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Augmented Reality (AR) Story Book

In partial fulfilment of the requirements for the degree of

Bachelor of Science in Information Technology

Supervisor: Numan Aslam

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Bahria University, Lahore Campus

July 2020

C e r t i f i c a t e

We accept the work contained in the report titled

"Augmented Reality (AR) Story Book"

Written by

ALI BIN HUSSAIN

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As a confirmation to the required standard for the partial fulfilment of the degree of Bachelor of Science in Information Technology.

Approved by:

Supervisor: Numan Aslam

_____ (Signature)

July 20, 2020

DECLARATION

We hereby declare that this project report is based on our original work except for citations and quotations which have been duly acknowledged. We also declare that it has not been previously and concurrently submitted for any other degree or award at Bahria University or other institutions.

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Specially dedicated to

Family members, Friends and Teachers

(ALI BIN HUSSAIN)

My family, BULC, and above all supervisor

(ALI AWAIS)

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AUGMENTED REALITY (AR) STORY BOOK

ABSTRACT

This project intends to develop a real time android application using Augmented Reality (AR). The concept provides more freedom for the users and option for business because it does not need to be a wearable display such as Virtual Reality (VR). The primary goal of this application will be to create a learning environment for user and allows them to use this technology effectively and efficiently with as much satisfaction as possible. Different tools and techniques will be used to developed augmented reality story book, Vuforia will be utilized for android development. 3D Max or Blender will be used for 3D modelling and animations. With the help of camera of mobile the object will be scanned. The application will narrate the text by speakers of the device, it also will present 3d animation and provide a learning environment.

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LIST OF SYMBOLS / ABBREVIATIONS

AR	Augmented Reality
VR	Virtual Reality
ARSB	Augmented Reality Story Book

CHAPTER 1

INTRODUCTION

Augmented Reality is the physical view of the real-world environment that works on computer vision-based reorganization algorithms to augment sounds, video, graphics and other sensor-based inputs or real-world object using camera of device. In augmented reality the view of reality is tailored by computer this concept is also known as tailored reality. We must be clear on difference between AR and VR which help us understand augmented reality more clearly. The AR changes one's reality, whereas virtual reality replaces the real world.

The capabilities of AR is becoming vast which has begun to be explored and become the part of everyday life with the development of other technologies such as sensing technology, graphic, computer vision system and mobile computing which allow us to make a virtual book that will help children to learn.

As we know the practice of book reading as technology changes the habit of book reading is vanishing from youngster, but we must keep alive the habit of in our kids. For this purpose, we use AR technology such as application that has feature like 3D modelling, animation etc. which attracts kids.

The augmented reality story book will involve a feature object such as story book, alphabetic book for children to understand and pronounce ABC with animation and sound. There will be more modules include in the application. The user can swipe select the book and as soon as the object is recognized it will create an augmented environment upon the user mobile. The feature of click within the book will also be added so that if different object is tapped it will start a small animation the application will create a smooth and professional user experience with the goal of book creating a learning augmented environment and education platform for children.

To develop an AR book is a mobile application that enables readers to dive into the writing using AR to retroactively supply existing kid's books into 3D which shows into the mobile phone. This will create a digital learning environment for kids and boost their interest reading as well as visible learning will be more beneficial for them to grasp the concept rather than just reading.

Augmented reality is a fast-evolving technology. Technology giants like Apple and Google are working hard to improve development frameworks. With the launch

of Apple's AR Kit and Google's AR Core in 2017.It is now clear that augmented reality has a high growth potential.

Examples of augmented reality are games, travel, marketing, decoration, movies, Commercial Ads and even education. In general, this technology offers many opportunities for new and existing companies. The application will give us a visual 3D-models which will give us wider understanding of things. AR swivels the environment around you into a digital interface by placing implicit objects in the real world, in real-time.

The reason why we are working on this project it has vast scope in the field of education. The Concept of our project can lead to create a professional learning environment apart from children this project has vast boundaries. For Example, suppose that a medical student is reading a book about brain we can create a learning for him/her that can be helpful for them to understand the bookish knowledge by visuals such virtual brain created in augmented environment. In which the concept on a book page is explained or narrated by the visual and augmented means which is efficient to grasp the concept. Not just in medical field but it can be done to the book of any field because visuals are knowledge you always remember.

1.1 Background

Virtual AR is an interactive experience of a real world in which real objects are amplified by computer-generated perceptual information, sometimes through multiple sensory modalities, including visual, auditory, and auditory. Superimposed sensory information can be constructive additive to the natural environment or destructive masking the natural environment and is perfectly connected to the physical world to be perceived as an immersive aspect of the environment real.

In this way, augmented reality changes the current perception of a real environment, while virtual reality completely replaces the user's real environment with a simulated environment. Augmented reality refers to two generally synonymous terms: mixed reality and computer-mediated reality.

1.2 Problem Statements

We live in the "digital" era and our lives are surrounded by several technologies, whose purpose is to ease and simplify our lives in several aspects. When it comes to technological advancements, the word augmented reality is thrown around a lot these days. But apart from being used to catch Pokémon and adding filters on your Snap Chat, AR is a whole new universe, waiting to be explored and can become very

efficient in learning purpose basically for children. As children in this era are very good with technology, so AR will provide a platform for the children to learn using the modern technology with keen interest. Children can learn from interactive experiences. AR will produce the supplementary information to the children when the books or flashcards will scan by the AR device. The movement of the objects in 3D will make children curious about the things and they will become more active learners. We aim to spread these innovations to all types of consumers regardless of their technical knowledge and skills. We aim to provide a complete range of services from basic support services such as 3D modelling.

1.3 Aims and Objectives

- The application will display the cartoon characters of the book into the 3D-models objects.
- The application will give us the visual 3D-models which will give a wider understanding of the things.
- The application will have the ability to render the objects which are hard to understand by turning them into the 3D-models.
- The application will help children with their listening and speaking skills because of the text reading part.

1.4 Scope of Project

- Mobile Application
- Creating augmented environment
- 3d modeling
- 3d animations
- Narration and subtitle
- Tap action
- Multiple books modules
- Image processing and recognition
- Learning outcome

CHAPTER 2

LITERATURE REVIEW (and/or SRS)

2.1 Proposed System

The current systems that exist are support for android. Our game plays start plays with minimum jellybean 4.1 android versions and so on size of app is up to 500mb and orientation is landscape right. The current systems that exist are small bits of a bigger picture.

Augmented Reality truth is a quick advancing innovation. Innovation goliaths like Apple and Google are striving to improve advancement structures. With the dispatch of Apple's AR Kit and Google's AR Core in 2017.

2.2 Overview

The proposed system of the Android AR game provides the real environment to its users. The AR camera understand the marked base image to detect then enjoy the App.

2.3 Functional Requirements

2.3.1 FR01: Home Page

Req. No.	Functional Requirements
FR01-01	The system shall enable the user to quickly overview the application.
FR01-02	The system shall allow the user to choose from the following options. • Book Selection • Settings • Mute • Exit • About Us

Table 2.1: Home Page

2.3.2 FR02: Scan Object

Req. No.	Functional Requirements
FR02-01	The system shall enable the user to scan the page of the book.
FR02-02	The system shall enable the user to interact with the 3D-models of the detected objects.

Table 2.2: Scan Object

2.3.3 FR03: Narrate Text

Req. No.	Functional Requirements
FR03-01	The system shall narrate the detected text from a page of the book.
FR03-02	The system shall narrate text from the speakers of the device.

Table 2.3: Narrate Text

2.3.4 FR04: View Subtitles

Req. No.	Functional Requirements
FR03-01	The system shall view the subtitles of the detected text from the page of the book.
FR03-02	The system shall view the subtitles on the bottom of the device screen.

Table 2.4: View Subtitle

2.3.5 FR05: Screenshot

Req. No.	Functional Requirements
FR04-01	The system shall allow the user to take the screenshot of the display screen.
FR-04-02	The system shall allow the user to save the screenshot.
FR04-03	The system shall allow the user to discard the screenshot.
FR04-04	The system shall allow the user to rotate the taken screenshot.
FR04-05	The system shall allow the user to zoom-in the screenshot.

Table 2.5: Screenshot

2.3.6 FR06: Settings

Req. No.	Functional Requirements
FR05-01	The system shall allow the user to choose from the following options. • Sound Volume • Mute • Back
FR05-02	The system shall allow the user to volume-up or volume-down by using the horizontal scrollbar.
FR05-02- 01	The system shall allow the user to mute the volume of the application.
FR05-02	The system shall allow the user to go back to the previous page by pressing the Back button.

Table 2.6: Settings

2.4 Non-Functional Requirement:

2.4.1 NFR01: Performance Requirements

NFR01-01	Average load time of the starting page of the system must be less than 2 seconds.
NFR01-02	Average processing time taken by the system to complete a transaction/request should be less than 10 seconds.
NFR01-03	System Mean Time to Failure should not be more than 60seconds within 24 hours of use.
NFR01-04	Average system response time should not be greater than 5 seconds.
NFR01-05	The system must successfully run on a client machine with 2 GB RAM or above.
NFR01-06	100 Students should be able to simultaneously access the system and update the database.

Table 2.7: Performance Requirement

2.4.2 NFR02: Safety Requirements

NFR02-01	Post Release defects of the system must not exceed 1 critical bug per month.
NFR02-02	Post Release bug fixing should not take more than 5 hours.

Table 2.8: Safety Requirements

2.4.3 NFR03: Security Requirements

NFR03-01	The system must provide access to authorized users only that enter through the login module.
NFR03-02	The system must not provide access to ANY user EXCEPT the designated user to update the database.
NFR03-03	No user can view data of any other user through any report or views provided by the system.
NFR03-04	After the end of a user Session, no information must be saved anywhere on the client machine.

Table 2.9: Security Requirements

2.4.4 NFR04: Software Quality Attributes

NFR04-01	In the case of client /server crash, all information/data should be recoverable within 30 minutes of the incidence.

Table 2.10: Software Quality Attributes

2.5 Operation Environment

Operating Environment	Hardware/Software
Mobile Phone	Android Minimum 16-megapixel camera required minimum resolution of 480x800 Compass (magnetometer), rear facing camera, GPS, gyroscope and an accelerometer.

Table 2.11: Operation Environment

CHAPTER 3

DESIGN AND METHODOLOGY

3.1 Main Component

Tools	Version
Unity	Unity 2019.2.9
Vuforia	Vuforia Engine v8.5.8
Visual Studio	Visual Studio 2019
Blender	Blender 2.80
Balabolka	Balabolka 2.3
Android studio	Version 3.3
Adobe Photoshop	Cs6
Adobe illustration	Cc2015
Adobe Premier Pro	Cc2017
Mobile Phone	Minimum 16-megapixel camera required minimum resolution of 480x800 Compass (magnetometer), rear facing camera, GPS, gyroscope and an accelerometer.
Books	Story, learning books.

Table 3.12: Main Component

3.2 Methodology

The Scrum Development Model also be used to develop an augmented reality project.

Initiate - This phase includes the processes related to initiation of a project: Create Project Vision, Identify Scrum Master and Stakeholder(s), Form Scrum Team, Develop Epic(s), Create Prioritized Product Backlog, and Conduct Release Planning.

Plan and Estimate -This phase consists of processes related to planning and estimating tasks, which include Create User Stories, Approve, Estimate, and Commit User Stories, Create Tasks, Estimate Tasks, and Create Sprint Backlog.

Implement - This phase is related to the execution of the tasks and activities to create a project's product. These activities include creating the various deliverables, conducting Daily Stand-up Meetings, and grooming (i.e., reviewing, fine-tuning, and regularly updating) the Product Backlog at regular intervals.

Review and Retrospect - This phase is concerned with reviewing the deliverables and the work that has been done and determining ways to improve the practices and methods used to do project work.

Release - This phase emphasizes on delivering the Accepted Deliverables to the customer and identifying, documenting, and internalizing the lessons learned during the project.

There are two development types for augmented reality application.

1. Marker based
2. Marker less

This project is going to be based on Marker based methodology. It is a traditional development method for augmented reality projects where the key component is image reorganization. The marker-based tracking allows the use of digital image to identify markers by using camera of device and create an augmented environment upon it.

3.3 Work Breakdown Structure (WBS)

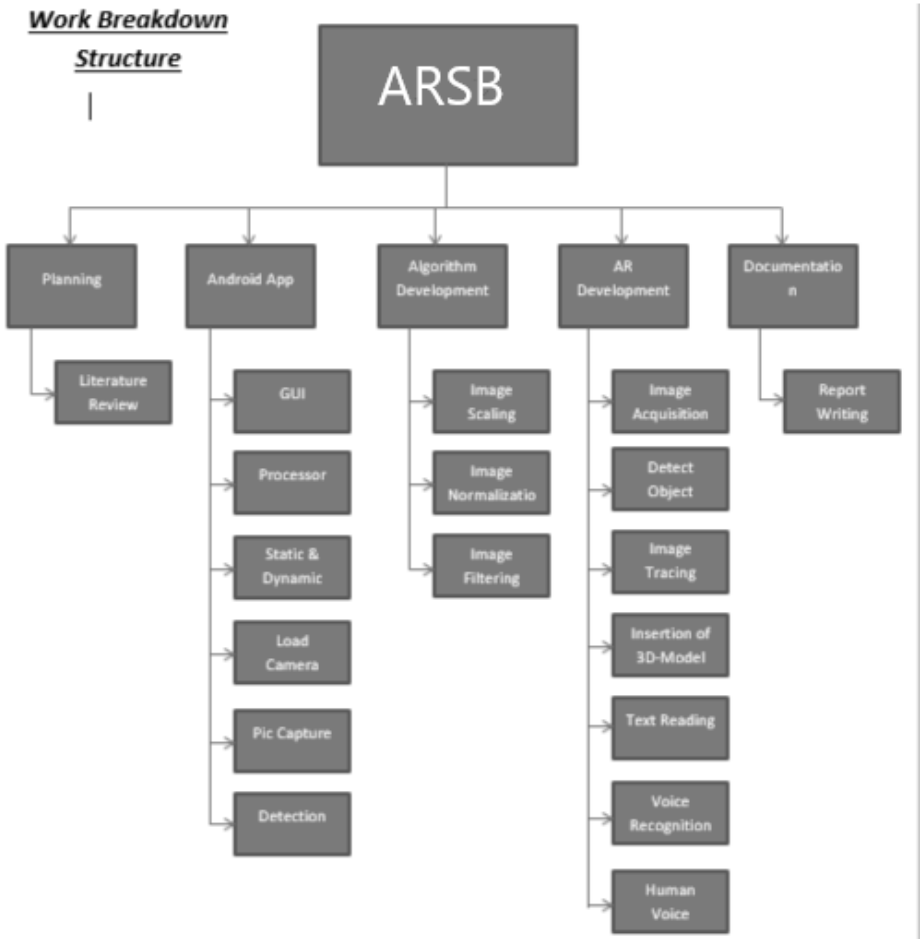

Figure 3.1: Work Breakdown Structure

3.4 Use Case Diagram

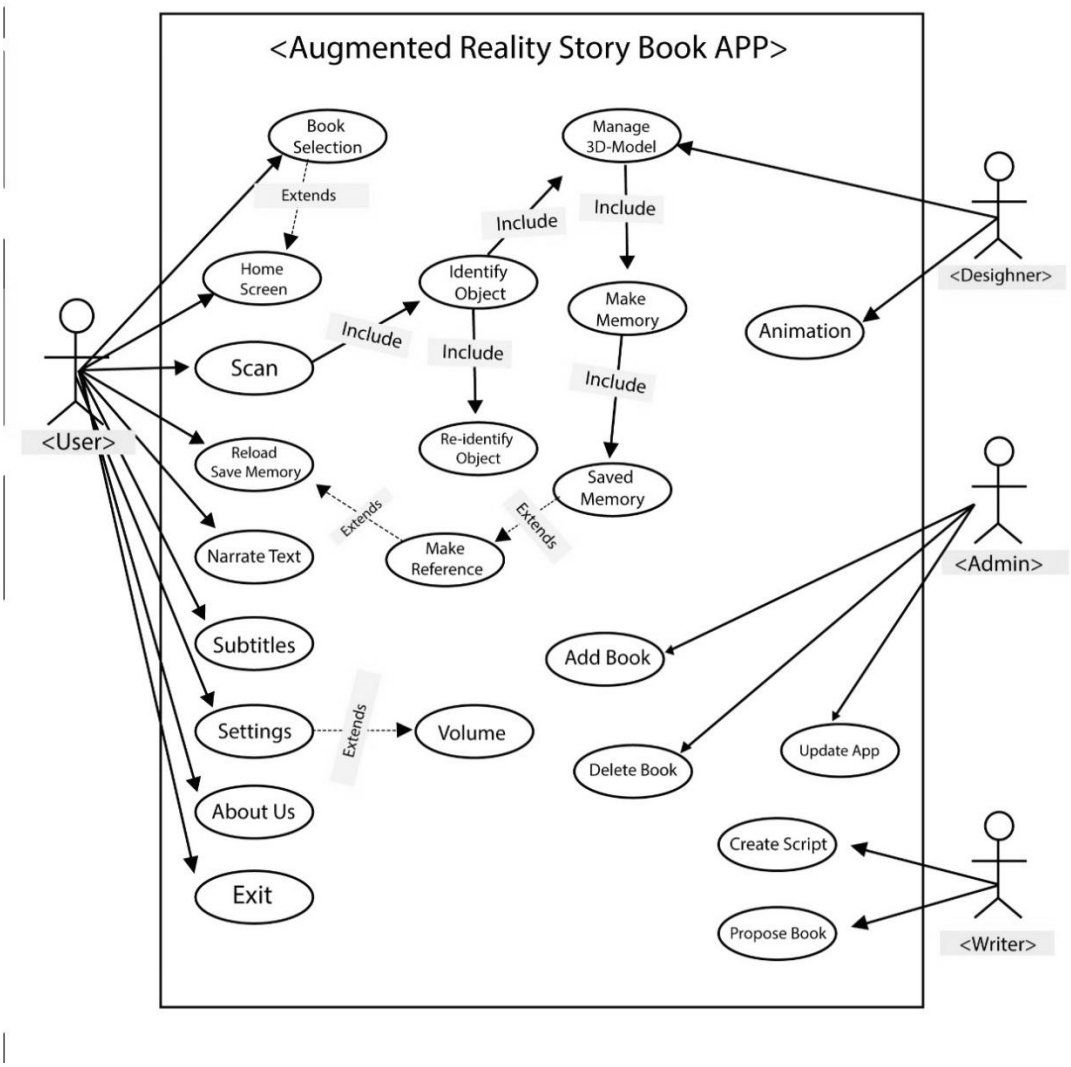

Figure 3.2: Sample Use-Case Diagram

3.5 Use Case Description

3.5.1 Home Screen (U1)

Use case ID 001	**Use case Name: Home Screen**	
Priority	**High**	
Actors:	User	
Use Case Summary	The home screen allows the user to access all functionalities of the application from a single screen.	
Pre-condition:	The user has already taken the quick tour of the application.	
Normal Flow of Events		**Alternative Path**
1. The use case starts when the user moves to the Home screen.		
2. The system displays the Book selection in the center of the smartphone screen.		
3. The system enables the user to choose the following options from the Home Screen. • Book selection • Mute • Exit • Settings		
4. The system displays the settings icon at the top left corner of the screen.		
5.The system displays the Exit icon at the bottom right corner of the screen		

6. The system displays the Mute icon at the bottom right corner of the screen	

7. The system displays the About us icon at the bottom left corner of the screen	
5. This use case ends.	
Post Conditions	
Step#	**Description**
1.	The user can access all the functionalities from one screen of home.
Use Case Cross References	
Includes	None
Extends	None

Table 132: Home Screen (U1)

Scan Object (U2)

Use case ID 002	**Use case Name: Scan Object**	
Priority	**High**	
Actors:	User	
Use Case Summary	Scan Object allows the user to scan an object directly from the book.	
Pre-condition:	They should have chosen the book which they want to play.	
Normal Flow of Events		**Alternative Path**
1. The use case starts when the user plays the book		1a: If the user is not scanning

reading, the camera will scan the cartoon character in the book and a pop up of the cartoon character will appear on the screen.	right target image i.e. scanning any image other than target image an error message of "Wrong Target Image Scanned" will appear on the screen. 1b: If the camera is not scanning the targeted character correctly then an error message of "Scan has not completed. Scan Again! " will be displayed on the screen. 1c: if the camera is unable to detect the object then it will re-identify the object and make sure that it will scan the target.
2. The system responds by displaying the camera screen which enables the user to scan the cartoon directly from the book.	
3. The system makes the 3D-Model of the scanned object and displays it on the device screen.	3a: If the model is not stored in the database then it will not able to appear on the device screen.
4: The system allows the user to save the memory for later use	4a: the system allows the user to delete the captured memory.
3. This use case ends.	

Post Conditions	
Step#	**Description**
1.	The user can scan an object through which 3D models will be created.
Use Case Cross References	
Includes	Identify Object
Extends	None

Table 14: Scan Object

3.5.3 **Identify Object (U3)**

Use case ID 003 **Use case Name: Identify Object**	
Priority **High**	
Actors: User	
Use Case Summary	Identify Object allows the user to identify the scanned object.
Pre-condition:	They should first scan the object through the camera.
Normal Flow of Events	**Alternative Path**
1. The use case starts when the user has scanned the object, the device will identify the object from the system.	1a: if the system hasn't scan any object then it will not identify any model from the system. 1b: If the scan object isn.t save in the system then it will not show any model on the device screen. 1c: if the system hasn't scan any object through the camera, it will then re-identify the object.

2. This use case ends.	
Post Conditions	
Step#	**Description**
1.	The user will see the 3D-Model of the detected object on the device screen.
Use Case Cross References	
Includes	Re-identify,3D-Model
Extends	None

Table 3.4: Identify Object

3.5.4 **Re-identify (U4)**

Use case ID 004	**Use case Name: Re-identify**	
Priority **High**		
Actors: User		
Use Case Summary	Re-identify allows the user to identify the object if it is not identified before.	
Pre-condition:	They shouldn't have identified the object before.	
Normal Flow of Events		**Alternative Path**

1. The use case starts when the user is unable to scan the object in his first attempt.	1a: if the system hasn't scan any object then it will not identify any model from the system. 1b: If the scanned object isn't saved in the system then it will not show any model on the device screen.
2. This use case ends.	
Post Conditions	
Step#	**Description**
1.	The user will see the 3D-Model of the detected object on the device screen.
Use Case Cross References	
Includes	3D-Model
Extends	None

Table 3.5: Re-identify Object

3.5.5 **3D-Model (U5)**

Use case ID 005	**Use case Name: 3D-Model**
Priority	**High**
Actors:	User
Use Case Summary	3D-Model allows the user to see models on the device screen.
Pre-condition:	The system should first identify the object.

Normal Flow of Events	**Alternative Path**
1. The use case starts when the system identifies the scanned object and make the 3D-Model of that scanned object.	1a: if the system hasn't identified any object then it will not make 3D-Model of that object. 1b: If the identified object isn't saved in the system then it will not show any model on the device screen.
2. The use case allows the user to get the screenshot of the 3D-Model of the identified object.	2a: System allows the user to discard the screenshot of the 3D-Model.
3. This use case ends.	
Post Conditions	
Step#	**Description**
1.	The user will see the 3D-Model of the detected object on the device screen.
Use Case Cross References	
Includes	Make-Memory
Extends	None

Table 3.6: 3D-Model

Make Memory (U6)

Use case ID 006	**Use case Name: Make Memory**

Priority **High**	
Actors: User	
Use Case Summary	Make Memory allows the users to capture the memory.
Pre-condition:	The user should identify the object first.

Normal Flow of Events	**Alternative Path**
1. The use case starts when the identified object is shown on the device screen.	1a: The user can discard the capture memory if not needed.
2. This use case ends.	

Post Conditions	
Step#	**Description**
1.	The user can capture the memory of the 3D- Model which is displaying on the device's screen.

Use Case Cross References	
Includes	Saved Memory
Extends	None

Table 3.7: Make Memory

Saved Memory (U7)

Use case ID 007 **Use case Name: Saved Memory**
Priority **High**

Actors: User	
Use Case Summary	Saved Memory allows the user to save memory for future use.
Pre-condition:	The user must capture memory first.
Normal Flow of Events	**Alternative Path**
1. The use case starts when the user wants to save the memory for future use.	1a: The user is not able to save the memory for future use.
2. This use case ends.	
Post Conditions	
Step#	**Description**
1.	The user can save the memory for future use.
Use Case Cross References	
Includes	None
Extends	None

Table 3.8: Saved Memory

Reload Saved Memory (U8)

Use case ID 008	**Use case Name: Reload Saved Memory**
Priority **High**	
Actors: User	
Use Case Summary	Reload Saved Memory allows the user to access the saved memories.

Pre-condition:	The user should have saved the memories first.
Normal Flow of Events	**Alternative Path**
1. The use case starts when the user wants to access the saved memories.	1a: The system will not open any memory if there is no memory saved in it.
2. The system will make reference to the required memory in order to access it.	2a:if there is no memory saved then there will be no reference.
3. This use case ends.	
Post Conditions	
Step#	**Description**
1.	The user can see the save memory whenever they want.
Use Case Cross References	
Includes	None
Extends	Make Reference

Table 3.9: Reload Saved Memory

Make Reference (U9)

Use case ID 009	**Use case Name: Make Reference**
Priority	**High**
Actors:	User
Use Case Summary	Make Reference allows the user to access the saved memory.

Pre-condition:	The user must request a saved memory.
Normal Flow of Events	**Alternative Path**
1. The system will make reference to the required memory in order to access it.	1a: if there is no memory saved then there will be no reference.
2. This use case ends.	
Post Conditions	
Step#	**Description**
1.	The system will access the required memory from the saved memories.
Use Case Cross References	
Includes	None
Extends	None

Table 3.10: Make Reference

3.5.10 **Narrate Text (U10)**

Use case ID 010	**Use case Name: Narrate text**
Priority **High**	
Actors: User	
Use Case Summary	Narrate Text allows the user to hear the sound of the text.
Pre-condition:	The user must have the application installed on their smartphone.

Normal Flow of Events	**Alternative Path**
1. The user presses the audio button to enable/disable audio option for the 3D model.	
2. The system responds by turning audio button on/off to enable/disable audio explanation of generated 3Dmodel	
3. This use case ends.	
Post Conditions	
Step#	**Description**
1.	The user can hear the text reading sound.
Use Case Cross References	
Includes	None
Extends	None

Table 3.11: Narrate Text

3.5.11 **View Subtitles (U11)**

Use case ID 011 **Use case Name: View Subtitles**	
Priority **High**	
Actors: User	
Use Case Summary	View Subtitles allow user to view the subtitles of the narrated text at the bottom of the device screen.
Pre-condition:	The user must have the application installed on their smartphone.

Normal Flow of Events	**Alternative Path**
1. The user hover the camera towards the target image to view the subtitles on the bottom of the screen.	
2. The system responds by generating subtitles at the bottom of the screen while narrating the text.	
3. This use case ends.	
Post Conditions	
Step#	**Description**
1.	The user can view the subtitles at the bottom of the screen.
Use Case Cross References	
Includes	None
Extends	None

Table 3.12: View Subtitles

3.5.12 **Settings (U12)**

Use case ID 012 **Use case Name: Settings**	
Priority **Low**	
Actors: User	
Use Case Summary	Settings allow the user to change the volume of the sound and mute the sound.
Pre-condition:	The user must have the application installed on their smartphone.

Normal Flow of Events	**Alternative Path**
1. The use case starts when the user wants to change volume from the settings.	
2. The system responds by providing the user few of the settings options and then the user will be able to make the changes.	
3. This use case ends.	
Post Conditions	
Step#	**Description**
1.	
Use Case Cross References	
Includes	None
Extends	Volume, Mute.

Table 3.13: Settings

3.5.13 **Volume (U13)**

Use case ID 013 **Use case Name: Volume**	
Priority **Low**	
Actors: User	
Use Case Summary	Volume allows the user to change the volume.
Pre-condition:	The user should be in the setting's interface.
Normal Flow of Events	**Alternative Path**

1. The use case starts when the user clicks on the volume bar to increase or decrease the volume.	
2. The use case starts when the user clicks on the mute button to mute the volume.	
3. This use case ends	
Post Condition	
Step#1	**Description**
1.	The user can change the volume(high/low)
Use Case Cross References	
Includes	None
Extends	None

Table 3.14: Volume

3.5.14 About Us (U14)

Use case ID 014	**Use case Name: About us**	
Priority **Low**		
Actors User		
Use Case Summary	About allows the user to view the vision of application.	
Pre-condition:	The user must have the application installed on their smartphone.	
Normal Flow of Events		**Alternative Path**

1. The use case starts when the user clicks on the about button to view the vision of application.	
2. The system responds by displaying about the screen which describes what an application all about is.	
3. This use case ends.	
Post Condition	
Step#1	**Description**
1.	The user can view the vision of the application.
Use Case Cross References	
Includes	None
Extends	None

Table 3.1515: About Us

3.5.15 **Add Book (U15)**

Use case ID 15	**Use case Name: Add Book**
Priority **High**	
Actors: Admin	
Use Case Summary	Books are add in directory on which AR functionality will be performed
Pre-condition:	Books should be for children
Normal Flow of Events	**Alternative Path**
1. The use case starts when the user add the book the	.

camera scan the object and perform animation on it.	
2. This use case ends.	
Post Conditions	
Step#	**Description**
1.	The admin can add the book.
Use Case Cross References	
Includes	None
Extends	None

Table 3.16: Add Book

3.5.16 **Delete Book (U16)**

Use case ID 016	**Use case Name: Delete Book**	
Priority **High**		
Actors: Admin		
Use Case Summary	Books which is not required will be deleted	
Pre-condition:	Books should be added	
Normal Flow of Events		**Alternative Path**
1. The admin is able to delete a book from directory.		
2. This use case ends.		
Post Conditions		
Step#		**Description**

1.	The admin can delete the book
Use Case Cross References	
Includes	None
Extends	None

Table 3.17: Delete Book

3.5.17 **Update (U17)**

Use case ID 017	**Use case Name: Update**	
Priority	**High**	
Actors:	Admin	
Use Case Summary	Admin can proposed the updating of ARSB	
Pre-condition:	App requires an update.	
Normal Flow of Events		**Alternative Path**
1. The Admin propose when updating of app is required		
3. This use case ends.		
Post Conditions		
Step#		**Description**
1.		Updating of app is Proposed.
Use Case Cross References		
Includes	None	

Extends	None

Table 3.18: Update

Writing Scripts (U18)

Use case ID 018	**Use case Name: Writing Scripts**	
Priority	**High**	
Actors:	Writer	
Use Case Summary	Writer give a script on its proposed script Animation is performed.	
Pre-condition:	None	
Normal Flow of Events		**Alternative Path**
1. The writer give a script on basis of his script books and images are selected and AR Functionality is performed on it.		
3. This use case ends.		
Post Conditions		
Step#		**Description**
1.		
Use Case Cross References		
Includes	None	
Extends	None	

Table 3.19: Writing Scripts

3.5.19 **Propose Book (U19)**

Use case ID 019	**Use case Name: Propose Book**	
Priority	**High**	
Actors:	Writer	
Use Case Summary	Writer can Propose Book which AR Functionality will be performed	
Pre-condition:		
Normal Flow of Events		**Alternative Path**
Writer Propose a book whose images are scanned and the on that scanned images AR functionality is performed.		
3. This use case ends.		
Post Conditions		
Step#		**Description**
1.		
Use Case Cross References		
Includes	None	
Extends	None	

Table 3.20: Propose Book

[redacted] **Animation (U20)**

Use case ID 020	**Use case Name: Animation**
Priority	**High**

Actors: Designer	
Use Case Summary	Animation allows the user to see 3D models on the device screen.
Pre-condition:	The system should first identify the object.

Normal Flow of Events	**Alternative Path**
1. The designer identifies the scanned object and develop animation for that object	
3. This use case ends.	

Post Conditions	
Step#	**Description**
1.	

Use Case Cross References	
Includes	Scanned Object
Extends	None

Table 3.21: Animation

Manage 3D-Model (U21)

Use case ID 021 Use case Name: Manage 3D-Model
Priority High

Actors: Designer	
Use Case Summary	3D-Model allows the user to see models on the device screen.
Pre-condition:	The system should first identify the object.
Normal Flow of Events	**Alternative Path**
1. The designer identifies the scanned object and develop 3D model for that object	
3. This use case ends.	
Post Conditions	
Step#	**Description**
1.	
Use Case Cross References	
Includes	Scanned Objects
Extends	None

Table 3.22: Manage 3D-Model

3.6 Class Diagram

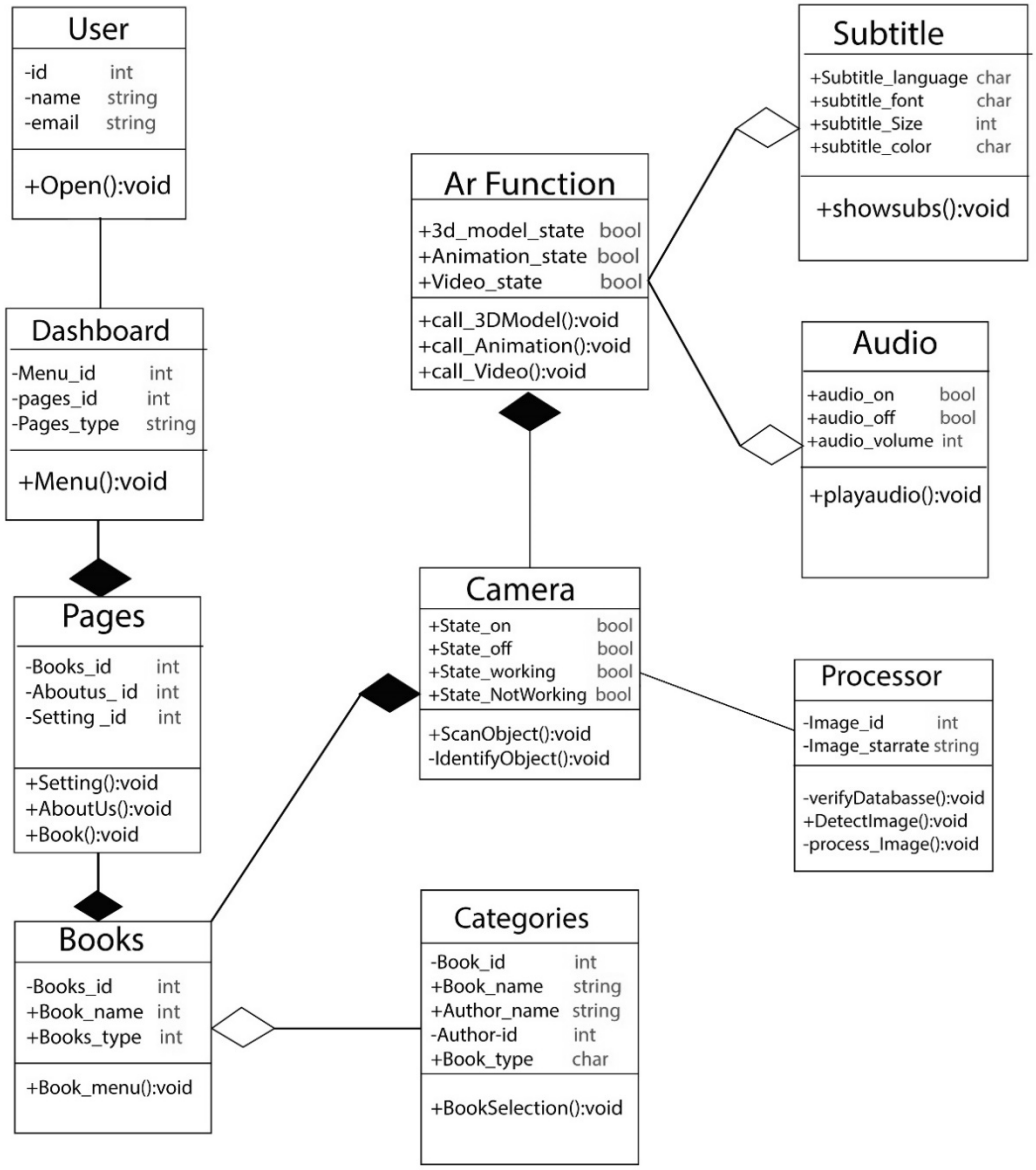

Figure 3.3: Design Class Diagram

3.7 Sequence Diagram

3.7.1 Select Books

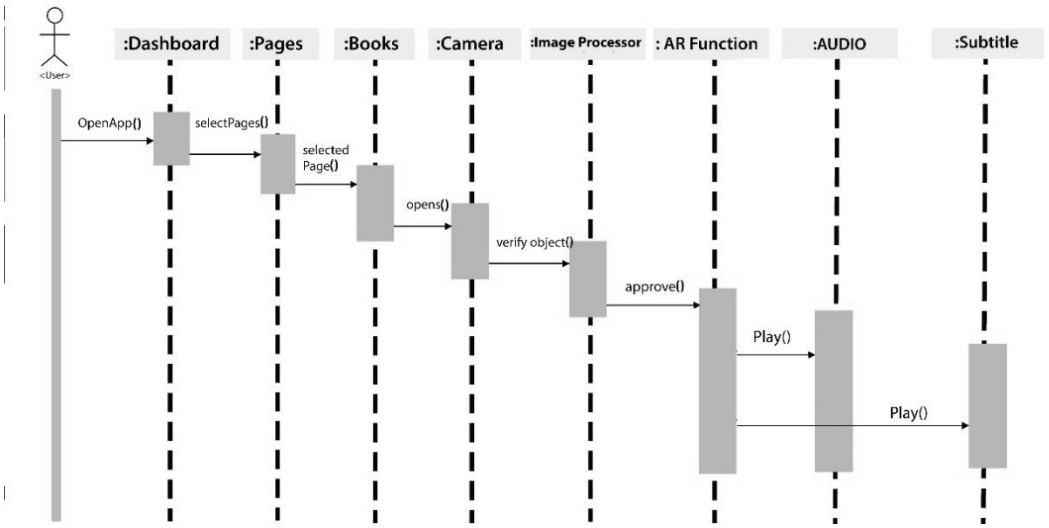

Figure 3.4: Select Books

Settings

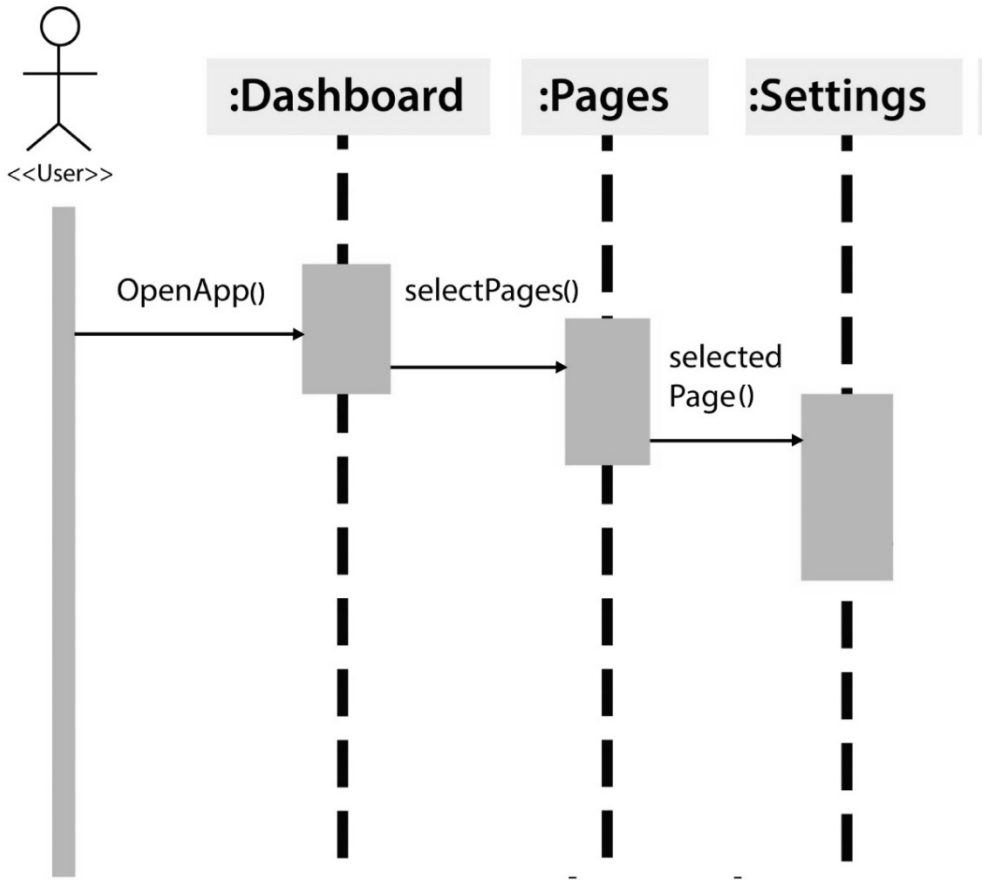

Figure 3.5: Settings

3.7.3 About Us

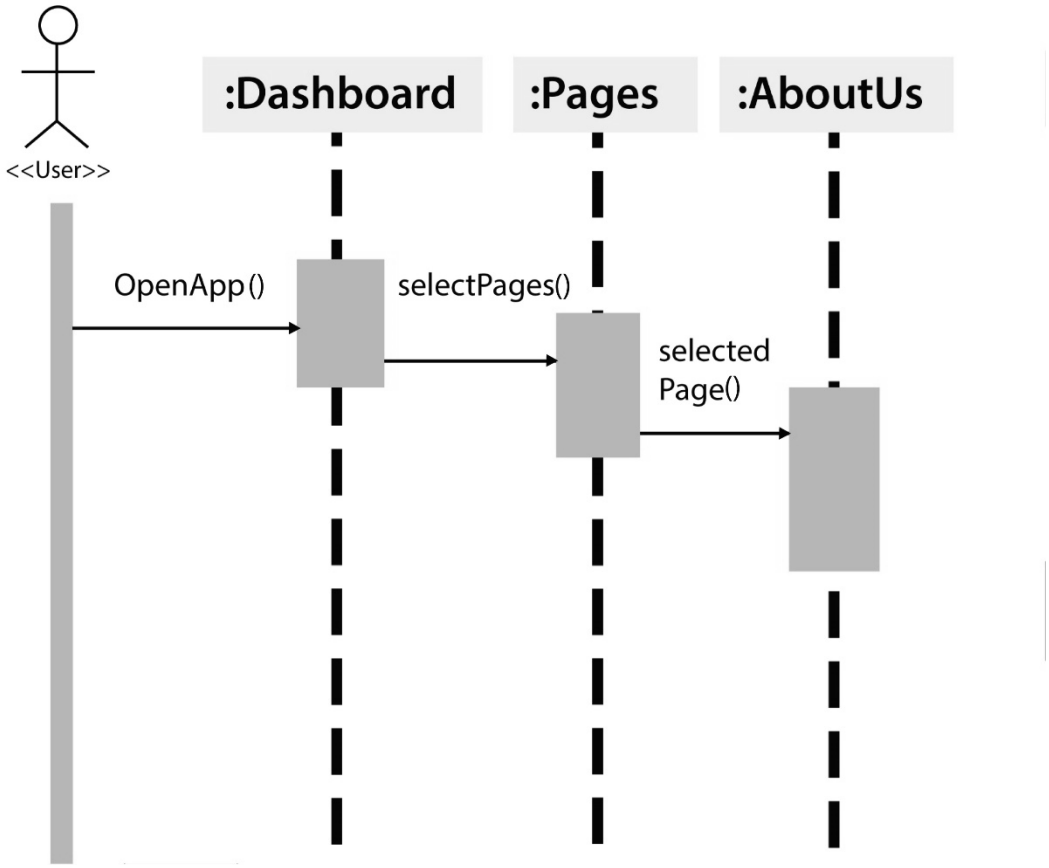

Figure 3.6: About Us

3.8 Domain Model

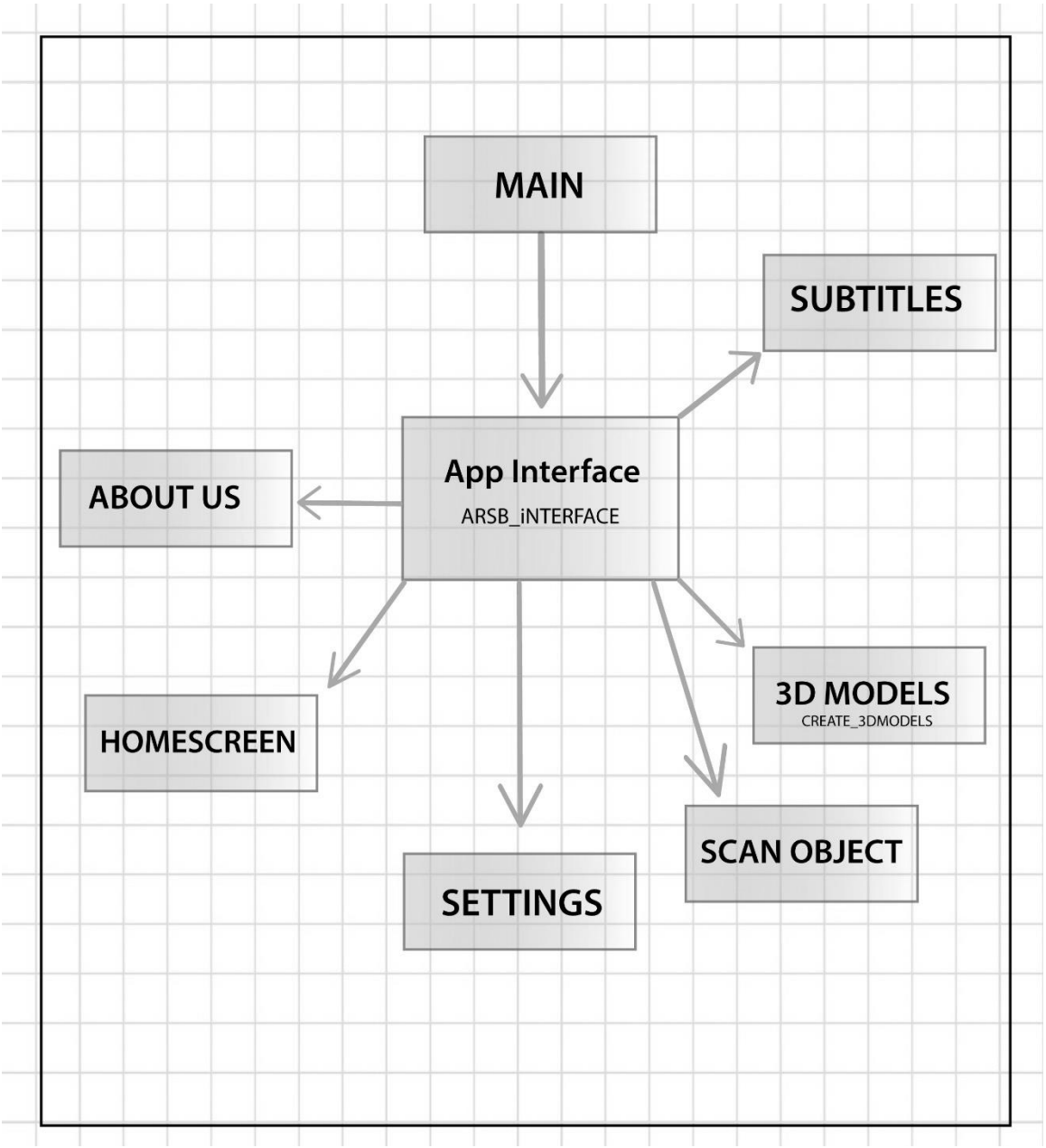

Figure 3.7: Domain Model

3.9 Collaboration Diagram

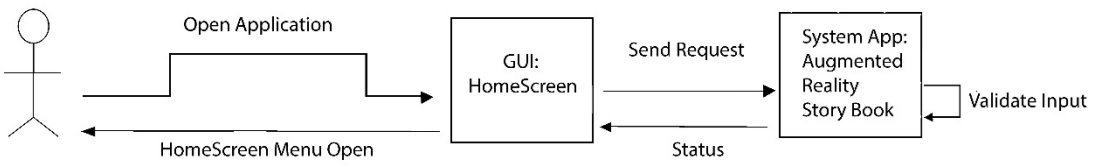

Figure 3.8: Main

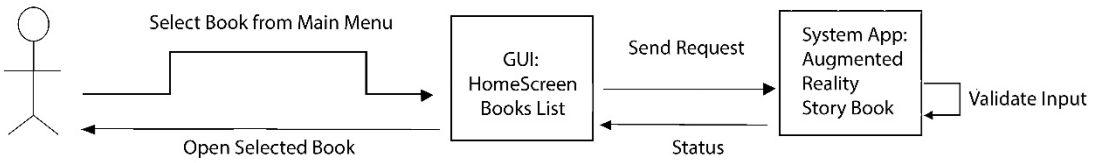

Figure 3.9: Select Books

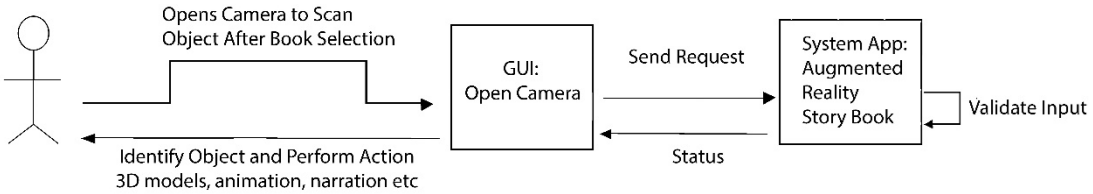

Figure 3.10: Scan Object

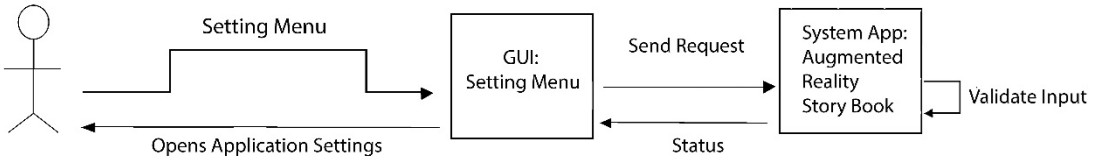

Figure 3.11: Settings

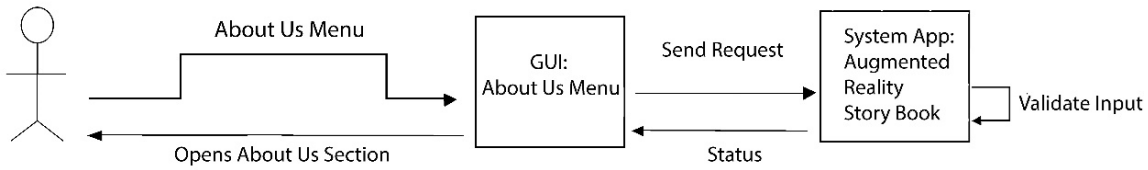

Figure 3.12: About Us

3.10 ERD

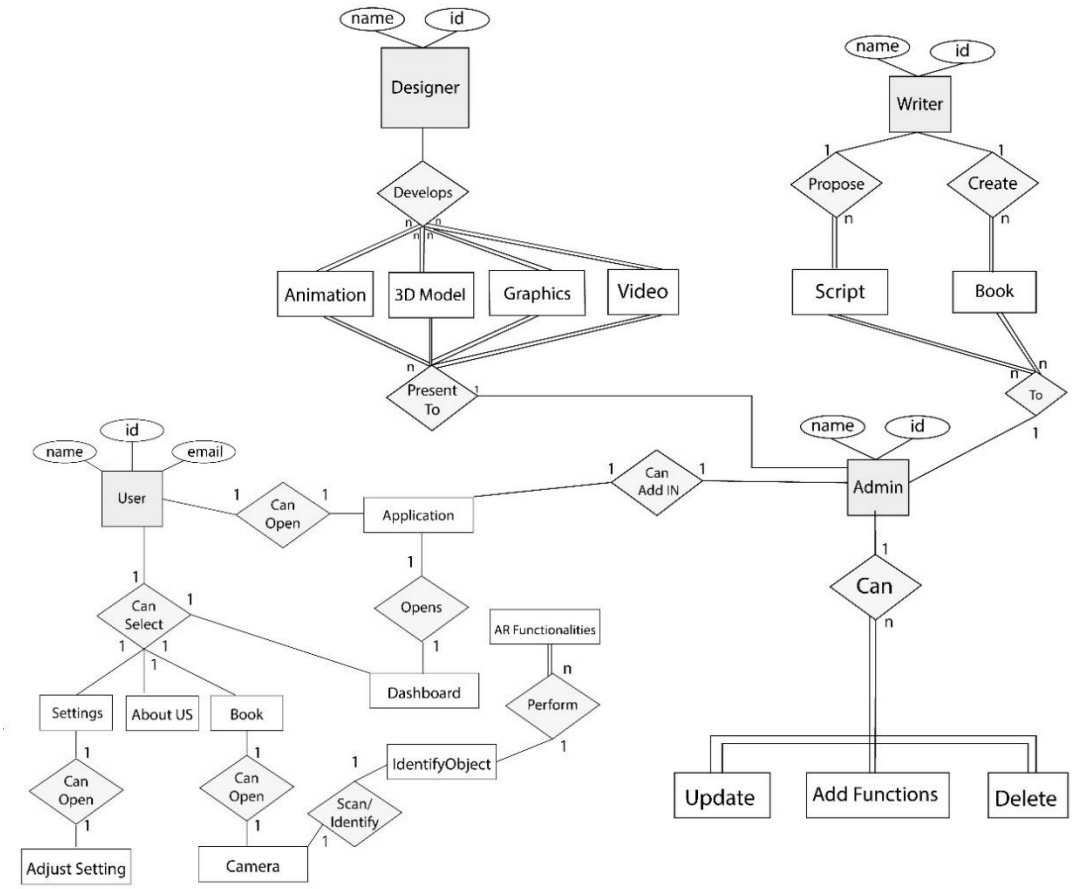

Figure 3.13: ERD

CHAPTER 4

DATA AND EXPERIMENTS (and/or IMPLMENTATION)

4.1 Implementation

The ARSB combination of software and hardware. We are adopting SCRUM methodology feature driven development to ensure deadline and goals and meet on time.

4.2 Mobile AR

The android version we use in our project minimum is 7.0 because of the good display. The android setting on unity, so we set that requirement on game engine.

4.3 ARSB Physics

The App managed the 3D objects behaviour. The behaviour of 3D Objects when they collide with each other.

4.4 ARSB Design

The design of logos and panel we design for our project as well as the buttons like the play etc.

4.5 Animation Controller

The animation controller used in button and other objects for animates the objects.

CHAPTER 5

RESULTS AND DISCUSSIONS

5.1 Interface of Home Screen

Interface of home screen include the Different option like Books, Settings and about us.

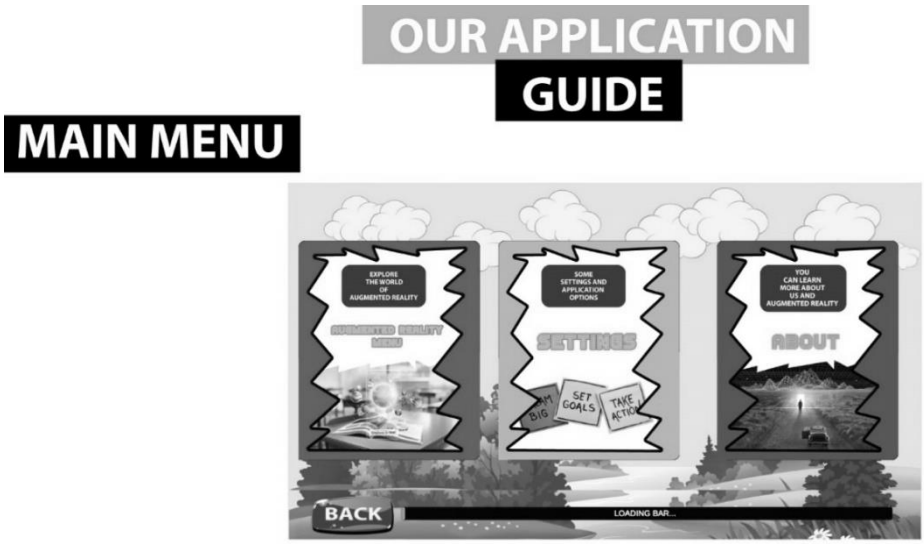

Figure 5.1: Home Screen

5.2 Interface of Book Selection

After Book menu is pressed the selection scene appear contain the different option of Books with swiping feature and back button.

Figure 14.2: Books Menu

5.3 Pied Piper Story Book

After Selecting the option required Functionalities will be performed.

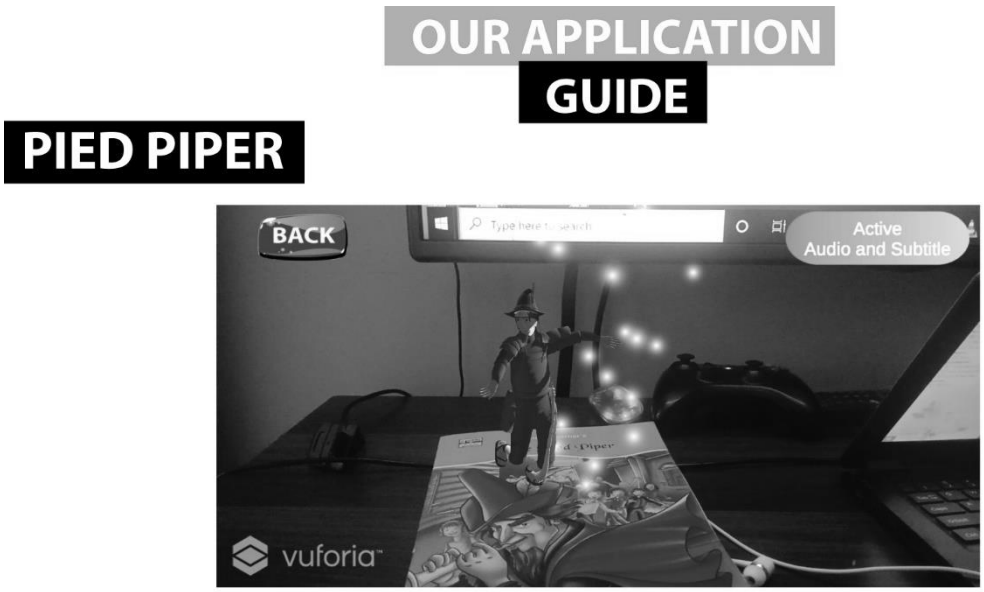

Figure 5.3: Story Book

5.4 ABC Book

Virtual Button Functionality

Figure 5.4: ABC

5.5 Rhymes

Figure 15: Rhymes

5.6 Settings:

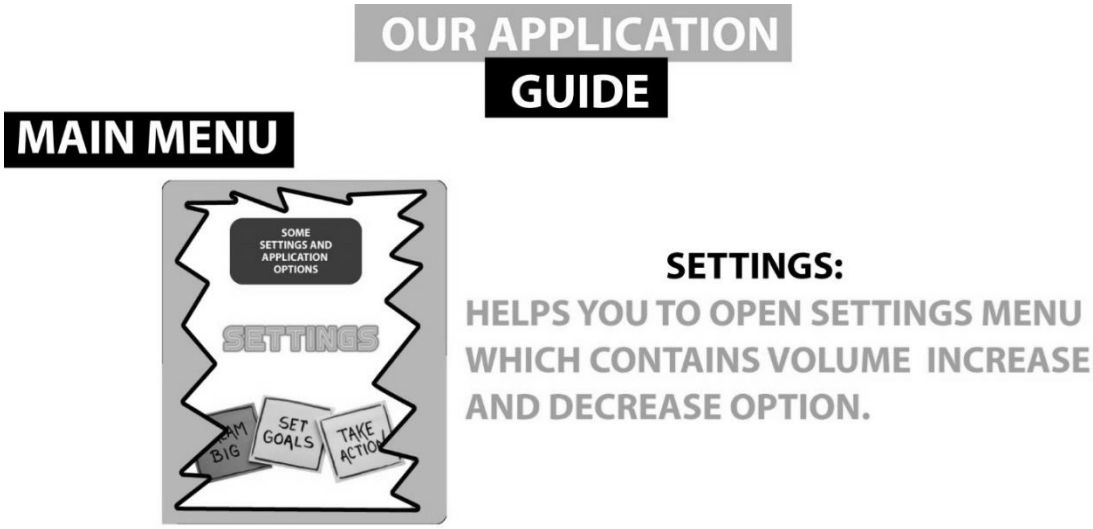

Figure 16: Settings

5.7 About Us:

Figure 5.7: About Us

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Problem Faced

We faced difficulty in learning AR as there are less number of AR-tutorials available and creating 3D-Model animations in the 3ds max as there is less number of built-in characters available and it is very difficult to create a large number of models.

Project Summary

In this project, we aim to propose a real-time Android Application using Augmented Reality (AR). By using Vuforia we will develop an application which will scan the objects and the text by using the camera of the device also present it in 3D-model objects and narrate the text by the speakers of the device.

Future Work

In the future, we aim to work on HoloLens because it enables you to involve with digital contented and interrelate with the holograms in the world around you. HoloLens, nowadays are being used for games, after wearing HoloLens it gives you the virtual view of the gaming of the gaming world. So, in the future, we will work on it.