Software Requirements Specification

for

AugBuddy

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Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose

The purpose of this SRS document is to provide a clear and detailed description of the requirements for the new learning application. The document will guide the development team, providing them with a clear understanding of the project's objectives and the necessary features to be included in the application.

The purpose of this SRS document is to outline the requirements for a new learning application for students aged 6-10. The software is designed to provide students with a fun and engaging learning experience that harnesses the power of augmented reality technology. In addition to traditional academic subjects, the software also includes interactive environments that allow students to explore various theme parks and fair lands.

1.2 Document Convention

This document follows standard documentation conventions such as providing an overview, specifying the requirements in detail, defining the scope, and outlining the expected deliverables.

This document is written in English and follows standard grammar and spelling conventions for ease of reading and understanding.

Acronyms and abbreviations used throughout the document are defined in a glossary at the end of the document.

All requirements are numbered for ease of reference and are written using the standard shall/must format.

Use cases and scenarios are described using a standard format, including preconditions, post-conditions, and steps.

All diagrams and illustrations in the document are labeled with a clear title and figure number and referenced in the document’s text where relevant.

1.3 Intended Audience and Reading Suggestions

This document is intended for the development team, stakeholders, and anyone involved in the project's implementation. The audience is expected to have a basic understanding of software development concepts and practices. It is suggested that the reader first familiarizes themselves with the project's objectives before reading the detailed requirements.

1.4 Product Scope

The product scope includes the learning application's objectives, features, and constraints. The application's primary objective is to provide a fun, immersive, and interactive learning experience for students aged 6-10. The application will be built using Unity and Vuforia and will use augmented reality technology to create interactive environments that students can explore and learn from. The application will also include interactive content, such as quizzes, games, and puzzles, to support students' learning.

1.5 References:

IEEE Standard for Software Requirements Specifications (IEEE Std 830-1998)

ISO/IEC/IEEE 29148:2018 - Systems and software engineering -- Life cycle processes -- Requirements engineering.

Agile Alliance. (2001). Manifesto for Agile Software Development.

Fagan, M. (1976). Design and Code Inspections to Reduce Errors in Program Development. IBM Systems Journal, 15(3), 182–211.

Gottstein, E., & Gorman, M. (2012). Discover to Deliver: Agile Product Planning and Analysis. EBG Consulting.

2. Overall Description:

2.1 Product Perspective

This section describes the product's context and how it fits into the larger system of which it is a part. Our product is a standalone application that is designed to be used by playgroup students aged 6-10. It is intended to provide a more innovative and child-centered approach to learning, using augmented reality technology to engage students and enhance their learning experience.

2.2 Product Features

The product will include the following features:

A variety of interactive, augmented reality experiences that allow students to explore different environments and concepts in a fun and engaging way.

Educational content aligned with playgroup curriculums that students can access and interact with through the application.

User-friendly interface and controls that are easy for young students to navigate and use.

A range of customization options allows students to personalize their experience and choose the environments they want to explore.

2.3 User Classes and Characteristics

The primary users of the product are playgroup students aged 6-10. These users will have varying degrees of familiarity with technology, but the application is designed to be intuitive and user-friendly to accommodate a range of skill levels.

2.4 Operating Environment

The application will be designed to run on mobile devices running iOS and Android operating systems. It will require an internet connection to download content and updates, but once content is downloaded, it can be used offline.

2.5 Design and Implementation Constraints

The application will be developed using Unity and Vuforia, which are widely used platforms for developing augmented reality applications. The design will need to be optimized for use on mobile devices, with considerations made for screen size, resolution, and performance.

2.6 User Documentation

User documentation will be provided in the form of an online user manual, which will include instructions for using the application, troubleshooting tips, and other relevant information.

2.7 Assumptions and Dependencies

The product assumes that users will have access to a mobile device with an internet connection and will have basic familiarity with mobile devices. The application depends on the availability and stability of the internet connection, as well as the ongoing support and maintenance of the Unity and Vuforia platforms used to develop it.

3. System Features:

System features are the specific functionalities that the product must provide to meet its objectives. These features are described in detail in this section to provide a clear understanding of the system's capabilities and limitations.

3.1 Improving UI/UX:

System feature 1 includes the use of augmented reality technology to provide a highly interactive and engaging learning experience to children between the age of 6-10. This feature allows users to explore a virtual environment that enhances the learning process, making it more enjoyable and interactive.

3.2 Including Themes :

System feature 2 includes the integration of different themes and learning materials that are suitable for children between the ages of 6-10. This feature provides an extensive library of educational materials, including videos, quizzes, and other interactive content, to support children's learning process.

3.3 Easy Flow:

System feature 3 includes providing an easy-to-use interface that is intuitive and user-friendly. This feature allows users to navigate the application without any difficulties and provides an enjoyable user experience.

3.4 Progress:

System feature 4 includes the incorporation of a progress-tracking system that allows teachers and parents to monitor the child's progress in real-time. This feature provides feedback on the child's performance and helps to identify areas of improvement.

In summary, the system features section describes the essential functionalities of the product, including the use of augmented reality, integration of educational materials, user interface design, and a progress tracking system. These features provide a comprehensive learning experience for children between the ages of 6-10, making the learning process more interactive and enjoyable.

4. External Interface:

4.1 User Interfaces:

The user interface for the application will be designed to be intuitive and user-friendly, with simple navigation and clear instructions. The application will be primarily designed for use on mobile devices, such as smartphones and tablets, and will feature touch-screen controls.

4.2 Hardware Interfaces:

The application will require a mobile device with a camera and sufficient processing power to handle the demands of augmented reality. The device must also have a stable internet connection to download and update the application.

4.3 Software Interfaces:

The application will be developed for both iOS and Android platforms, using their respective software development kits (SDKs). It will be compatible with the latest versions of these operating systems.

4.4 Communications Interfaces:

The application will require a stable internet connection to download and update content, as well as to access additional features such as online multiplayer. It will use standard communication protocols such as HTTP and HTTPS for data transfer.

- **Learning Content**

The software shall provide age-appropriate content for students aged 6-10.

The software shall provide content in various academic subjects, including language arts, math, science, and social studies.

The content shall be interactive and designed to engage the student's creativity and imagination.

The software will track students' progress and provide feedback to both students and teachers.

The software shall allow teachers to customize content to meet the needs of individual students or groups of students.

- **Augmented Reality**

The software shall include augmented reality technology to enhance the learning experience.

The software will allow students to interact with virtual objects in the real world.

The software shall provide a seamless experience, with virtual objects appearing to be part of the physical environment.

The software shall support a range of devices, including smartphones and tablets.

- **Interactive Environments**

The software shall include various interactive environments like theme parks and fair lands.

The environments shall be designed to be fun and engaging, while also providing learning opportunities.

- **Detail Exposure:**

Augmented reality (AR) is a technology that enhances our perception of the physical world by overlaying computer-generated sensory information such as sound, graphics, or video onto it. AR applications have gained popularity in recent years and have been widely used in various fields, including entertainment, education, advertising, retail, and healthcare.

Here are some examples of augmented reality applications:

Entertainment: Augmented reality has been widely used in the gaming and entertainment industry. One popular example is Pokémon Go, an AR game that allows players to capture and collect virtual Pokémon characters in the real world. Another example is the AR app Snapchat, which offers various AR filters and lenses that allow users to enhance their photos and videos with fun and interactive animations.

Education: AR has been used to enhance learning experiences and make them more engaging and interactive. For example, AR apps can be used to bring textbooks to life by overlaying 3D models, animations, and videos onto the pages. AR can also be used in museums and galleries to provide interactive exhibits and immersive experiences.

Advertising: AR has been used by advertisers to create interactive and engaging campaigns. For example, AR ads can allow users to try on virtual clothes or accessories before making a purchase. AR can also be used to create immersive brand experiences by overlaying virtual content onto physical spaces.

Retail: AR has been used to enhance the shopping experience by allowing customers to try on products virtually before making a purchase. For example, AR apps can be used to overlay virtual furniture or decor onto a room to see how it would look before making a purchase. AR can also be used to provide customers with product information and reviews.

Healthcare: AR has been used in healthcare to enhance medical training and education. For example, AR can be used to overlay virtual anatomical models onto a patient's body to help medical students and healthcare professionals visualize complex medical concepts.

Overall, augmented reality applications have a wide range of uses and have the potential to revolutionize various industries by enhancing the way we interact with the physical world.

- **Accessibility**

The software shall be designed to be accessible to all students, including those with disabilities.

The software shall provide alternative ways of interacting with content, such as through audio or haptic feedback.

- **Non-Functional Requirements**

Technical Requirements

The software shall be compatible with a range of devices and operating systems.

The software shall be easy to install and use, with minimal setup required.

The software shall be designed to be scalable, able to support many users.

User Interface

The software shall have a user-friendly interface, designed to be easy to use for students and teachers.

The interface shall be visually appealing, with high-quality graphics and animations.

The interface shall be designed to be intuitive, allowing users to easily navigate and find content.

Security and Privacy

The software shall meet industry standards for security and privacy.

The software shall protect user data and personal information.

The software shall include measures to prevent unauthorized access or use.

- **Design Constraints**

Technical Constraints

The software shall be developed using Unity, a game engine with support for augmented reality.

The software shall use Vuforia, an augmented reality SDK, to support augmented reality functionality.

System Architecture

The software shall be designed to be modular, with components that can be easily updated or replaced.

5. Other Non-Functional Requirements:

5.1 Performance Requirements

Performance requirements specify how the product should perform and respond to different user actions and system inputs. These requirements define parameters such as response times, throughput, and resource utilization that the system must meet to provide satisfactory performance.

5.2 Safety Requirements

Safety requirements are crucial to ensure that the product is safe to use for its intended purpose. These requirements specify safety measures to be taken, safety-critical functions, and safety-related software design aspects.

5.3 Security Requirements

Security requirements are necessary to protect the product and user data from unauthorized access, modification, or theft. These requirements define security measures such as authentication, access control, and data encryption that must be incorporated into the product.

5.4 Software Quality

Software quality attributes specify the quality characteristics of the software, such as reliability, maintainability, and usability. These requirements ensure that the product is stable, maintainable, and easy to use, and are crucial for its overall success.

In summary, these nonfunctional requirements play a crucial role in ensuring the overall quality and usability of the product, and their implementation is essential for the product's success.

User Documentation

The software should include user documentation to help students and teachers use the software effectively. The documentation shall include the following:

User manuals and guides that explain how to use the software.

Tutorials and help resources for troubleshooting and support.

FAQs and other resources to address common questions and concerns.

Glossary

The following terms are used in this SRS document:

Augmented Reality: a technology that superimposes computer-generated images on a user's view of the real world.

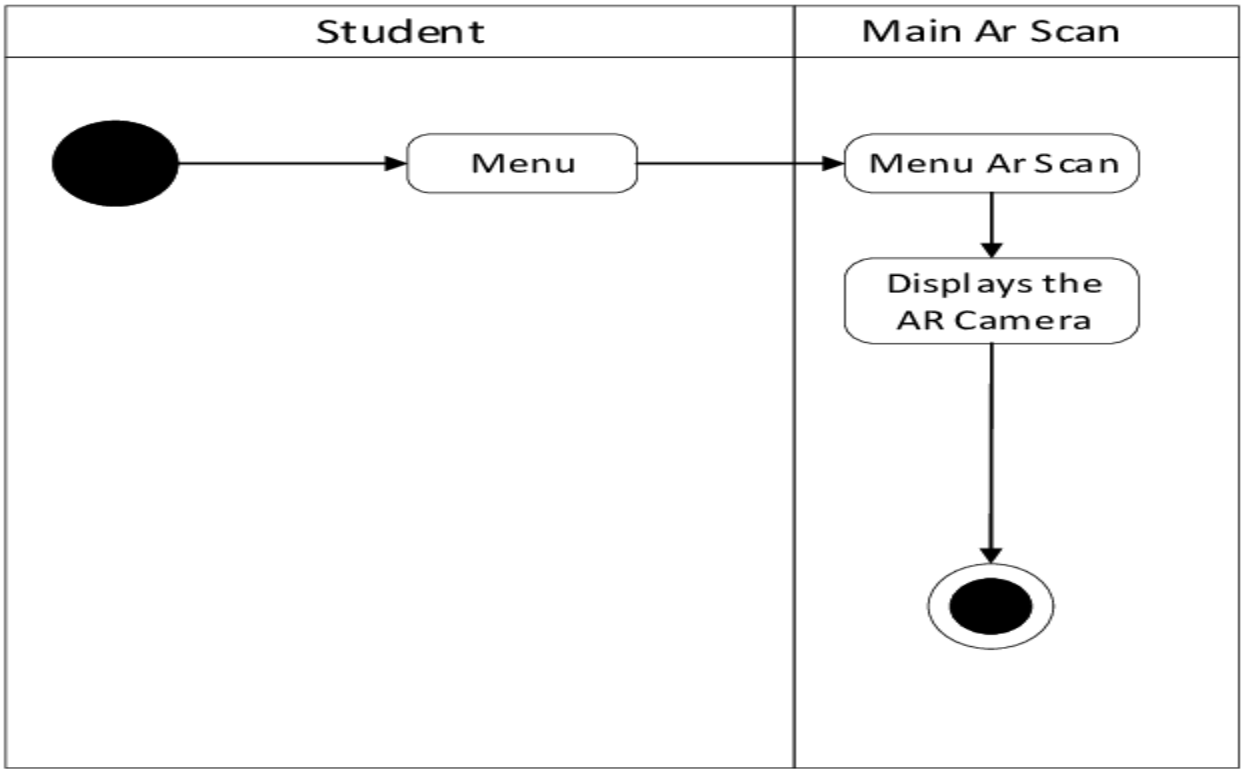
Interactive Environments: virtual environments that allow users to interact with virtual objects and learn through exploration and play.

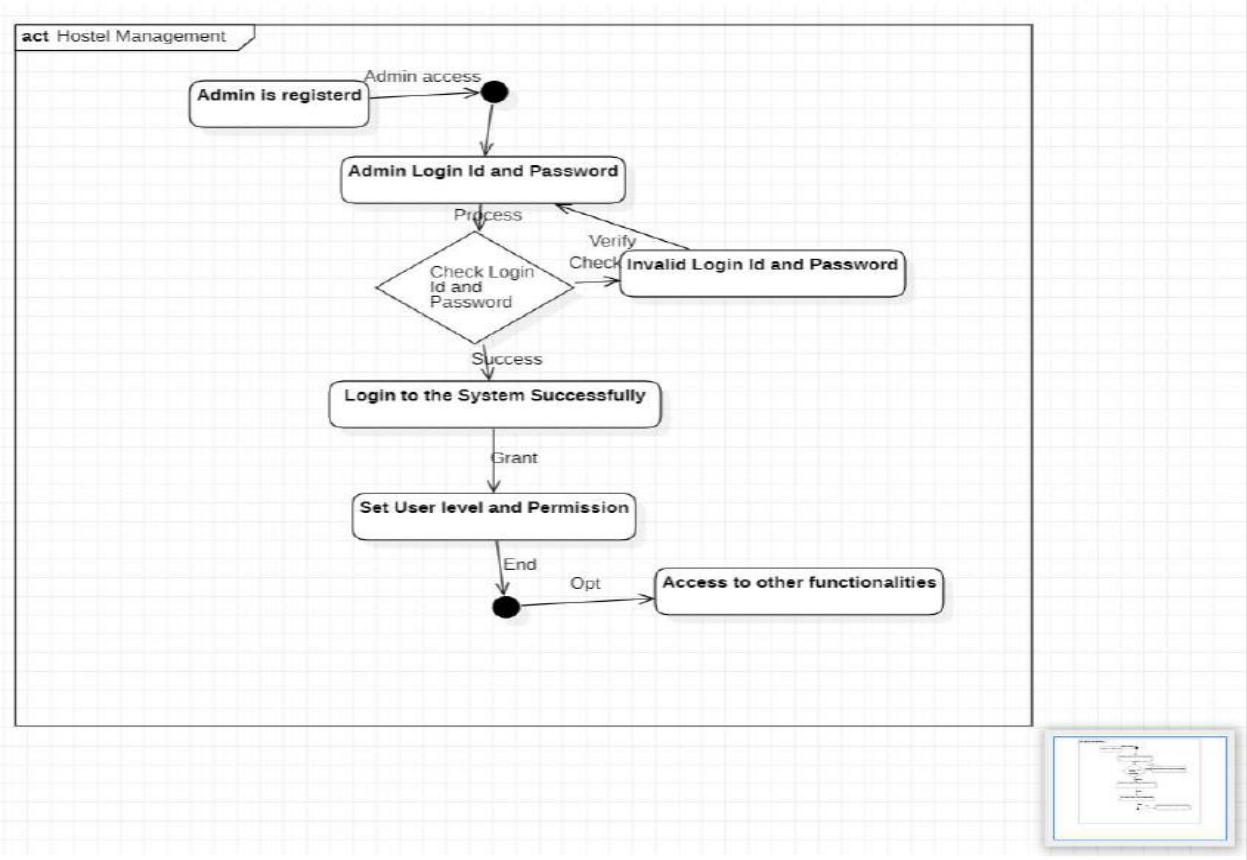
Theme Parks: amusement parks that feature various themed areas and attractions.

Fair Lands: fantasy lands with magical themes and creatures.

Conclusion

This SRS document outlines the requirements for a new learning application for students aged 6-10. The software is designed to provide an engaging and interactive learning experience using augmented reality technology. The software includes a range of content and interactive environments to support learning and creativity. The software is designed to be accessible, secure, and scalable. It will be developed using Unity and Vuforia and will comply with industry standards and regulations. User documentation will be provided to help students and teachers use the software effectively.


Student
Main Ar Scan
Menu
Menu Ar Scan
Displays the AR Camera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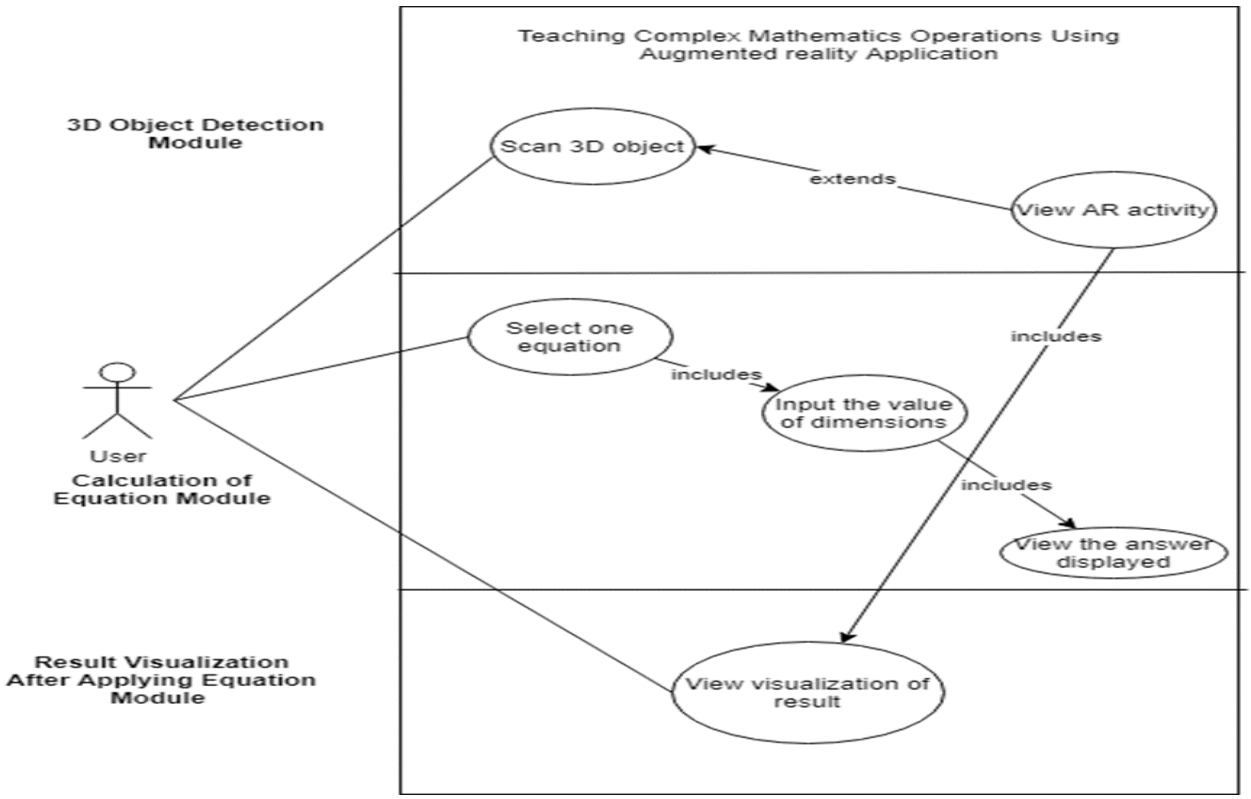
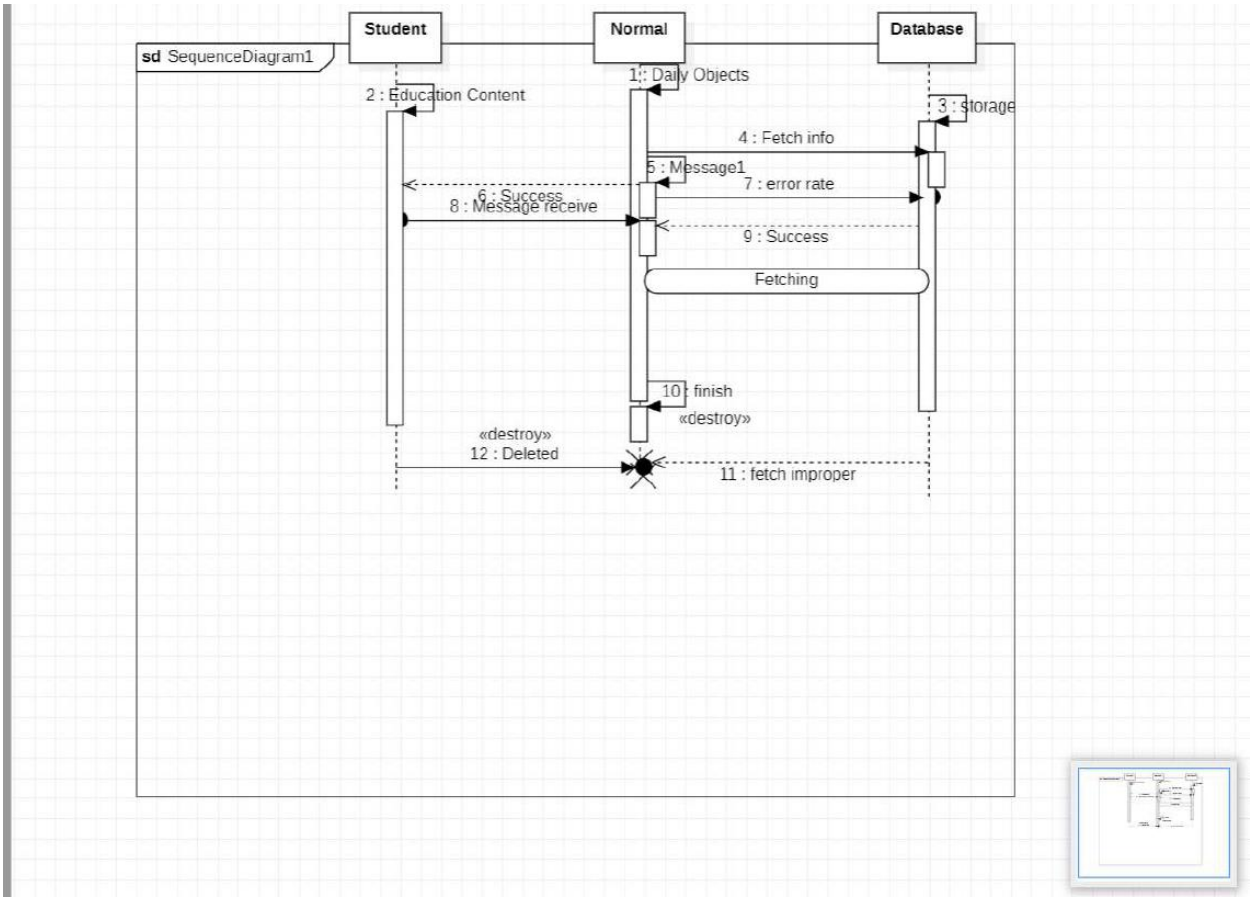
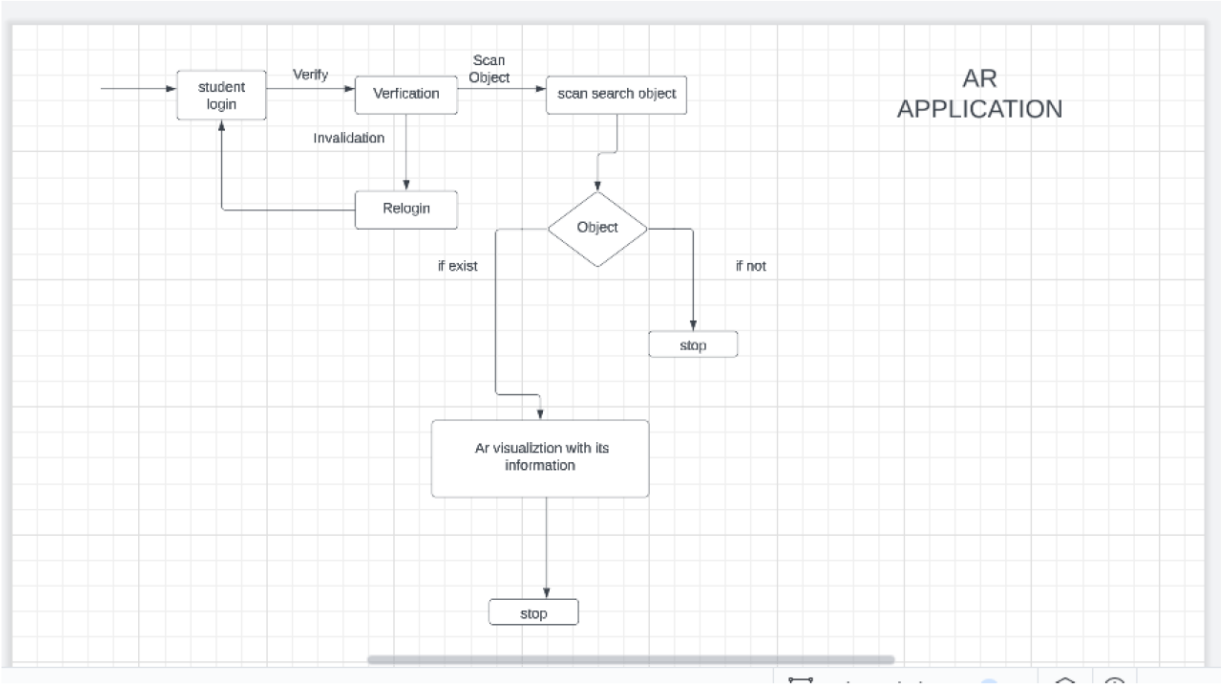
Opt
Access to other functionalities


Teaching Complex Mathematics Operations Using Augmented reality Application
3D Object Detection Module
Scan 3D object
extends
View AR activity
Select one equation
includes
Input the value of dimensions
includes
includes
View the answer displayed
User
Calculation of Equation Module
Result Visualization After Applying Equation Module
View visualization of result


sd SequenceDiagram1
Student
Normal
Database
1 : Daily Objects
2 : Education Content
3 : storage
4 : Fetch info
5 : Message1
6 : Success
7 : error rate
8 : Message receive
9 : Success
Fetching
10 : finish
«destroy»
«destroy»
12 : Deleted
11 : fetch improper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stop