A D Patel Institute of Technology

(A Constituent College of CVM University)

New V. V. Nagar

INFORMATION TECHNOLOGY DEPARTMENT

Mini Project Proposal

On

FruitHub

Submitted By

Name of Student: Harsh Dadiya

Enrolment Number: 12102080601040

Name of Student: Divyesh Kuchhadia

Enrolment Number: 12102080601035

Name of Student: Jay Vekariya

Enrolment Number: 12102080601048

MINI PROJECT (202040601)

A.Y. 2023-24 EVEN TERM

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1.Introduction:

- **Problem Statement:**
  Post-COVID, there is a heightened awareness of healthy living, with fruits being a popular choice. However, concerns arise due to potential chemical use in cultivation. People seek accurate fruit nutrition data and guidance for natural cultivation, yet reliable information is scarce. Addressing this gap is crucial for meeting the demand for healthy, chemical-free produce.

- **Project Summary and Introduction:**
  FruitHub emerges as an innovative solution within this context—a mobile application designed to harness the power of machine learning for the purpose of accurately identifying a wide array of fruits and vegetables. Beyond mere recognition, this application endeavours to furnish users with comprehensive insights into the nutritional profiles of different produce items, alongside practical guidance pertaining to their cultivation. By offering a user-friendly interface replete with valuable information, FruitHub aspires to not only promote healthier eating habits but also to empower users to make well-informed decisions regarding their dietary intake.

- **Aim and Objective of the Project:**
  At its core, FruitHub seeks to achieve the following objectives:
  - Development of a robust machine learning model capable of accurately recognizing and categorizing diverse fruits and vegetables.
  - Integration of nutritional data and cultivation tips into the application interface, thereby enhancing user accessibility to pertinent information.
  - Design and implementation of an intuitive user interface, ensuring seamless interaction and navigation throughout the application.
  - Ensuring compatibility across a broad spectrum of mobile devices, thereby maximizing accessibility and usability for all users.

2.System Analyses:

- **Motivation:**

  The impetus behind the conception of FruitHub lies in the pressing need to foster greater awareness and understanding surrounding dietary choices and their impact on individual health. In an era characterized by burgeoning technological advancements, there exists a unique opportunity to harness machine learning algorithms to address this critical societal need effectively.

- **Brief Literature Survey:**

  - **Explanation of Different Methods with Comparison:**

    Extant literature within the realms of image recognition and machine learning offers a plethora of methodologies for fruit and vegetable identification. These approaches range from conventional image processing algorithms to more sophisticated deep learning models, such as convolutional neural networks (CNNs). A comprehensive comparison of these methods will be undertaken to ascertain the most suitable approach for the development of FruitHub. [6,7]

3.Design Analysis, Design Methodology, and Implementation Strategy:

- **Hardware and Software Requirements:**
  - **Hardware:** The application will be compatible with smartphones equipped with camera functionality, ensuring widespread accessibility.
  - **Software:** Development will be conducted primarily using Kotlin (Jetpack Compose) or React-Native for the mobile app interface, React for webapp interface, Python libraries for the machine learning model, and MySQL or Firebase for data storage and retrieval. So, Android mobile or Browser compatible PC with Internet connection.
- **Design Methodology:** We will try to follow the Incremental Model for app development. It is beneficial because we are doing every stage of development in full detail so the changes, we encounter at the later stage will be less in number.
- **Implementation Strategy:**
  - **Research and Data Collection:**
    - Gather comprehensive data on fruit nutrition and natural cultivation methods from reputable sources such as scientific journals, agricultural research institutes, and nutrition databases.
    - Collaborate with experts in the fields of nutrition and agriculture to ensure the accuracy and reliability of the collected information.
  - **Machine Learning Model Development:**
    - Employ machine learning algorithms to develop a model capable of accurately recognizing and categorizing different types of fruits.
    - Train the model using a diverse dataset of images representing various fruits and vegetables to enhance its accuracy and reliability.
    - Continuously refine and optimize the model through iterative testing and validation processes.

- **Application Development:**
  - Utilize the Incremental Model for app development to ensure thorough attention to detail at every stage of development.
  - Begin with the development of core functionalities such as user authentication, data input, and retrieval mechanisms.
  - Incorporate the machine learning model into the application framework to enable fruit recognition capabilities.
  - Design an intuitive and user-friendly interface for seamless interaction and navigation within the application.
  - Implement features for accessing nutritional data and cultivation tips, ensuring the information is presented in a clear and understandable format.
- **Testing and Quality Assurance:**
  - Conduct rigorous testing procedures to identify and rectify any bugs, glitches, or inconsistencies within the application.
  - Perform usability testing with a diverse group of users to gather feedback and insights for further improvements.
  - Ensure compatibility across various mobile devices and operating systems to maximize accessibility for all users.
- **Deployment and Maintenance:**
  - Deploy the application on relevant app stores, ensuring compliance with all necessary guidelines and regulations.
  - Monitor user feedback and analytics to identify areas for further enhancement and optimization.
  - Provide regular updates and maintenance to address any issues or updates in nutritional data or cultivation practices.
  - Continuously engage with users to gather feedback and suggestions.

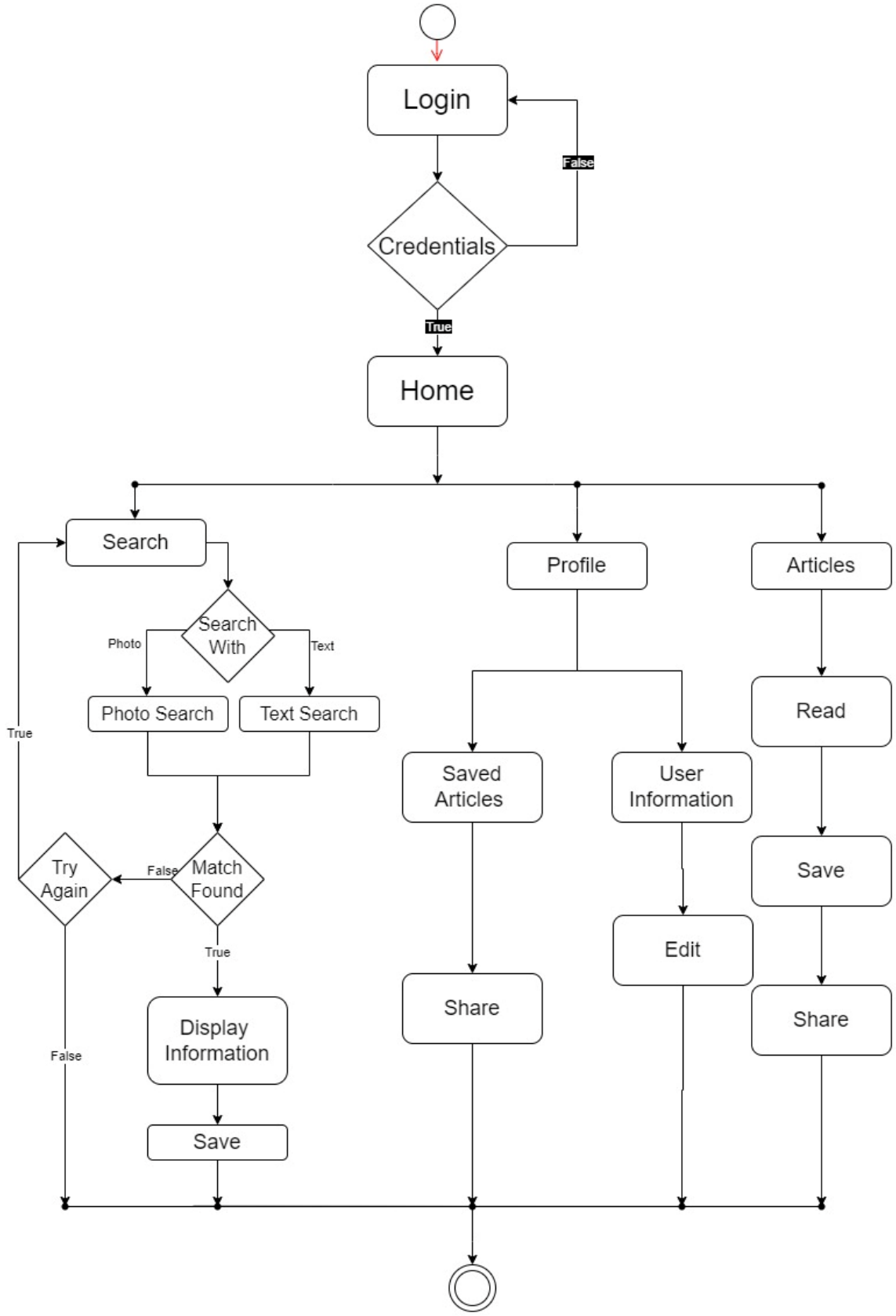

Fig 3(a): State Transition Diagram

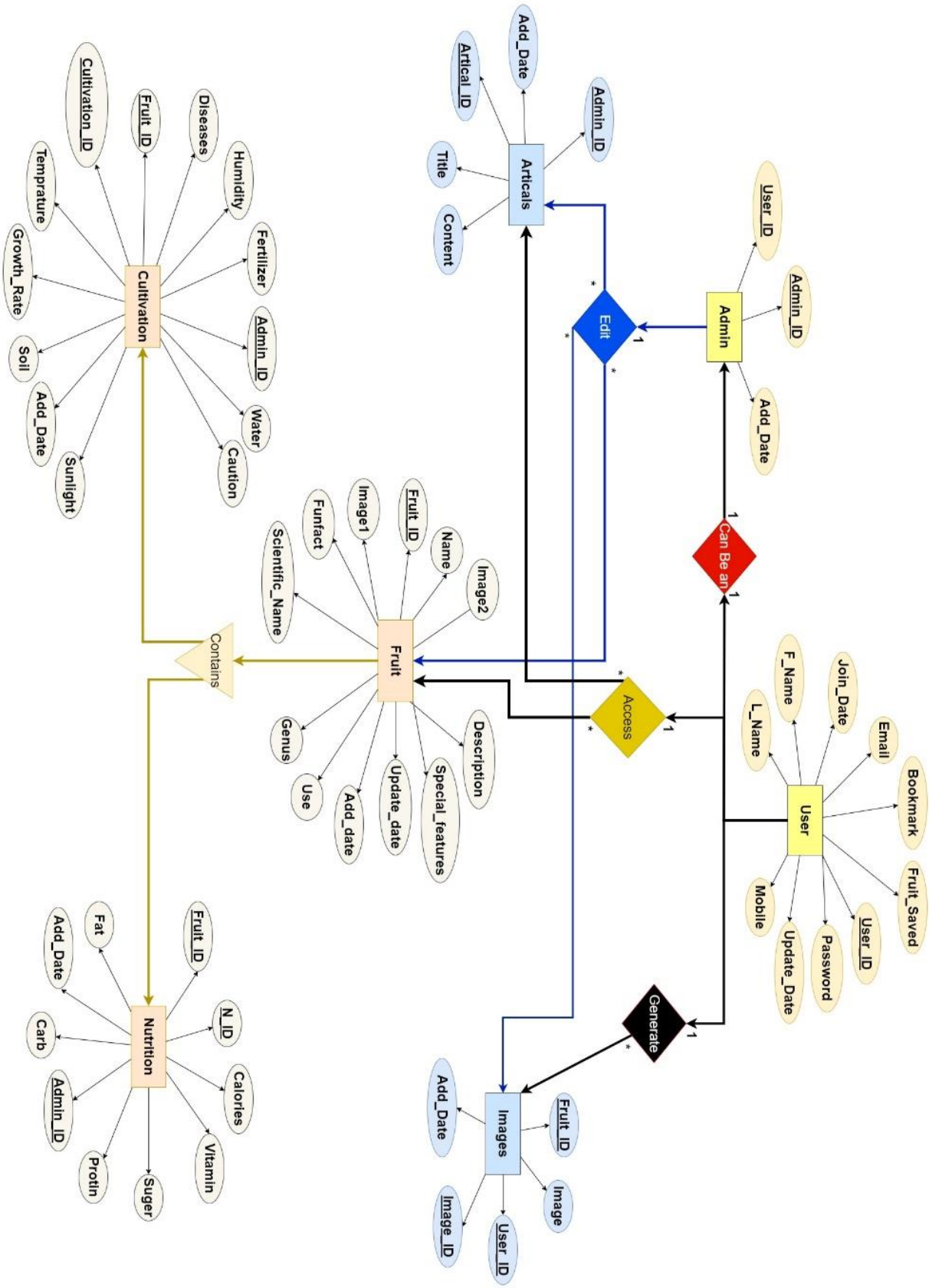

Fig 3(b): Entity-Relationship Diagram

Class Diagram

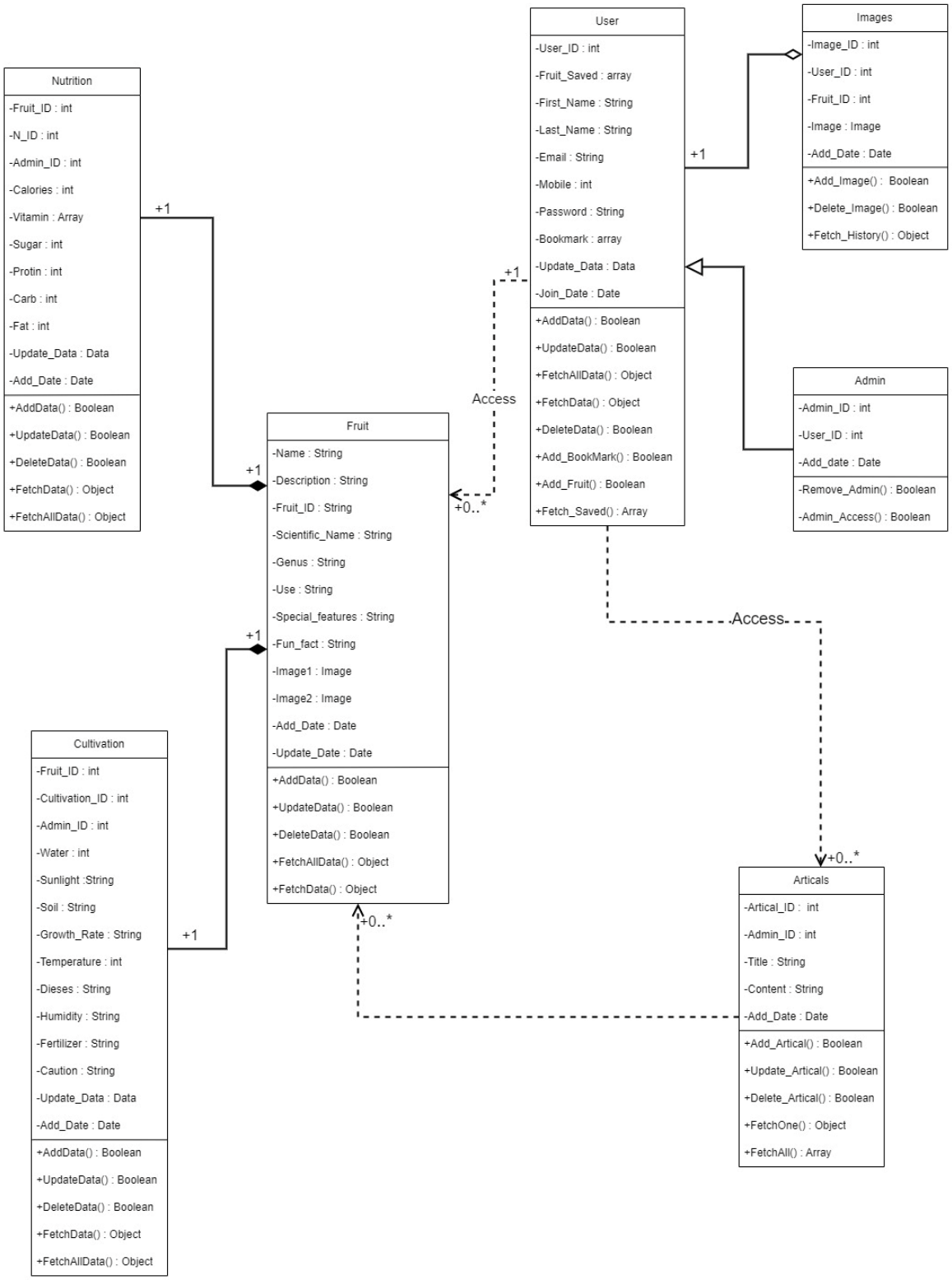

Fig 1(c): Class & Object Diagram

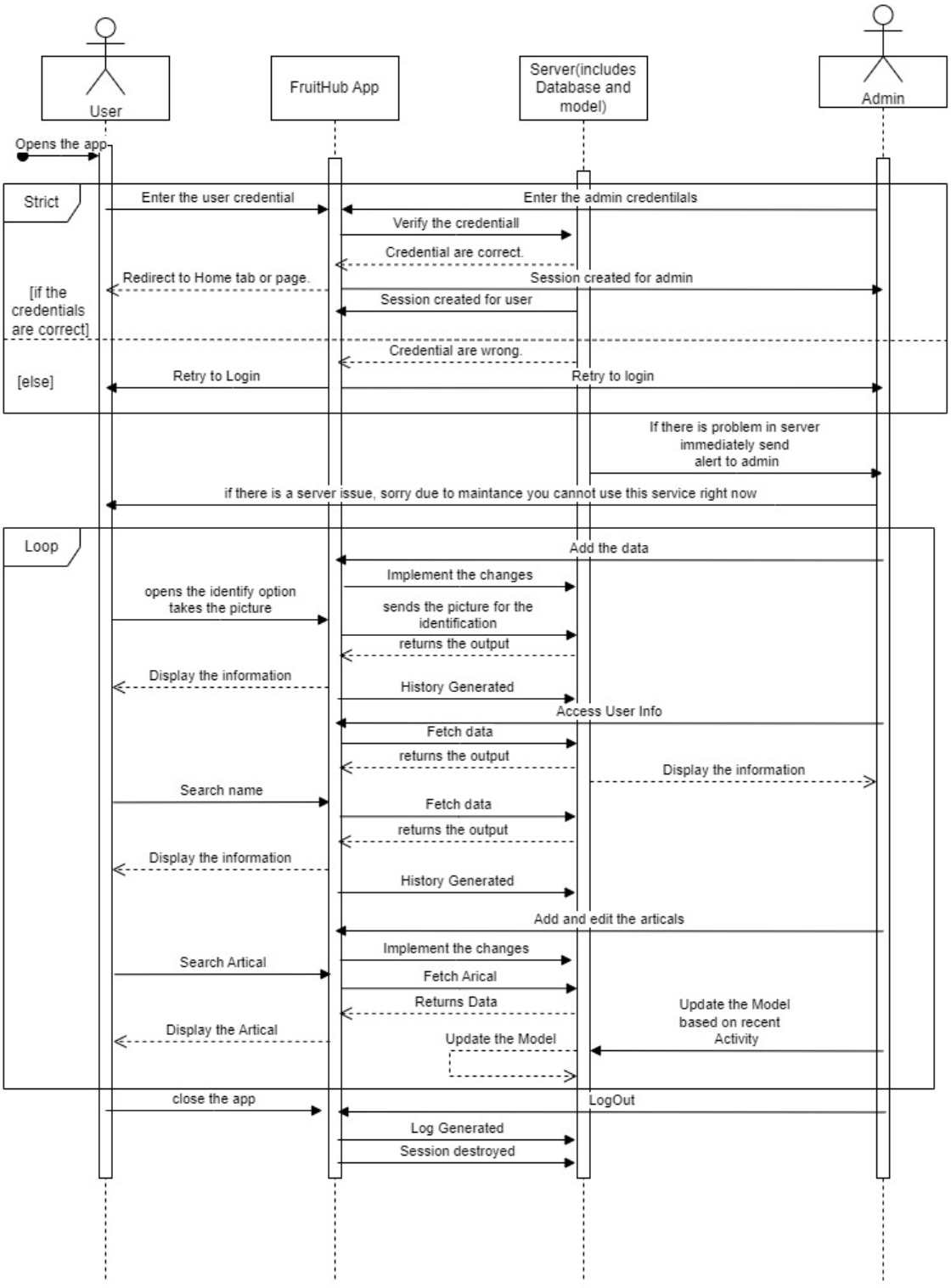

Fig 3(d): Sequence Diagram

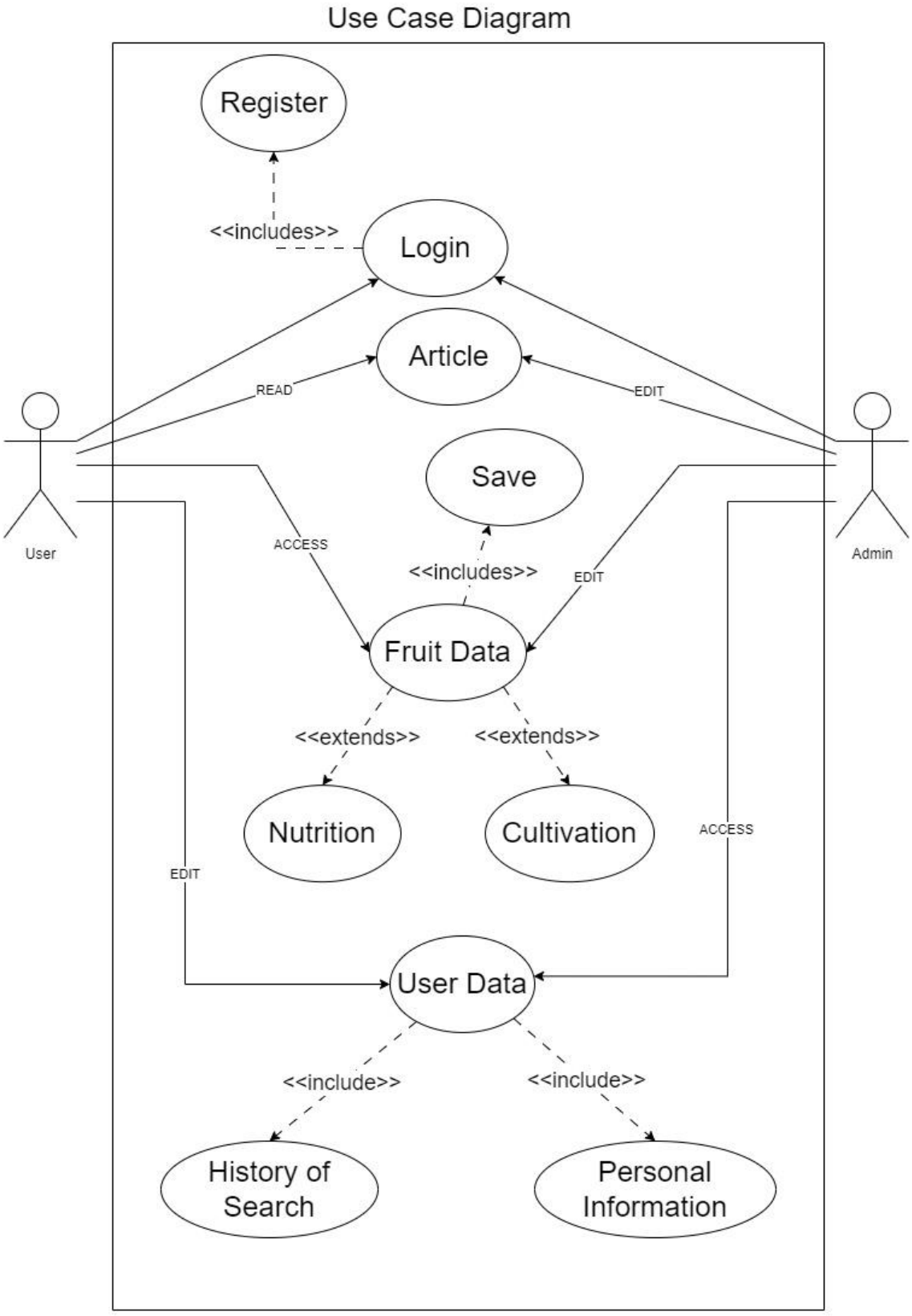

Fig 3(e): Use Case Diagram

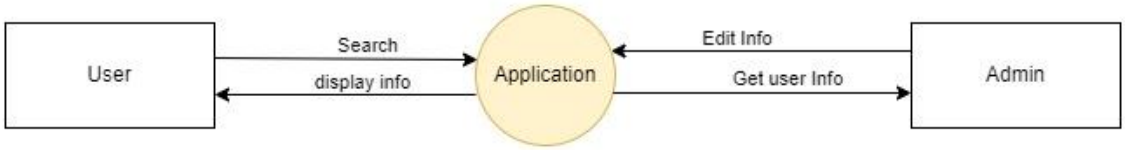

Fig 3(f): DFD Level-0

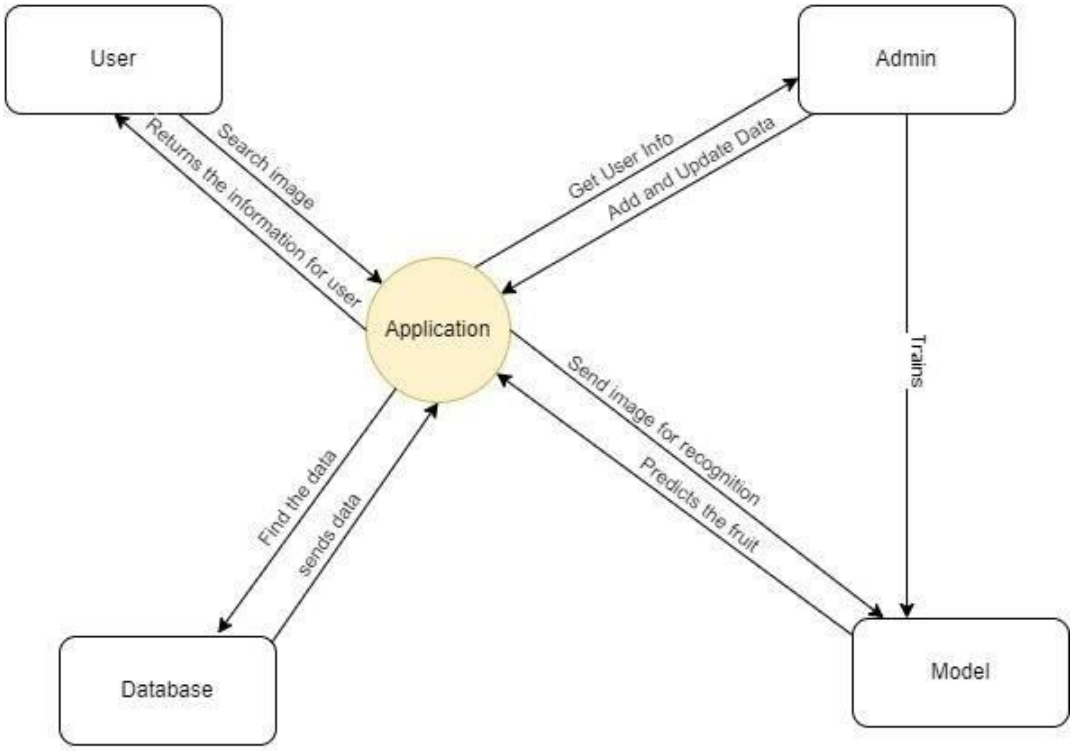

Fig 3(g): DFD Level-1

4.Implementation:

- **System Flow:**
    - Users will capture an image of a fruit or vegetable via the application interface.
    - The captured will be processed by the underlying machine learning model, facilitating accurate recognition of produce.
    - Relevant information, encompassing nutritional data and cultivation tips, will be retrieved from the database.
    - The retrieved information will then be presented to the user through the application interface in a clear and user-friendly manner.
    - Fig 1 on page 7 is diagrammatical representation on system flow.
- **Program/Module Specification:**
    - **Mobile App:** Development will be undertaken utilizing Kotlin and Jetpack Compose, encompassing modules for image capture, machine learning integration, and content display.
    - **Web App:** Development will be undertaken using React for frontend and adding backend services Node or Fierbase
    - **Machine Learning Model:** Implementation will be executed using Python, leveraging libraries such as TensorFlow or PyTorch. The model will be trained on a comprehensive dataset of fruit and vegetable images to ensure robust recognition capabilities.
    - **Database:** Storage and retrieval of nutritional information and cultivation tips will be facilitated through either MySQL or MongoDB, ensuring seamless access to pertinent data.

- **Timeline Chart:**

ID	Task	Start	Finish	Duration	Year-2024													
					Month													
					Jan				Feb				Mar				Apr	
					1 w	2 w	3 w	4 w	1 w	2 w	3 w	4 w	1 w	2 w	3 w	4 w	1w	2w
1	Research	1/1/24	17/2/24	7 weeks														
2	Designing and gathering data	21/1/24	3/3/24	7 weeks														
3	App Development	10/2/24	31/3/24	6 weeks														
4	ML model deployment	3/3/24	31/3/24	4 weeks														
5	Integration and Testing	31/3/24	3/4/24	4 Days														
6	Deployment	4/4/24	8/4/24	4 Days														

Fig 4(a): Timeline Chart

- **User Interface:**

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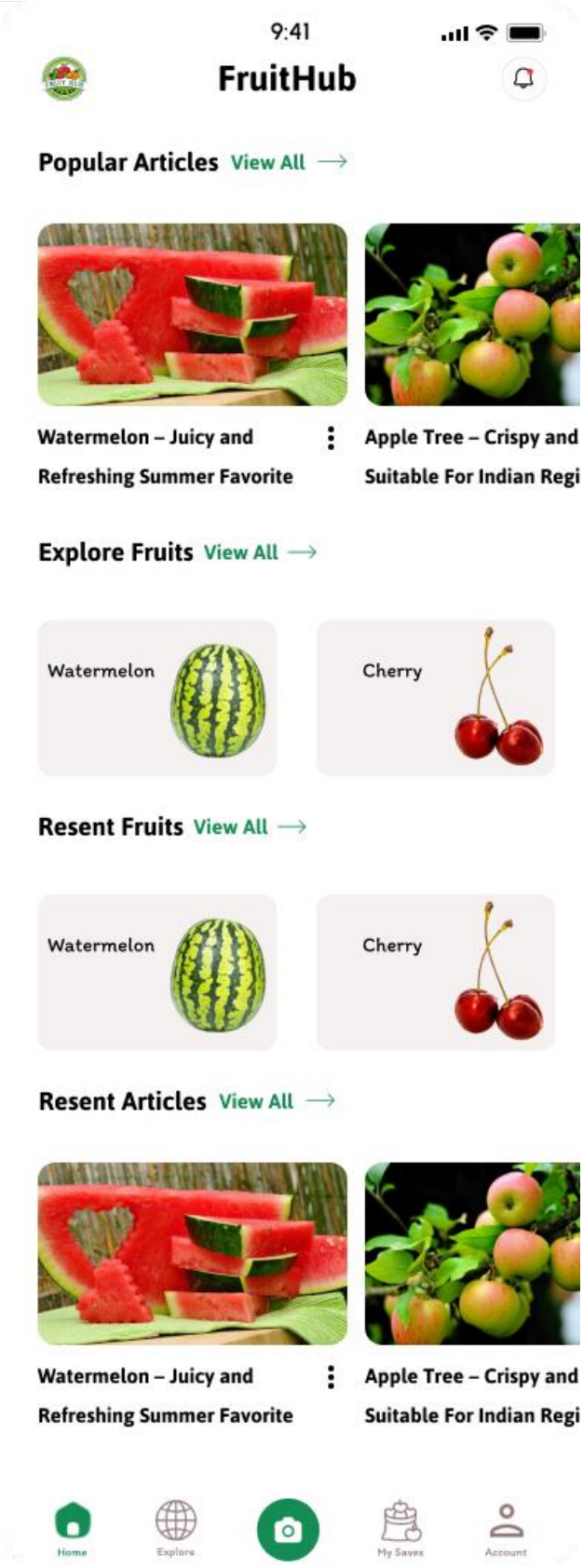

Fig 4(b): Home Screen UI

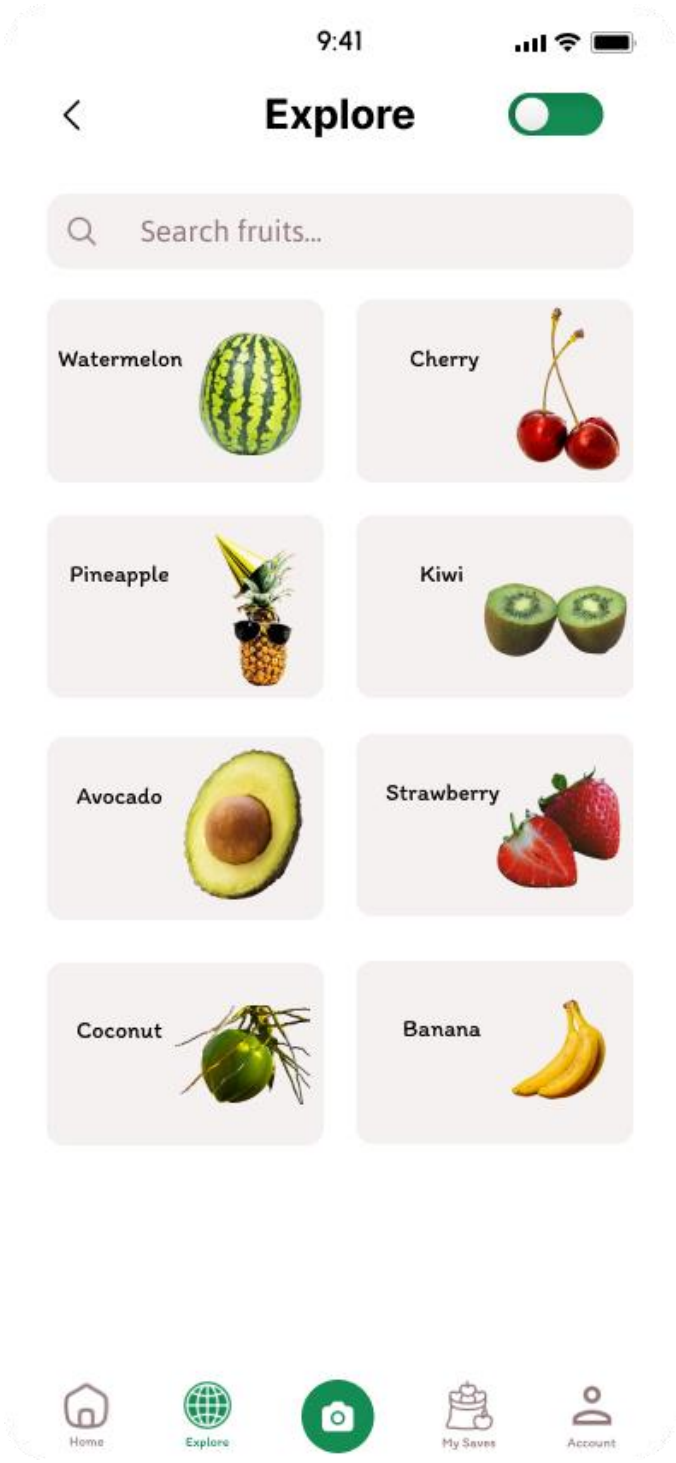

Fig 4(c): Explore Screen UI

Fig 4(d): Capture Screen UI

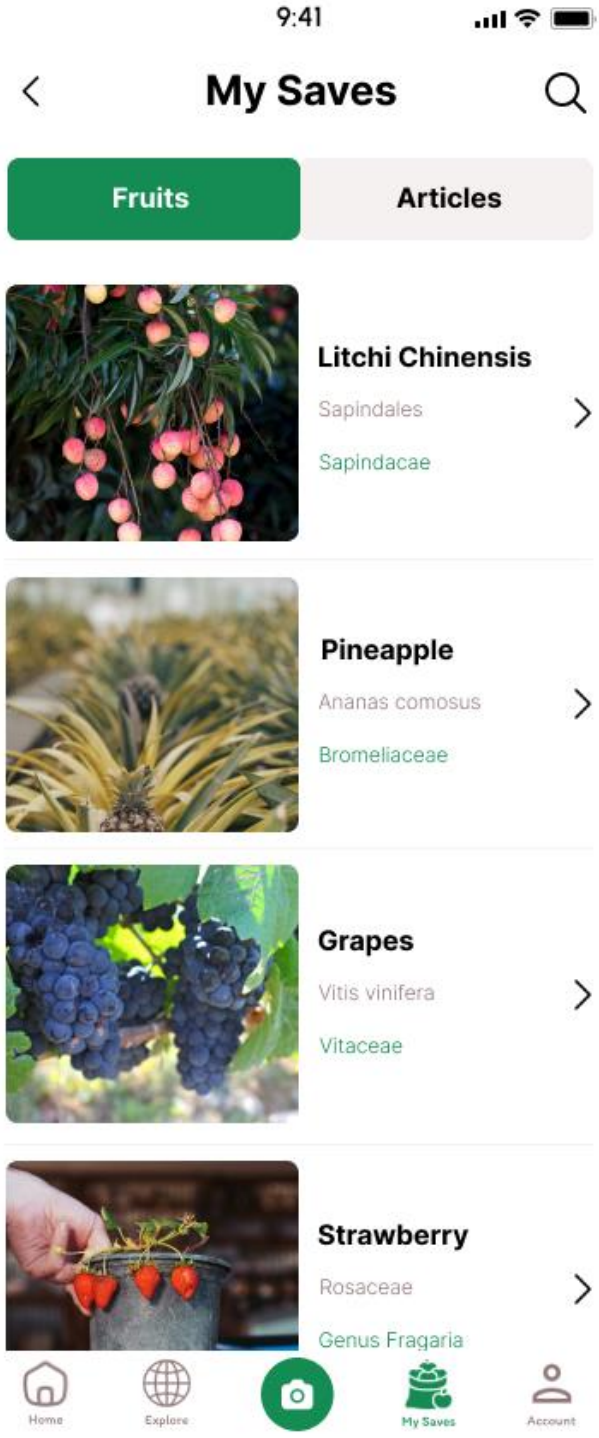

Fig 4(e): My Saves Screen UI

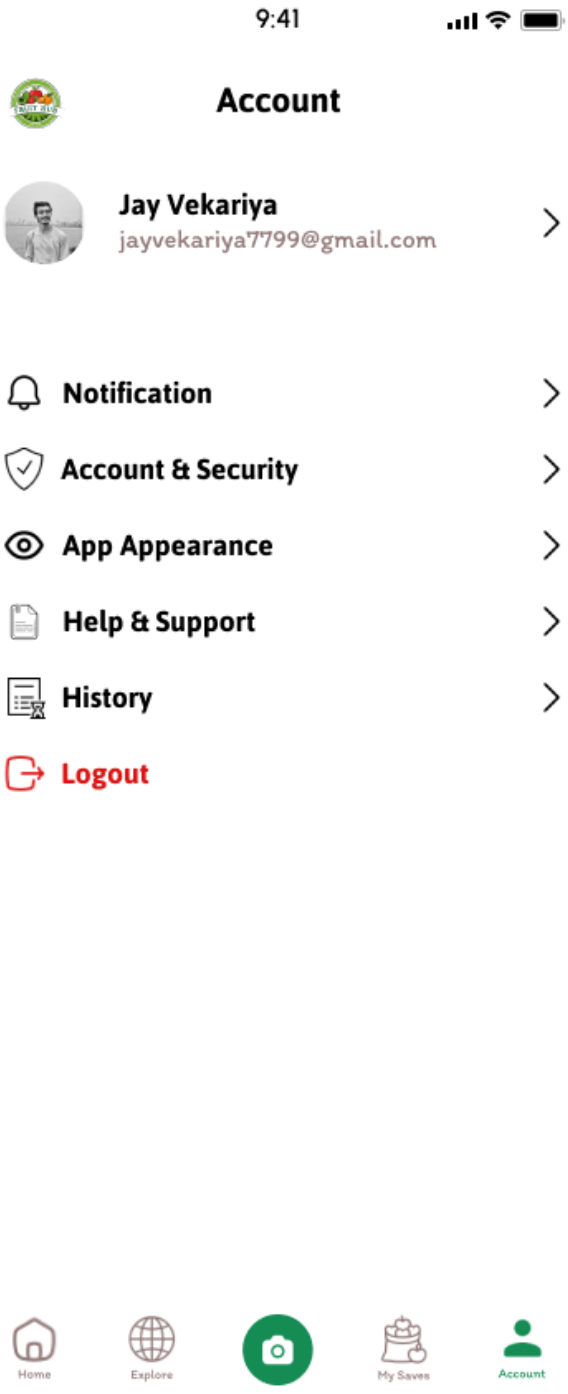

Fig 4(f): User Screen UI

5.Conclusion:

FruitHub epitomizes a pioneering endeavour aimed at fostering healthier dietary habits and enhancing nutritional literacy through the utilization of cutting-edge mobile technology. By amalgamating image recognition with comprehensive informational resources, the application endeavours to empower users to make informed decisions regarding their dietary choices and cultivate a deeper understanding of the fruits and vegetables they consume

6.References:

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