stoARe

System Requirement Specification

University of Windsor

Document Title
System Requirement Specification

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1.INTRODUCTION

1.1 Purpose

Our project target is to develop an application named **StoARe** that emphasizes providing local retailers with a cost-effective, high-revenue-generating platform. The document incorporates a project overview, as well as market analysis and functional and non-functional requirements. The proposal would comprehend the complete cost structure as well as a development plan.

1.2 Project Overview

The pandemic has left the entire highly competitive global industry in shambles, especially the small retail businesses. Due to the uncertain operations and hassling lockdowns, the businesses have registered reduced revenues, increased inflation, shrinked margins, depleted cash flows, noted downfall in profits and reported severe losses too. In order to cover up the losses and resume normalcy, the business has taken severe decisions to reduce their costs of operations by reducing their human resources but that still doesn't guarantee to generate more revenues.

Considering the situations and problems of these struggling retail entrepreneurs, we have come up with a strong and optimum solution. So, our team is planning to build a smart system that would allow them to boost their sales with lesser human resources and increase their reach in the market. Our application would mainly attribute to two different features

1. Walk-in
2. Online Shopping.

Integrating and developing the application by using multiple platforms, it would use an AR Camera to fetch the details of a particular product in real-time and provide hassle-free shopping experiences to the customers. **StoARe** will collaborate with shops such as toy stores. The process of using the app is listed below:

1. The user would need to select a shop they are looking for from the shop list which would only display the list of shops we would collaborate with.

2. On selecting the shop user will get four different options like Walk-in, Online, Help and business info.

3. Whenever a customer raises a query, he/she needs to press the help button. So, the sales team would receive an instant notification or an email on their mobiles, so the employee can reach the destination in minimal seconds to assist their customers.

4. The Info button will display the information about the rating, address and other information about the shop.

The Walk-in feature will start the AR camera and the user needs to place a camera against the object and that would show all details of that particular product.

Elaborating, the second feature would be reserved for online shopping. That module would show the list of collaborated shops and a list of products offered by them with its details. The product detail page would provide 3 buttons namely ‘Buy Now', ‘AR View’, where the product would be displayed on the floor in real-time with an integrated buying option featuring a stripe and the ‘More Details’ button.

1.3 Project Scope

We selected the scrum model as a software life cycle.The time constraint are 8 weeks and four milestones each of almost 2 weeks. Our goal is to deliver the product without the bugs and satisfy the customer fully. After every milestone we will fix the meeting with the customer and give updates of our work, making sure all customer needs are satisfied.

2. USER ANALYSIS:

2.1 User Personas:

The target users of this application contain two different classifications of 'External Users' and 'Internal Users'.
External Users(users of mobile applications which purchase the products through store or online platforms):

- Citizens
- Tourists
- Students
- Disabled or old age people

Internal Users

- All shop owners
- Sales employees in the shop
- The administrator who is responsible for database management and maintenance.

The following diagram refers to different users based on the demographic users, Internal Users and target age group.

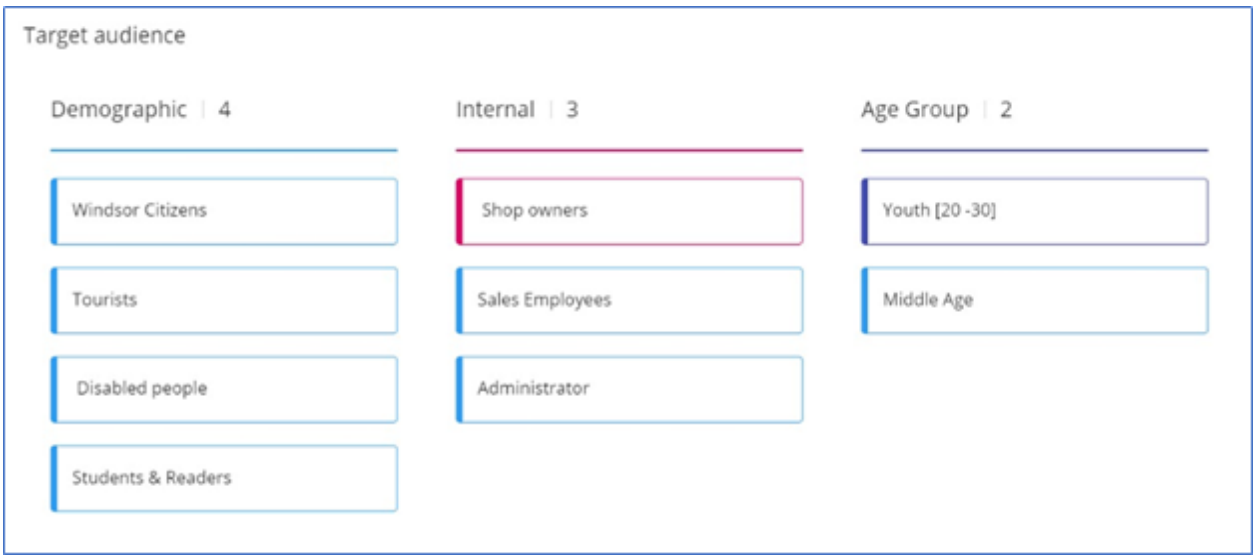


Fig 2.1 Division of Target Users into sub-categories

2.1.1 User Persona 1:

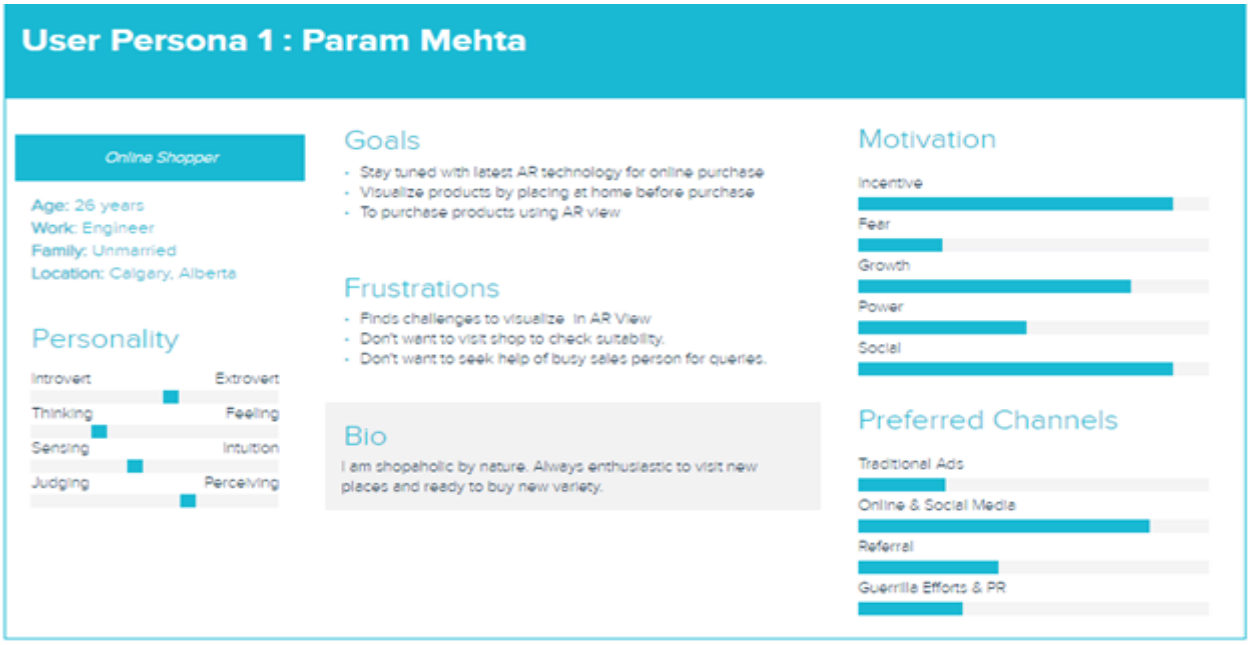


Fig 2.1.1 User Persona 1 for customer

2.1.2 User Persona 2:

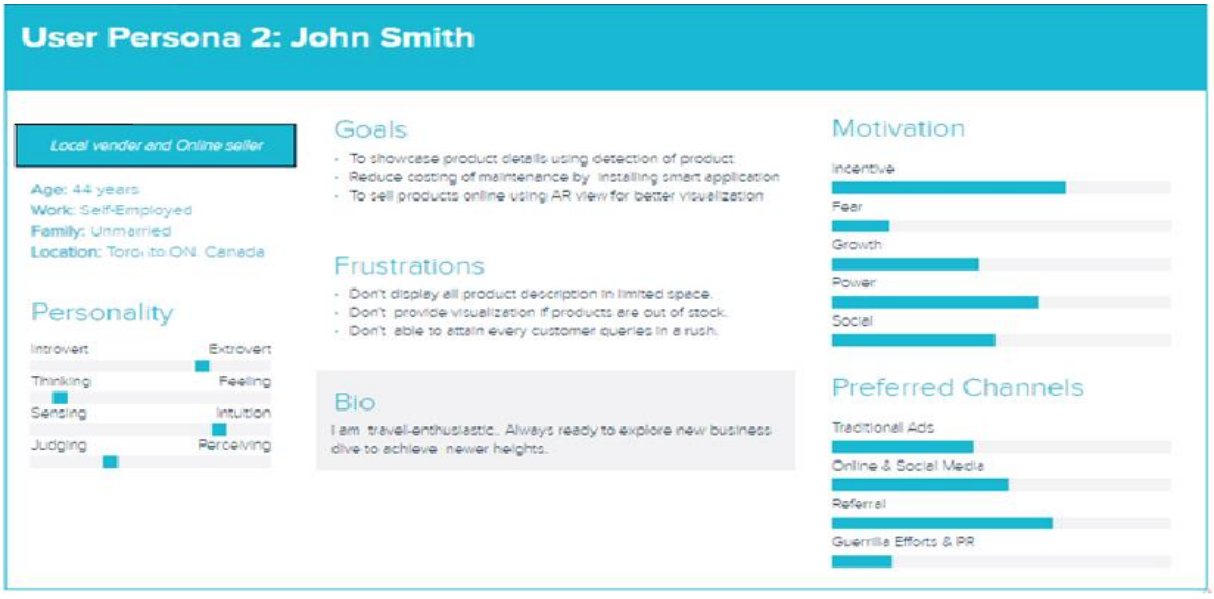


Fig 2.1.2 User Persona 2 for shop owner

2.2 User Stories:

1. As a User,
   - I am facing the issue of lack of information in the store.
   - So, I need an application that provides detailed information without asking the salesperson about the product when I visit the store.

2. As a User,
   - Sometimes, I am not able to judge the product on the online e-commerce platform. For example, Sofa, chair, toys.
   - So, I need a feature to visualise a product when I purchase on the e-commerce platform.

3. As a product owner,
   - The sales staff is inactive in the off-season, and I have to pay them regularly for the season store.
   - I want to reduce sales staff for decreasing maintenance cost so I can press the help button in this mobile application which can send notification through email to resolve customer queries.

4. As a Shop owner,
   - I am facing the issue of showcasing every product detail in a limited place.
   - So, I am looking for a platform where an AR Camera can detect the product as an object to display detailed product information.

3.FUNCTIONAL REQUIREMENTS (APPLICATION FEATURE):

Functionality	Description
User registration	New users can register themselves through their valid email-Id.
Authentication	User authentication for secured payment will be done through the login feature of our application.
Skip option	Users can quickly access all the functionalities of the product except product payment without login.
Listing of local shops	A list of authenticated local shops will be available. Additionally, users can make a choice from a variety of local shops.l
Online shopping	In this option, the user can see the AR view products on the target plane as well as can purchase the product through.
Shop details (Info Button)	Customers can check the shop details (address and rating).
Help Button	Using this feature, customers can email to customer executives for queries.
Product listing	Based on the shop section users can see the list of available products.
Product detail	Authenticated Product details (price, rating,) will be available on the application.
Product Purchasing	Through the secure medium, they can purchase the products online.
Product detection in AR cameras	AR view of product information for walk-in features.

Table 3 Functional Requirements

3.1 Use Case Diagram

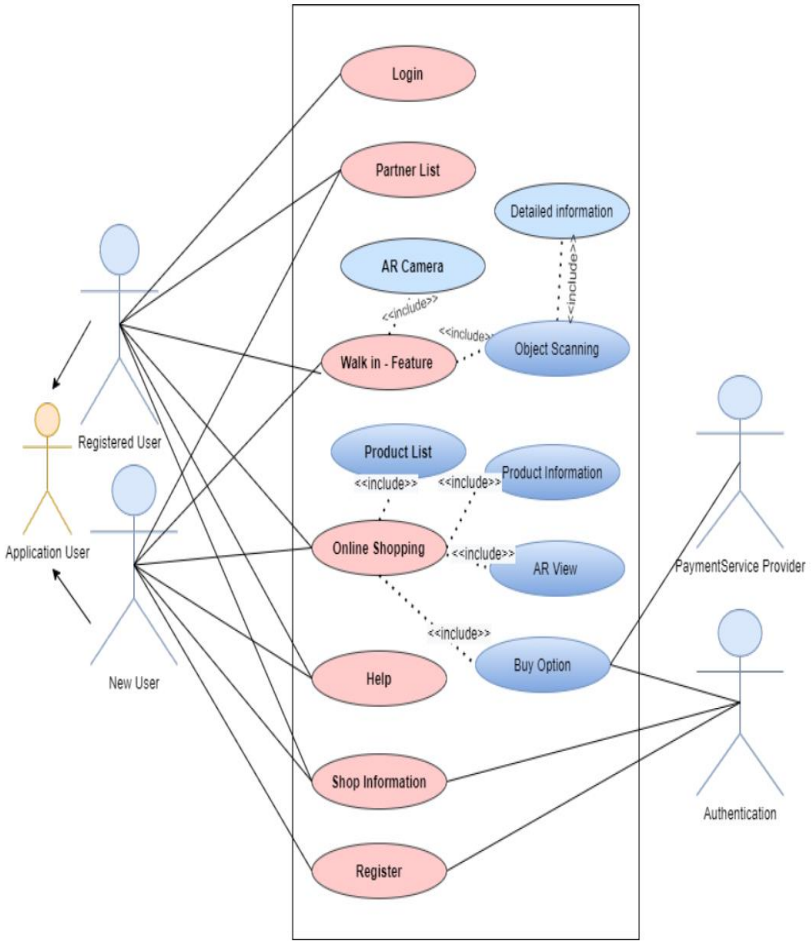


Fig 3.1 Use Case Diagram

3.1 Flow Chart Diagram

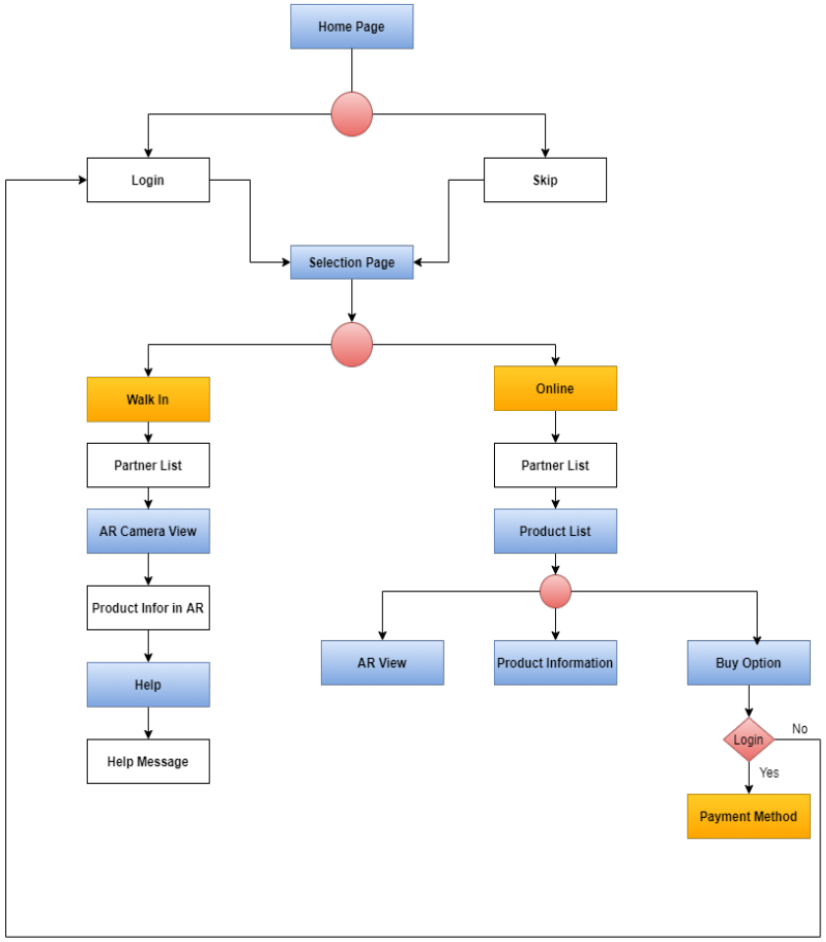


Fig 3.2 Flow-Chart Diagram

4.NON-FUNCTIONAL REQUIREMENTS(APPLICATION PROPERTIES) FOCUSES ON USER EXPECTATIONS.

4.1 Security

- We will follow the standards of the CIA to maintain the integrity of users.
- Database security protecting databases from SQL Injection and other database attacks.
- Secure purchase, all the external API calls are SSL encrypted.
- User authentication while purchasing.
- Authenticate shops (and shop info), products (and product info).

4.2 Performance

- Performance depends on the Code quality, Code length, graphics and database calling integration.
- In this project, we will use MYSQL for the database as well as minimise the graphics to give the best experience to users.
- In the testing phase, code quality will be checked for overall performance.

4.3 Compatibility

- Responsive UI for all sizes of mobile devices.
- Applications support after Android 7.0 version that launched in 2016.
- User engagement through various features and AR experience.

4.4 Accessibility

- Clean and understandable User Interface: convenient for beginners and novice users.
- Remote accessibility of shopping.

Feature division based on priority.

High priority	Walk-in feature(Shop listing, Help option, product detection and AR view of product))
Medium priority	Online shopping (Product listing, product info, AR view of product)
Low priority	Login and authentication, secured purchase option.

5. TECHNICAL CONSTRAINTS

5.1. Operating System: Android

- Minimum Supported Version: Android 7.0

AR supports the minimum versions of android from 4.4 and higher, however, additional packages of AR Foundation, AR Core and AR kit are supported in version 7.0 or later. In this application, we will use both the above-mentioned packages. Thus, the minimum requirement to use this application is a device having Android 7.0 or above.
Reference - https://developers.google.com/ar/devices

5.2 Front-end Technology: C#, Unity

- We will use Unity and C# in the initial stage for creating a frontend design as mentioned in the prototype.
- Unity Provides an inbuilt feature like a UI to create an attractive UI
- For creating 3D models, we will use third-party software.

5.3 Database: MYSQL and Server

- MySql is a relational database.
- We will fire SQL queries to retrieve the data from the Database.
- We will store our 3d models on our server.

5.4 Platforms for AR Development: Unity, AR Foundation.

- Unity is the platform that supports various packages for Augmented Reality such as **AR Foundation, AR Kit, AR Core and Vuforia**.
- To integrate various API and to ease the development process we will use Unity.
- Unity is cross-platform which supports different SDK for different operating systems directly.

5.5 Project Management tools: GitHub, JIRA

- To control the version during the development time and to review the code of other team members, we will use GitHub.
- JIRA is a project management software that supports various software development methodologies and customised methodology to follow the steps during the development.
- To follow our software development methodology as well as to distribute tasks through Tickets, we will use JIRA as a project management tool.
- To increase the productivity or analyse the productivity of all iterations we will use JIRA.

6. TARGET USERS

Our application primarily targets those customers who are looking to buy their specific products from the local shops in the city. As a target audience, we cover a variety of customers like visitors from worldwide, students from abroad countries and local citizens.

Our application will be helpful to local shop owners, which will attract more customers by providing an AR platform, a totally new and immersed experience for shopping. Irrespective of age, gender, education, occupation and religion anyone can use our application.

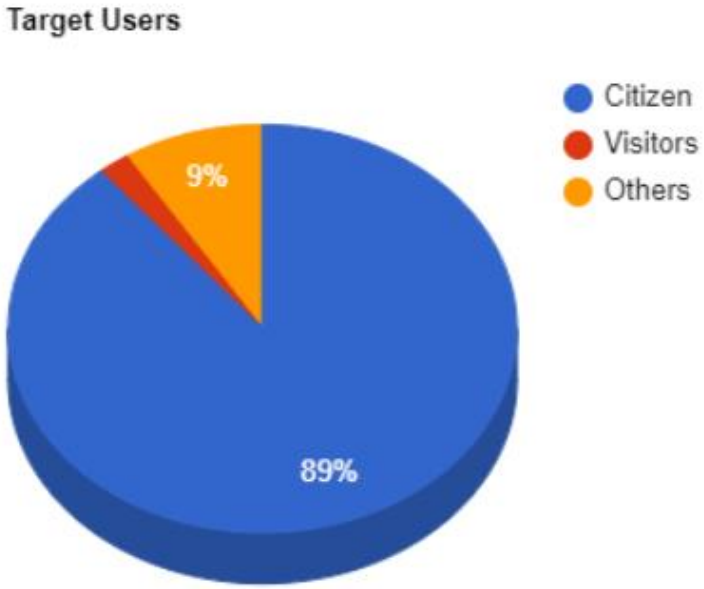


Fig 6.1 Target User

(The above Chart is based on the information provided on the internet till 2017 for Windsor City.)

7. MARKET ANALYSIS

Based on our market research, 62% of local shops did not have an online platform to enhance their business with growing technology. Therefore, our application can help local shops to grow their business on an online platform using AR. Thriving companies such as Uber-eats, DoorDash and Airbnb have collaborated with local restaurants and local house owners. Additionally, these gigantic companies as well as local collaborating business partners gain remarkable profit. Similarly, our aim is to provide a unique platform where local resellers can flourish their business by collaborating with our application which uses AR technology for a better shopping experience. Especially in Canada, we are not able to find such a platform.Below is the graph, which elaborates the different sectors of shopping where AR is implemented.

Based on a graph it is crystal clear that a sector such as shoes, beauty, jewellery as well as toys are having less than 40% of the AR market. [2][3]

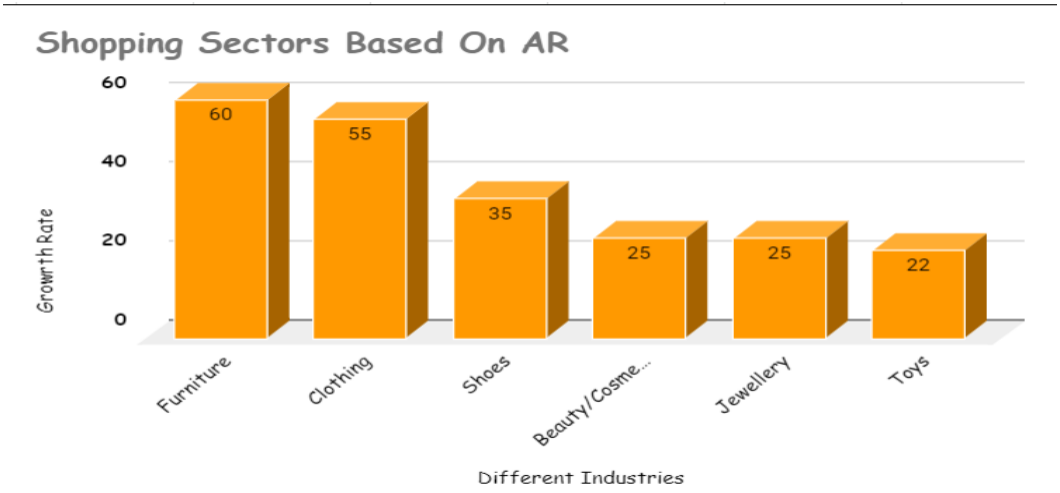


Table 7.1 Market Analysis

8. COST ANALYSIS

Various professionals are needed in our project. Based on the roles, below are the salaries of each role.

Full Stack Developer: Estimated Salary $70,000/year.
1 Year = 52 Weeks : $70000/52 = 1346.15/week per person
1346.15/40 (working hours) = 33.65 per hour
6 Developers will work 3h for 8 weeks = $33.65* = **$33991.2 for 8 weeks**
1 member work for 3h for 6 days in a week = $33.65*18 = $605.7*8 = **$4845.6**
1 member work for 2 hours for 8 weeks = ($33.65*14)*8 = **$3768.8**

Scrum Master:
$87,500/52 weeks = $1682.69 per week
$1682.69/40 = $42.05
$42.05*7 (7 hours in a week) = $294.35
$294.35*8(8 weeks) = $2354.8

Total = $2354.8

Besides, we need other tools such as

- JIRA license for deployment and monitoring purposes.
- Unity enterprise: $2000/month.
- Godaddy : $5 - $6/month, $145 /year,
- Internet,electricity. - $150/month

Total Costing: $49,417.4

9. QUALITY ASSURANCE PLAN

9.1 Lifecycle :

We will be using Scrum Methodology for our Project Development. We can focus on Iterative Development, where requirements and solutions develop through coordination between different teams working on Project. The development lifecycle we follow is versatile enough throughout the development.

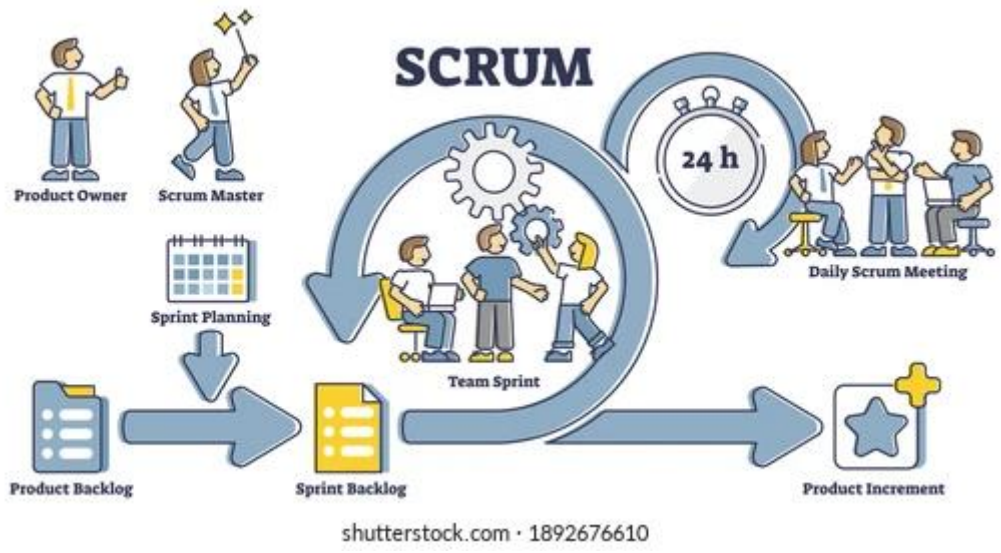


Fig 9.1 Scrum Diagram [1]

9.1.1 Scrum

- Scrum meetings will be conducted every day at 9.30 am for 30 mins where every team member has to mention the following
- Tasks finished yesterday
- Tasks he/she will be performing today
- Any blockers to finish the task

9.2 Procedures

9.2.1 Review

- Every pull request has to have at least two approvals from the team members before its being merged.
- Approval should be given after carefully reviewing the logic, coding standards and making sure there are no breaking changes.
- Reviewers should also make sure that comments are written properly for every method or functionality.

9.2.2 Testing

Testing is important because software bugs could be more expensive or even dangerous. We follow the following testing procedures so that each and every part of the line is tested thoroughly before its deployed into production.

- Unit testing
- Integration testing
- User acceptance testing

9.2.3 Communication

- All the communication between team members happens through Microsoft Teams or Outlook.
- Communication with customers happens by prior appointment.

9.2.4 Deployment

- CI/CD pipelines will be used to deploy the code into the production environments so that no manual work needs to be done.

9.3 Standards:

9.3.1 Coding standards.

Developers will follow coding standards depending upon the language used.

1. Python - https://www.python.org/dev/peps/pep-0008/
2. C#- https://docs.microsoft.com/en-us/dotnet/csharp/fundamentals/coding-style/coding-conventions
3. Mysql- https://dev.mysql.com/doc/dev/mysqlserver/latest/PAGE_NAMING_CONVENTIONS.html

9.4 Development and Roles

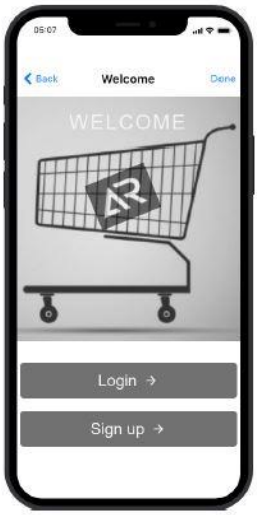
Code Repository: https://github.com/pavankalyankomarina/stoARe

Name	Tentative Roles
Atul Chand	Full Stack Developer
Manan Himanshu Patel	Full Stack Developer
Pavan Kalyan Komarina	Quality Assurance Engineer
Pranav HemanthKumar Bhatt	Full Stack Developer
Richa Jayeshkumar Thakkar	Full Stack Developer
Saumil Hiteshkumar Shah	Full Stack Developer
Shruti Vishal Khajanchi	Scrum Master, Full Stack Developer
Trisha Dineshbhai Rangrej	Full Stack Developer

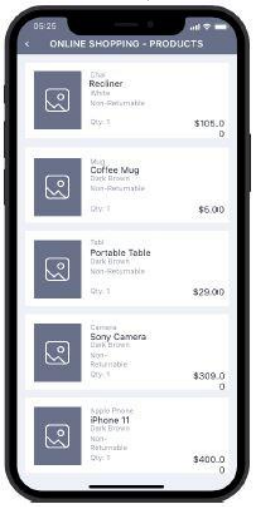
Table 9.1 Tentative Roles

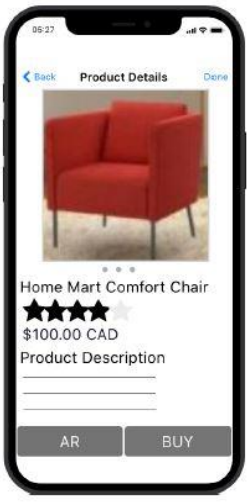
* **roles are not fixed and are subject to change based on the need.**

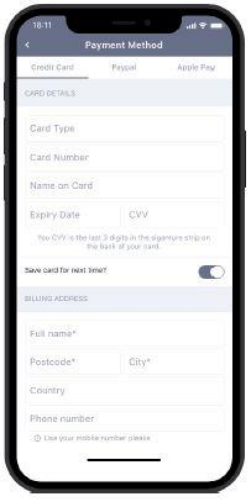
10. MOCKUPS/PROTO-TYPE



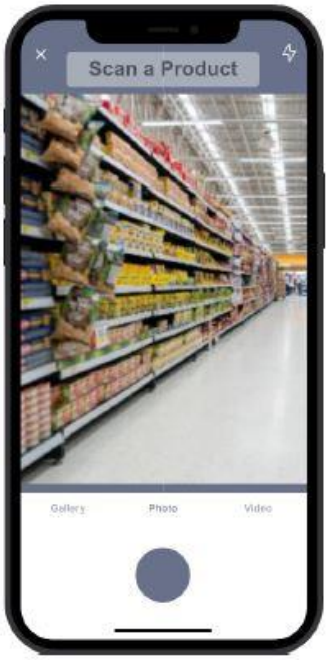
On selecting online option







On selecting Walk-In option :



11. PROVISIONAL PLANNING

Sprint 1:
Starting Date: May 31 2021
Ending Date: Jun 13 2021

We will implement the following functionalities in the 1st sprint that will be our first priority to set up the environment.

- Environment Setup (IDE, Packages)
- Basic UI
- Db connection/ design Listing shops/products Testing

Sprint 2:
Starting Date: Jun 21, 2021
Ending Date: July 5, 2021

We will implement the following functionalities in the 2nd sprint.

- Walk-in feature (Shop listing, HELP option, product detection and AR view of product)
- Fixing bugs
- Prepare Test-Cases and Testing

Sprint 3:
Starting Date: July 6, 2021
Ending Date: July 19,201
We will implement the following functionalities in the 3rd sprint.

- Augmented view of the product
- Fixing bugs
- Prepare Test-Cases and Testing

Sprint 4:
Starting Date: July 20, 2021
Ending Date: August 3, 2021

We will implement the following functionalities in the 4th sprint.

- Authentication
- Payment Integration
- Fixing bugs
- Prepare Test-Cases and Testing Payment Integration

12. DESIGN STRUCTURE

12.1 Architecture

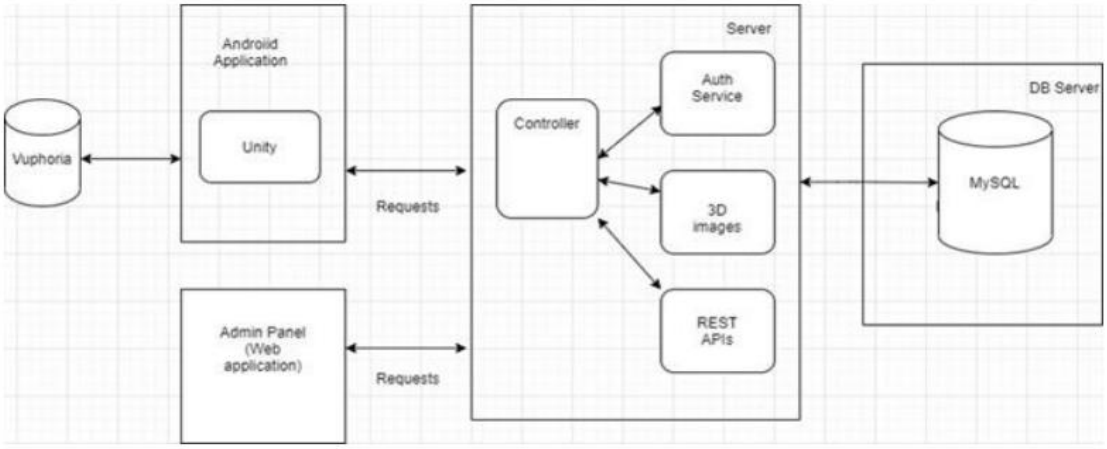


Fig 12.1 Client-Server Architecture

12.2 High-Level Design

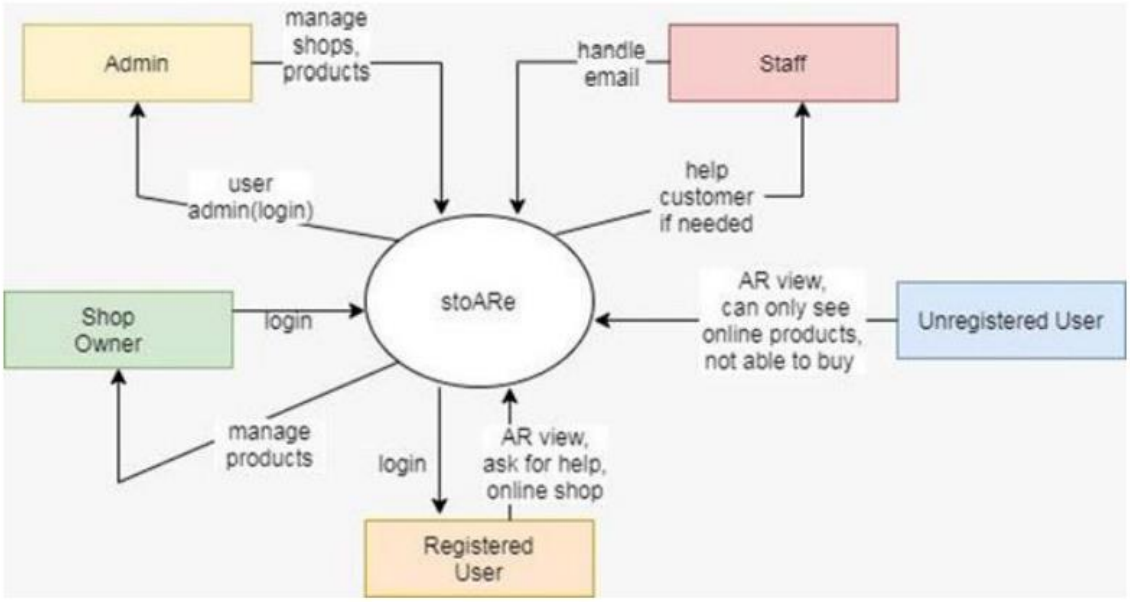


Fig 12.2 High-Level Design

12.3 Low-Level Design Document

12.3.1 Low-Level Design (Project)

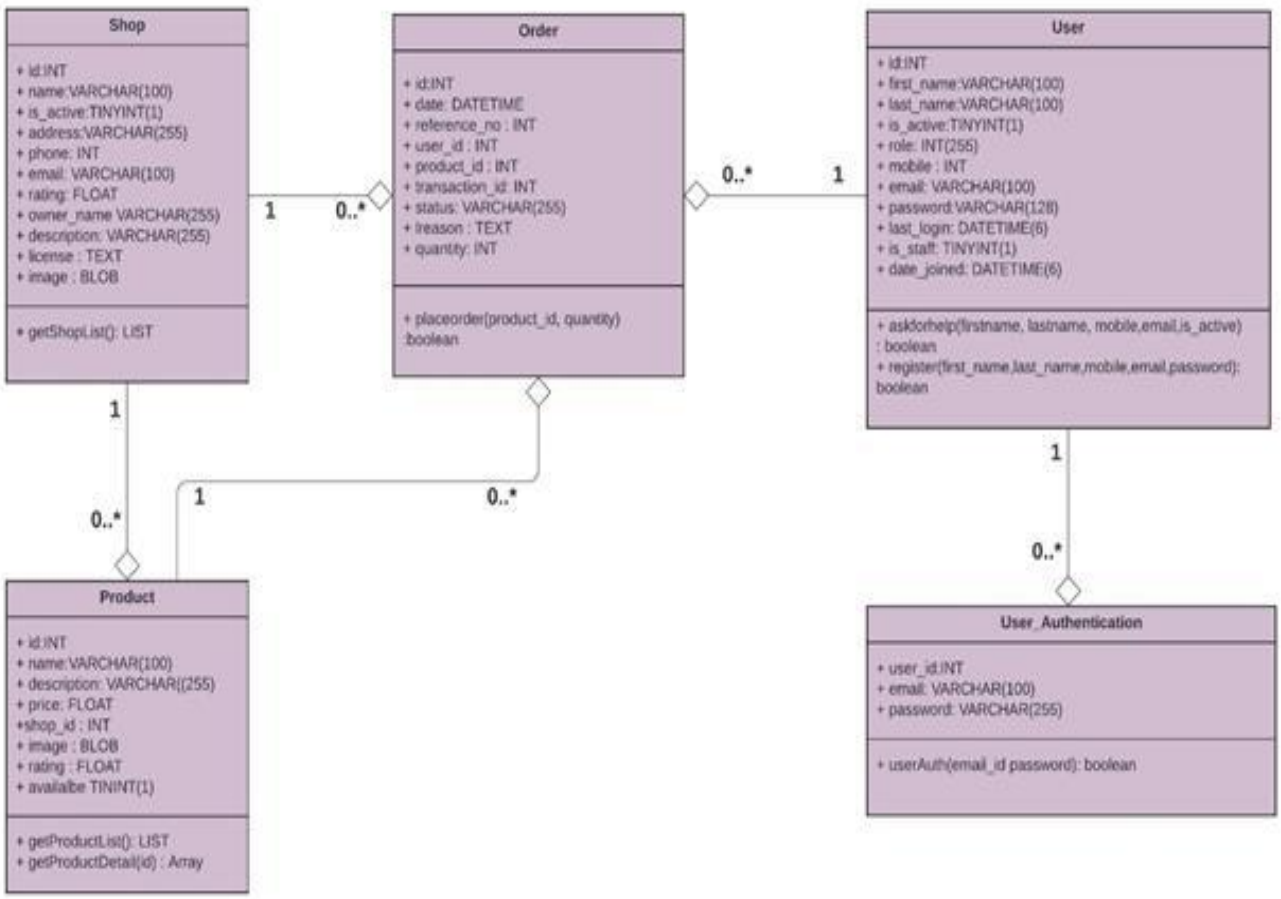


Fig 12.3.1 Low-Level Design (Project)

12.3.2 Low-Level Design (Admin)

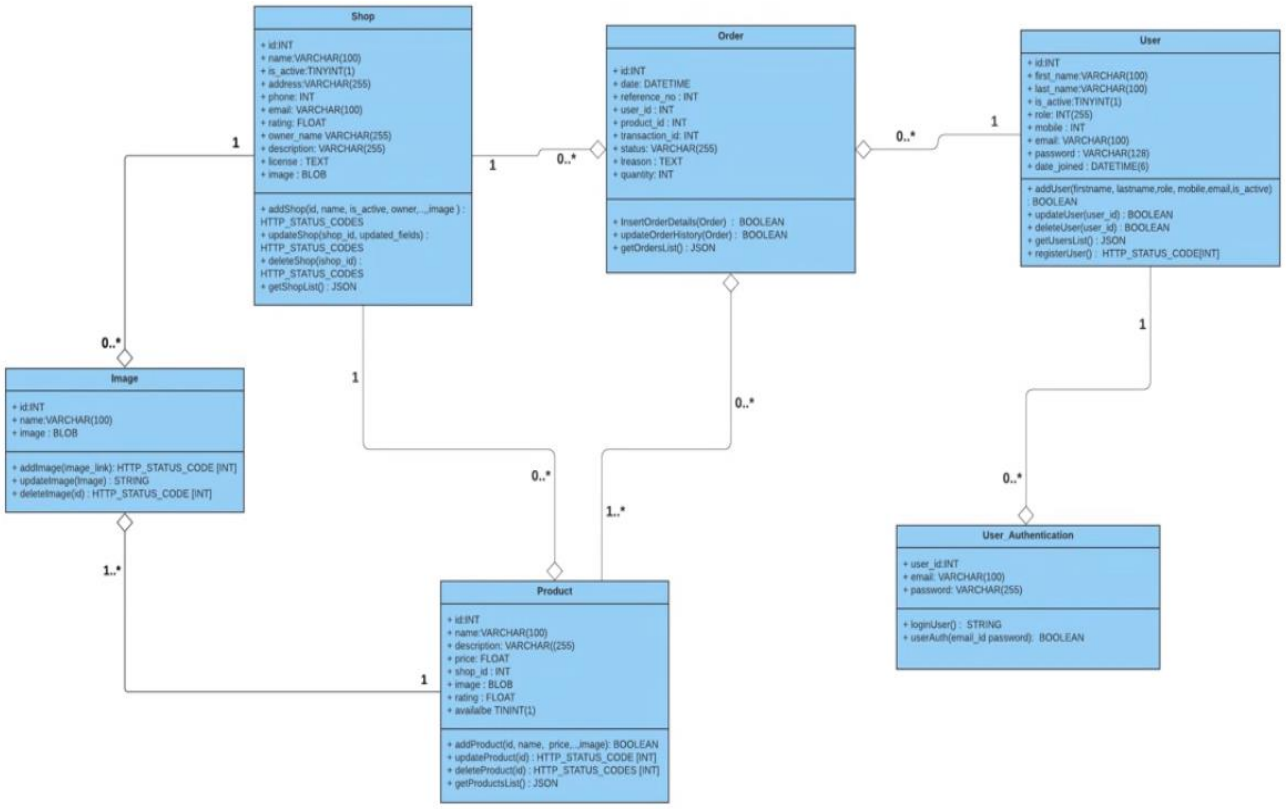


Fig 12.3.2 Low-Level Design (Admin)

13. REFERENCES AND CITATION

[1] VectorMine. (n.d.). *Scrum process diagram as educational and labeled agile software development scheme outline concept. Task sprint teamwork methodology explanation and project management work cycle vector illustration.* Scrum Process Diagram Educational Labeled Agile Stock Vector (Royalty Free) 1892676610. https://www.shutterstock.com/image-vector/scrum-process-diagram-educational-labeled-agile-1892676610.

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[3] *Augmented shopping market size & Share REPORT, 2020-2027*. Augmented Shopping Market Size & Share Report, 2020-2027. (n.d.). https://www.grandviewresearch.com/industry-analysis/augmented-shopping-market.