep Learning Approach*

The paper "*Yoga Asana Identification: A Deep Learning Approach"* written by Mr. Josvin Jose, Mr. Shailesh S [2] system uses a classification model for recognizing and identifying a yoga asana from an image or a frame of a video in this work. The classification model is developed using deep learning techniques backed with image processing and computer vision methods. The entire work focuses on classifying 10 classes of yoga asanas. The postures like Bridge, Child's, Downward dog, Mountain, Plank, seated forward bend, Tree, Triangle pose, Warrior1, Warrior2 were analyzed and recognized by the deep learning model and then used to identify the exact class of the yoga posture.

They have used transfer learning with VGG16 architecture and pre-trained ImageNet weights along with a DNN classifier. The results were quite promising; they gave 82% prediction accuracy. The domain still has numerous possibilities to explore. Apart from the images, video analysis can be done to analyze the movement of the yoga asanas for validating the correctness of the movements. The architectures like 3DCNN, Deep-Pose Estimators, LSTM, GRUs are well suited for video-based analysis.

3) *Yoga Pose Classification Using Deep Learning*

In the paper *"Yoga Pose Classification Using Deep Learning"*, author Sruti Kothari [3], lays the foundation for building a system by discussing various machine learning and deep learning

approaches to accurately classify yoga poses on pre-recorded videos and also in real-time. The project also discusses various pose estimation and keypoint detection methods in detail and explains different deep learning models used for pose classification.

The paper explains a computational method using deep learning, particularly CNN, for classifying the Yoga postures from images. They have considered a dataset containing 1000 images distributed over 6 classes for building the classification model. Nearly 85% accuracy was obtained for this work.

4) ***Yoga Posture Recognition and Quantitative Evaluation with Wearable Sensors Based on Two-Stage Classifier and Prior Bayesian Network***

Hua- Tsung Chen [4] proposed a yoga posture recognition system that can recognize the posture performed by the trainer. In the first step, he used a kinetic to capture the body map of the user and body contour extraction. Then, the star skeleton which is a fast skeletonization technique by connecting from the centroid to other joint parts is done as the next step. From this technique, an accuracy of 96% is acquired.

To evaluate this method, a wearable device with 11 inertial measurement units (IMUs) fixed onto the body was designed to measure yoga posture data with quaternion format, and the posture database with a total of 211,643 data frames and 1831 posture instances was collected from 11 subjects.

2.2 Statistics

Interactive Fitness: Zenia App

Zenia is more than a yoga app — it's your virtual yoga studio. With Zenia, you can do your yoga practice in the safety and privacy of your home. The app does access your camera, but it's private — no one can see you. Train yoga at home — with a teacher, if you like it Zenia is not only about artificial intelligence motion tracking. If you prefer following yoga classes with a teacher, Zenia will help you too. With this yoga app, you can practice with experienced yoga trainers.

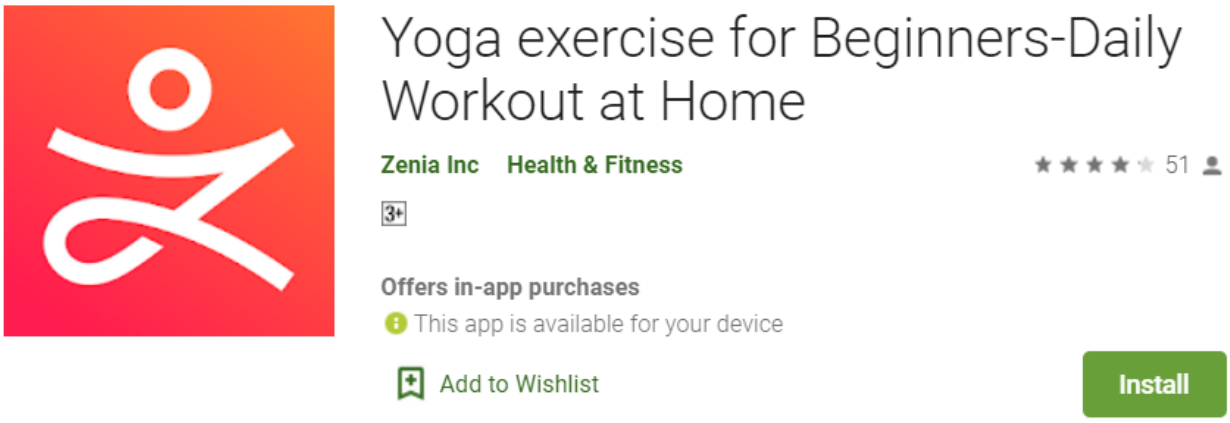

Figure 1.1 - Zenia App

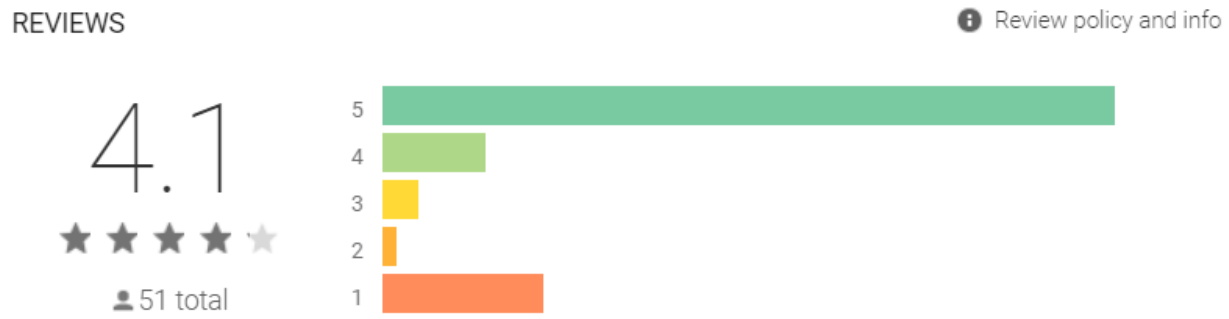

Figure 1.2 - Zenia App Ratings

YogiFi: Smart

YogiFi is a unique yoga app designed keeping just YOU in mind. Very often you are overwhelmed with so much content from yoga apps, online videos, etc., You might have skipped yoga class due to traffic, time, conflicting priorities, or just being unable to keep up with pace along with others.YogiFi offers flexible & personalized programs with daily motivation to integrate yoga into your daily lifestyle. It allows you to be with yourself and be on your journey. You may also find a buddy or instructor in our community to help you with daily motivation.

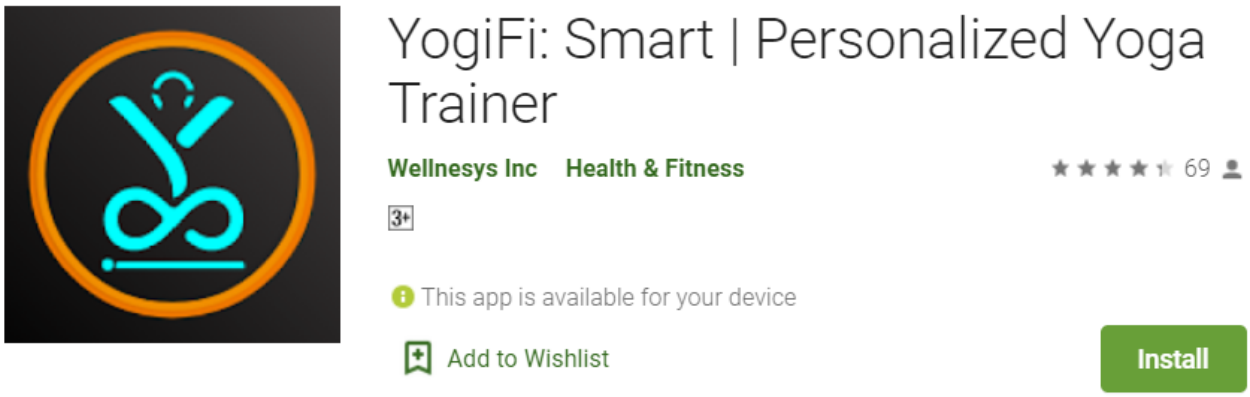

Figure 2.1 - YogiFi App

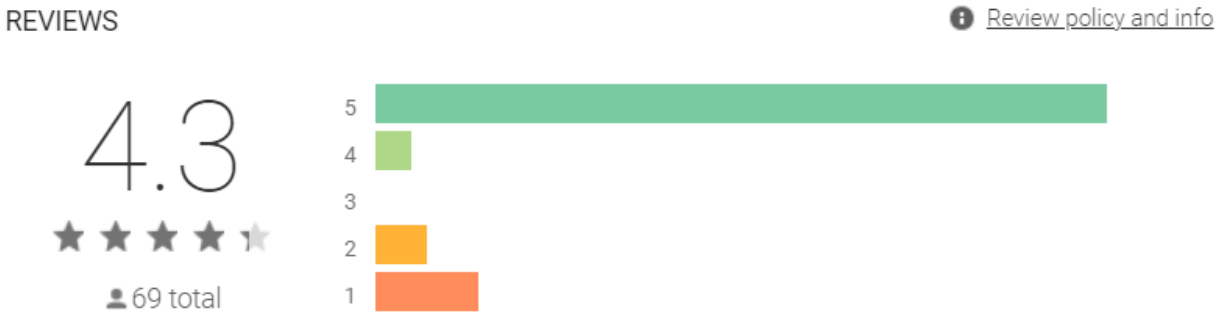

Figure 2.2 - YogiFi App Rating

Flow Yoga Asana

Flow Yoga is your client-side yoga academy, with professionally instructed classes and challenges that test you and help you to achieve your goals, whether that be improving posture, increasing flexibility, building a beach body, or keeping fit. You can choose between strength, relaxation, and health-focused flows, using curated collections of yoga poses for optimal results.

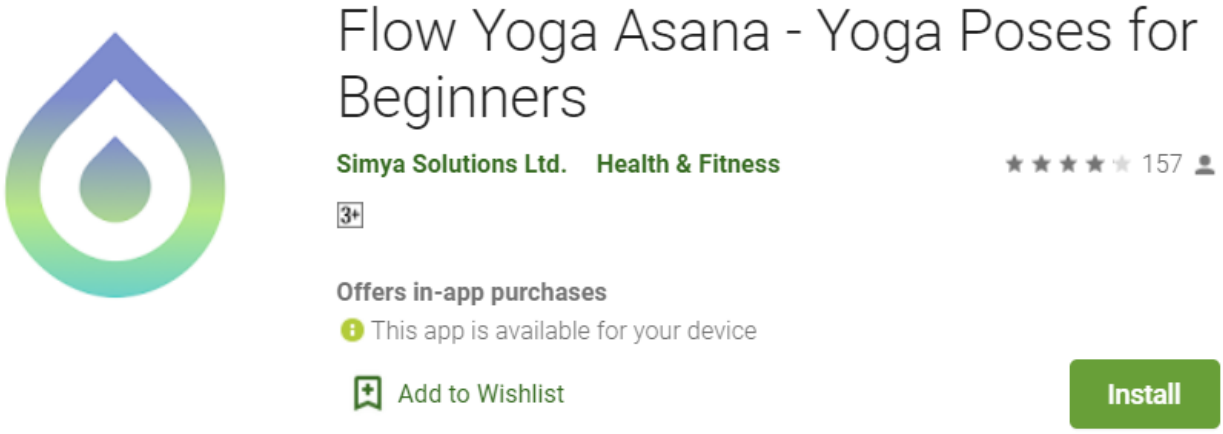

Figure 3.1 - Flow Yoga Asana App

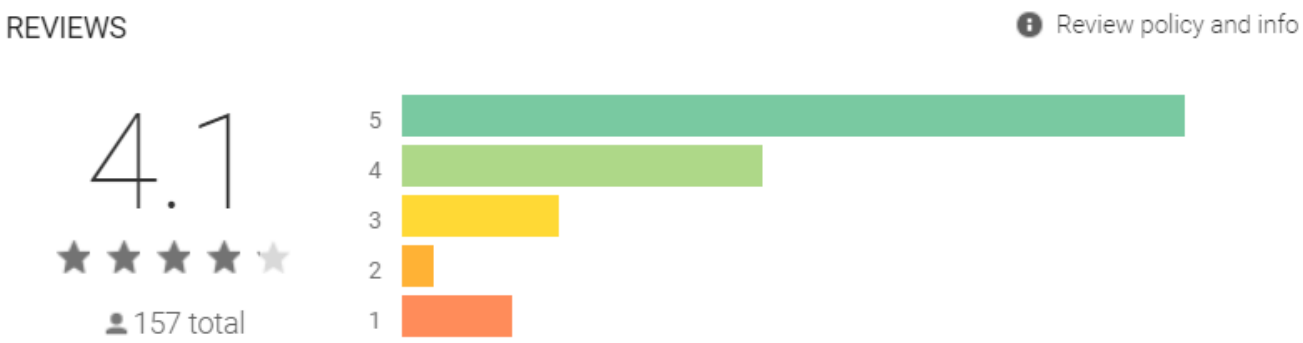

Figure 3.2 - Flow Yoga Asana App Ratings

3. Architecture Flow

3.1 Block Diagram

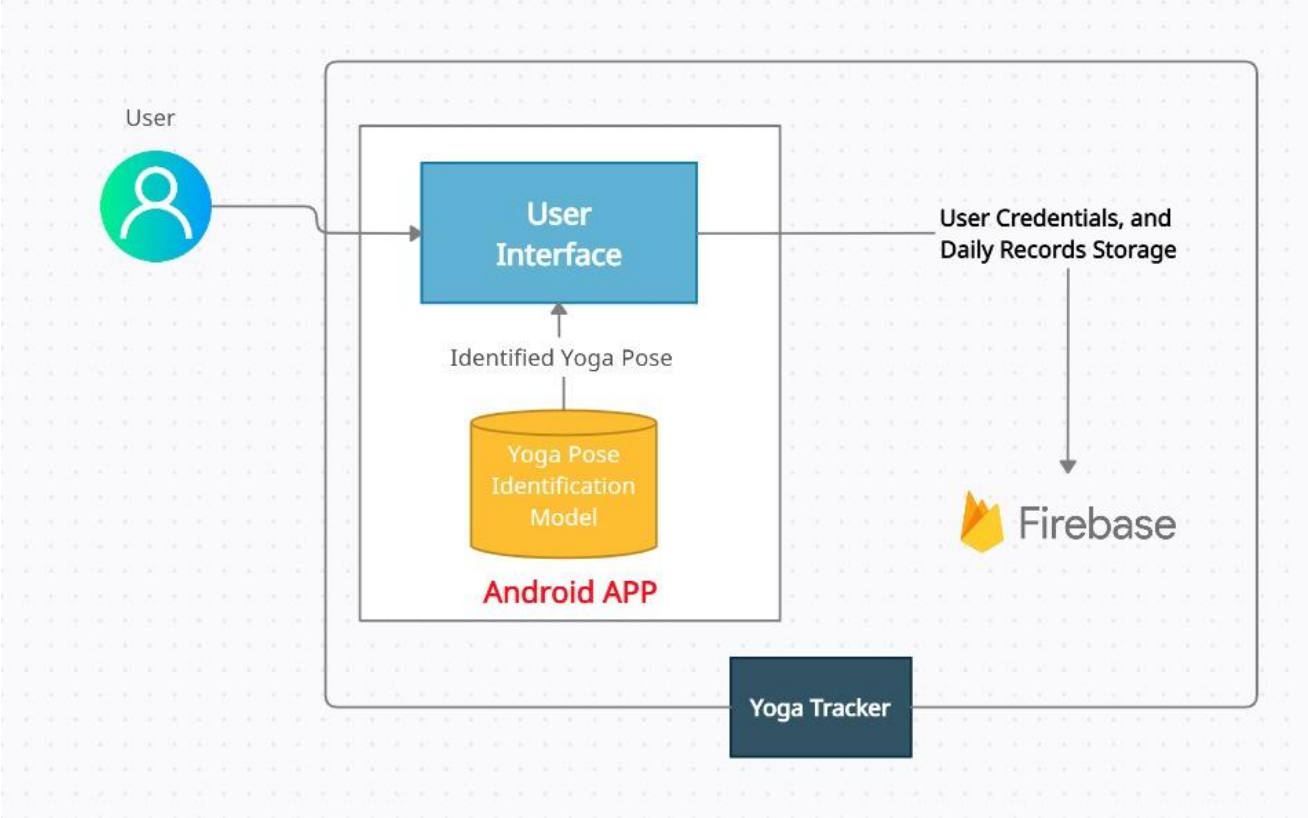

Figure 4.1 - Use case Diagram of YogaTracker

The “Yoga Pose Identification Model” resides in the client side i.e. in the android application itself, as the name suggests it is used to identify yoga poses, when an image (or frame of real-time video) is given as input, it outputs yoga pose and confidence scores.

We have used Firebase as our real-time cloud-based database system to store user credentials, and daily users records, like which all yoga poses have been performed by the user, their respective durations, and their respective date.

3.2 Flow Diagram

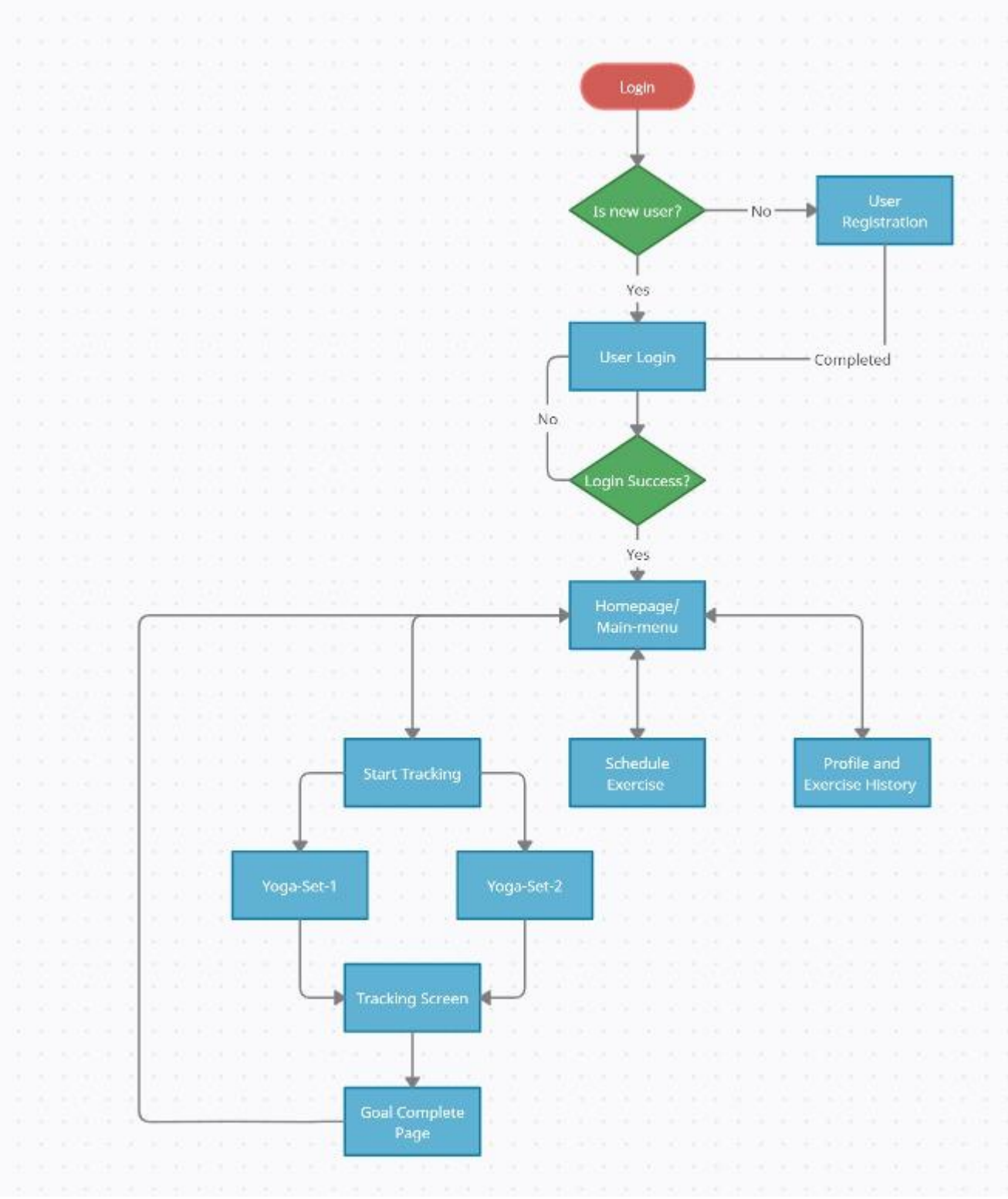

Figure 4.2 - Flow Diagram of YogaTracker

The flow diagram starts when the user opens the Application for the first time. If the incoming user is a new user he has to register first and provide his name and password for registration, and that same credentials will be used for signing into our app.

Once the user is logged in, he has options to view his previous records (each record contains the date, exercise performed, and its duration), schedule yoga timings (15 minutes before the actual timing notification will be sent to the user as a reminder to prepare and start exercising). Coming to the main feature of our application, the user can select between “Yoga-Set-1” or “Yoga-Set-2” sets of exercises, each set will comprise of 3 poses which the user has to perform in front of his mobile phone front camera from which we will verify pose and will also be able to record the time for which the user holds up that particular pose.

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[6] YogiFi: Smart

[7] Flow Yoga Asana