MACERA TÜNELİ

by Gizem

Software Requirements Specification

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1. INTRODUCTION

1.1 Purpose

This document details the software requirements specification for Macera Tüneli. It will later be used as a base for the extension of the existing software itself. This document follows the IEEE standard for software requirements specification documents.

Macera Tüneli is aimed to help education of disabled children and to support self_development of preschool-age children. Different types of activities (drawing, singing, taking his own pictures, recording his own videos, etc.) will be applied by children being involved in an environment. Later, their response, reaction and performance in the game will be evaluated and their situation (they might improve, regress or stay stable) will be examined.

The development process will be carried out in cooperation with Prof. Dr. Kürşat Çağıltay and his team. They has been developing an educational game for disabled children. Macera Tüneli will not only include missing and new features differently from his project, but also support it. Brainstorming has been done with Prof. Dr. Kürşat Çağıltay and Macera Tüneli was born from his feedback and his experience. Development process will continue similarly and information flow will always be considered in following phases.

The important features of Macera Tüneli will be recording and portability. It will be designed to function on different platforms, which is a basic requirement of today's technology and which makes the tool up-to-date. Moreover, it will record the activities of children, which will enable parents, teachers, experts, etc. to follow development of children. Recording feature will also bring more demand to the design since many of the games in this field don't provide it.

1.2 Document Conventions

Macera Tüneli has not been created prior to this document; meanwhile, it is in design phase. Thus, all requirements stated here are needed to be satisfied. Moreover, It is very important to update this document with every future requirement and clarify its priority for consistency purposes so that this document can remain useful.

1.3 Intended Audience and Reading Suggestions

This software requirements document is intended to supply these:

− Developers reviewing capabilities of the tool might understand better where their efforts should be targeted to improve or add more features to it.
− Testers might use this document as a base for their testing strategy as some bugs are easier to find using a requirements document. This way testing becomes more methodically organized.
− It might give an idea to users who would like to read more about what this tool is.
− It sets the guidelines for future development.

1.4   Project Scope

Macera Tüneli will be developed on Unity which will make the game compatible to different platforms. In other words, it will be platform-independent. Using the tool, one may draw, record voice, record video and take a photo throughout the game and a shell Interface (Console). It will be available in one version, but with two language (Turkish and English) options.

It provides a graphical interface (GUI). GUI provides the user with all the functionality needed to lead the game. The functionalities are distributed in plugins, each of which performs a specific function. These plugins might be used from "in game" screen or from "game title" screen. As it will be seen in following sections, from "game title" screen, these operations might be applied:

− Play Game
− Open Records
− Options
− Exit

Clicking on "Options", one might turn on or turn off the sound of the game, change the language of the game (Turkish or English) and change background color. Moreover, from "in game" screen, one might use the plugins of the tool, which are:

− Draw Picture
− Take Photo
− Record Video / Record Voice
− Pause

1.5 References

- IEEE, IEEE Std 1016-1998 IEEE Recommended Practice for Software Design
Descriptions. IEEE Computer Society
- http://www.utility.com/

2. OVERALL DESCRIPTION

2.1 Product Perspective

Macera Tüneli is a free style game which will be used for education of disabled and preschool-age children. The scenario of it will be as free (dependent to choice of the user) as possible so that the user will not be bored and will play it for a long period of time. Thinking of the fact that target audiences are children, freestyle comprehension becomes such important. One might be able to create a new scenario for each use since different features of the tool might be used in each time for different cases. Maximized freestyle will diminish Macera Tüneli from its competitors.

Macera Tüneli will be developed on Unity in order to make it compatible for different platforms. It is considered that this compatibility will increase demand for the game. Since it will reach more users with good features, it will surpass the competitors once again.

Moreover, Macera Tüneli will allow user to record its activities, which indicates to another serious problem. Today, it is not that common to record activities, which are may seen as results for disabled children, in a game so that it is not really possible to analyse capacity and improvement of a child. Recording ability of the game will score another goal against the competitors and make the game reach its purpose more.

Macera Tüneli will be developed in cooperation with Prof. Dr. Kürşat Çağıltay and his team. It will support his game project for disabled children and take it one step further. Thus, distribution policy will be determined by them. It would not be true to state whether the game will be free or be offered for sale, whether it will be sent to the schools or also provided in the market or not.

As written before, Macera Tüneli will be designed as one version with language (Turkish or English) options for now.

2.2 Product Features

Macera Tüneli will allow the user to carry out below activities:

– Draw a picture by using a programme or touching the screen
– Record a video
– Record voice
– Take a picture
– Drag items by touching the screen
– Turn the sound on or turn the sound off
– Select the language, English or Turkish
– Change background of a screen
– Pause the game and resume
– Reach the records of previous activities

All these features are important since they redound freestyle comprehension to the game.

2.3 User Groups and Characteristics

This project refers to two groups of users of any computer system

- Disabled children and preschool-age children
- Experts

As explained before, it is an educational game, which will be used to treat children and examine their progress. As long as being freestyle as much as possible, Macera Tüneli has been strengthened by other educational concepts:

- Recognizing animals
- Recognizing fruits, vegetables
- Recognising materials of a class
- Recognizing materials of a house

One not only will perform some actions, but also will go through different learning steps. Expert might use it efficiently and commonly to educate and examine these group of children.

2.4 Operating Environment

Macera Tüneli, in relation to the development environment, is aimed to be platform independent, which means it will function in any platforms. Android and iOS mobile devices were the platform of choice since they naturally lend themselves to the game mechanics. However, in time, compatibility has been more important and so requested. Now it is more important to provide this property.

Macera Tüneli will be developed on Unity. It is a file management tool and text editor with basic auto completion and debugging capability, which makes it is a lot more usable. It also includes a built in player that allows you to rapidly test your apps on your computer at multiple screen sizes / resolutions. By the way, Macera Tüneli is planned to be tested on Android and iOS.

Memory needed to record activity results has not been decided since no test has been done. However, it is planned to last ten records of usage of each activity. The default value of memory might be changed upon request by developers.

2.5 Design and Implementation Constraints

Our primary design constraint will be the game's integration with the all smart phone and tablet devices which use Android or İOS. The two major obstacles are the device's touch screen and hardware limitations. We will have to ensure that the control layout does not affect the player's view of the screen and that it remains ergonomic and comfortable. We will also have to keep the size of the screen in mind when constructing text, making sure that it will be readable on all versions of the Android and iOS devices. As for hardware limitations, we will have to maintain efficiency in scripting and modeling in 3D so that resources are not wasted. Any lag as a result of failing to meet these requirements will translate to a poor play experience.

2.6 User Documentation

Since the tool has not been completed, it is still in design phase, unfortunately a user documentation is not available. However, it is known that it is a must and it will be handled in final phases.

3. System Features

3.1 Recording Voice

Recording Voice can record audio from the microphone of device. User can record voices in several level of the game. After voice are recorded , in the one of the following steps recorded voice plays with respect to the level of the game .The recorded audio can be saved in .wav.

3.1.1 Stimulus/Response Sequences

Step 1 : The system will ask the user whether s/he prefers to record voice or not, depend on the preferences record voice button appears.
Step 2 : User touches the record voice button ,then user records voices via microphone of the device.

3.1.2 Functional Requirements

REQ 1 : Record Voice which should appears only the time , is needed.
REQ 2 : When user touches the Record Voice button , a microphone image should be appeared in the screen.

3.2 Taking Photos

With the Taking Photo feature of the system user can take photos and save them. The system will use this photos in the game. For instance , in the Amusement Park chapter of the scenario. Before entrance to Amusement Park, user takes photos or use pre-saved photos. Afterwards user have an ID card which has a photo of user.

3.2.1 Stimulus/Response Sequences

Step 1 : The system will ask the user whether s/he prefers to take a photo or use pre-saved photos. Then, Take Photos button and Use Old Photos button appears.
Step 2 : After user touches the Take Photo button the device will capture. Or, the other choice is to select pre-saved photos.

Step 3 : User confirm or go back the Step 1 using OK button or DELETE button.

3.2.2 Functional Requirements

REQ 1 : Take Photos button should appear in the Amusement Park, House screens.
REQ 2 : When user touches the Take Photo button a Vİdeo Frame should demonstrate the images which comes from video camera of device.

3.3 Recording Videos

The Recording Videos feature is one of the main features of this system. Since using this feature user is able to watch him/herself is in the tale. The Music Course of the School user can record videos and system use this in the following level of the game.

3.3.1 Stimulus/Response Sequence

Step 1 : In the Music Course user must record a voice or video. If user prefer to record video, then s/he must touch the Record Video button.
Step 2 : A video frame appears in the screen and a BEGIN button. User should touch the BEGIN button to record video.
Step 3 : After recording video user either confirm the video or record a different one.

3.3.2 Functional Requirements

REQ 1 : Record Video button should be appear in the Music Course of the School.
REQ 2 : After touching the Record Video button a video frame should be appear in the screen.

3.4 Multi Touch

Multi Touch is the central feature of the system since in every screen user must use the multi touch feature. Apart from the basic select buttons activity, user will use this feature like drag and drop.

3.4.1 Stimulus/Response Sequence

Step 1 : User should touch the screen or object that s/he wants to move or select.
Step 2 : User should move his/her finger on the screen.
Step 3 : When user wants to drop the object ,should make his/her finger leave off the screen.

3.5 Title Screen

The title screen is the screen the player will see every time upon playing the game. Through this interface, the player can choose to start a new game, playfrom saved data, or adjust the options. Since the title screen is the "hub" for all activities in the project, it must be included.

3.5.1 Stimulus/Response Sequences

Step 1: The player launches the game from their portable device.
Step 2: The start screen loads and appears, prompting the player with three buttons: "Play Game", "Options", and "Exit".
Step 3: The player presses one of the buttons, triggering its respective function.

3.5.2 Functional Requirements

REQ 1: The title screen must load and appear every time the game is launched.
REQ 2: If the player quits the game during any stage of a environments, they must be returned to the title screen.
REQ 3: If the player presses the exit button, the game will end and return the player to the phone's regular interface.
REQ 4: If the player completes the game, the game will end and return the player to the title screen.

3.6 Environment Selection Screen

The Character Selection screen is the primary way for the player to choose between different environments. The game is separated into narrative chapters, inside of which are multiple environments. The hierarchy holds true for the environments select screen as well. Because this

screen constitutes the player's main method of accessing the environments database, it is essential to the game.

3.6.1 Stimulus/Response Sequences

Step 1: Available chapters appear, as well as a "Return to Title Screen Option."

Step 2: The player selects one of the chapters or returns to the title screen.

Step 3: If the player chooses a chapter, available environments within the chapter appear as well as an option to return to the chapter view.

Step 4: The player selects one of the available environments or returns to the chapter view (Step 2.)

3.6.2 Functional Requirements

REQ 1: To unlock a chapter on the screen, a player must complete the final stage in the previous chapter.

REQ 2: When a chapter is completed, the environments which have not been unlocked become visible on the screen in sequence with their respective environments, but are still inaccessible to the player.

REQ 3: Only chapters and environments which the player has unlocked are displayed on the Environment Selection screen, excepting those environments falling under REQ 2.

3.7 Pause Menu

The player should be able to pause anytime during game-play, and his screen fulfills that requirement. The pause menu also allows the player to navigate between game-play and the environments selection and title screens. The portable nature of the console renders player convenience paramount, so this feature must be included.

3.7.1 Stimulus/Response Sequences

Step 1: The player presses the pause button on the game-play interface.

Step 2: The level pauses, drawing up the pause menu which prompts the player with three options: "Resume Game," "Return to Screen" and "Exit Game."

Step 3: The player presses one of the buttons, triggering its respective function.

3.7.2 Functional Requirements

REQ 1: The "Return to Screen" option must return the player to the chapter to which the exited environment belongs.

REQ 2: The "Resume Game" option must continue the game without any change to the character's vector or the state of the environments from the moment of the pause action.

3.8 Options Menu

The options menu is accessible from the title screen and allows the player to configure controls and graphical settings to suit his/her convenience. This screen is not essential to accessing game-play and is hence of lower priority than the Title Screen or Pause Menu, but constitutes a standard feature in commercial titles and is thus a desirable inclusion.

3.8.1 Stimulus/Response Sequences

Step 1: The player accesses the options menu from the title screen. From here, the player chooses to:

- Select "On" or "Off" for "Sound"
- Select Language
- Select Background Color
- Select "Return to Title Screen"

Step 2: The chosen options are written to the game and take effect immediately.

3.8.2 Functional Requirements

REQ 1 : Sound will be enabled when "On" is selected and disabled when "Off" is selected.

REQ 2 : The Sound will be set to "On" by default.

REQ 3 : The language options should appear in the screen by default is Turkish.

REQ 4 : The colors must be seen in the screen to decide.

REQ 5 : Player will be directed back to the Title Screen when "Return to Title Screen" is selected.

4. External Interface Requirements

In this section, interface requirements and samples will be focused on in order to illustrate planned desing more effectively.

4.1 User Interfaces

User interfaces and their functionalities will be examined in this section. Although all screens haven't been created yet, main samples will be provided. The screenshots of this section are created by using Unity up to know. It is likely that any other tool will not be needed for his purpose since it is important to keep secreen design as simpleas possible. The more copmlicated or detailed a screen is, the more it will force, evenmore frighten, a disabled child.

4.1.1 Title Screen
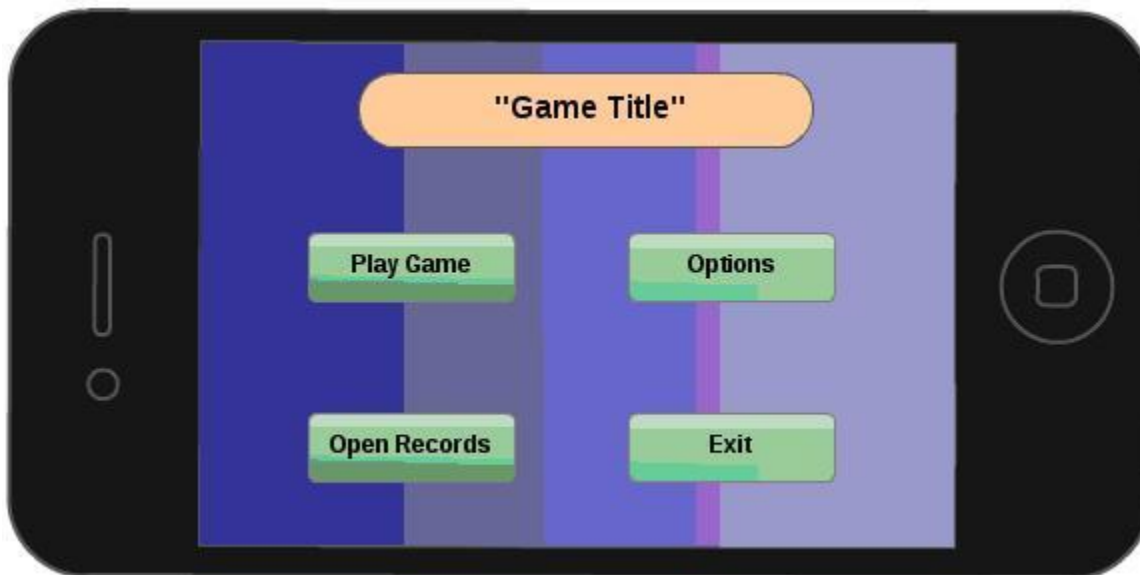
Screen 1: *Title Screen*

Game Title Screen will be the first screen introduced to the player after the application has been loaded.

 - It will display the game title, as well as three buttons with which the
player can navigate to multiple screens.

- Play Game Button: When selected, this button will open a new screen containing a graphical list of famous characters.
- Options Button: When selected, this button will open a new screen containing options that are user-modifiable enabling the player to personalize the game.
- Open Records Button: When selected, this button will open a new screen containing last 10 performances of the player.
- Exit Button: When selected, this button will activate a verification window, insuring the player intended to exit the game, if the player selects "Yes" the game will exit, if the player selects "No" the player will be returned to the Title Screen.

4.1.2 Character Selection Screen
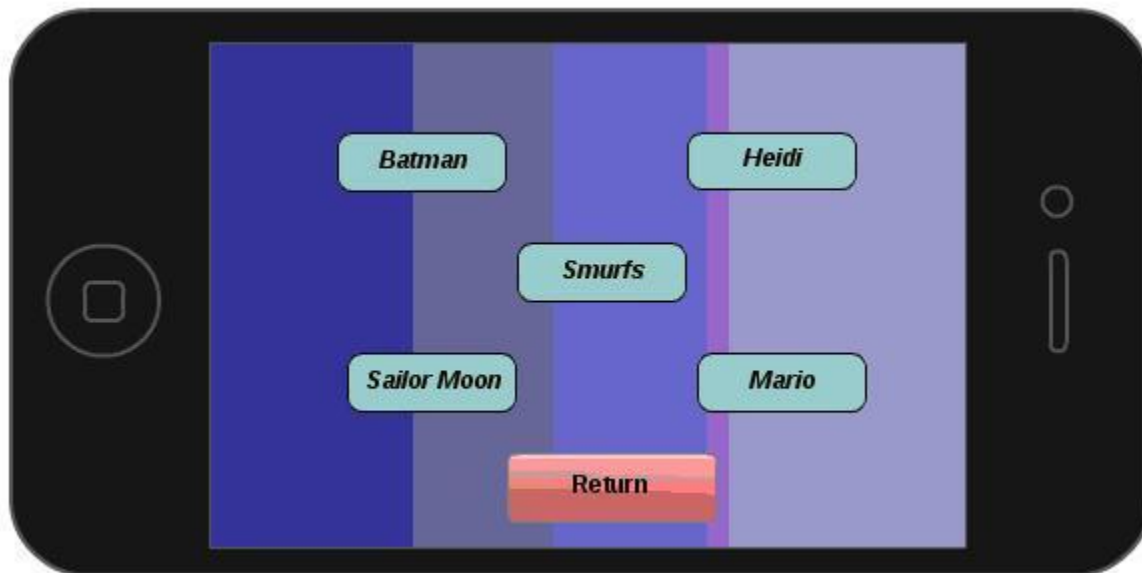

Screen 2: *Character Selection Screen*

Character Selection Screen will enable the player to select the desired character of the play.

- Character Icon: When selected, the player will immediately be transferred to the Environment Selection Screen to choose the environment in which he want to play the game.
- Return Button: When selected, the player will be transferred to the Title Screen.

4.1.3 Environment Selection Screen

Environment Selection Screen will enable the player to select the desired environment of the play.

- Environment Icon: When selected, the player will immediately be transferred to the environment specified by the icon to begin game play.
- Return Button: When selected, the player will be transferred to the Character Selection Screen.
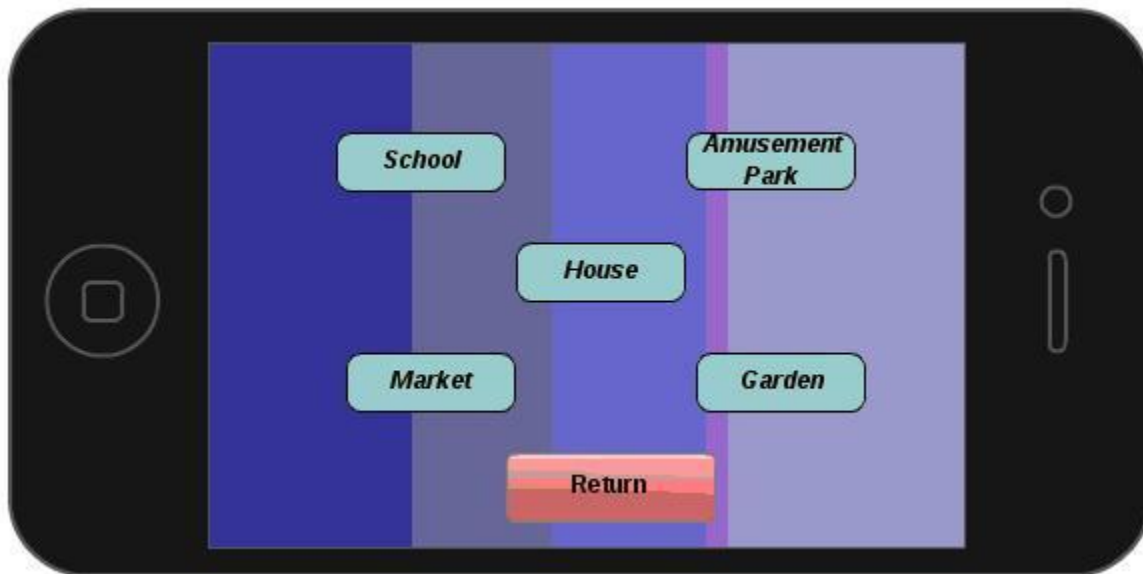
Screen 3: *Environment Selection Screen*

4.1.4 Game Options Screen

Game Options Screen allows the player to adjust settings to their specifications.

- Sound: Selecting "On" will enable sound, selecting "Off" will disable sound.
- Language : There will be 2 language choice button for the player based on Turkish or English
- Return Button: When selected, the player will be directed back to the Title Screen.
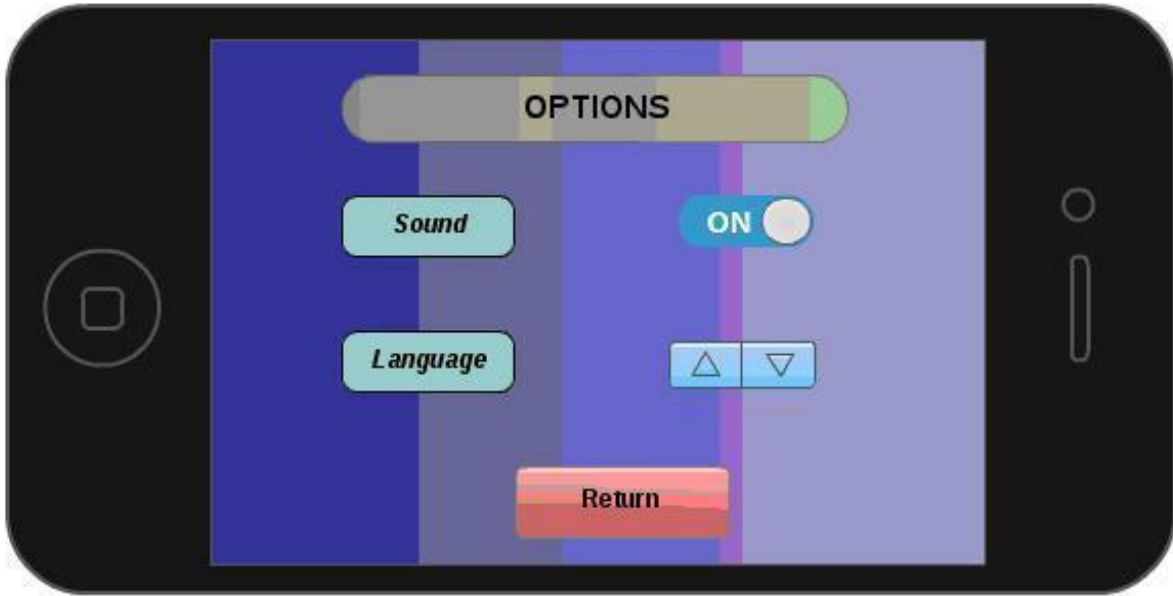
Screen 4: *Game Options Screen*

4.1.5 In-Game Screen
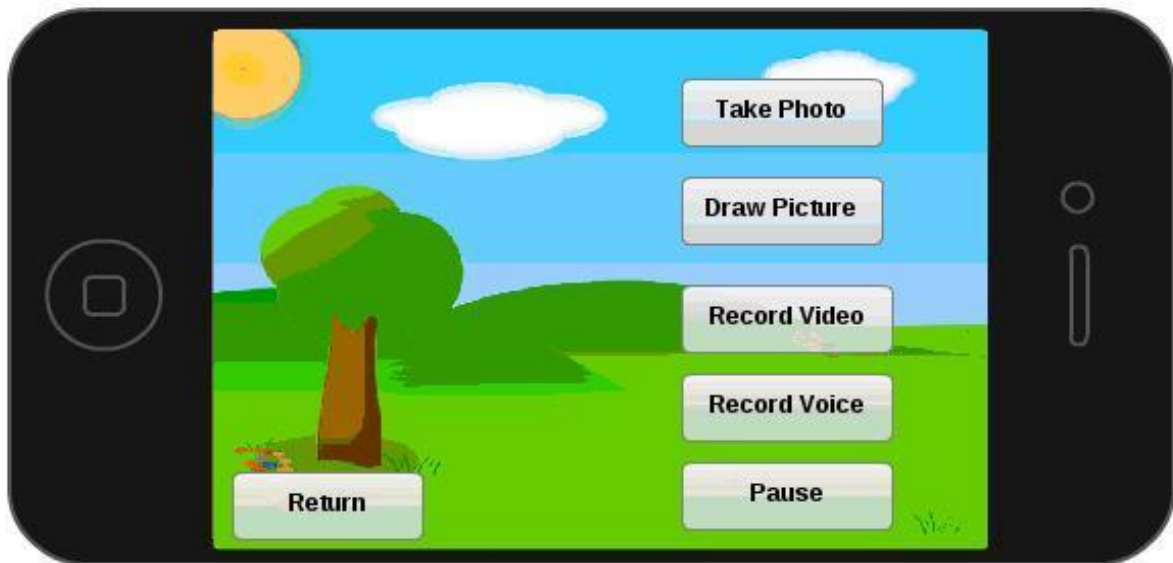
Screen 5: *In-Game Screen*

In-Game Screen contains in-game user interface regarding player control and actual game play. There will be a lot of different game scenarios depending on the environment choice and the process of the player, but upper photo shows most important basic icons which the player can choose.

4.2 Hardware Interfaces

Macera Tüneli is a mobile gaming application designed for the Android and iOS platforms and is functional on both mobile smart phones and tablets. Gaming application data is stored locally on the both iOS and Android device using a SQLite relational database.

Both Android and iOS support video/still cameras, touchscreens, GPS, accelerometers, gyroscopes, barometers, magnetometers, dedicated gaming controls, proximity and pressure sensors, thermometers, accelerated 2D bit blits (with hardware orientation, scaling, pixel format conversion) and accelerated 3D graphics.

4.3 Software Interfaces

Macera Tüneli will be developed under both Android and iOS operating systems, using Unity. It is easy to make applications with Unity which work on both iOS and Android.

One of the major benefits of Unity is that it allows the developer to test his application on the computer at the same moment. It even supports multiple resolutions so that you can quickly switch between screen sizes and resolutions in order to get a sense of how your application will look like on various devices. The most useful and innovative feature of it is that one can install the tool on iOS or Android devices and build the apps on the device wirelessly. This gives you the ability to modify and test your application immediately. This feature is a huge time saver for developers.

4.4 Internet Interfaces

Macera Tüneli will enable users to save their activities on a website in oder to prevent possible memory limitations and allow users to reach records independently from devices. Website is mainly aimed to serve to experts in oder to examine process or condition of a child. There will

me no extra procedure in order to use website. Entering address of the website, an expert may upload any activity of the child and later, he may again work on them using the website. Two main screenshots from the website are provided below with brief explanations.
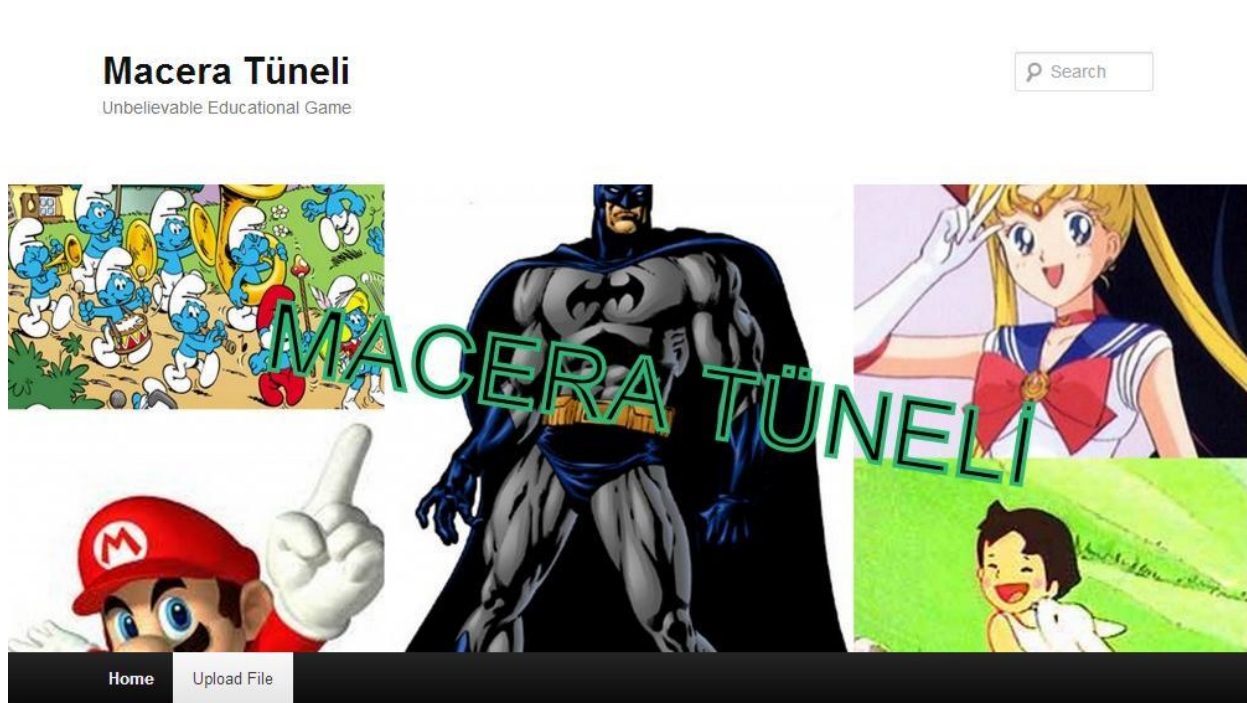
Screen 6: *Website Main Page*

As seen in Screen 6, the website is designed to be as simple as possible for the beginning. Website Main Page will allow a user to have a general understanding about the game and lead him to upload a new record from "Upload File" tab. Clicking on this tab, one may choose a file from the device on which game is played and then, upload it, as seen in Screen 7. While updating, one may add some descriptions to the record from "Description" option of Website Upload Page in order to clarify later use.
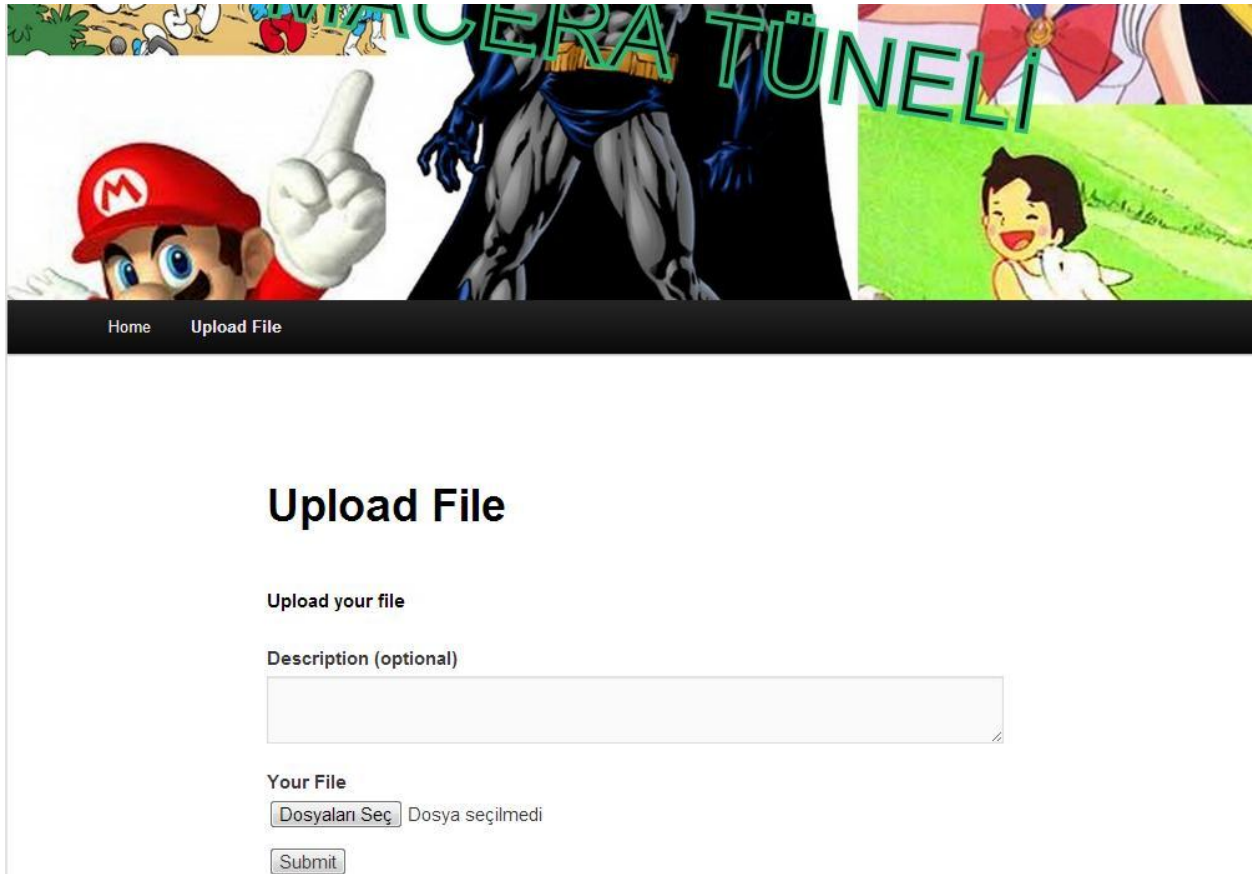
Screen 6: *Website Upload Page*

In later phases of design, it is planned to create separated acounts for each user by asking at least a username to them or other extra information. Moreover, in the final form of the website, an activity, being completed in the game, will be uploaded to the website into the personal account of the user automatically.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

Based on the capabilities of current phones and the Android and iOS systems, performance should not be an issue. However, phones with weaker hardware may incur some difficulties and potentially run slower. The game design will be tailored in order to give an enjoyable experience on all Android and iOS phones, regardless of hardware. The functionality of the

game will be simplistic enough, but not trivial, and the graphics will not be overly detailed so the system does not become slowed down.

5.2 Safety Requirements

Macera Tüneli will not affect or damage any of the other applications installed on the player's phone. The game will also not cause any overheating of the player's phone; therefore, the phone's internal components will not be damaged. Macera Tüneli should not be played when the player's attention is divided among multiple tasks to prevent potential harm to the player. For example, Macera Tüneli should not be played while eating something. Perihelion should not be played for an extended period of time and it is suggested that the player take a 5 minute break after every hour of game play.

5.3 Security Requirements

Macera Tüneli will not ask for any personal information from the player and will thus be unable to compromise such information. There is no player authentication required to play Macera Tüneli. The player simply has to download the application in order to start playing Macera Tüneli. That being said, anyone who has access to the player's phone will have the ability to play Perihelion. If any unauthorized player acquires the original player's phone, that unauthorized player will be able to play Macera Tüneli. It is the responsibility of the player to make sure that no unauthorized player/person will have access to his or her phone.

5.4 Software Quality Attributes

To ensure reliability and correctness, Macera Tüneli will respond to the player's commands in a timely manner. When the player choose school as an environment, the player should see the effects of this command within milliseconds not 10 seconds after the fact. For adaptability and flexibility, Macera Tüneli will automatically save the player's progress after every game completion. That way, in the event that the player's phone runs out of battery during game-play, the player can resume game-play at a reasonable starting point.

In terms of usability, the graphical user interface will be very intuitive for the player to use. In order to draw children's attraction, different famous characters will be used and children play the game with their heroes. In order to develop children, social places like schools or houses will be used as environment and children will have a chance in order to know objects which are

used in daily life while enjoying in the game. Moreover in the game it will be wanted frequently to draw a picture or sing a song from children; that's why, they will show a big process in their different abilities. As mentioned before each game when finished will be saved and their parents or teachers can follow their progresses whenever they want. With this property they can also compare children's game performance with other past experiences.

Our game focuses on both ease of use and ease of learning while not leaning towards one or the other. Macera Tüneli should be a game that any player can pick up and play instantly without much downtime in figuring out the controls. The controls will be easy and intuitive to use and the player will not be bombarded by having to use all the controls at once in the beginning of the game. The game play will ease the player into learning and using each of the basic skills by gradually introducing each command as the player progresses through the game. By the end of any game the player should be familiar with and fully able to use the command introduced in that game.

6. Appendix

6.1 Appendix A : Glossary

SRS : Software Requirements Specifications

GUI : Graphical User Interface

IEEE : The Institute of Electrical and Electronics Engineers

iOS : iPhone Operating System

REQ : Requirements

6.2 Appendix B : Analysis Models - Use Case Diagrams

In this section, four use case diagrams will be provided in order to make the reader understand better in a schematic way. In other words, schematically, a brief summary is given with diagrams in following four sub-sections.

6.2.1 Use Case 1 - Initiate Story

In Diagram 1, how a user will initiate the game and his options in oder to start a scenario are shown.
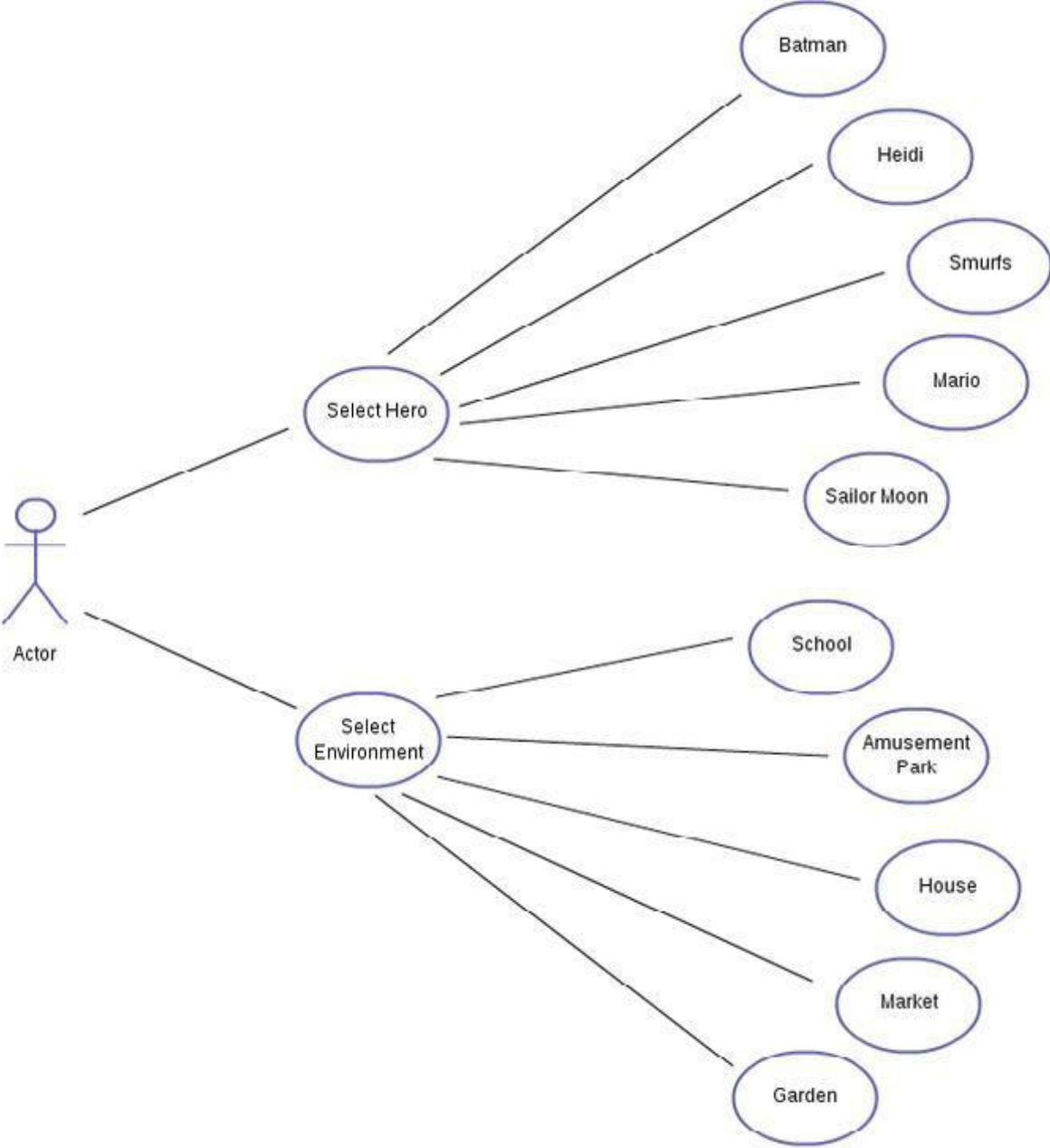

Diagram 1: *Initiate Story*

6.2.2 Use Case 2 - Manage Story

In Diagram 2, under all possible options, different scenarios and their iner steps are illustrated.
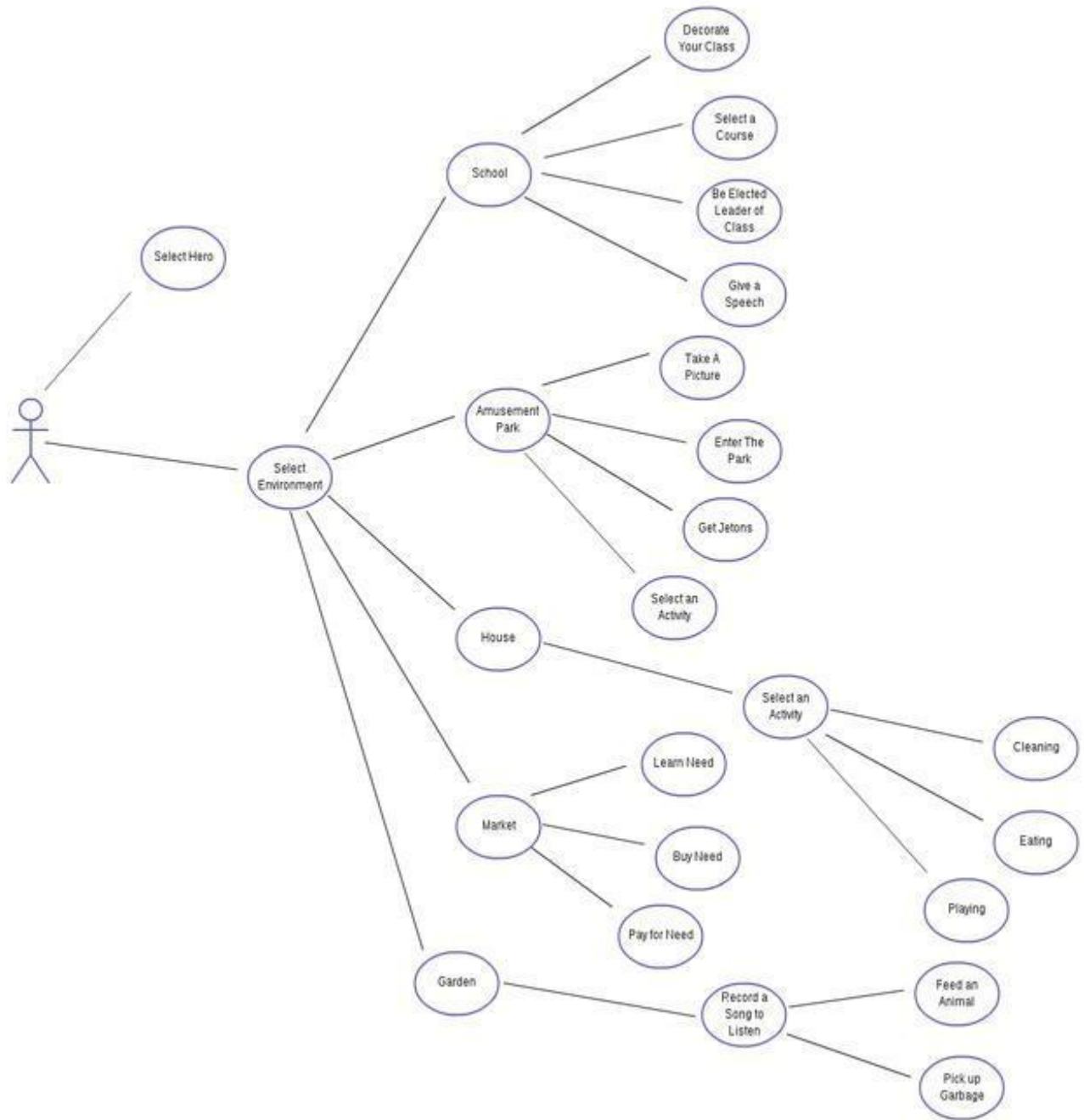

Diagram 2: *Manage Story*

6.2.3 Use Case 3 – Hardware Support

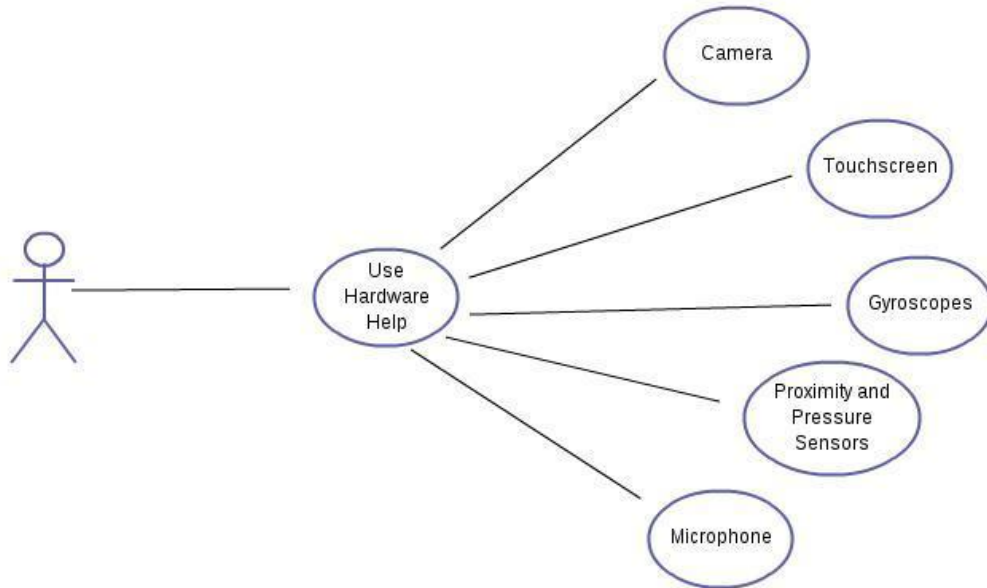In Diagram 3, hardware support which will be used to implement different features of the game is shown.

Diagram 3: *Hardware Support*

6.2.4 Use Case 4 - Save / Open Activities

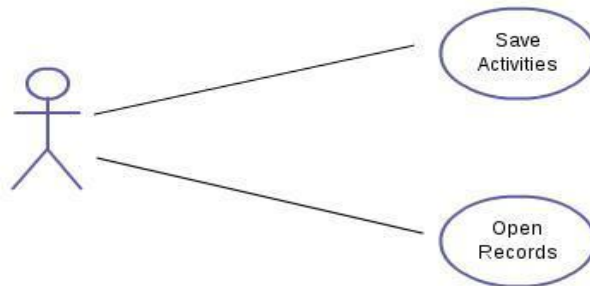In Diagram 4, activities related to website are grouped into two different branches.

Diagram 4: *Activities*