

ABSTRACT

Shopping is one of the activities that some people consider part of their life, while others do not even think of it. This comparison makes us discover people's problems with shopping. People have shopping problems such as limited time, a transportation issue, people consider physical shopping as a waste of time, health issues, long-distance to market. And the difficulty in obtaining some items. This personal grocery shopping is an innovative app that allows the customers to get all their needs and suggest items.

In addition, this app could help people who are facing health problems and unable to buy something physically to avoid future problems. Finally, some people do not have transportation methods for shopping, and they should keep pace with the evolution. E-commerce has seen a tremendous growth in the past decade. An important feature of an online grocery system is to arise up with suitable recommendations, which can help the user make quick decisions, so that they don't have to spend additional time browsing the application.

Keywords: Online Grocery; Mobile app; Smart association; E-commerce.

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Chapter: 1 **INTRODUCTION**

1.1 Project Introduction

- In this thesis, the Flutter technology is utilized to develop an e-commerce mobile application. E-commerce, or electronic commerce, is a technique of purchasing goods and services through the internet that is growing in popularity and effectiveness for online businesses. Ecommerce offers a number of benefits, the most significant of which is that it is inexpensive and convenient.

1.2 Project Purpose

- The main goal for developing this project where customer can purchase an order on groceries. The structure is very convenient for customer. They can easily buy the grocery products from home through internet. The system decrease a much of work load for customer. The product is directly delivered customer address by system online grocery shopping.
- This project provides a lot of feature to manage the product in well manner. Online grocery market is a method of E-Commerce that allows customer to buy a product form a seller over internet. There had been a increasing demand for e commerce sites, in the past decades. Online grocers, especially have growing in popularity.

1.3 Project Scope

- The intention of here tabloid is to create an online grocery application. Presently life for everyone has become so confused and time consuming, at such time we require a smart system at our kitchen also. To put on records and observing all the grocery at home is hard. Many of the time we remain in incorrect belief that we have enough grocery in our kitchen but we have to face empty bottles at the time of difficulty when the requirement is must that gives us trouble. And to avoid this, some time we buy more than enough grocery & store it at our home for many days, which is also an inconvenience can cause damage to grocery.
- This application's main purpose and goal is to empower and assist a person in accessing e-commerce platforms so that they may do their own online shopping.

1.4 Literature Review

- In recent years, online purchasing has become increasingly popular. People all around the world prefer to buy things online rather than in stores, which is why Amazon and other similar online retailers are not only successful but also increasing interest in online commerce.
- In today's world, though, innovation is assisting us in breaking down some of these barriers by using computer frameworks to aid us with various forms of labour. As we all know, the world of online purchasing is quickly developing. As a result, e-commerce apps have already developed various new tactics and technologies for giving information to individuals. These ideas and technologies, however, provide a number of challenges and concerns for people.

Chapter:2
SYSTEM REQUIREMENT
ANALYSIS AND PROJECT
MANAGEMENT

2.1 Tools and Technology

- **Front End Technologies:-**

Flutter

This application is built on Flutter technology. Flutter offers several advantages because it is a Google product. The following is a quick overview of flutter. The app development process is revolutionized by Flutter. You can design, test, and publish stunning mobile, web, desktop, and embedded apps by writing onetime code. Google built Flutter as an open-source project. It's used to make hybrid apps for Android, iOS, Linux, macOS, Windows, Google Fuchsia, and the web from a single codebase.

You can develop and iterate quickly using Hot Reload. You'll observe changes very immediately after updating the code, with no loss of state. Maintain every pixel to create unique, responsive designs that look and feel great on every device.

Every component in flutter is referred to as a widget. It is entirely widget based. Stateless or stateful widgets are available. There are several states in a stateful widget, not just one. They have the ability to modify their state in response to user interest. A Stateless widget, on the other hand, is a static widget that is utilized for static data or functionality. It is devoid of any state. We need to utilize it in some circumstances because we work with static data.

Flutter is an open-source project, anybody may use and contribute to it at any level. It's better to use it and offer your passion for Google technology by becoming a Google contributor. Flutter has a massive user base since it is a Google product, and Google is the most widely used search engine on the planet.

Flutter outperforms other hybrid solutions in terms of cost. It's one of the many advantages of flutter. Flutter developers may encrypt app data with both asymmetric and symmetric keys using the iOS SecKey API and the Common Crypto library. Flutter code is written in Dart, which has many cryptos and 13 encrypts libraries that employ various cryptographic hashing and encryption techniques.

Dart

Dart is a client-oriented programming language that enables rapid app development across all platforms. Its primary goal is to create one of the most productive languages on a variety of platforms. Both the server and the user will benefit from it. The Dart SDK includes the Dart VM compiler as well as the dart2js tool, which generates the JavaScript version of a Dart Script so that it may be executed on sites that don't support Dart. It is a very similar object-oriented programming language to C++. Dart is a popular programming language for creating single-page websites and online apps.

Dart is designed to provide logic and, as a result, a beautiful user interface. For mobile, desktop, and backend apps, compile specialized machine code. Alternatively, for web use, compile to JavaScript.

Benefits

The first advantage is that it is a very easy language to pick up. If any of us are familiar with C or C++, we can quickly learn this language because the grammar is comparable. The vast community, which provides extensive documentation, is the second item to note. And because it's a Google product, they make it as simple as possible. The third advantage is its excellent performance. Dart-based programs are faster to execute than JavaScript-based programs. (Code Carbon, 2020)

Drawback

Of course, we must consider the drawbacks in addition to the rewards. The first disadvantage is that it has limited resources, making it harder to find solutions to problems. This is due to a lack of larger and more cohesive development communities to assist you.

Dart is currently in development. That's fantastic, and there's nothing "wrong" with Dart, but if you start writing in Dart today, the API may change, or things may not be fully or accurately documented, and the quantity of knowledge accessible on the web may be less than, example, the amount of information available on jQuery. (Code Carbon, 2020)

- **Back-End Technologies:-**

Google Firebase

Firebase is a Google program that allows developers to create apps for a variety of platforms, including iOS, Android, and web-based apps. Firebase is a quick tool for developing things that would take a long time in a traditional database system, such as bespoke APIs. Firebase has built-in APIs that allow us to construct applications quickly. One of the nicest features of Firebase is that it gives us tools for tracking business reports and experimenting with different goods.

The Firebase database is a real-time database that allows clients to immediately access data. Even if you are not connected to the internet, you can still use your program with all of your prior data sets. Firebase allows users to use data in a secure and secured manner.

The Firebase database is a NOSQL database, similar to the MYSQL database used in PHP applications. The real-time database API was created exclusively for rapid operations and capabilities. (Firebase, no date).

Database

SQLite database is the de-facto and standard SQL based embedded database engine. It is small and time-tested database engine. sqflite package provides a lot of functionality to work efficiently with SQLite database. It provides standard methods to manipulate SQLite database engine. The core functionality provided by sqflite package is as follows –

- Create / Open (openDatabase method) a SQLite database.
- Execute SQL statement (execute method) against SQLite database.
- Advanced query methods (query method) to reduce to code required to query and get information from SQLite database.

2.2 Hardware and Software Requirement

- **HARDWARE REQUIREMENTS**
 - **Device:** Any mobile device, laptop or personal computer
- **SOFTWARE REQUIREMENT**
 - Windows XP or above
 - Any latest browser

Chapter:3

SYSTEM ANALYSIS

3.1 Introduction

- System is a collection of an interrelated components that works together to achieve a purpose. System analysis is referred to the systematic examination or detailed study of a system in order to identify problems of the system, and using the information gathered in the analysis stage to recommend improvements or solution to the system. System design is an abstract representation of a system component and their relationship and which describe the aggregated functionality and performance of the system. System design is also the overall plan or blueprint for how to obtain answer to the question being asked. The design specifies which of the various type of approach.

3.2 Comparative Analysis

Existing Solutions	Proposed Solution
Assists in the improvement of our standard, carefully crafted products for distribution within the showcase.	More attractive user interface
The framework allows a buyer to quickly explore or search for an item.	Faster Server-to-client-side response.
It provides an easy way to purchase items directly from sellers without the use of a third-party interface.	Tried to make the rural individuals fill out the description form which will provide more about their products. Tried providing a better and user-friendly environment than the existing one.

3.3 Analysis of existing system

- From the insignificant amount of the current Stores Online, has issues with its software, then a complaint about what isn't correct is imperative for Stores Online to remedy the condition. General postings made about Stores Online services are frequently indistinct concerning what purchasers need Stores Online to do.
- Stores Online's products are always enhanced when clients distinguish particular glitches in the software.

3.4 Requirement and Defination

- Online grocery shopping paves a threat to the traditional bricks-and-mortar retailers in various sectors, and having lesser impact on food retailers. But this is changing – online grocery is coming of age. Major players such as Amazon Fresh and Walmart are ready to invest rapidly to accelerate this growth. As per a recent Nielsen Global E-commerce and the New Retail Survey, one-quarter of global respondents are already buying groceries online for home delivery, and more than half (55%) are willing to use it in the future.

3.5 System Design

- System design is the process of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements through system modeling. One could see it as the application of systems theory to produce development. The design of the system should be user friendly. It is designed in such a way that employees will be able to navigate easily through the information supplied on the system. In other words, system design consists of design activities that produce system specifications satisfying the functional requirements that were developed in the system analysis process. System design specifies how the system will accomplish. System design is the structural implementation of the system analysis.

3.6 System Modelling

- During the system requirements and design activity, systems may be modelled as a set of components and relationships between these components. These are normally illustrated graphically in a system architecture model that gives the reader an overview of the system organization. System modelling helps to give more detailed system specifications which are in form of graphical representations that can describe problem to be solved or the system that is to be developed. Because of the graphical representations used, models are often more understandable than detailed natural language description of the system requirements.

3.7 Data Modeling

3.7.1 ER Diagram

An entity relationship model, also called an entity-relationship (ER) diagram, is a graphical representation of entities and their relationships to each other, typically used in computing in regard to the organization of data within databases or information systems.

An entity is a piece of data-an object or concept about which data is stored.

There are three basic elements in E-R Diagram.

- Entities
- Attributes
- Relationships
- **Data Entity:**
 - A Data Entity, which will be referred to as entity flow now on, is the main symbol on an ERD.
 - An entity is anything, real or abstract, about which we want to store data.
- **Relationships:**
 - A relationship is a diamond that contains its name. It touches one relationship-entity and optionally some attribute-entity connectors. It is linked with two entities.
- **Three Types of Cardinality Relationship:**
 - **One to one:** For one Occurrence of the first entity there can exist only one related occurrence of the second entity and vice – versa.
 - **One to Many:** For one Occurrence of the entity there can exist many related Occurrence of the second entity, it doesn't matter which is first or second.
 - **Many to Many:** For one Occurrence of the first entity, there can exist many related occurrence of the second entity, and for occurrence of the second entity there can exist many occurrence of the first entity.

- **Symbols used in E-R diagrams:**

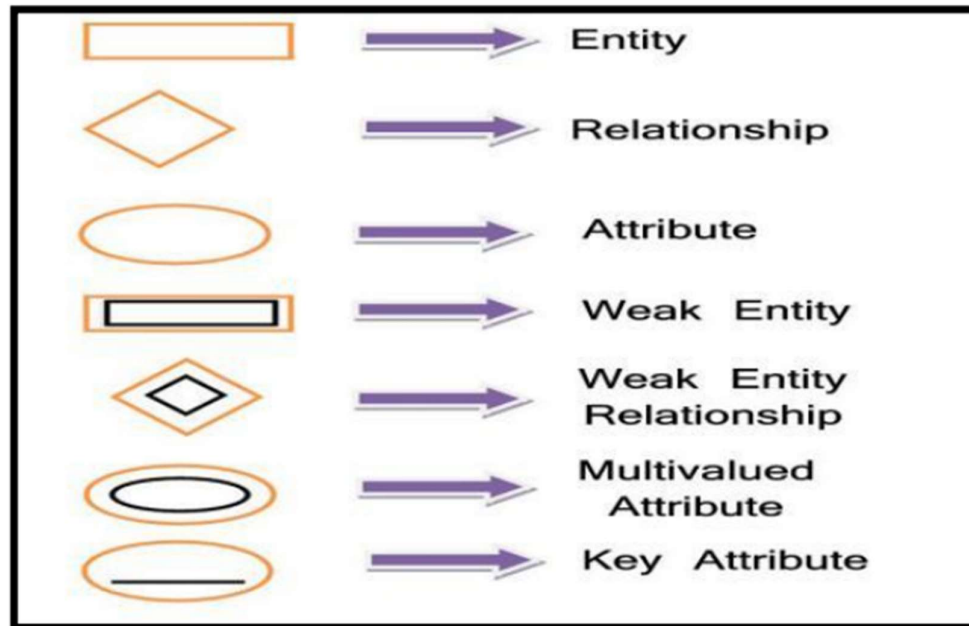


Fig 3.7.1.1: Symbols of E-R Diagram

• ER DIAGRAM:

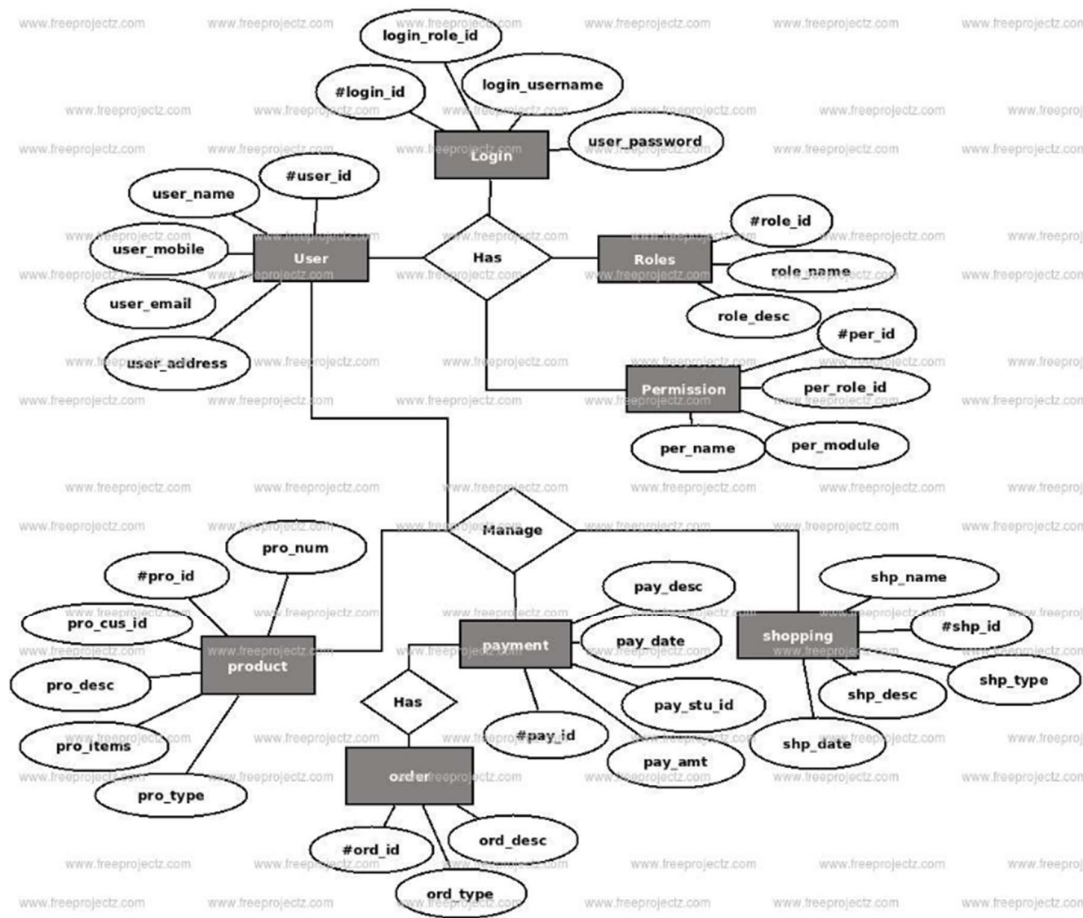


Fig 3.7.1.2: E-R diagram

3.7.2 Activity Diagram

- Activity diagram is basically a flowchart to represent the flow from one activity to another activity.
- The activity can be described as an operation of the system.
- The control flow is drawn from one operation to another.
- This flow can be sequential, branched, or concurrent.
- Activity diagrams deal with all type of flow control by using different elements such as fork, join, etc.
- Activity diagram is used to show message flow from one activity to another.

- **ACTIVITY DIAGRAM FOR USER:**

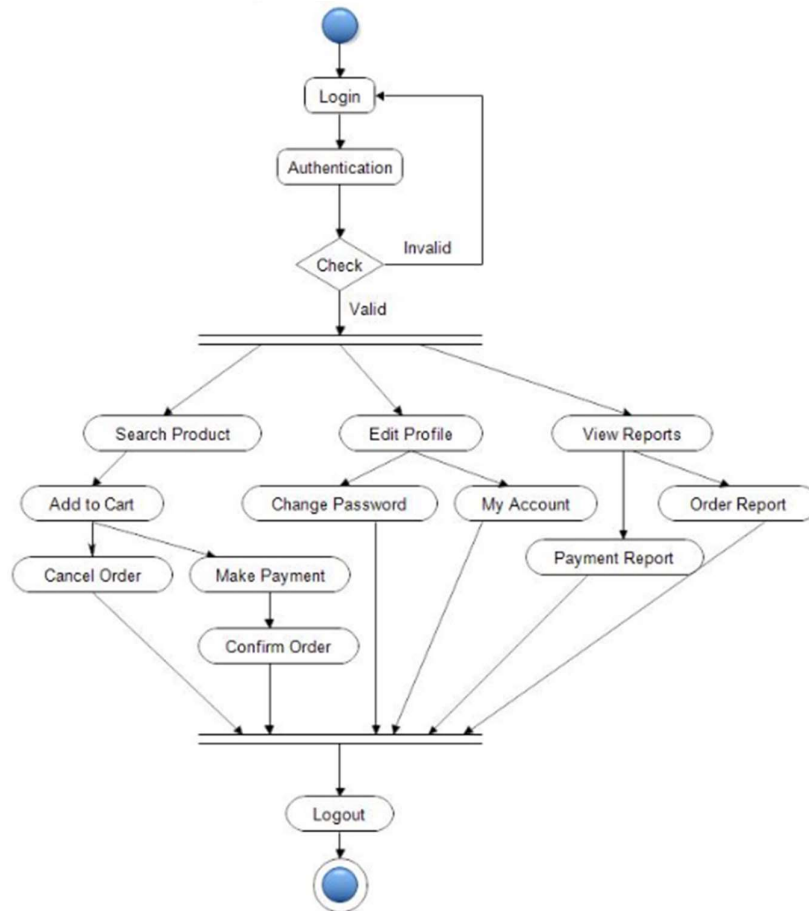


Fig 3.7.2.1: Activity diagram of User

- **ACTIVITY DIAGRAM FOR ADMIN:**

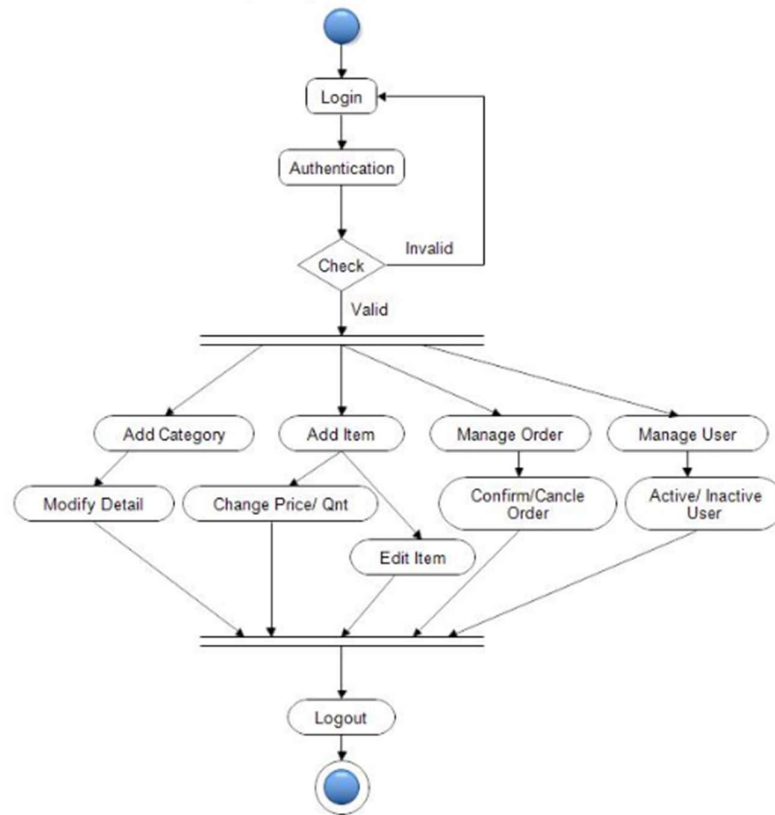


Fig 3.7.2.2: Activity diagram of Admin

3.8 Functional and Behavioral modelling

Diagram is a graphical representation of the flow of data through an information system. It differs from the system flowchart as it shows the flowchart as it shows the flow of data through processes instead of hardware.

- A data flow diagram is logical model of the system and shows the flow of the data and the flow of logic so this all thing describe s what takes place in a proposed system, not how the activities are accomplished.
- DFD consist of a series of symbols joined together by a line. There may be a single DFD for the entire system or it may be exploded into various levels.
- Types of DFD's:
 - Context Level Diagram
 - First Level DFD A Data Flow
 - Second Level DFD

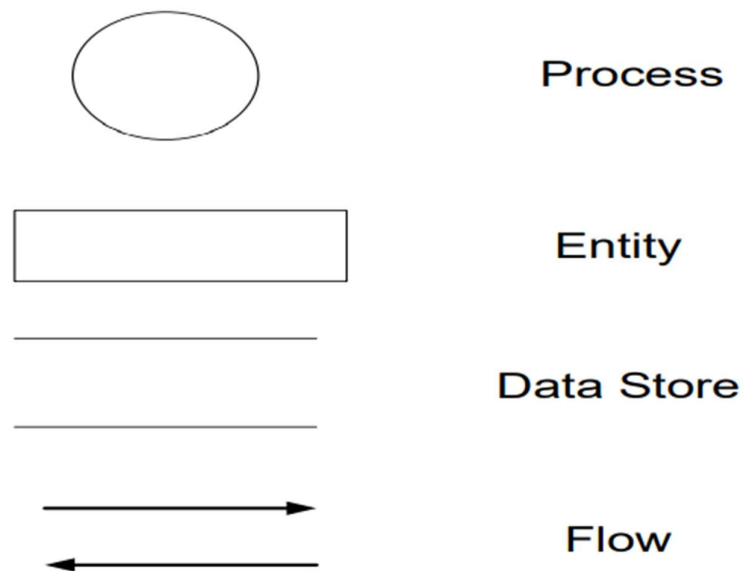


Fig 3.8.1: Symbols used for DFD

3.8.1 DFD Level 0

- **DFD LEVEL-0:**

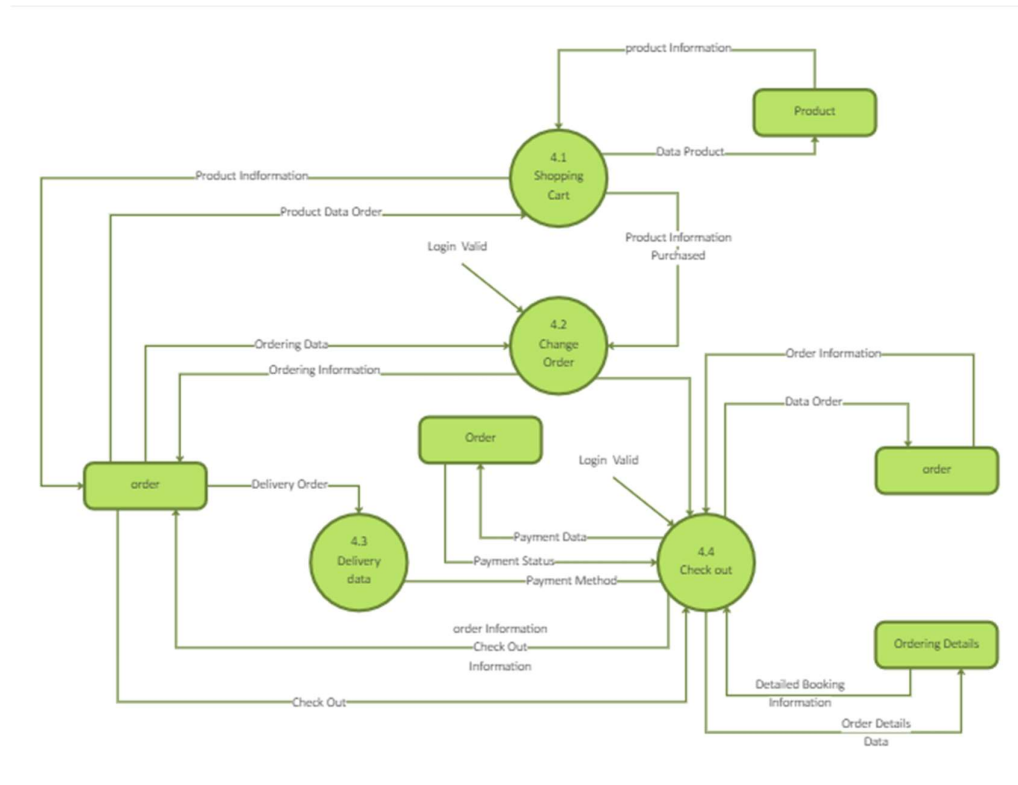


Fig 3.8.1.1: Data Flow Diagram 0 Level

3.9 Functions of System

3.9.1 Use Case Diagram

Use case diagrams are used to gather the requirements of a system including internal and external influences.

- These requirements are mostly design requirements
- So when a system is analyzed to gather its functionalities use cases are prepared and actors are identified.
- The use case model captures the requirements of a system.
- Use cases are a means of communicating with users and other stakeholders what the system is intended to do.

- **Symbols used for Use case:**

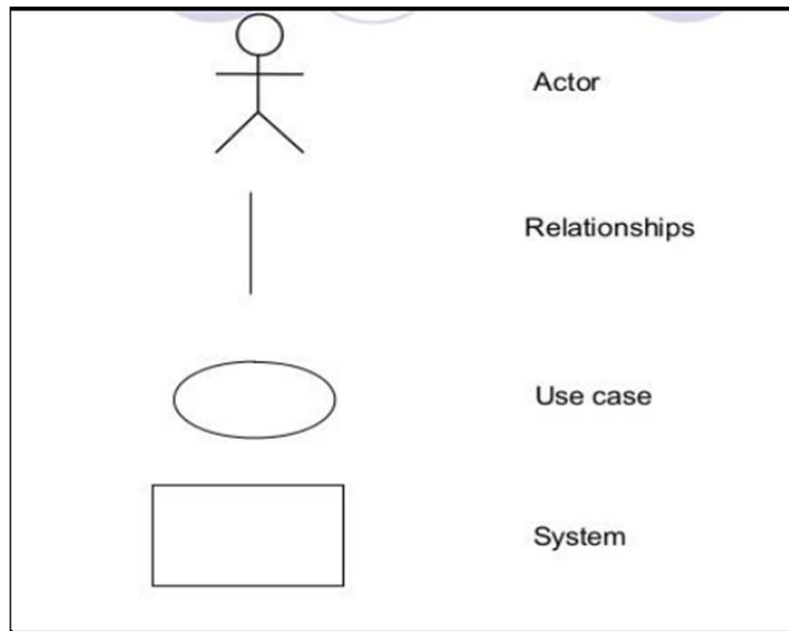


Fig 3.9.1.1: Symbols used for use case

- **Use case Diagram:**

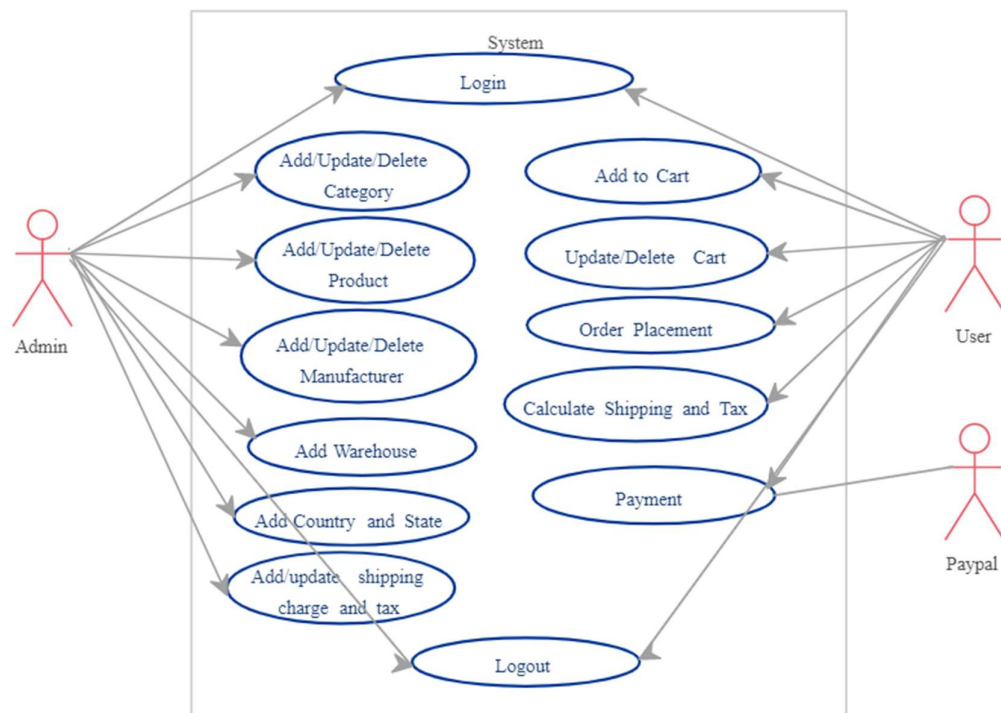


Fig 3.9.1.2: Use Case Diagram

Chapter:4

TECHNICAL

IMPLEMENTATION

Technical Implementation

4.1 Functional Requirements

The functional requirements for this application that are necessary to complete this project are as follows:

- Application must start when client clicks on app icon
- Application must show the home page of the application first
- Application must provide the selected category's content list for the client
- Client must be able to view the products
- Client must be able to view the products image
- Application must provide the selected product's description for the client
- Client must be able to add the product to the cart
- Application should add the product to the customer's shopping cart.
- Application must provide the customer's information form for the client.
- Client must send the provided credentials to the application.

4.2 Non-Functional Requirements

The non-functional requirements for this application that are necessary to complete this project are as follows:

- Application should have an interface to display products to the customer.
- Application should have an interface to display list of categories
- Application should be able to display list of categories, so customers easily click on them
- Application should be able to display a product's description
- Application should have an interface for the customer to add a product to the shopping cart.

- **Planning**

The initial stage in our project's technological execution is to plan what we want to build that will benefit our society.

We've attempted to question everything that may be touched by the program up to this point:

- Will the development take place in stages or all at once?
- How much time will it take?
- Will there be new security challenges?

Finally, we want to create an ecommerce software that allows users to purchase items without having to go to an actual store or shop. This is an excellent concept for easing

the difficulties faced by many folks who are unable to go to the market to purchase goods. An entire store is there at their fingertips; all they have to do is scroll and choose the things that best suit their needs.

- **Configuration and Customization**

It's now time to install the programmer and begin configuring the functionalities that may be used right away. In fact, this step should always come first before developing any procedures or rushing to customize any module.

- The first step is to install and configure flutter. After that, we'll install it by following the instructions on the official flutter website.
- The second step is to install and configure Visual Studio, after which we will install the flutter and dart plugins to use flutter in Visual Studio.
- We built up an emulator in Android Studio to run and test our app in this phase.
- The fourth step is to create a home screen. Then we used dart language to create the home screen.
- We developed items and their product detail pages after designing the home screen. Similarly, we have created each design component separately.
- To pick numerous things at once, we have provided add to cart capability to our app. The add to cart feature also allows you to buy numerous items at once.
- We've introduced a login and registration form, and users must first register and login before placing an order. This was accomplished using firebase and flutter

- **Flutter Firebase working**

When a client (iOS or Android) requests a firebase API, the client sends its query to the firebase database, which then responds to the firebase API and the client (IOS or Android).

In Flutter, this is a lib folder where we can handle all our app's screens. This folder also contains the functioning section. This folder is responsible for 90% of our app development.

- Pubspec.yaml manages all our library files. This is a very private section of our software. It is also space constrained.
- Two responsible libraries for firebase integration are
 1. firebase_core: ^1.16.0
 2. firebase_auth: ^3.3.17 19
- Flutter asset folder, where we keep track of all the assets for our flutter app. Images, static data, videos, and other assets
- The IOS folder is responsible for all IOS development operations. Flutter is a hybrid technology, which means it can manage several platforms.
- It manages all the tasks required for Android development, same as IOS

4.3 GUI (Graphical User Interface)

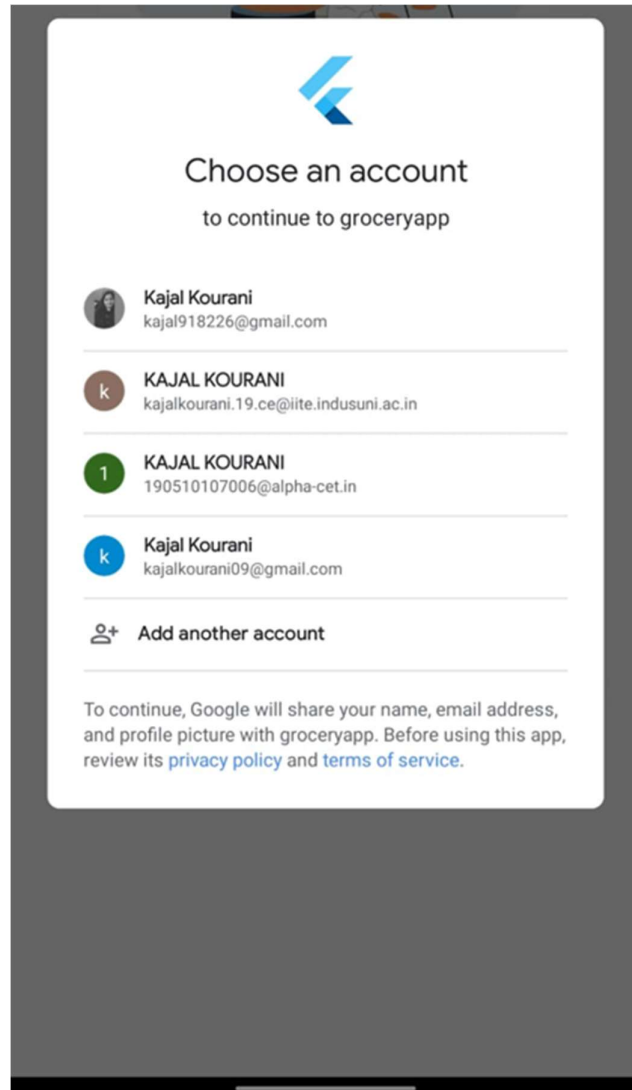
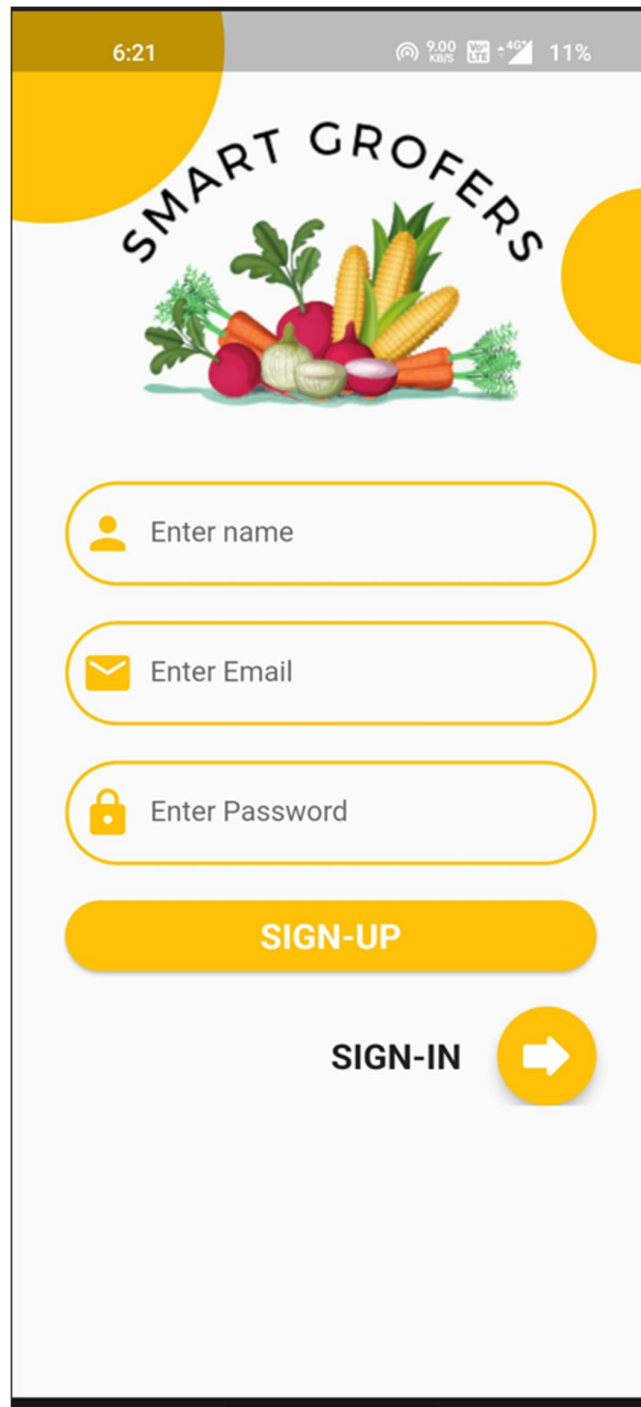


Figure 4.1: Customer login and splash screen from Google



The image shows a mobile application interface for 'SMART GROFERS'. At the top, there is a status bar with the time 6:21, signal strength, 9.00 KBPS, 4G+ network, and 11% battery. Below the status bar, the app's logo 'SMART GROFERS' is displayed in a curved banner above a basket of fresh vegetables including corn, carrots, and leafy greens. The registration form consists of three input fields, each with a yellow icon on the left: a person icon for 'Enter name', an envelope icon for 'Enter Email', and a padlock icon for 'Enter Password'. Below these fields is a large yellow button labeled 'SIGN-UP'. At the bottom, there is a 'SIGN-IN' text label next to a yellow circular button containing a white right-pointing arrow.

Figure 4.2: Register Screen

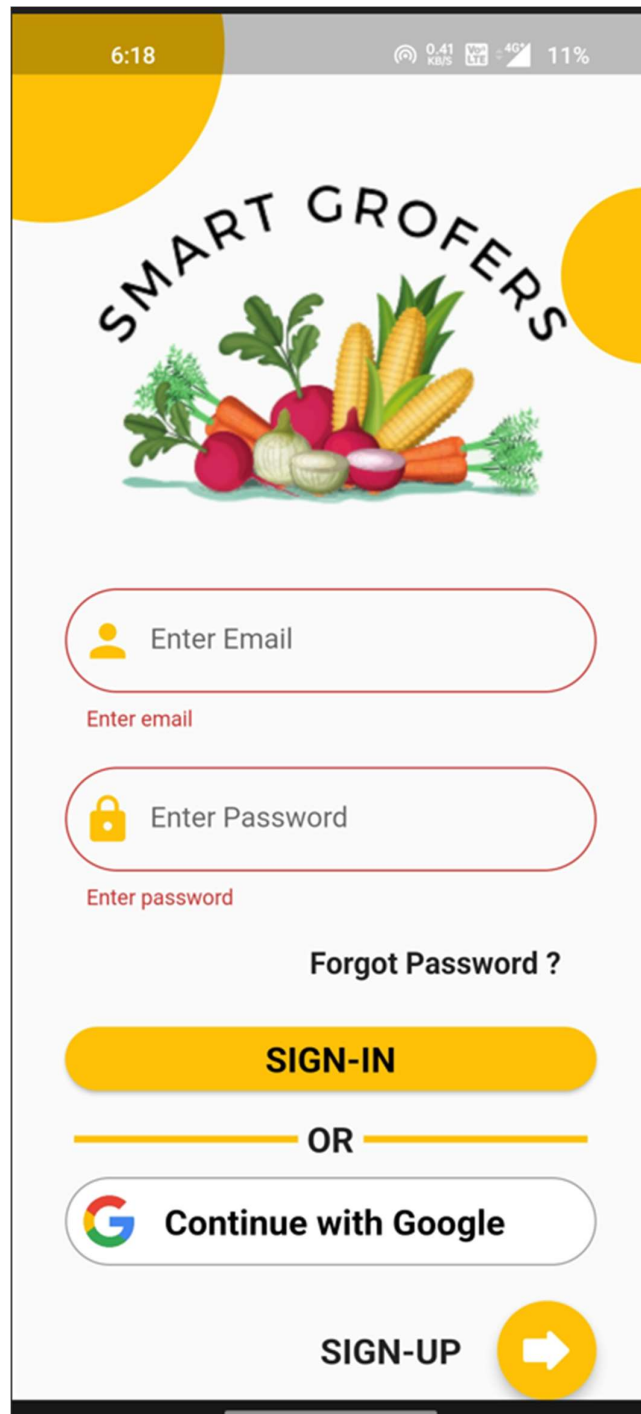


Figure 4.3: Login Screen

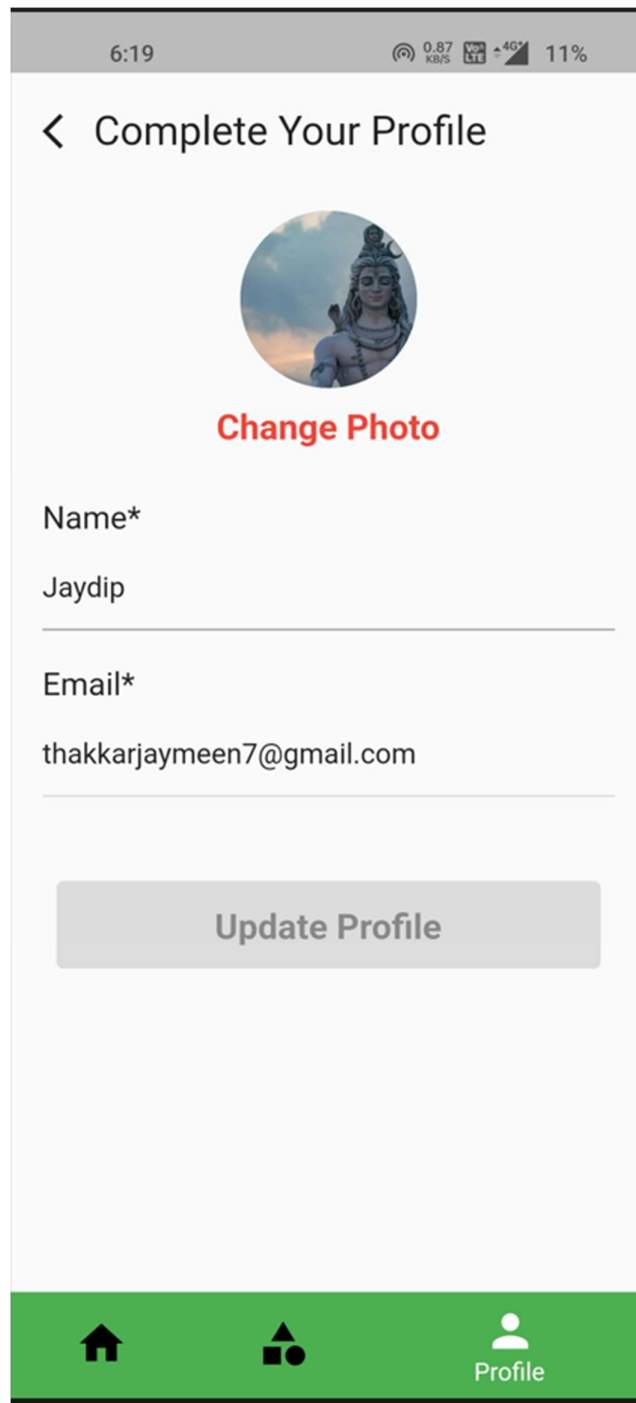


Figure 4.4: Profile Screen

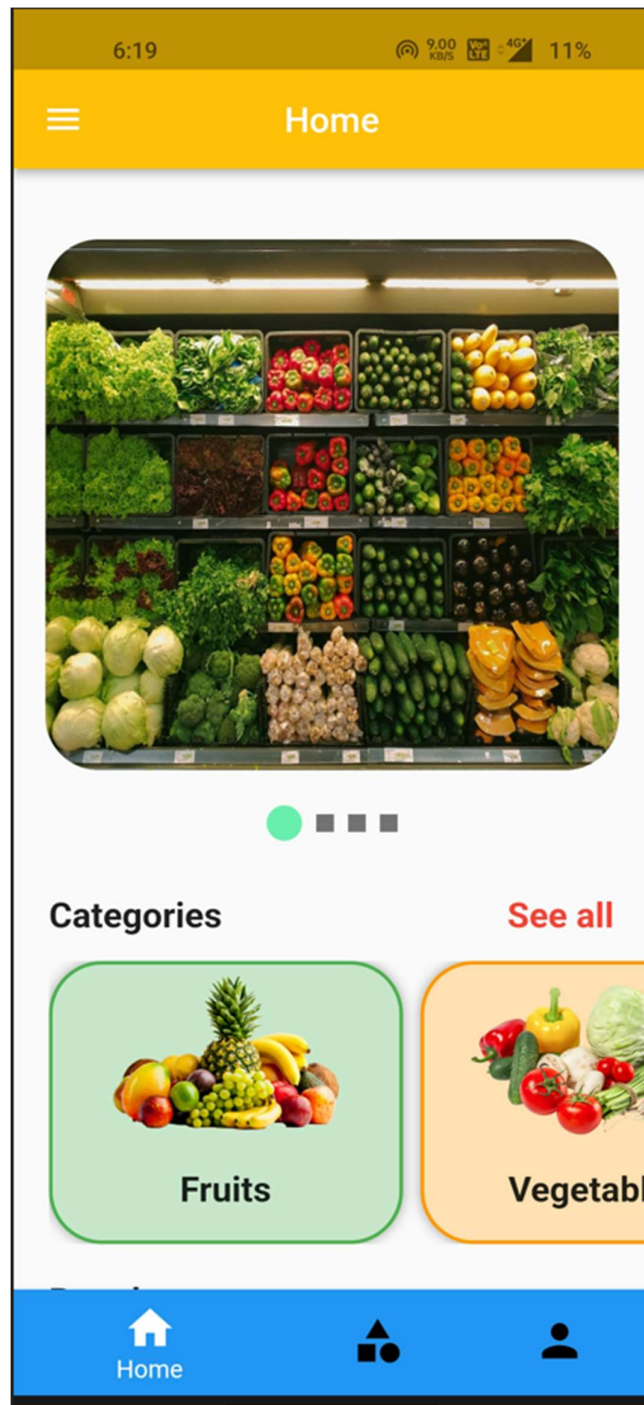


Figure 4.5: Home Screen



Figure 4.6: Category Screen

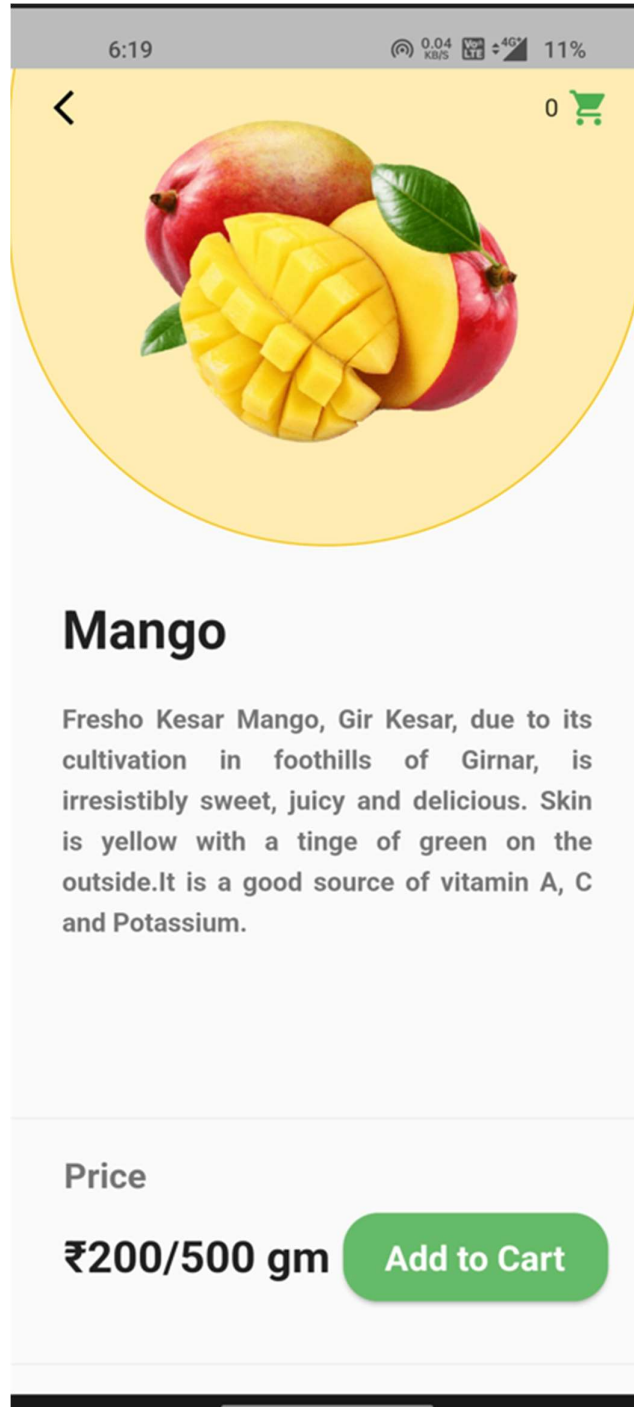


Figure 4.7: Specific Item Screen

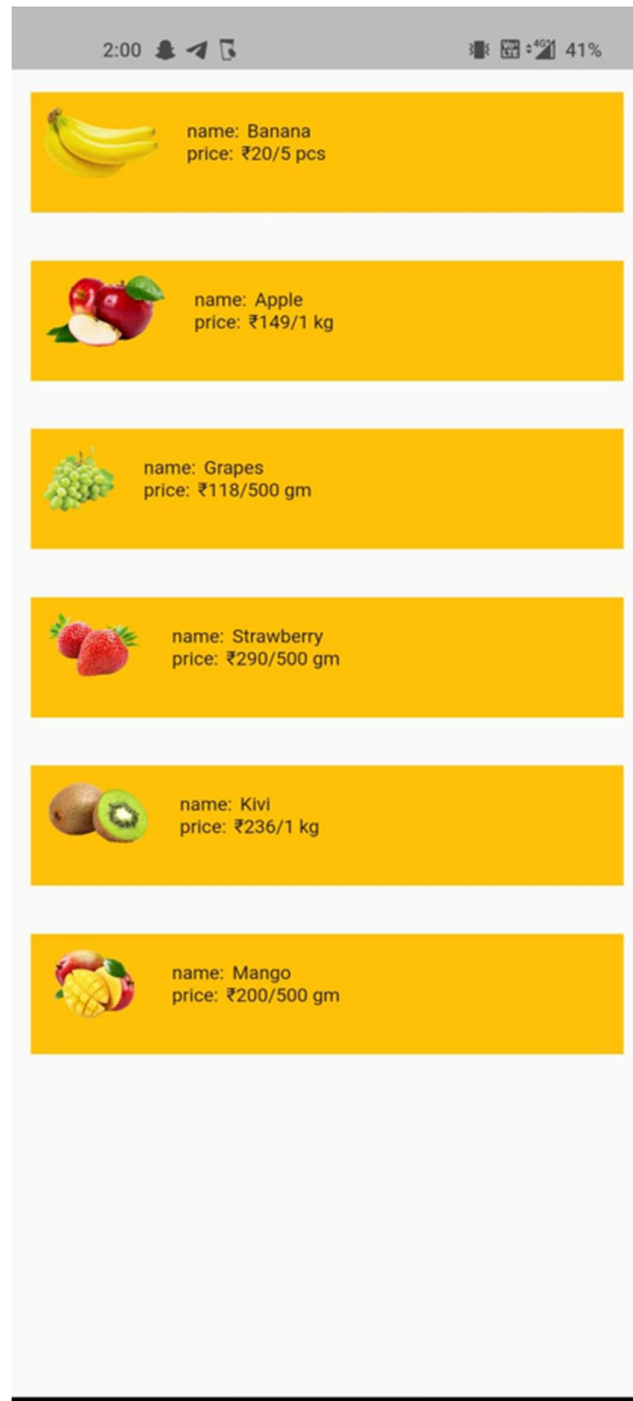


Figure 4.8: Cart Screen

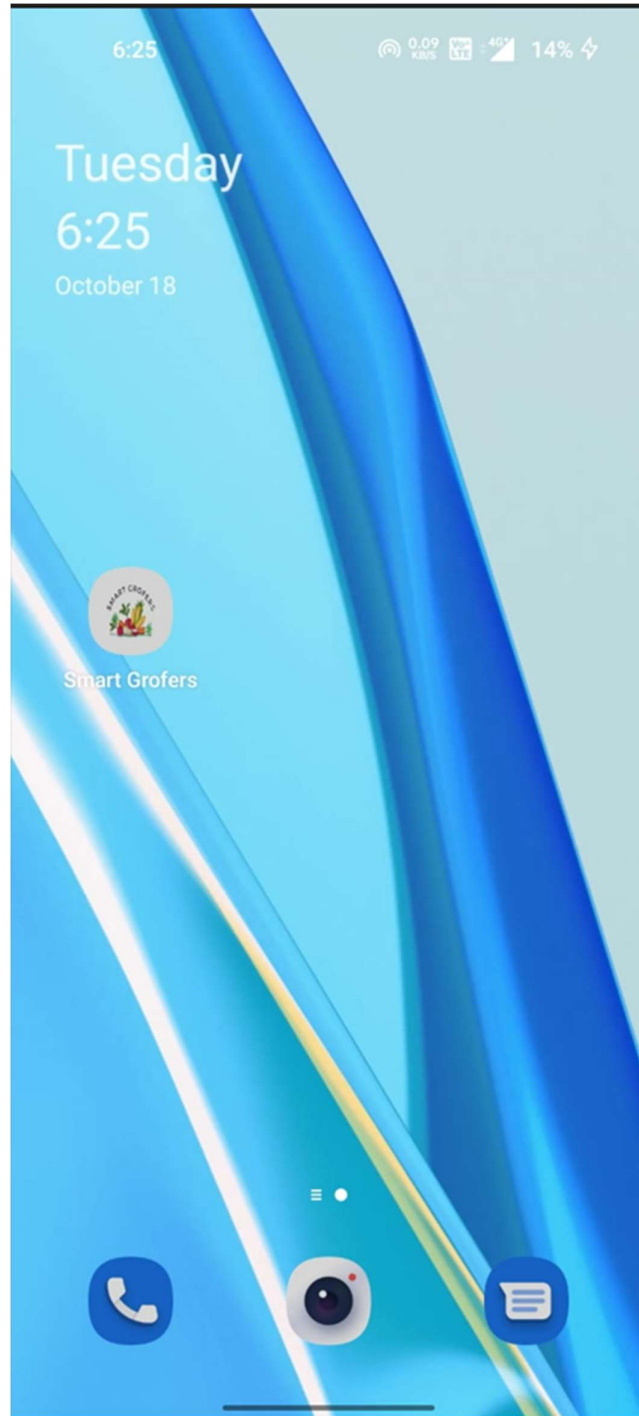


Figure 4.9: App Icon

CONCLUSION

Online purchasing has grown increasingly popular in recent years. People all over the world prefer to purchase online rather than go to the store, which is why Amazon and other similar online stores are not only profitable but also generating interest in online business. Many new strategies and technologies have been created in e-commerce apps to offer users with information. Online commerce is experiencing considerable development all around the world. We've provided answers, but they'll need some time and resources. This App will provide users with modules to help them with their task. The player's major goal in building the app was to prioritize quality above quantity. As previously indicated, more modules and functionality will be introduced soon to make the program more solid and adaptable. The primary goal and aim of this program are to enable and assist people in using an e-commerce-based platform, which is widely utilized throughout the world for online shopping and purchase of commodities and products nowadays. As a result, individuals may enjoy, conveniently access, and purchase all things through internet shopping and feel fully integrated into society. Our effort will not end here; we will continue to improve the software and provide new features for those who are unable to perceive the world from any angle (completely blind people). We'll aim to include a feature that makes this app totally accessible to blind people; they'll be able to control it with their voice and dress themselves according to their preferences. We'll be adding additional features as time goes on.

Future Work:

- In future, we will try to implement all the concepts through application.
- The future scope of this project would be an addition feature of Direct interaction with Product Company and all the CONCESSION and FREE extra product will be direct get to the Customers where in the real time conversation would be enabled.
- Add Video conferencing through directly customer support and product reviewers.

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