

A Major Project Final Report on
Metamandu: A MetaReal City
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After a rigorous and continuous united effort, we are glad to present this report as an outcome of the major project report on “**Metamandu: A MetaReal City**”. We express our sincere gratitude to those helping hands that come forward and direct us towards the success of the whole project with the desired output. We extend our genuine thankfulness to our project supervisor **Mr. Saroj Shakya** for his valuable and great support and guidance in all the happenings regarding the project. We must express our thanks to **Dr. Roshan Chitrakar**, project coordinator for his encouragement and guidance throughout the project. We are indebted to the department of information technology for providing support to add on our venture. Last, but not the least, we would like to thank our teachers and colleagues who have been knowingly or unknowingly part of this project and lent support and views during the entire development time.

Thank you.

Sincerely,

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ABSTRACT: -

The Meta City project is an ambitious and innovative initiative that seeks to create a virtual world environment using Unity's powerful capabilities. Its primary goal is to provide users with a shared space that remarkably resembles their physical surroundings, resulting in a realistic and non-immersive experience like never before.

Central to this virtual world is the freedom for users allowing them to express their individuality and personality within the digital realm. Within the expansive virtual city, users are presented with endless opportunities for exploration and social interaction. They can traverse various landmarks all carefully designed to closely mirror their real-world counterparts. Whether it's wandering through bustling marketplaces, strolling in tranquil parks, or admiring architectural marvels, the virtual city caters to a diverse range of user interests and preferences.

A significant and groundbreaking aspect of the Meta City project is its integration of e-commerce activities. By incorporating an online payment system and a convenient shopping cart, users can indulge in virtual shopping experiences like never before. The seamless connection between the virtual and physical worlds allows users to purchase real items from virtual stores and have them shipped directly to their doorstep, blurring the line between the digital and tangible realms.

The implications of the Meta City project are vast and profound. In the gaming industry, it could mark a paradigm shift, introducing players to an unprecedented level of immersion and engagement. Beyond gaming, the project's realistic virtual environment could transform urban planning and architecture, providing city planners with a cutting-edge platform for conceptualizing and testing ideas before implementation in the real world.

Keywords: Virtual world, Meta Real City, Unity, online payment system, e-commerce, social interaction, admin panel, scalability.

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Introduction

The Meta City project is a visionary and innovative endeavor that seeks to create an unparalleled virtual world environment using the advanced capabilities of Unity. At its core, this groundbreaking initiative introduces the Meta Real City platform, providing users with an immersive virtual city that closely mirrors their physical surroundings. Through this platform, users can embark on a captivating journey, exploring diverse cityscapes, and engaging in a wide array of activities, including shopping.

To bring this ambitious vision to life, the Meta City project leverages a rich combination of advanced tools and technologies such as HTML, CSS, Vanilla JS, C#, PHP, Unity, and Blender. This harmonious amalgamation of tools ensures a robust and scalable platform, capable of accommodating a vast user base while seamlessly integrating e-commerce activities and online payment systems.

The Meta City project distinguishes itself by its revolutionary integration of e-commerce activities within the virtual world. Users can indulge in seamless virtual shopping experiences, navigating through virtual stores, browsing and selecting products, and completing transactions using an online payment system. The most remarkable aspect is that these virtual purchases can be translated into real-world deliveries, effectively bridging the gap between the digital and physical realms and providing an innovative and immersive shopping experience.

Beyond catering to users, the Meta City project also addresses the needs of building owners through an intuitive admin panel. This essential feature empowers creators and businesses to customize and manage their virtual spaces, enabling them to curate unique and tailored experiences for their target audience. Furthermore, access to sales data offers valuable insights, fostering data-driven decision-making to optimize the overall performance of their virtual spaces.

Problem Statements

The Meta City project is an ambitious initiative that aims to bridge the gap between e-commerce and virtual worlds, creating a unique and immersive experience for users in what is referred to as the Meta Real City. The concept combines the convenience of online shopping with the engaging environment of a virtual city, allowing users to interact, explore, and participate in various activities within the digital realm.

One of the main challenges the project seeks to overcome is the limited availability of virtual cities that closely resemble users' physical surroundings. Most existing platforms lack the level of detail and customization required to create a truly realistic and personalized virtual environment. Additionally, these platforms often struggle to scale effectively to accommodate the demands of various domains, such as gaming, urban planning, and education.

To tackle these issues, the Meta City platform has leverage a combination of web technologies, programming languages, and 3D modeling tools. HTML, CSS, and Vanilla JS will be utilized to create the web-based interface that enables users to interact with the virtual city seamlessly. Meanwhile, C# and PHP will support the development of server-side functionalities, including the payment system and real-time shopping cart. Unity and Blender will play a vital role in constructing the 3D elements of the virtual city, ensuring a high level of realism and immersion for users. The presence of a payment system and a real-time shopping cart will enable users to make purchases within the virtual city, mimicking the experience of real-world e-commerce.

Project Objectives

The objectives of the Meta City project are as follows:

- To create virtual world environment that closely resembles physical surrounding
- To offer a non-immersive user experience

By addressing these objectives, the Meta City project aims to revolutionize the concept of virtual worlds and redefine the way users interact with online environments, creating a dynamic and engaging experience that blurs the line between the physical and digital realms.

Significance of Study

The significance of the Meta City project are as follows:

- **Advancing Technology and Innovation:** The Meta City project represents a significant advancement in technology and innovation by merging various fields such as e-commerce, 3D modeling, and web-based applications. This integration paves the way for more sophisticated and engaging virtual experiences, inspiring further developments in these domains.
- **Enabling Multi-Industry Applications:** The versatile nature of the Meta City platform opens up new avenues for a wide range of industries. This adaptability demonstrates the project's potential to revolutionize multiple sectors.
- **Contribution to Research and Knowledge:** The Meta City project contributes to ongoing research on Meta Real City and virtual worlds. It serves as a practical case study for researchers to explore the impact of virtual environments on user behavioral activities. The findings from such studies can lead to new insights and knowledge in the field.
- **Driving E-commerce and Virtual Transactions:** The integration of online payment and shopping cart features within the virtual city facilitates safe and seamless transactions. This presents a practical solution for businesses to offer virtual and real goods, extending the reach of e-commerce and potentially creating new revenue streams.
- **Empowering Building Owners and Businesses:** The Meta City provides building owners and businesses with a unique marketing platform. They can showcase their products and services in a non-immersive environment, tapping into a broader and potentially global audience. This exposure can lead to increased brand visibility and customer engagement.
- **Redefining User Interactions:** The Meta City's immersive experience transforms how people interact with their surroundings, both virtually and in real life. Users can explore, socialize, and engage in activities in a novel and exciting manner, potentially shaping future preferences for online interactions.

- **Supporting Sustainable Urban Development:** By facilitating virtual urban planning and architecture simulations, the Meta City can contribute to more sustainable city designs. This virtual testing ground allows for better evaluation of design choices, potentially leading to more eco-friendly and efficient urban spaces.
- **Driving Positive Social Impact:** The Meta City's virtual community can foster positive social interactions, encouraging users to support one another, collaborate, and participate in shared activities. It can be a platform to raise awareness about social issues and support meaningful causes.

In conclusion, the MetaReal City project represents a groundbreaking initiative with significant implications for technology, business, research, and societal development. Its innovative approach to creating a non-immersive and interactive virtual city has the potential to shape the future of how people interact, learn, work, and conduct business in the digital age.

Scope and Limitation

Scope

- The project aims to create a virtual world environment using Unity's capabilities that allows users to interact and engage in various activities.
- The system includes an online payment system and a shopping cart for users to purchase real items in the virtual world.
- The platform enables building owners to customize their virtual space and monitor sales data through an admin panel.

Limitation

- The project is limited to the available technology and resources.
- The system is currently designed for a single city and single player, with plans to expand to other locations in the future.
- The social interaction aspect of the project is still in the planning phase and may not be fully developed at the current stage.
- The project may require high-speed internet connectivity to provide a seamless experience for the users.

Literature Reviews

Sansar

Sansar [1] is a virtual reality platform that enables users to create and explore immersive worlds. It allows users to customize their avatars, interact with others, and participate in activities such as games, concerts, and meetups. The platform also provides tools for creators to design and build their own virtual spaces. The Meta city project aims to create a similar platform, but with a focus on creating a virtual city that closely resembles the user's physical surroundings. The platform will allow for e-commerce transactions and will provide an admin panel for building owners to customize their virtual spaces.

Advantages of Sansar:

- Provides a platform for collaborative design and planning of virtual cities, enabling users from various locations to work together and share ideas in real-time.
- Offers a variety of tools and resources for creating and customizing virtual environments, including pre-built assets, and programming languages like C# and Python.
- Allows for the creation of simulations that can be used to test real-world scenarios and inform decision-making in urban planning and design.
- Offers potential cost savings compared to traditional urban development projects, as the creation and testing of virtual environments can be less expensive than physical construction.
- Provides an accessible and inclusive means for people with disabilities or limited mobility to experience and participate in urban environments.

Disadvantages of Sansar:

- Requires a high level of technical expertise and familiarity with 3D design software and programming languages, which may be a barrier to entry for some users.
- May be limited in its ability to fully replicate the complexity and diversity of real-world urban environments, which can impact the accuracy of simulations and testing.
- Requires a high-performance computer and graphics card, which may not be affordable or accessible to all users.
- May face challenges related to security and privacy, as the platform collects and stores user data and personal information.
- Could potentially contribute to social isolation and disconnection if users prioritize virtual interactions over real-world interactions.

Relationship to our project:

- Sansar provides a means for exploring the potential of immersive and interactive virtual environments in enhancing urban experiences and addressing challenges faced by real- world cities.
- The platform enables users to experiment with and test different urban design strategies in a safe and controlled environment, allowing for more innovative and efficient urban planning.
- Sansar's collaborative and inclusive nature aligns with the goals of your project to create a more connected and equitable Meta real city.
- The simulations and testing capabilities of Sansar can inform decision-making in urban planning and design, leading to more sustainable and efficient urban development.
- Sansar's emphasis on interactivity and engagement can enhance the social and cultural aspects of urban environments, promoting community building and engagement.

Second Life

Second Life [2] is a popular virtual world platform that allows users to create and customize their own avatars, socialize, participate in activities, and even trade virtual goods and services. The Meta City project draws inspiration from Second Life, but with a focus on creating a more realistic and immersive experience that closely resembles users' physical surroundings.

Advantages of Second Life:

- Provides a platform for the creation and exploration of highly detailed and customizable virtual environments, including buildings, landscapes, and objects.
- Offers a rich set of communication and social interaction tools, including chat rooms, voice and video chat, and avatar customization, which enable users to engage with each other in real-time.
- Allows for the creation of simulations that can be used to test real-world scenarios and inform decision-making in urban planning and design.
- Offers a variety of educational and training opportunities, including online courses and workshops on topics related to urban planning and design.
- Provides an accessible and inclusive means for people with disabilities or limited mobility to experience and participate in urban environments.

Disadvantages of Second Life:

- May be limited in its ability to fully replicate the complexity and diversity of real-world

urban environments, which can impact the accuracy of simulations and testing.

- Requires a high-performance computer and graphics card, which may not be affordable or accessible to all users.
- May face challenges related to security and privacy, as the platform collects and stores user data and personal information.
- Could potentially contribute to social isolation and disconnection if users prioritize virtual interactions over real-world interactions.
- May have a steeper learning curve compared to other virtual environment platforms, which may be a barrier to entry for some users.

Relationship to our project:

- Second Life provides a means for exploring the potential of immersive and interactive virtual environments in enhancing urban experiences and addressing challenges faced by real-world cities.
- The platform enables users to experiment with and test different urban design strategies in a safe and controlled environment, allowing for more innovative and efficient urban planning.
- Second Life's educational and training opportunities align with the goals of your project to create a more connected and informed Meta real city.
- The simulations and testing capabilities of Second Life can inform decision-making in urban planning and design, leading to more sustainable and efficient urban development.
- Second Life's emphasis on communication and social interaction can enhance the social and cultural aspects of urban environments, promoting community building and engagement.

Virtual worlds have been a subject of interest for researchers and developers in the field of computer graphics and interactive media. Unity, as a powerful game development engine, has been widely used to create virtual environments and simulations. Various studies focus on the integration of Unity's capabilities to develop interactive and realistic virtual worlds that offer social interaction, exploration, and gamified experiences. The Meta City project's reliance on Unity aligns with this trend, ensuring that users can easily engage with the virtual city and interact with their surroundings.

The integration of e-commerce functionalities into virtual worlds has gained traction in recent

years. By allowing users to purchase real items within the virtual environment and have them shipped to their physical location, the Meta City project aims to bridge the gap between virtual experiences and real-world transactions. This concept shares similarities with existing research on virtual commerce (v-commerce) and the potential of using virtual spaces as an avenue for real-world transactions [2]. Additionally, research on secure online payment systems and user trust in virtual environments is crucial for ensuring a seamless and secure shopping experience within Meta City.

Research on scalable virtual environments and the efficiency of 3D modeling techniques can provide valuable insights into ensuring a seamless and optimized experience for users [3]. Furthermore, studies on the challenges of maintaining consistency and performance in large-scale virtual worlds can offer guidance for the Meta City project's growth and development [4].

Researchers have studied the impact of realistic virtual environments on gameplay experiences and player immersion [5]. In the context of urban planning, virtual worlds offer opportunities for city simulations, community engagement, and architectural visualization [6]. Studies on the applications of virtual environments in urban planning can shed light on the potential benefits and challenges of the Meta City project in this domain. Moreover, the integration of educational elements within the virtual city can provide opportunities for interactive and experiential learning [5]. Research on the effectiveness of virtual worlds as educational tools can inform the design and implementation of educational features in the Meta City project.

Agile methodology

Agile methodology is a popular approach to software development that emphasizes flexibility, collaboration, and iterative progress. This literature review aims to explore and summarize existing research on agile methodology, its principles, practices, benefits, and challenges.

Principles and Manifesto of Agile:

The Agile Manifesto, published in 2001 by Beck et al., outlines the core principles of agile development [4]. Researchers have extensively analyzed these principles and their impact on software development projects. The emphasis on individuals and interactions, working software, customer collaboration, and responding to change has been found to enhance project success [4].

Agile Practices:

Numerous studies have focused on specific agile practices like Scrum, Kanban, and Extreme Programming (XP). Scrum, for instance, is a widely adopted agile framework that promotes regular sprint cycles and close collaboration within cross-functional teams [4]. Research indicates that Scrum's iterative approach facilitates adaptation to changing requirements and improves team productivity [4]

Benefits of Agile:

The benefits of agile methodologies have been a subject of interest for researchers and practitioners. Studies have highlighted advantages such as faster time-to-market, improved customer satisfaction, and increased team morale [4]. Agile's customer-centric approach has been particularly praised for enhancing product quality and alignment with user needs [3]

Challenges in Agile Implementation:

While Agile offers numerous advantages, it also comes with challenges. Researchers have explored hurdles related to project management, team dynamics, and organizational culture. For instance, distributed agile teams may face communication and coordination issues [4]. Studies have suggested strategies to address these challenges, including the use of virtual collaboration tools and fostering a culture of trust and transparency [5].

PHP (Hypertext Preprocessor) is a widely used server-side scripting language for web development. Research has shown its versatility and effectiveness in processing user requests, handling databases, and generating dynamic content on web pages [7]. The seamless integration of PHP with HTML allows developers to create interactive web applications and facilitate data exchange between the client and server.

Unity is a powerful cross-platform game engine, extensively employed for creating interactive and immersive gaming experiences. Studies have demonstrated Unity's ability to streamline game development processes, enable real-time rendering, and support a wide range of platforms [8]. The integration of Unity with JavaScript enables developers to build sophisticated game mechanics and interactions.

JavaScript is a fundamental scripting language used in web development to enhance front-end interactivity. Researchers have explored its role in creating responsive user interfaces, client-side form validation, and dynamic content updates without the need for page reloads [9]. Combining JavaScript with HTML and CSS allows developers to implement dynamic features that enrich the user experience.

HTML (Hypertext Markup Language) and **CSS (Cascading Style Sheets)** are the foundational languages for web design. Studies have highlighted the importance of adhering to web standards, optimizing HTML structure for accessibility, and leveraging CSS for responsive layouts [10] [11]. By incorporating HTML and CSS into the project, developers can ensure a visually appealing and user-friendly interface.

The integration of PHP, Unity, JavaScript, HTML, and CSS provides a robust foundation for developing dynamic and interactive web applications with gaming capabilities. Existing research demonstrates how these technologies can be effectively combined to create seamless experiences for users. For instance, PHP can be used for server-side interactions, database handling, and user authentication, while Unity and JavaScript enable real-time game mechanics and interactive elements. HTML and CSS ensure the presentation and responsiveness of the application, enhancing its overall visual appeal and usability.

Proposed Methodology

The proposed methodology for our project is Agile Methodology [3].

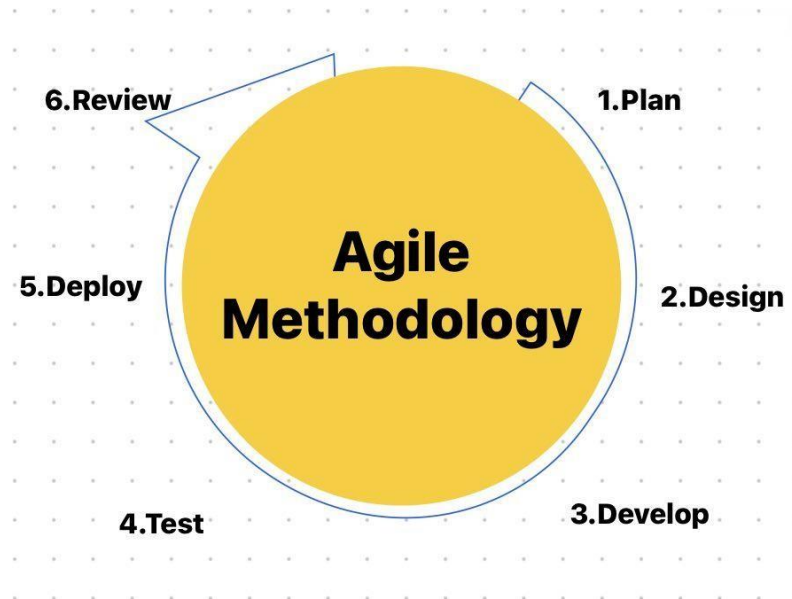


Figure 1: Agile Methodology

- 1. Plan:** - In this first phase of the agile model, the requirement will be identified, and the system functional requirements will also be understood to develop the desired platform. For this process, a survey was created, and the questions were designed for targeted users about their day-to-day interaction. Analyzing the survey data helped in recognizing the problem in a broad sense and provided insights as well.

How MetaReal city project was planned:

Goal: Create a MetaReal city platform for virtual world exploration and e-commerce activities

Objectives: Design an immersive environment, integrate e-commerce functionalities, and ensure a seamless user experience.

Research: Conducted extensive research on virtual worlds, e-commerce integration, and user preferences.

Requirements: Gathered input from users to define platform requirements.

- 2. Design:** - During the design phase, the team plans a sprint (a fixed period of time, usually 2-4 weeks) and selects the tasks that will be completed during the sprint. The team estimates the time required for each task and assigns tasks to team members. The goal of this phase is to create a plan that is achievable within the timeframe of the sprint.

During the design phase of the metareal city project, the focus is on creating a blueprint for the platform's visual elements, user interface, interactivity and overall architecture. Here's what is done the design phase.

- Define the concept and theme of the virtual world.
 - Create wireframes and mockups for the user interface (UI).
 - Design 3D models, landscapes, and interactive elements.
 - Plan e-commerce integration and virtual goods/services.
 - Implement navigation and wayfinding features.
 - Consider avatar customization and social interaction elements.
 - Ensure accessibility and scalability in the design.
 - Gather feedback and iterate to refine the design.
3. **Develop:** - During the design phase, the team plans a sprint (a fixed period of time, usually 2-4 weeks) and selects the tasks that will be completed during the sprint. The team estimates the time required for each task and assigns tasks to team members. The goal of this phase is to create a plan that is achievable within the timeframe of the sprint.
 4. **Test:** - Testing is a critical part of the agile methodology. The team tests the completed work to ensure that it meets the requirements and quality standards. The team may use automated testing tools and continuous integration to streamline the testing process and catch errors early.

During the testing phase of the metareal city project, the primary focus is to evaluate the platform's performance, functionality, and user experience. Here's what is done during the testing phase:

- Functional, UI, and performance testing.
- Compatibility, security, and accessibility assessment.
- Stress testing for capacity and responsiveness.
- E-commerce functionality verification.
- Bug tracking and regression testing.
- User Acceptance Testing (UAT) with selected users.

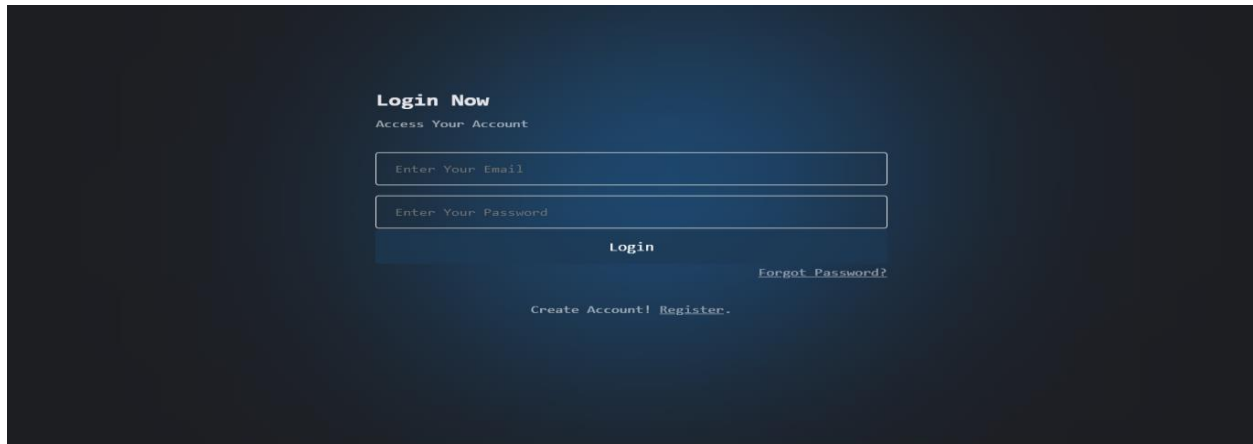


Figure 2: Screenshot of Testing of Login Panel

In the figure provided as **Figure 2**, we tested the user interface of the Login Panel. This interface includes two fields for Email and Password, allowing users to input their login credentials. These credentials are then matched to grant access to the page.

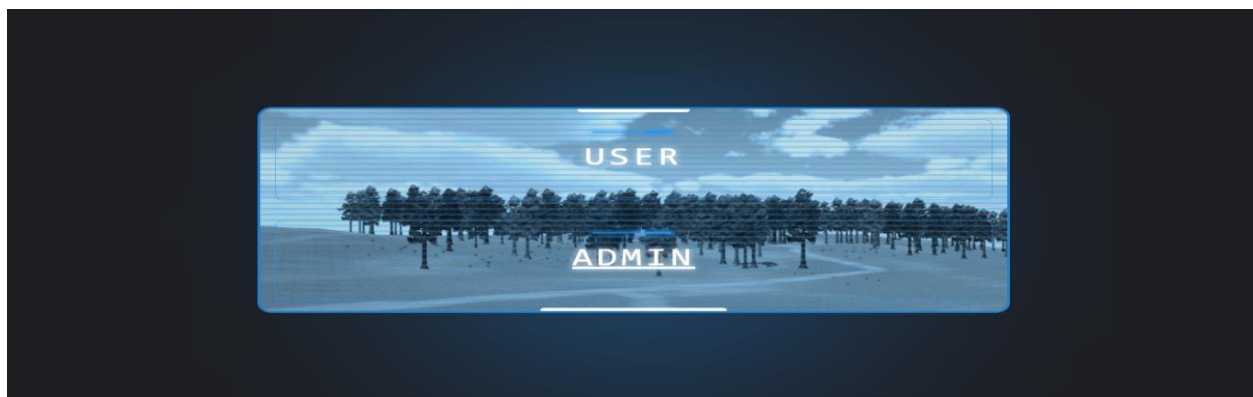


Figure 3: Screenshot of Testing of Selection Screen

In the figure labeled as **Figure 3**, the displayed content showcases the code for the initial page where users and admins can select their preferred interface – either the user side or the teacher's side. The webpage features two clickable buttons to facilitate this selection.

Users				
Previous 1 2 3 Next				
S.N	Name	Email	Added On	Action
1	omni	omeysketch@gmail.com	2023-08-02 23:37:41	Delete
3	om	omprakash.181420@ncit.edu.np	2023-08-02 15:27:18	Delete
5	laptop	laptop@gmail.com	2023-07-24 16:49:02	Delete
7	bottle	bottle@g.c	2023-07-24 16:45:02	Delete
9	redmi	redmi@gmail.com	2023-07-24 16:32:37	Delete

Figure 4: Screenshot of Testing of User's Screen

In the provided **Figure 4**, the displayed content illustrates the code for the page that presents user details retrieved from the admin panel.

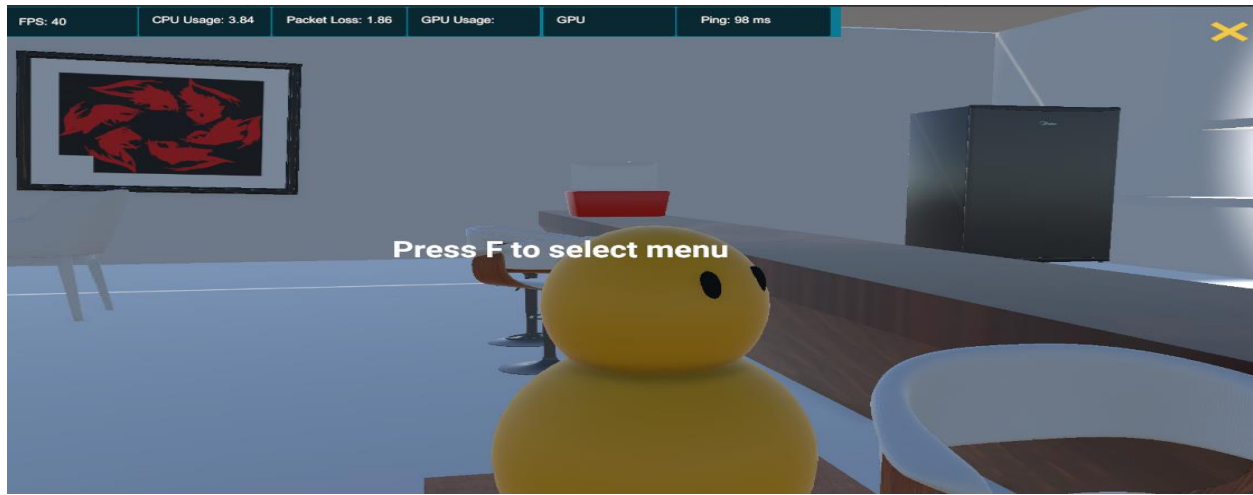


Figure 5: Testing of Character

In the provided Figure 5, testing of character is done.

Testing results:

Following are the test results

S.N	Unit	Test	Expected Result	Test Outcomes
1.	Login admin	Check login for valid username and password	Admin_name or password does not match	Invalid login credentials
2.	Add Vendor	Check Username of vendor	Vendor name already exists	Invalid vendor name
3.	Manage User	Check the user who register	All users are displayed	User information display.
4.	Add News	Adding News to the Game for notification	News appear on home screen of game	News information display
5.	Add Coupons	Check coupon code	Coupon code already exists	Invalid Coupon Code.
6.	Feedback	Check feedback of users	Feedback are displayed	Feedback information display
7.	Add Product	Check Fields are filled	Successful	Successful
8.	View and mark Orders	Check if all order are displayed	Successful	Successful
9.	Edit Profile	Check vendor Name,description and mobile	Please fill out the field!	Please fill out the field
10.	Search Product	Check product name	Successful	Successful
11.	Add To Wishlist	Check product added to wishlist	Product added to wishlist	Successful
12.	Add To Cart	Check product added to cart	Product added to cart	Successful
13.	Proceed Checkout	Check the checkout product	All product are displayed	Successful
14.	Select Payment method	Check payment method button clicked and redirected	Successful	Successful
15.	Generate master key	Check the ²² master key is	Successful	Successful

5. **Deploy:** - Once the work is completed and tested, it is deployed to a production or staging environment. This allows stakeholders to see the work in action and provide feedback.
6. **Reviews:** - After the sprint is completed, the team and stakeholders review the work that was completed and gather feedback. This feedback is used to refine the product backlog and plan the next sprint. The review process is an important part of agile methodology, as it allows the team to continuously improve and adjust their approach based on real-world feedback.

Technology Used:

C#: is a programming language primarily used with Unity, a popular game development platform. It was used to create the logic and functionality of the metareal city platform [12].

PHP: PHP is a server-side scripting language used for web development. It played a crucial role in building the backend infrastructure for data management and e-commerce integration [7].

Unity: Unity is a powerful game engine used to develop 3D virtual worlds and interactive experiences. It was the primary tool for creating the metareal city environment, including 3D models, landscapes, and avatar movements [8].

Blender: Blender is a 3D modeling and animation software. It was utilized to create detailed 3D models and assets for the virtual world, enhancing its visual appeal and realism [13].

HTML, CSS, JS: HTML, CSS, and JavaScript are the core technologies of web development. They were used to design the user interface (UI) of the metareal city platform, enabling users to interact with the virtual world and access e-commerce functionalities through their browsers [10] [11] [9].

Use-Case Diagram

Use case diagram is a behavioral diagram that shows a set of use cases and actors and their relationship. It is an association between the use cases and actors. Use case describes the action that the user takes on the system [14].

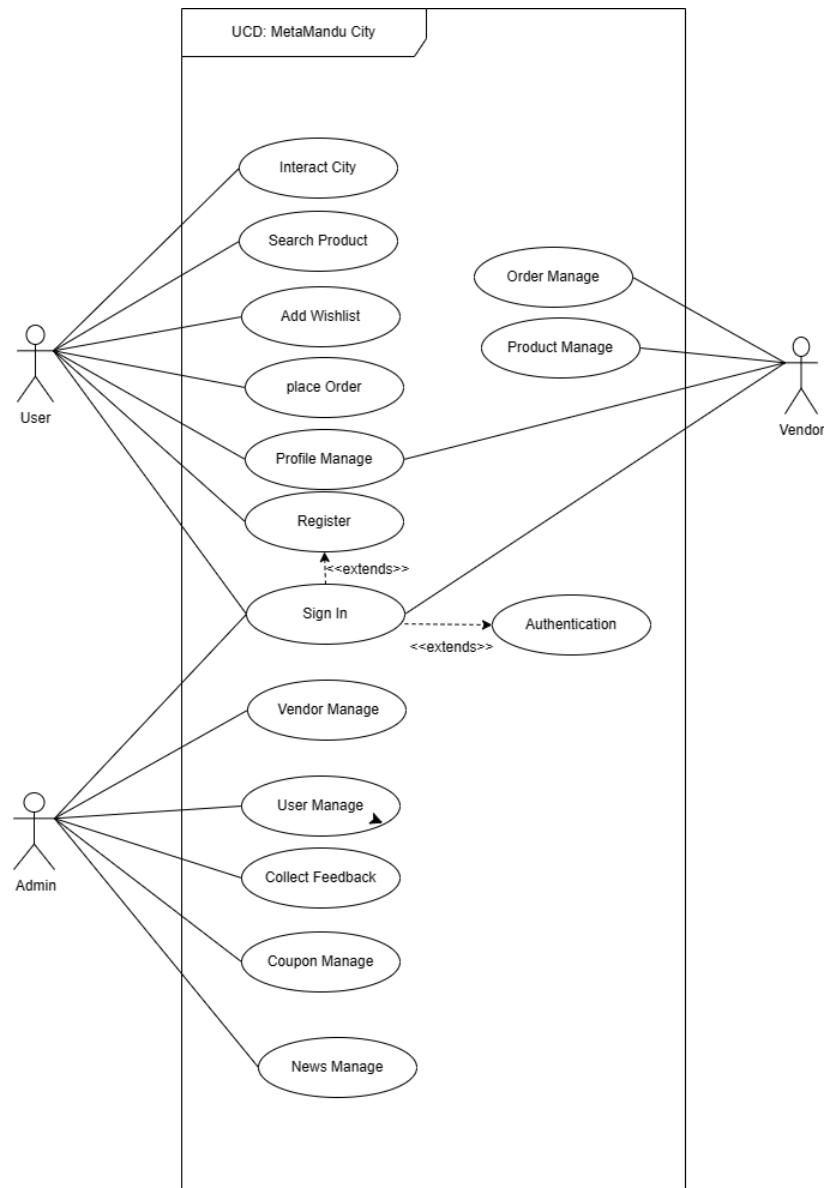


Figure 6: Use Case Diagram of MetaMandu

System Sequence Diagram

1. Sign up

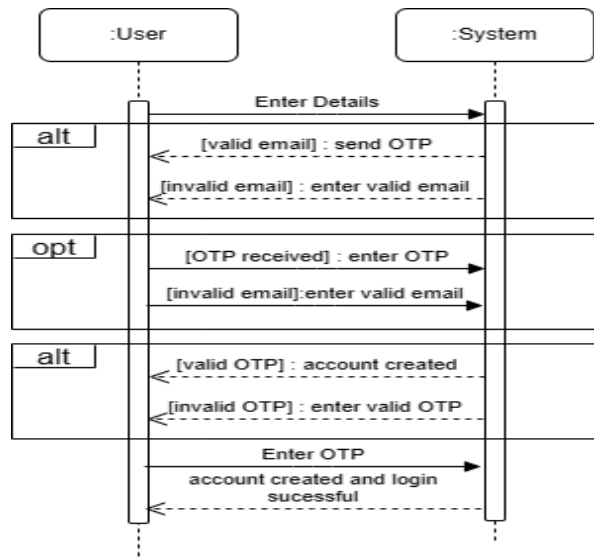


Figure 7: SSD of Sign up

Name: Signup

Actor: Admin, User

Description: The user can sign up to the system before they can use any functionalities.

Precondition: User is identified and authenticated by the system.

Post condition: User signup to the system.

User view product and product to cart.

2. Login:-

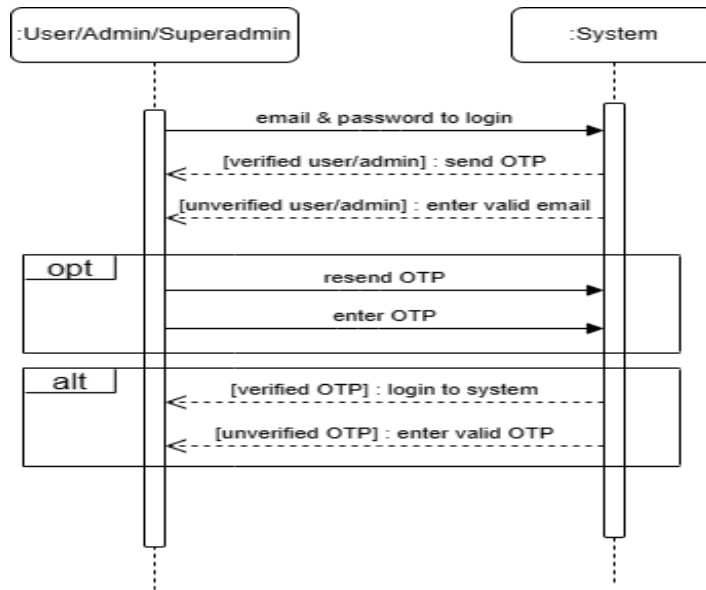


Figure 8: SSD of Login

Name: Login

Actor: User, Admin, Super admin

Description: The user, admin, Superadmin can sign up to the system before they can use any functionalities.

Precondition: user, admin, Superadmin is identified and authenticated by the system.

Post condition: Admin/user/Superadmin login to system.

Superadmin manage admin and users. Admin add product and view orders. User view product and view orders. User view product and add to cart.

3. Edit Profile:

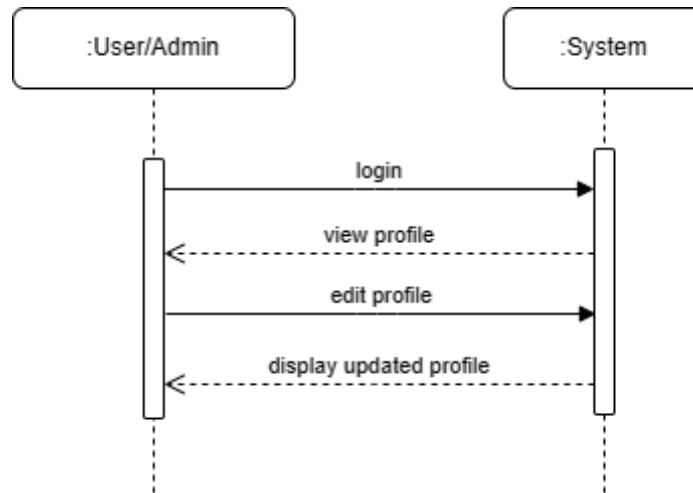


Figure 9SD of Edit Profile

Name: Edit profile

Actor: User/Admin

Description: The User/Admin can utilize the system to edit their personal information allowing them to update and manage their personal details within system.

Precondition: User/Admin is identified and authenticated by the system.

Post condition: User/Admin successfully edit their profile information.

4. Add Product

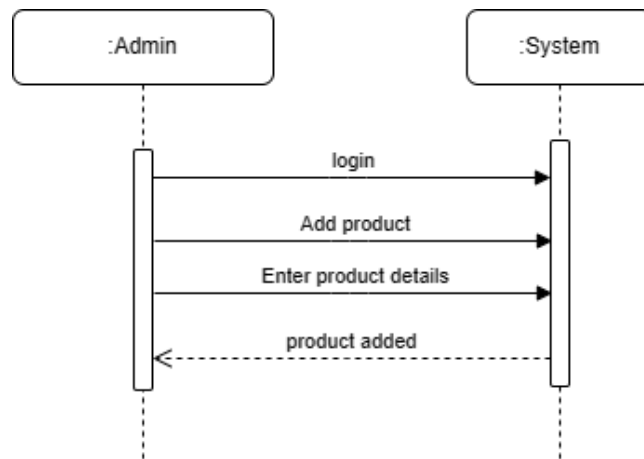


Figure 10 SSD of Add Product

b: Add Product

Actor: Admin

Description: Admin will add new product and quantity to the system.

Precondition: Admin is identified and authenticated by the system.

Post condition: Admin adds products.

Admin mention product quantity and price details.

5. View Product

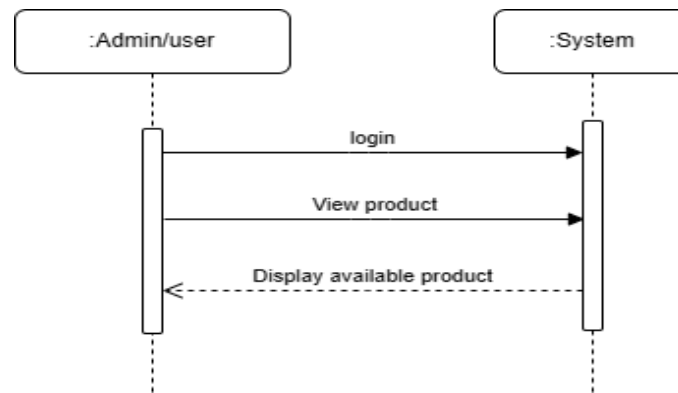


Figure 11SSD of View Product

Name: view product

Actor: Admin, user

Description: Admin/user can access the system to view product.

Precondition: Admin/user is identified and authenticated by the system

Post condition: Admin/user successfully view the product.

6. Add to cart

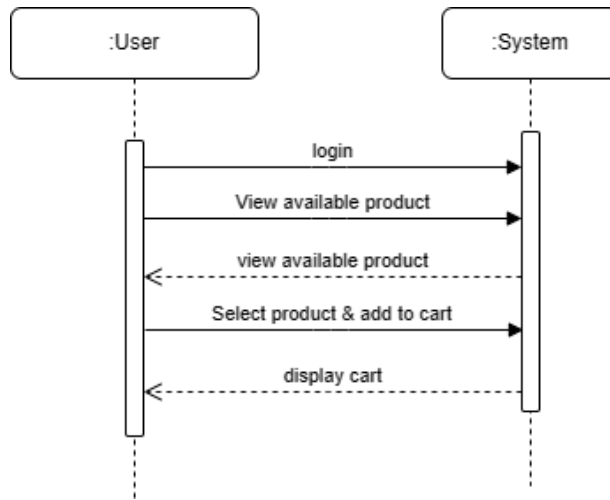


Figure 12: SSD of Add to Cart

Name: Add to cart

Actor: User

Description: User can use the system to add selected product to their cart enabling them to gather items for purchase or further consideration. Before proceeding to checkout.

Precondition: User is identified and authenticated by system.

Post condition: User successfully adds selected Product to their cart.

7. Manage User

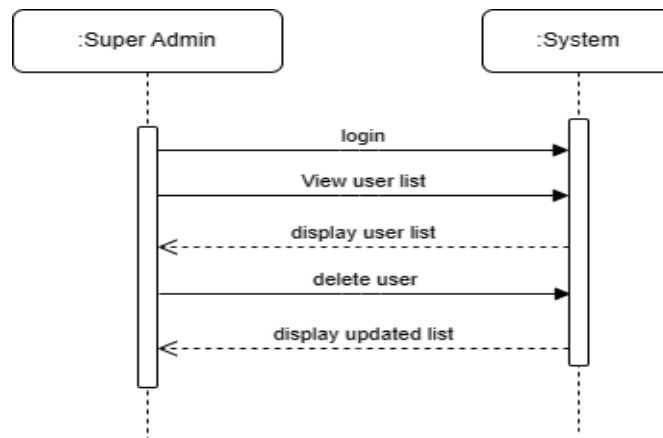


Figure 13: SSD of Manage User

Name: Manage User

Actor: SuperAdmin

Description: SuperAdmin has the authority to manage user within the system, including ability to delete customer account as necessary.

Precondition: Superadmin is identified and authenticated by the system.

Post condition: SuperAdmin successfully deletes user accounts.

8. Manage Admin

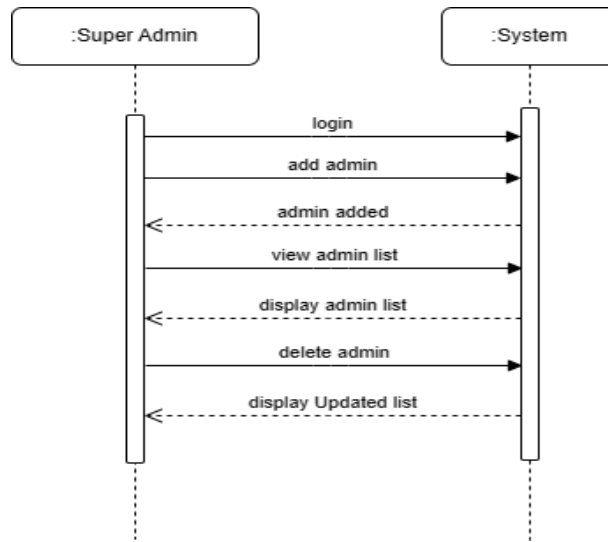


Figure 14: Manage Admin

Name: Manage Admin

Actor: Super Admin

Description: Super Admin has authority to manage admin within the system including the ability to add and delete admin account, as necessary.

Precondition: Super Admin is identified and authenticated by the system.

Post condition: Super Admin successfully add and delete admin account.

9. View Queries

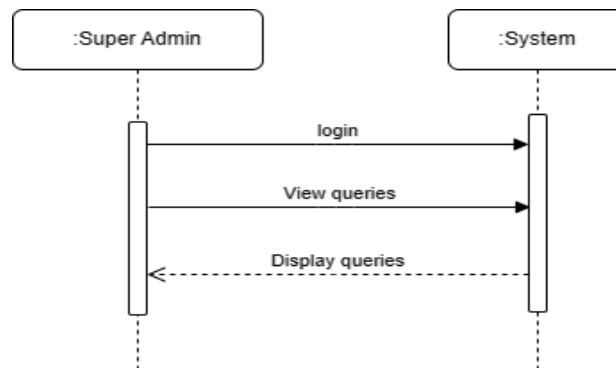


Figure 15: SSD of View Queries

Name: View Queries

Actor: Super Admin

Description: Super Admin can access the submitted queries submitted by users or admin enabling them to review and respond to inquiries and concerns.

Precondition: Super admin is identified and authenticated by the system.

Post condition: Super Admin successfully views queries submitted by admin or user.

ER Diagram

The ER diagram consists of various entities: Admin, Users, Product, Super admin, Cart, Product. Cart contains the details of the user added products. Admin is responsible for managing store, merchants, and every other aspect. Super admin is responsible to manage admin and users [14].

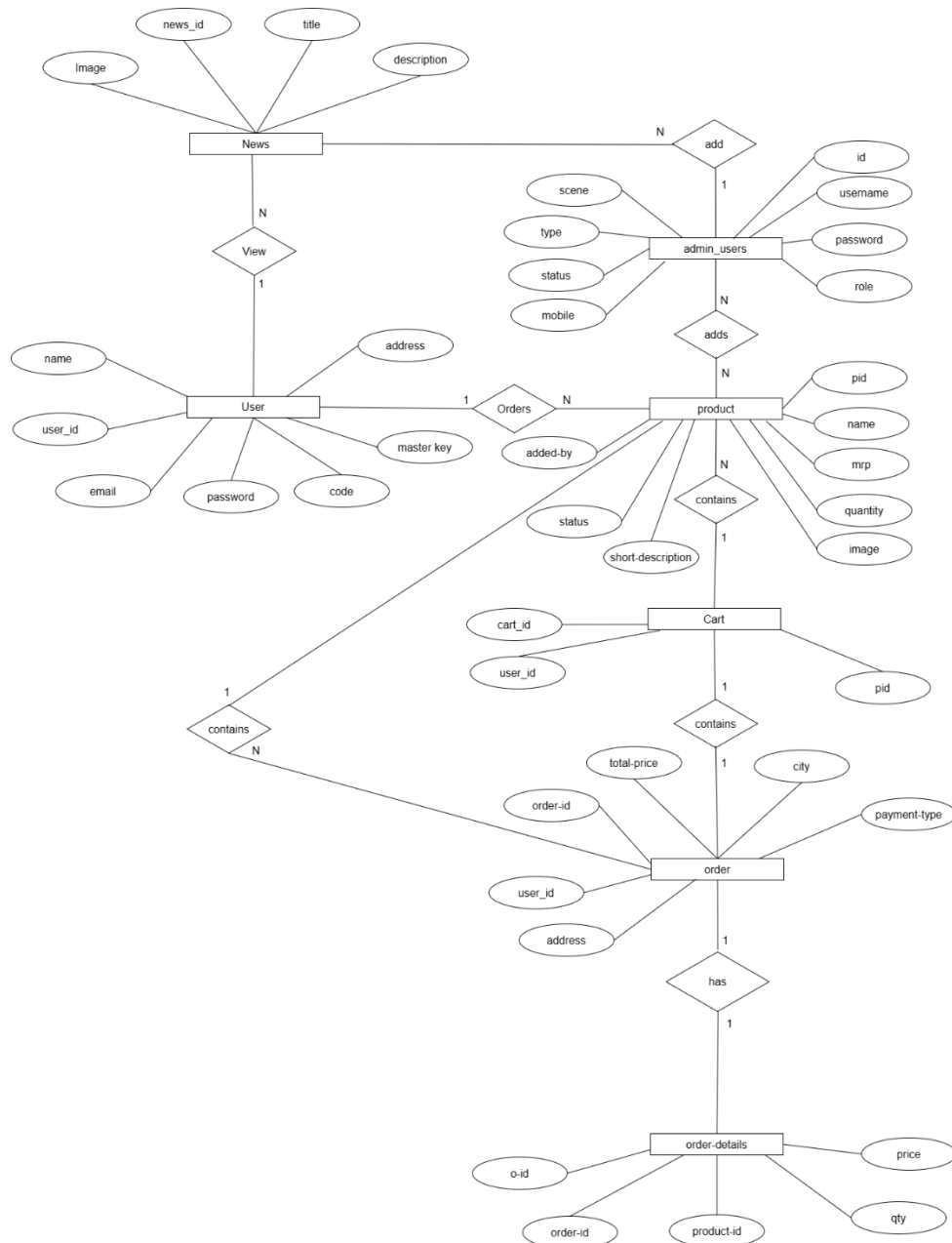


Figure 16: ER Diagram of Metamandu

Activity Diagram

Activity diagrams are graphical representations used in UML (Unified Modeling Language) to illustrate the flow of activities or processes within a system or business process. They use various symbols like circles for activities, arrows for transitions, and diamonds for decision points to visualize the sequence of actions and decision-making in a clear and concise manner. Activity diagrams help in understanding, analyzing, and communicating the workflow of complex systems or processes [14].

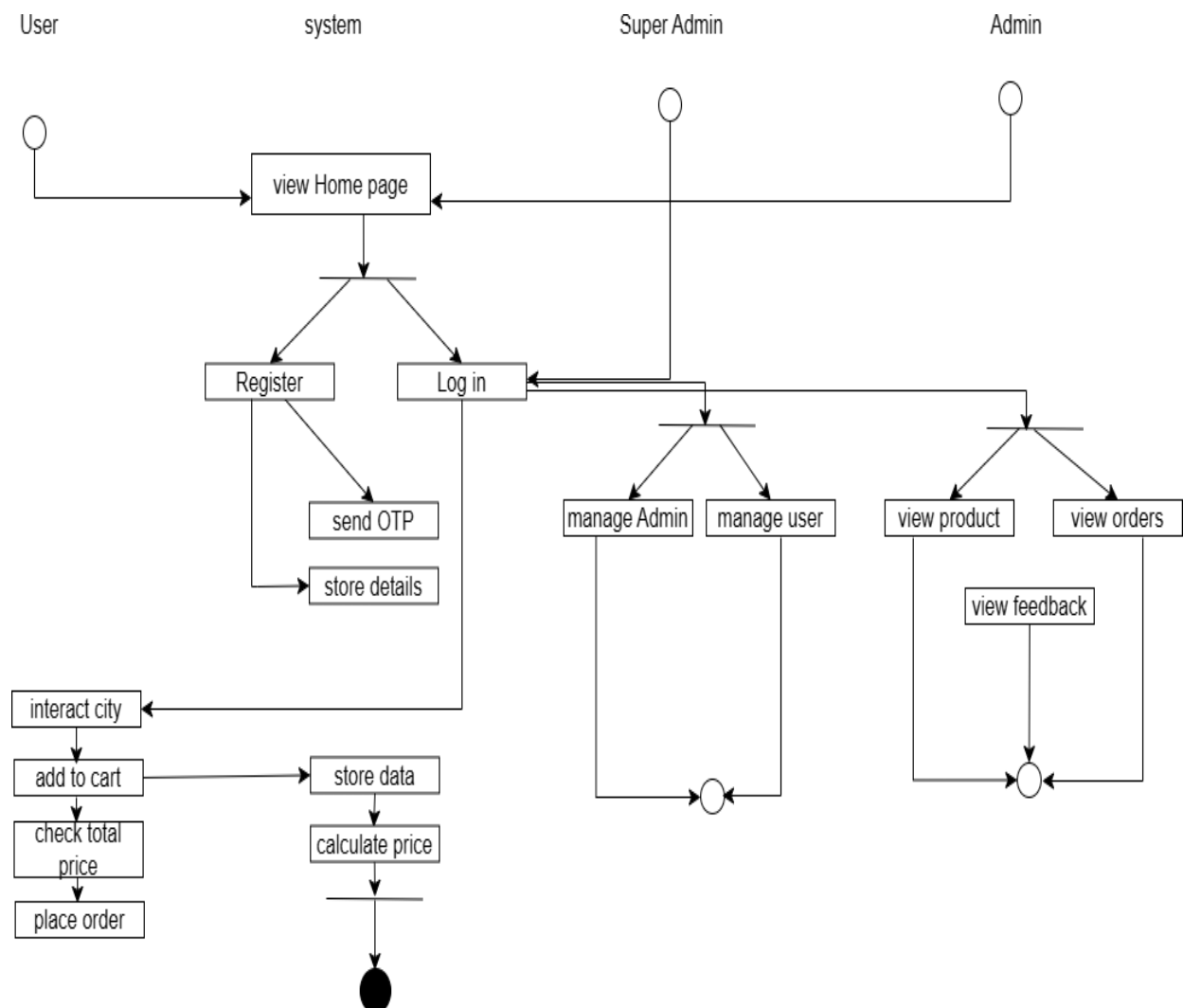


Figure 17: Activity Diagram of Metamandu

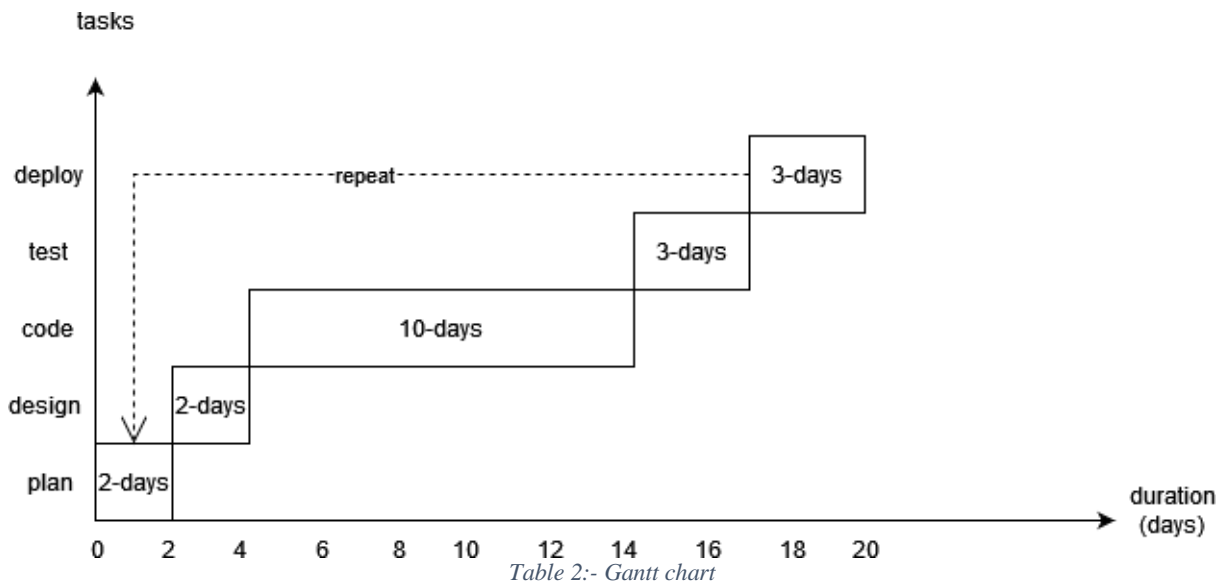
Project Task and Time Schedule

Team Members Name	Planning	Design	Front-end(Unity)	Front-end	Backend	Testing
Bimal	✓	✓	✓		✓	✓
Om	✓	✓			✓	✓
Pratik	✓	✓		✓		✓
Saroj	✓	✓		✓		✓
Sheetal	✓	✓	✓		✓	✓

Table 1:- Project Task Schedule

Gantt chart

A Gantt chart is a visual project management tool that displays tasks or activities along a timeline. It uses horizontal bars to represent each task's duration and shows the start and end dates of these tasks. Gantt charts help project managers and teams track progress, identify dependencies, allocate resources, and manage deadlines effectively. They provide a clear overview of a project's schedule, making it easier to plan and monitor project activities.



1st Iteration: (15-May , 05-June) [Complete Unity and Web UI designs]

2nd Iteration: (05-June, 15-June) [Basics authentication functionality in web and Unity]

3rd Iteration: (15-June, 05-July) [Functionality in Web UI designs]

4th Iteration: (05-July 05-August) [Complete Unity and Web functionality]

Proposed Deliverables

Deliverables is concerned with the detailed features to be included in the software that solve the problems mentioned in the description of the problem area section. The deliverables have been broken down into two distinct categories which are the “core” and “additional” features.

Core Project Deliverables:

- A fully functional virtual city environment developed using Unity.
- User registration and authentication system.
- Avatar movement functionality.
- In-game shopping system with a shopping cart and online payment integration.
- Admin panel for building owners to customize their virtual space and manage sales data.

Additional Project Deliverables:

- Additional virtual locations and activities for users to explore and engage.
- Integration with real-world events and promotions for in-game rewards.
- Enhanced avatar customization options and 3D modeling improvements.
- Mobile application for users to access the virtual city on the go.

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]
- [13] Blender, "Blender," [Online]. Available: <https://www.blender.org/>.
]
- [14] Diagram, "Diagram," [Online]. Available: <https://app.diagrams.net/>.
]

Appendix



Figure 18: Screenshot of Start Screen

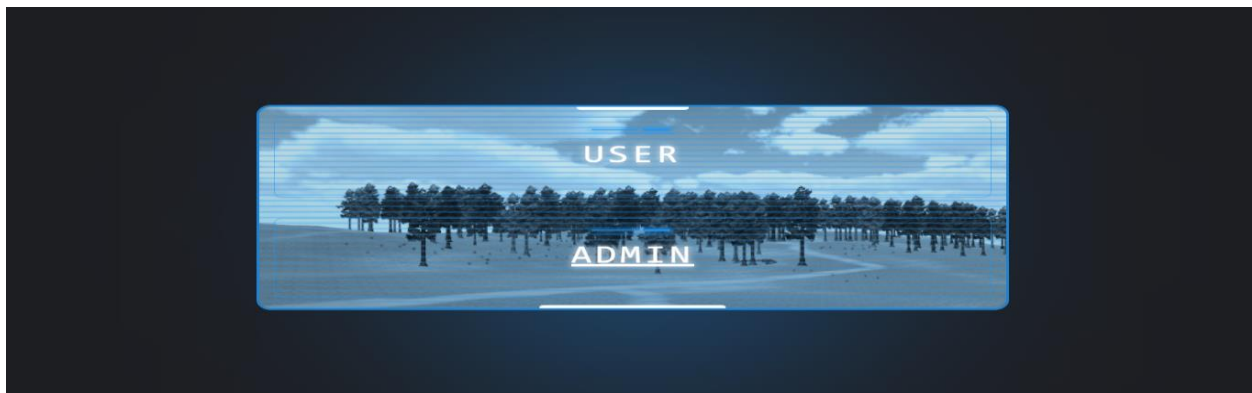


Figure 19: Screenshot of Selection Screen

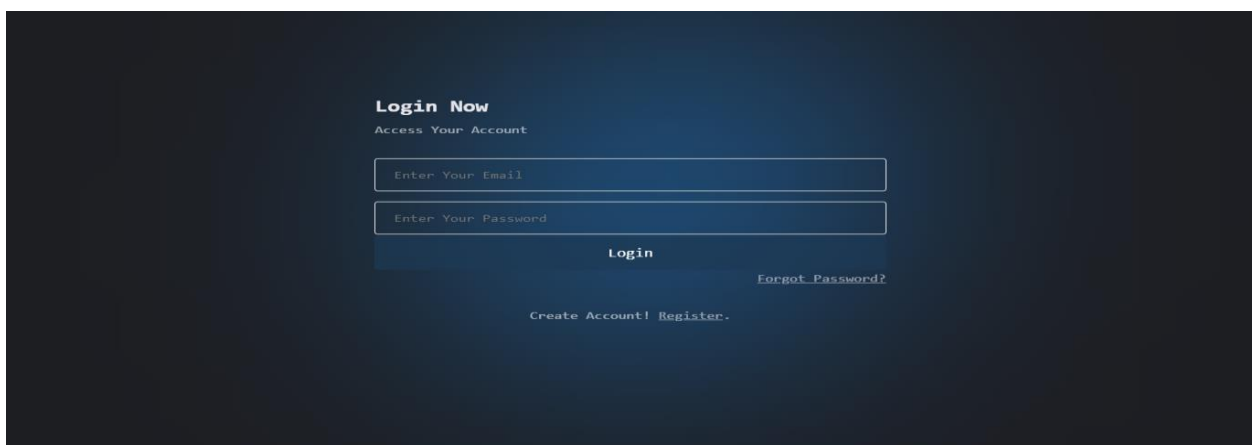
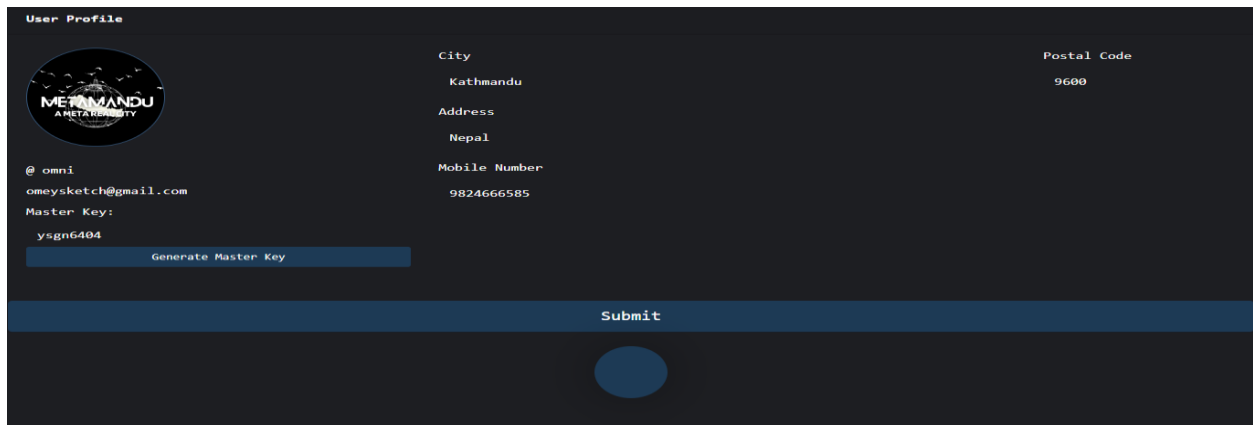



Figure 20: Screenshot of Sign in Screen



User Profile



City

Kathmandu

Postal Code

9600

Address

Nepal

Mobile Number

9824666585

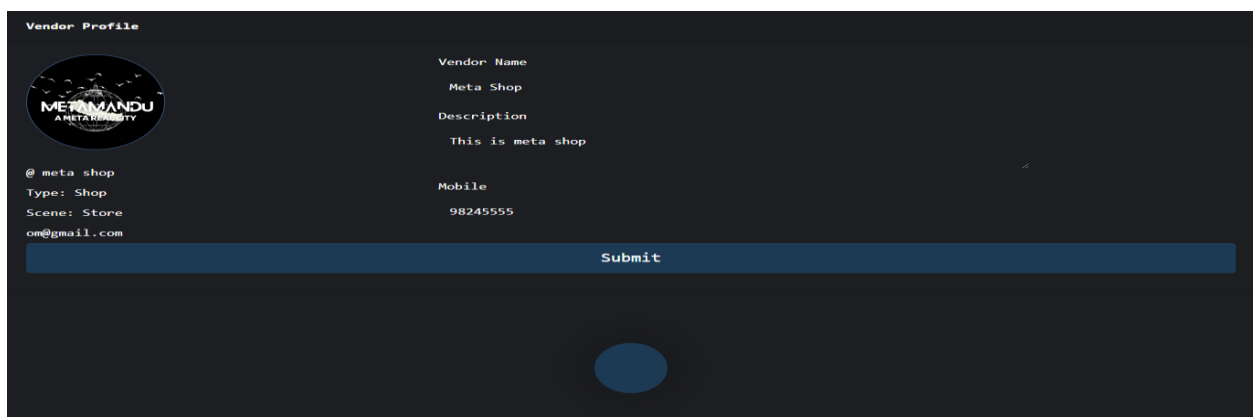
@ omni
omeysketch@gmail.com

Master Key:
ysgn6404


Generate Master Key

Submit

Figure 21: Screenshot of User's Profile Screen



Vendor Profile



Vendor Name

Meta Shop

Description

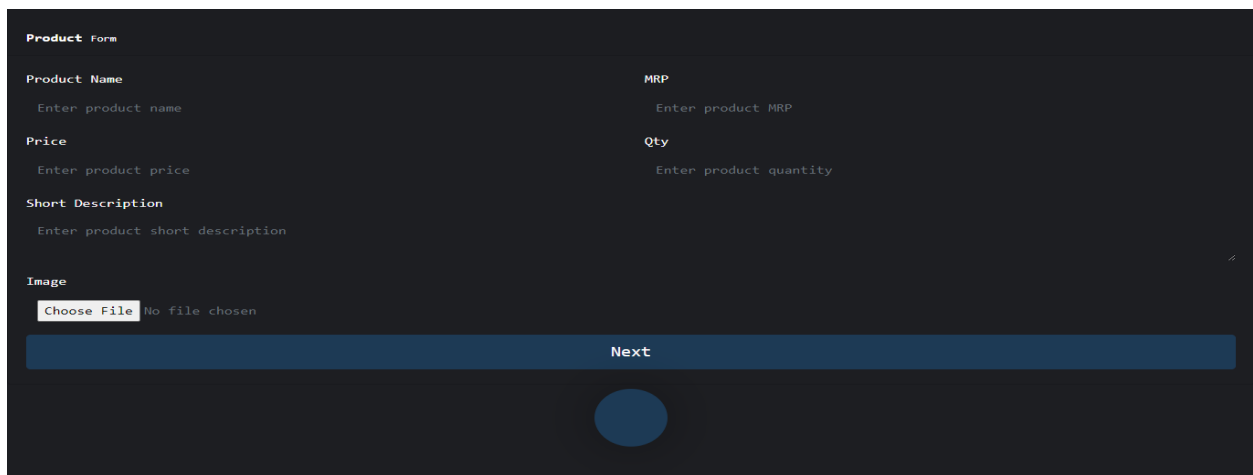
This is meta shop

@ meta shop
Type: Shop
Scene: Store
on@gmail.com

Mobile
98245555

Submit

Figure 22: Screenshot of Vendor Profile Screen



Product Form

Product Name

Enter product name

MRP

Enter product MRP

Price

Enter product price

Qty

Enter product quantity

Short Description

Enter product short description

Image

Choose File No file chosen

Next

Figure 23: Screenshot of Product Add Screen

Feedbacks							
Previous		1	Next				
S.N	ID	Name	Email	Mobile	Query	Date	Action
1	5	om	omm@gmail.com	928288^^	dhsjk	2023-07-10 09:52:54	Delete
2	4	test	test@gmail.com	9990413778	test	2020-05-01 09:21:37	Delete
3	3	Vishal	vishal@gmail.com	1234567890	testing	2020-01-19 08:00:09	Delete
4	2	vishal@gmail.com	vishal@gmail.com	1234567890	testing	2020-01-19 07:59:38	Delete
5	1	Vishal	vishal@gmail.com	1234567890	Test Query	2020-01-14 00:00:00	Delete

Figure 24: Screenshot of Feedback Screen

Order

Previous

1

Next

Order ID	Product/Qty	Address	Payment Type	Payment Status	Order Status
14	Pizza 1	Nepal Kathmandu 9600	COD	Pending	<div><div>Pending</div><div></div></div> <div>Update</div>

Figure 25 Screenshot of: Order Status Screen




Wishlist					
Previous		1	2	Next	
S.N	products	name of products		Price	
1		Pizza		300	Delete Add to cart
2		Burger		100	Delete Add to cart
3		Burger		100	Delete Add to cart

Figure 26: Screenshot of Wishlist Web Screen

Users				
Previous 1 2 3 Next				
S.N	Name	Email	Added On	Action
1	omni	omeysketch@gmail.com	2023-08-02 23:37:41	Delete
3	om	omprakash.181420@ncit.edu.np	2023-08-02 15:27:18	Delete
5	laptop	laptop@gmail.com	2023-07-24 16:49:02	Delete
7	bottle	bottle@g.c	2023-07-24 16:45:02	Delete
9	redmi	redmi@gmail.com	2023-07-24 16:32:37	Delete

Figure 27: Screenshot of User's Screen

Vendor							
Add Vendor							
Previous 1 Next							
S.N	ID	Username	Email	Mobile	type	Scene	Action
1	24	meta shop	om@gmail.com	98245555	Shop	Store	Active Edit Delete
2	2	metarestro	metarestro@gmail.com	982466655	Restaurant	restaurant	Active Edit Delete

Figure 28: Screenshot of Vendor Screen

News Management				
Add News				
Previous 1 Next				
S.N	Title	Description	Created At	
1	NCIT Fest	Today is ncit day	2023-08-02 15:33:28	Delete
2	Metamandu	This is the test case where we try to adjust the news.	2023-08-01 17:59:32	Delete
3	Welcome to Metamandu	Metamandu is a meta real city.	2023-08-01 17:52:34	Delete

Figure 29: Screenshot of News Screen

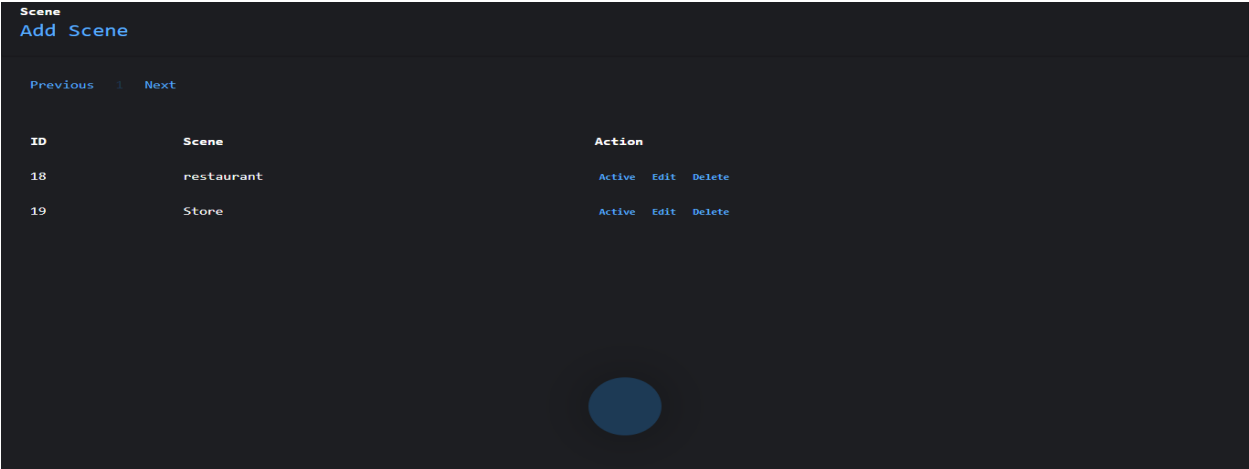


Figure 30: Screenshot of Scene Screen

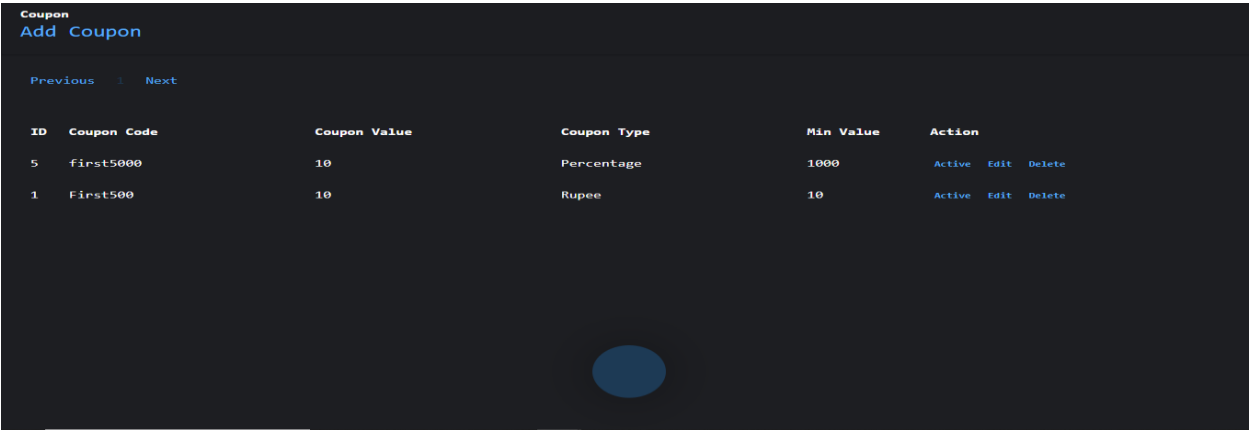


Figure 31: Screenshot of Coupon Screen



Figure 32: Screenshot of Splash Screen



Figure 33: Screenshot of Loading Screen

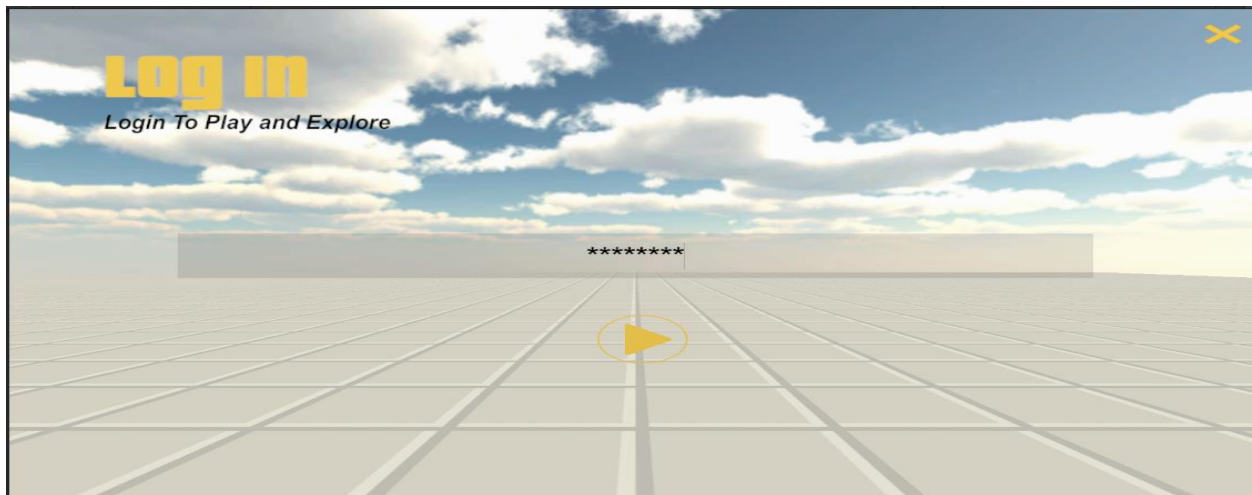


Figure 34: Screenshot of Login Screen

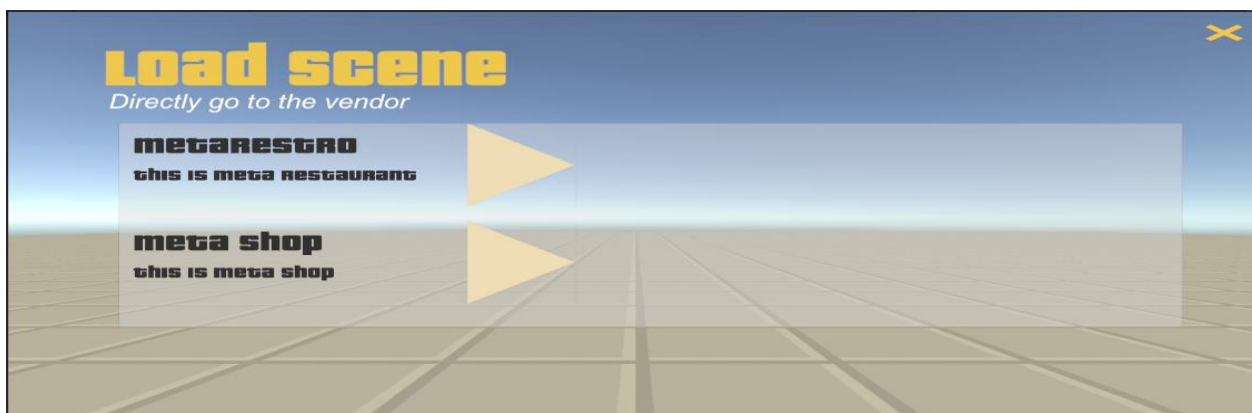


Figure 35: Screenshot of Load Screen

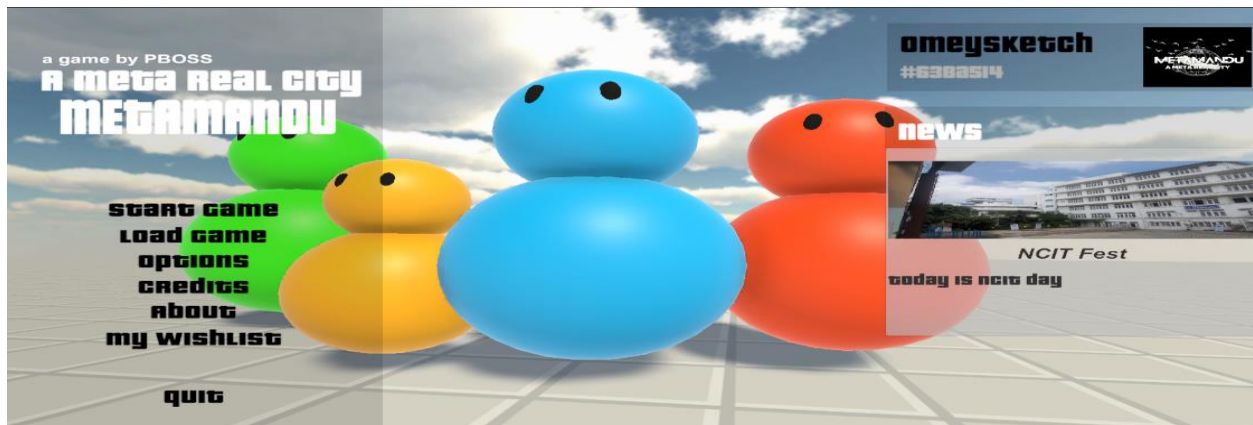


Figure 36: Screenshot of Home Screen

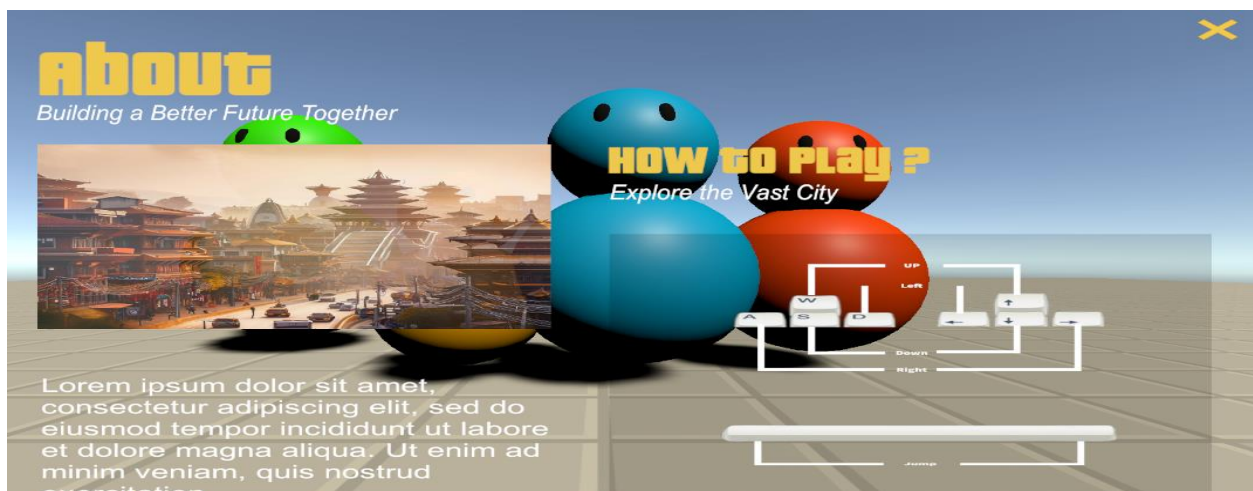


Figure 37: Screenshot of About Screen

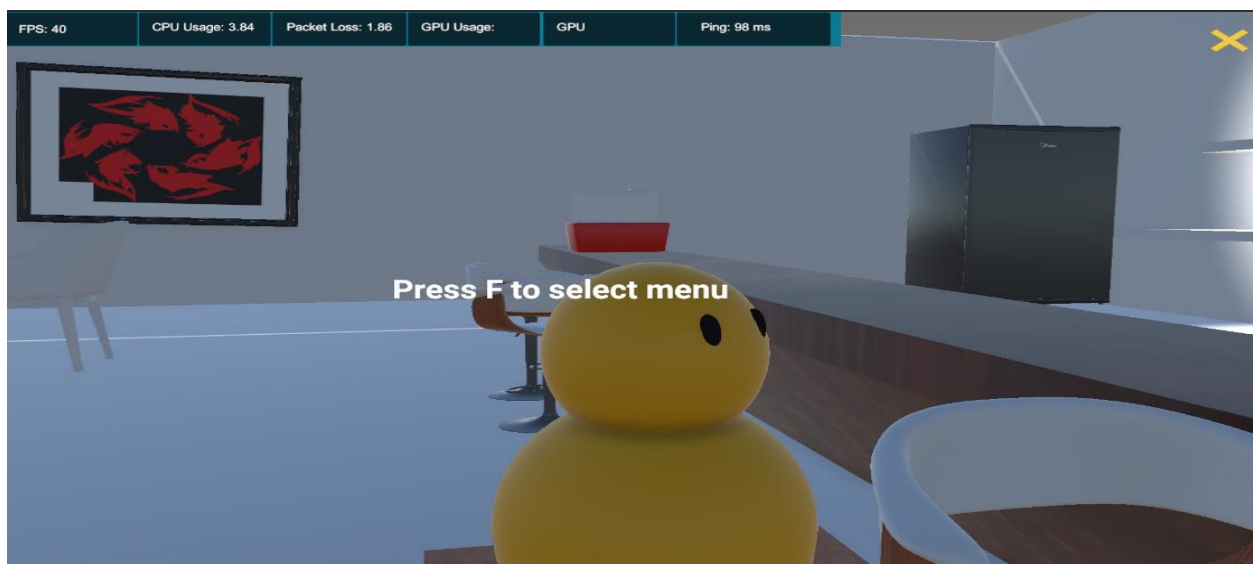


Figure 38: Screenshot of Entry View

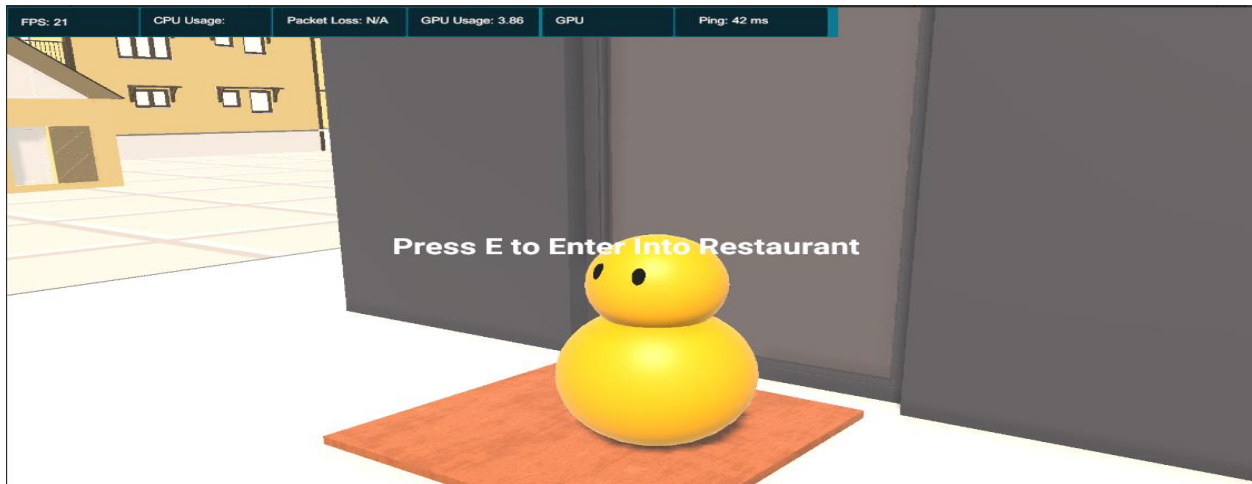


Figure 39: Screenshot of Entrance View

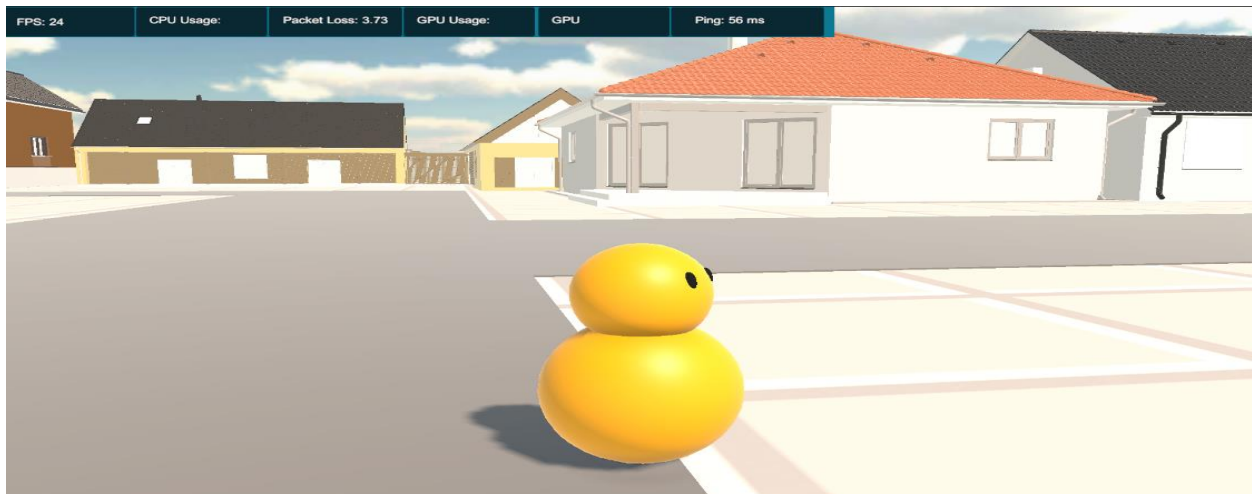


Figure 40: Screenshot of TPP View

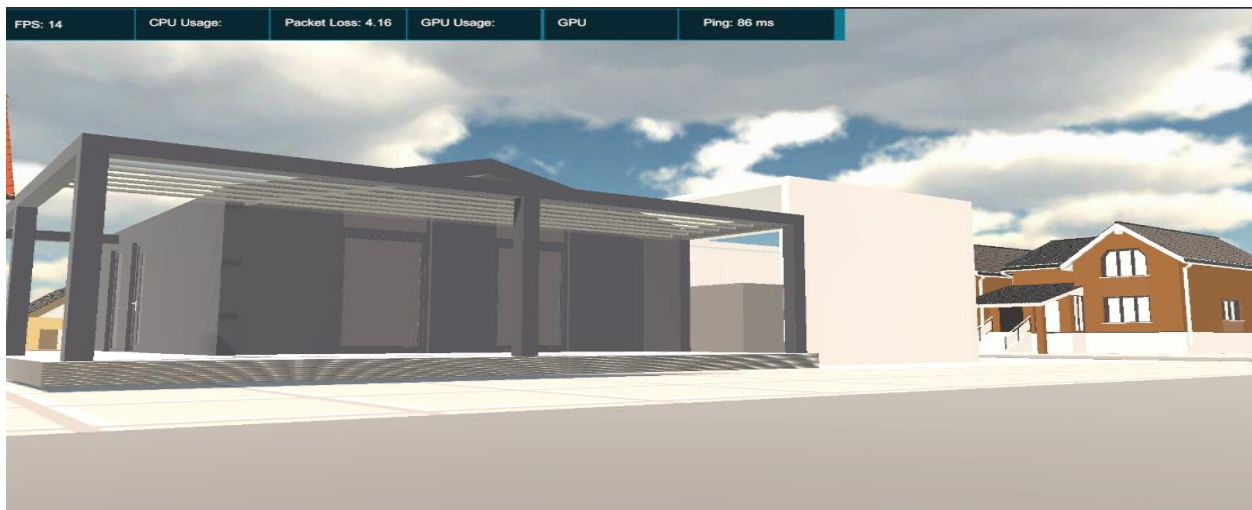


Figure 41: Screenshot of FPP View



Figure 42: Screenshot of Store View

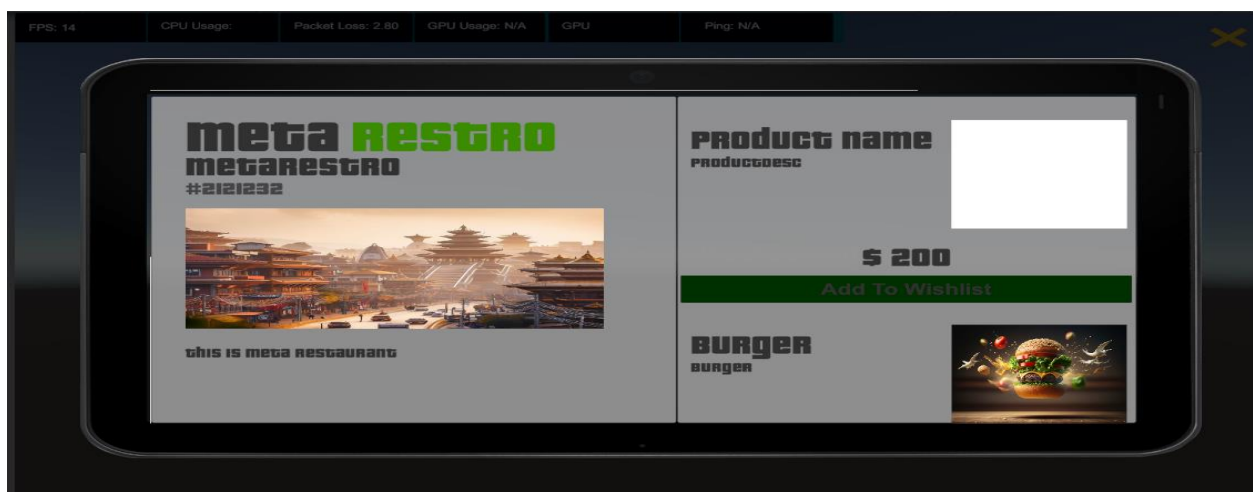


Figure 43: Screenshot of Menu Screen

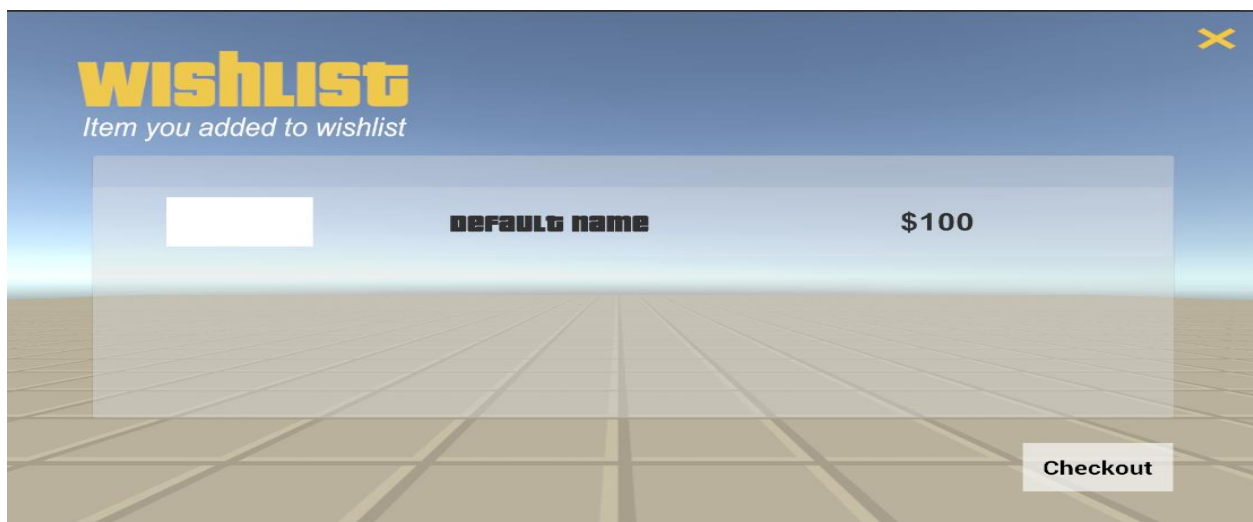


Figure 44: Screenshot of Wishlist Screen

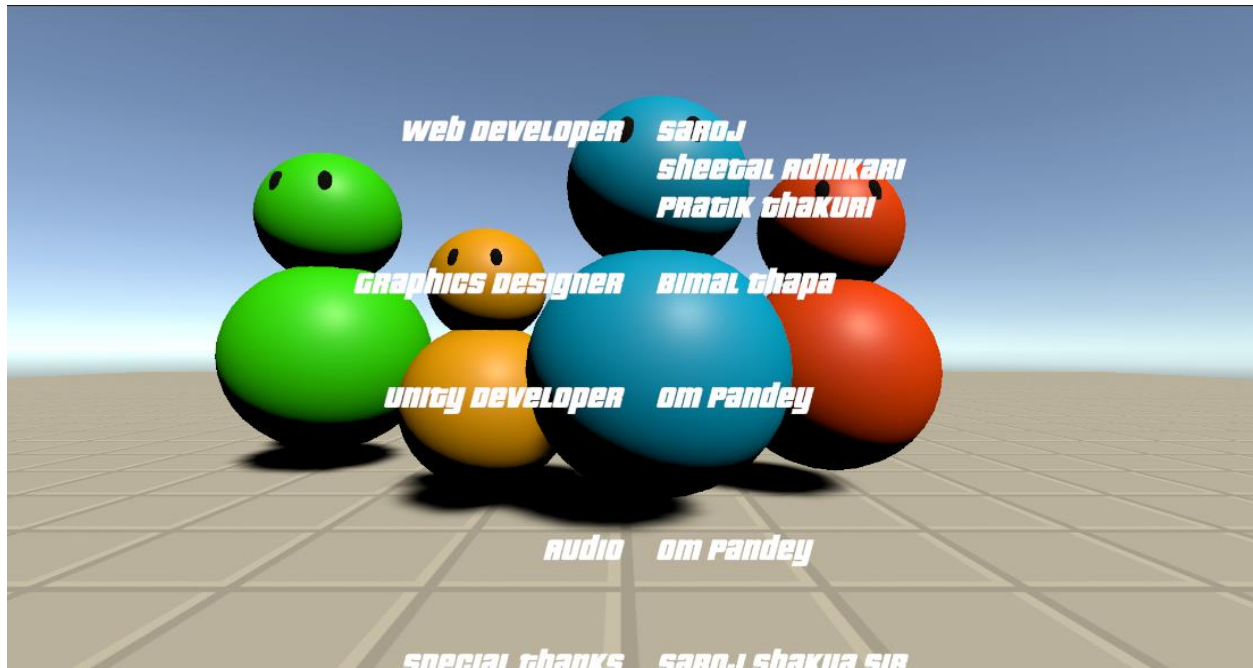


Figure 45: Screenshot of Credit Screen



Figure 46: Screenshot of Quit Screen