দৌড়াও: A RUNNING GAME

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering.

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APPROVAL

This Project titled **"দৌড়াও: A RUNNING GAME"**, submitted by MD. Sumonul Islam, Shrabonti Mazumdar, Foysal Mahmud Tomal and MD.Julfikar Ali Jewel to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering (BSc) and approved as to its style and contents. The presentation has been held on 25th November, 2018.

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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Nazmun Nessa Moon,** Assistant Professor Department of CSE Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

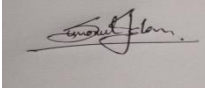**Supervised by:**   **Co-Supervised by:**

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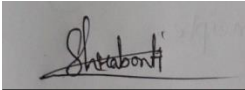
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ABSTRACT

This project titled "দৌড়াও: A RUNNING GAME" is a Mobile application. Mobile application development is one of the recent trends in computing Industry. Among several platforms for mobile, Unity, a 3D game engines which has become not only popular but also a standard in the gaming industry. Now android is one of the largest platforms in the world that run in several smart phones and tablets from various manufacturers like Google, Samsung, and HTC etc. The project we have developed is a game for Android platform. This report contains the design and architecture of android, about SDK, version of android and implementation and details (feature, different states of the game, how to play, scoring) about the game which we have developed. Design and develop useful android applications with user interfaces by using, extending, and creating own layouts and views. The project has been developed in C# Language by using the Visual Studio. We have used the Android software development applications on the Android platform. The interface in Unity is used to quickly generate game environments.

After implementation of the functions, the system is tested in different stage and it work successfully.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 Introduction

Video game is relatively a new sector in Bangladesh for some years. Now some IT companies have started to develop video games commercially [1]. The game market depends on smartphone and internet use in both cases, the country has been doing well for the last few years. Targeting the global market, the government is set to establish new mobile applications and game development. Games are used for child education, health care and human resource development in many developed countries and not just for entertainment only. Knowing how violence in game affects a person as well as how to use games to create positive affects in people. A game developer have to know about the games they produced affect the audience they have created the games for. Also a concerned parent can chose a game they feel their children can learn from or use as a positive outlet for anger. Now all kind of game has addiction and the effects of games have on children. দৌড়াও: A RUNNING GAME which can provide facilities to provide educative information to gather knowledge for the kids. This chapter introduces the application that is studied in this project দৌড়াও: A RUNNIG GAME and identifies the project area.

1.2 Motivation

Gaming applications are the most likely and downloaded applications in android market. A game which is simple and easy to use in a mobile handset can become useful to millions of mobile users. The motivation of this project is to learn and experience developing a simple game application in android which will target a small set of users.

After completing the project the knowledge which we will gather it may help in the career to develop any similar kind of applications focusing the large group of users. A poll has found that 25 per cent of children aged six and under already have their own mobile and nearly half of these spend up to 21 hours per week on their devices [2]. These makes the parents so much annoyed. So, we observed this and make a gaming app that works as a media between our child and parents because kids may learn from this app about the country.

Now a day, smartphone has become so much powerful device that's why we have chosen this for mobile and tablet. We have developed the game application in Unity 3d so that we can build our app for any Platform like Android, IOS etc. Now, Android has own the most extensive users and models so the marketplace became so much effective and huge that it will be easy to increase our project revenue. The following figure 1.1 shows that android OS market share is increasing day by day.
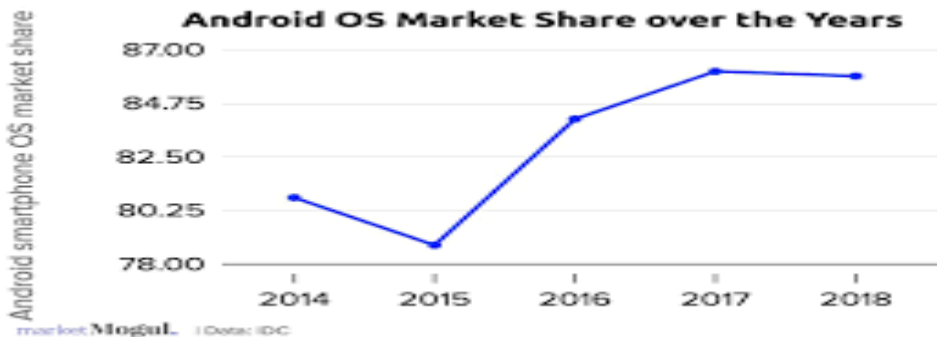

Figure 1.1: Android OS Market Share

1.3 Objective

The **"দৌড়াও: A RUNNIG GAME"** is such a game, which will not only for entertain but also give some educative information. By this game user can see the environment which is

based on our countries famous structural monuments. Basically this game will be made for the kids, but adults can also play this game. So kids can gather the idea about the

monuments of our country which will increase their knowledge about our country. This app will contain these features:

1. To build our own Android application.
2. To develop a user friendly game so that will entertain the users.
3. To create an environment that is based on some famous structure of our country.
4. To know the structures name it will written in Bengali.
5. To gather knowledge there will be some educative social message that will also in Bengali.
6. To gather points there will be coins so it will boost the points.
7. To make useful smartphone by children in useful and proper ways.
8. To develop the digital learning system.

1.4 Expected Outcome

Game playing is not a waste of time. Sometimes it is educative with fun while playing. By using this app a user can be entertained but also gather knowledge. There will be some structures of our country so that kids can know about that structure though it will be written in Bengali. [Like: শহীদ মিনার,বাংলাদেশের পতাকা,স্কুল, কলেজ, বিশ্ববিদ্যালয়, হাসপাতাল, স্মৃতিসৌধ।]. There will be some educative social message in the poster also written in Bengali. [Like: সামনে স্কুল হর্ণ বাজানো নিষেধ,সামনে হাস্পাতাল হর্ণ বাজাবেন না,জেব্রা ক্রসিং ব্যবহার করুন, ডাস্টবিনে ময়লা ফেলুন,ওভারব্রিজ ব্যবহার করুন,ট্রাফিক আইন মেনে চলুন,ধীর গতিতে গাড়ী চালান,শিশুদের স্কুলে পাঠান।] So these will increase the awareness between the kids from the childhood. Increase interest in effective use of smartphone: This app will motivate the child for effective use of smartphone.

1.5 Report Layout

Chapter 1: Introduction

This chapter is about the introduction, motivation, objective and the expected outcome of our project.

Chapter 2: Background study

This chapter is about the project background and the project overview. Works which is related with our app, comparative studies, scope with the problems and the challenges that we have faced in the implement of this app.

Chapter 3: Requirement specification

This chapter is about the requirement specification including the business process modeling, requirement collection and analysis, use case modeling, logical data model and design requirement.

Chapter 4: Design specification

This chapter is about the design specification including the front-end design, back-end design, interaction design and UX and implementation requirements.

Chapter 5: Implementation and testing

This chapter is about the implementation of data base, implementation of front-end design, implementation of interaction, testing implementation and test results and reports.

Chapter 6: Conclusion and future scope

The chapter is about the conclusion and the future scope of our project.

CHAPTER 2

BACKGROUND

2.1 Introduction

At first this application is developed and published by the imagine studio .basically android app is a software-based system and developed by unity. We used unity. In unity C# is the main coding language. And for design purpose we used JavaScript and also used C# language to design a GUI for this app.

2.2 Related works

Some android app almost similar with our app but these have many difference with our app. those apps are:

1. Alto's Adventures is popular game. It's a side scrolling infinite runner. Its main work is avoiding obstacles, collecting coins [3].

2. Jetpack Joyride is another popular infinite runner [4]. It's a side scrolled runner with tons of stuff to do. There are plenty of jetpacks to collect, obstacles to dodge, achievements, power-ups, and other stuff as well. It's family friendly and easy to play.

3. Minion Rush is another very popular infinite runner. It uses the classic runner mechanics. That includes three lanes to switch between, multiple obstacles to overcome, and more. The game also features boss fights, challenges, missions, power ups, and fun themes from the movies. Otherwise, it's a fairly standard runner with a family friendly theme [5].

4. Subway Surfers is right up there among the most popular infinite runners of all time. It uses the standard style of three lanes, obstacles, and collectibles. The game

also features multiple levels, power-ups, hover-boards, and more. It plays like most infinite runners. However, it's also rock solid, family friendly, and contains leaderboards for a bit of competition [6].

5. Sonic Dash 1 and 2 are two more popular games like Temple Run [7]. These use the classic style with three lanes, various obstacles, boss fights, and more. These also feature somewhat unique game mechanics, racing, and themes from the SEGA hit games. That includes many playable characters from the series. They're not too aggressive with it, thankfully.

2.3 Comparative Studies

Existing systems just give the entertainment while playing but not giving educative information. In our game we give facilities to provide educative information to gather knowledge for the kids. Basically this game will be made for the kids, but adults can also play this game. So kids can gather the idea about the famous monuments of our country which will increase their knowledge about our country. Also there is some social awareness information in the poster. So it will represent our culture our education.

2.4 Scope of the problem

In this android app, we make a simple graphical view with different famous monument of our country so it will attract the user. This app is very user friendly. We face problem to give a proper graphical view of the monument with high quality graphics. We need to keep our mind that it will not take enough space in the device. This app is only for kids, so have to keep in mind how to attract the kids. Language is one of the problems among all. We try to use Bangla.

2.5 Challenges

There are some challenges we faced to complete this project. They are:

1. Kid's attention: It is very challenging to get the kids attention from game to educational game because we want that kids can easily get some valuable information from this game. In our daily life we make a mistake when we walk in the road and not aware of the social values so when kids are playing this game they learn some positive lesson from this game.

2. Development and marketing: This application is educational app so this type app development is very challenging and difficult. On the other hand marketing is very challenging for this app. For reaching more users we must publish this game freely on market, though the app contains some advertisement such as Google AdSense. But the revenue is so limited.

3. Graphical Interface: Our graphics is so high. So this app will not install in the low quality phone or device. If it installed user cannot use it properly there will be lacking's and buffering. Also we have to keep in mind that it will not take enough space in the phone. So it can be a negative side of our project.

CHAPTER 3

REQUIREMENT SPECIFICATION

This chapter is about the requirement specification including the business process modeling, requirement collection and analysis, use case modeling, logical data model and design requirement.

3.1 Business Process Modeling

Business Process Modeling (BPM) is a process of constructing a structural view of a system or process for improving organizational efficiency and quality. Business Process Modeling is includes some process, starts and symbol, condition as like a flow chart and an extended process that is denoted by the various computer tools or software which are used for applying its methods. In our system we use BPM model which shows that how our system works.

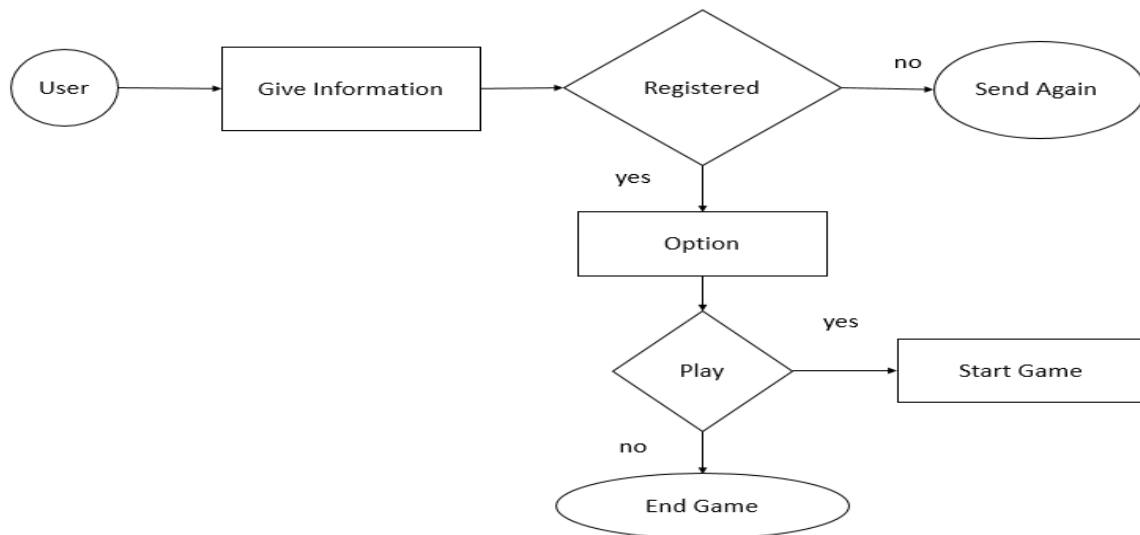The following figure 3.1 shows the business process model.

Figure 3.1: Business process model of this app

3.2 Requirement Collection and Analysis

An android app requires a lot of process to make a complete system. So, Requirement collection and analysis are very important part to develop any kind of system or any kind of android application. A requirement is based on the performance and display quality so it looks interesting to the users. For a game, the requirement must have low memory performance capability to perform fast enough so it make user friendly. The color combination for the game must be randomized for children so it can attract the children to play the game [8]. There should be high quality graphics but also low in size. So the requirements that needed to complete our project are:

1. Coding Language:
   - C#
2. Software IDE:
   - Unity
   - 3D max
3. Hardware
   - Android phone

Analysis From the project:

After some analysis we wanted to design this app, basically this game is for the kids. Now a day's children have mobile phone in their early age. So they spend a lot of time on it. Game playing is not a waste of time always. Sometimes it is educative while playing. So we make this app so that the kids can learn something new about our country and gather some social awareness. It will not be entertaining game only but also educative. So the parents will not be more tensed about their game playing.

Our app দৌড়াও: A RUNNING GAME is a simple contribution on this effective purpose.

3.3 Use Case Modeling and Description

Use case modeling is capturing requirements to clarify exactly what the system is supposed to do. In use case a series of actions performed by the user. Use case diagrams represent external behavior. Use case model represents a class of functionality provided by the system as an event flow. This method used in the system analysis to identify, clarify and organize the system requirements. Our system use case diagram is shown below in the figure 3.2.
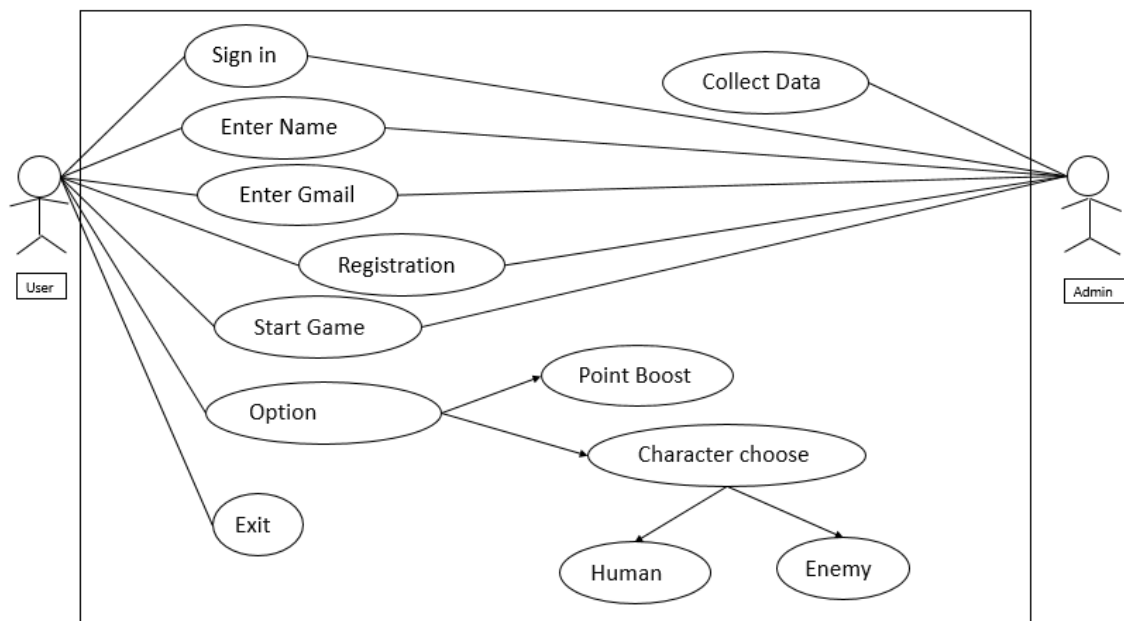
Figure 3.2: Use case diagram of this application

3.4 Logical Data Model

Logical data model represents the abstract model of system information. [9] In our project we have used the entity relationship model (ER model). In this model there is two user player and admin. Player can play the game get the option for choosing character, sound control and point boosting or may quit from the game. For entering the game player have to set a name and give mail id. And admin get that name collect it with individual id.

Logical data model is given below in figure 3.3.
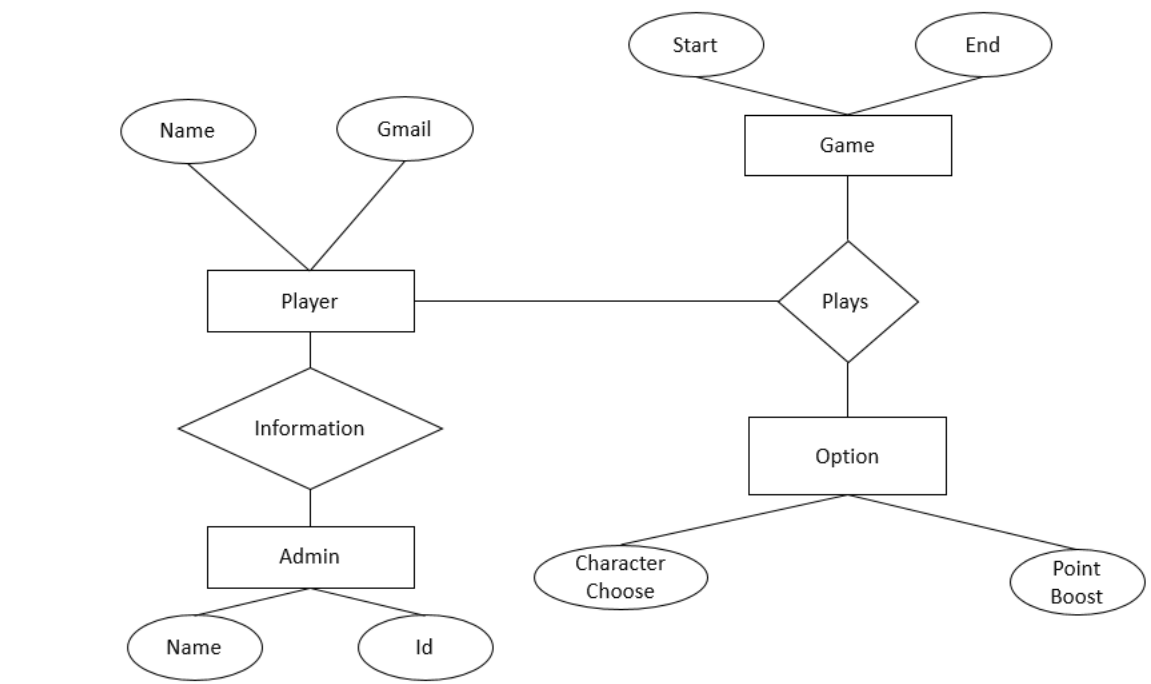
Figure 3.3: Logical Data Model of this App

3.5 Design Requirements

A well design of an android app is very essential but we should concentrate to the output design of the app first. So, proper design makes an application more efficient, user friendly, easy to use. Our app provides enjoyment and also educative knowledge. Our targeting users are kids so it should be attracted for them. It's easy to use for them. We have maintained some effective things like: Make our system more compatible, future maintenance must be less for this system, make our system so simple and more user friendly, efficiency is the most important part, system should run and work in minimum hardware and available without buffering.

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-end Design

To make every application attractive the Front-end Layout is the part of any application which is visual to the user. User can interact with the back-end work by the Front-End GUI. We will discuss about the initial front-end design in this part. We have designed this graphical user interface to make our application more attractive. The following figure 4.1 shows the initial starting layout of the দৌড়াও: A RUNNIG GAME application.
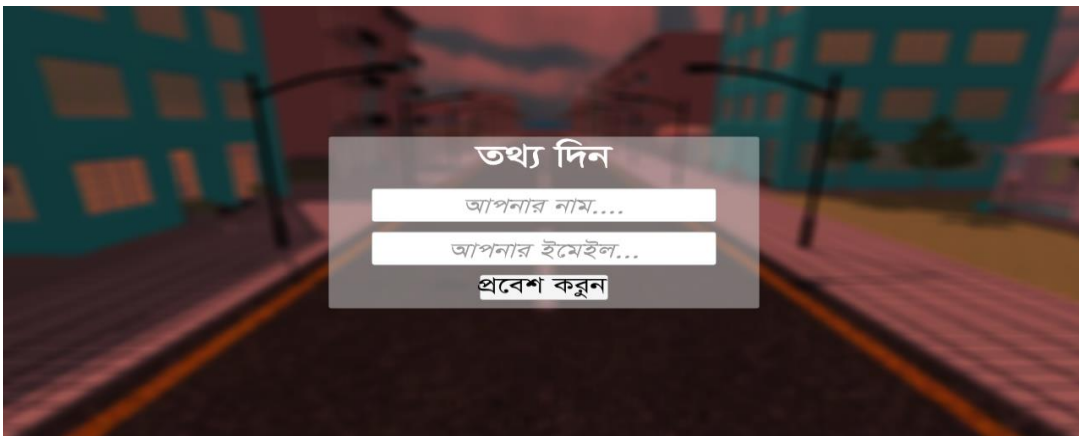
Figure 4.1: The initial starting GUI of the দৌড়াও: A RUNNIG GAME

The following figure 4.2 shows the GUI that will be shown when the player click on Play Button.
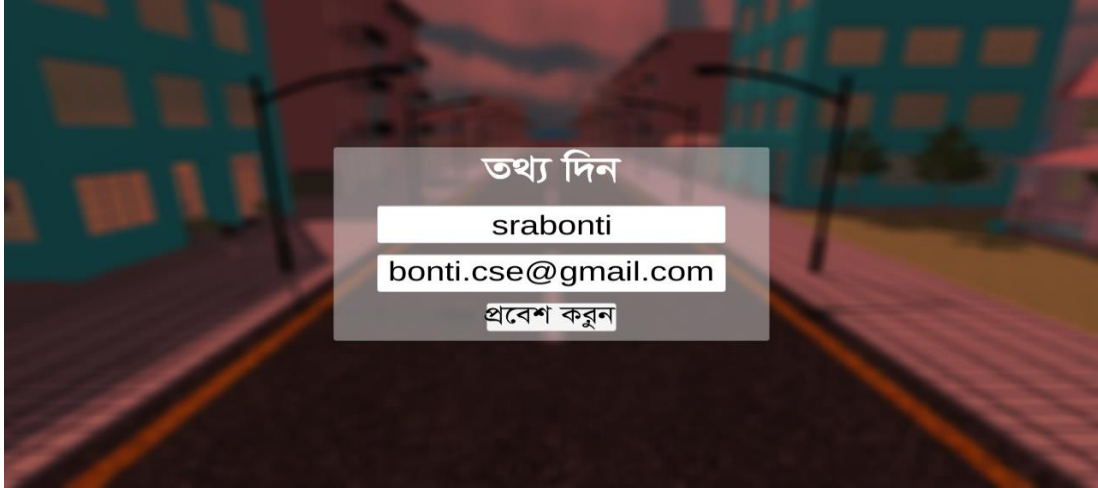
Figure 4.2: Select Option GUI

The following figure 4.3 shows the GUI that will be shown when the player is selecting the options
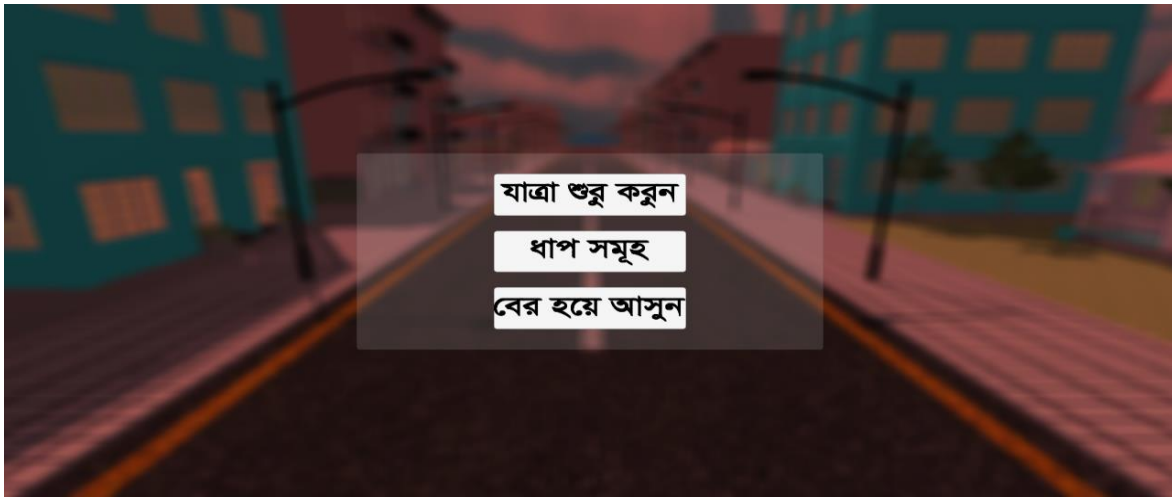
Figure 4.3: Player choosing the option

The following figure 4.4 shows the GUI that will be shown when the player is on the right side

Figure 4.4: Player on the right side

The following figure 4.5 shows the GUI that will be shown when the player is on left side and also showing the coin.
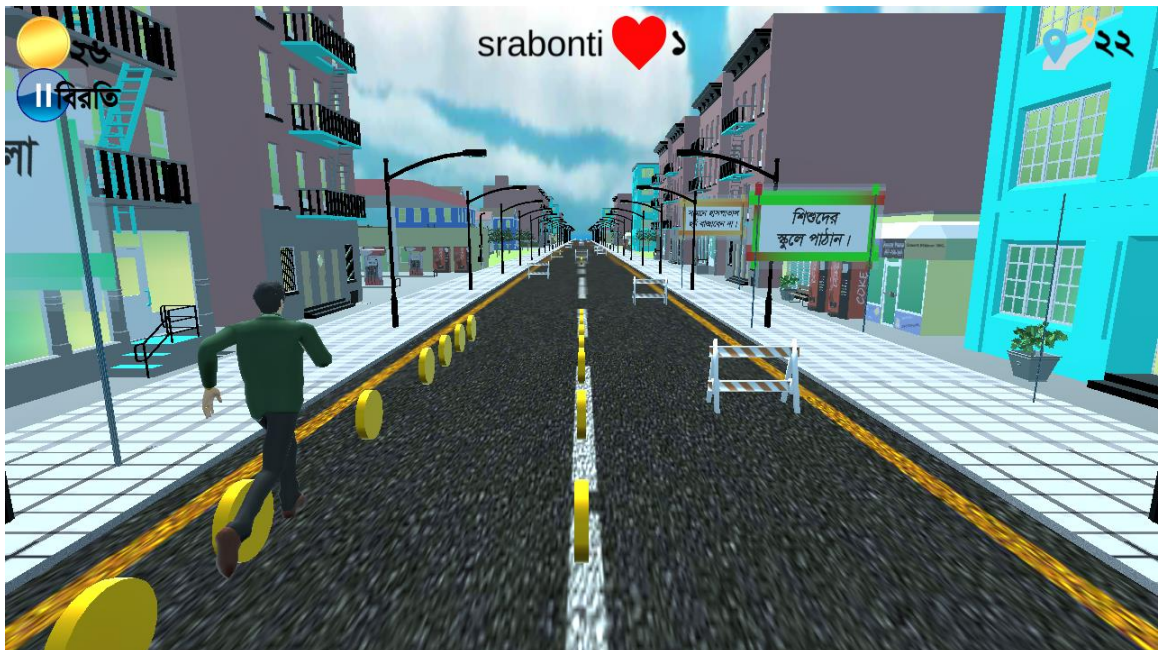
Figure 4.5: Player on the left side and with a coin

The following figure 4.6 shows the GUI that there are lots of random enemy in the road.

Figure 4.6: Showing random enemy

The following figure 4.7 shows the GUI that user can choose the character of player.

Figure 4.7: Showing player choosing

The following figure 4.8 shows the GUI that there are lots of posters in the road.

Figure 4.8: Showing Posters

The following figure 4.9 shows the GUI that there are national memorial of our country.

Figure 4.9: Showing our national memorial

The following figure 4.10 shows the GUI that there are 2 lives remaining of the player out of 3 lives.

Figure 4.10: Showing 2 life remaining of the player

The following figure 4.11 shows the GUI that the player has one life.

Figure 4.11: Showing the player has one life

The following figure 4.12 shows the GUI that the game is over.

Figure 4.12: Showing the game is over

4.2 Back-end Design

Programmers designed the back design and only they can see this design .In the back end design users are not interact. In this project we use unity game engine and use little database. When the user want to sign in this app a database is automatically generated for the user.

4.3 Interaction Design and UX

Interaction design describes the relationship between the application and the user. An android application will popular among the user depending on the interaction of the app with the user. Experience is very essential for interaction design because the user focuses on the experience between the user and the application. From this experience we tried to make most of the features of our app that can interact with the user.

User experience (UX) design is the process used to determine what the experience will be like when a user interacts with the application [10].

4.4 Implementation Requirement

To develop the front-end and back-end of this application we need some tools. Like: Programming language, 3D max, Game engine etc. We need Unity3D game engine for front-end development, 3D max to design. For back-end, we use C# coding language to control the logic and program.

CHAPTER 5

IMPLEMENTATION AND TESTING

This chapter contains discussion about Implementation and Testing report of this project.

5.1 Implementation of Front-end Design

We use Unity 3D game engine to implement the front-end design. The following figure 5.1 shows the implemented graphical user interface of the game.
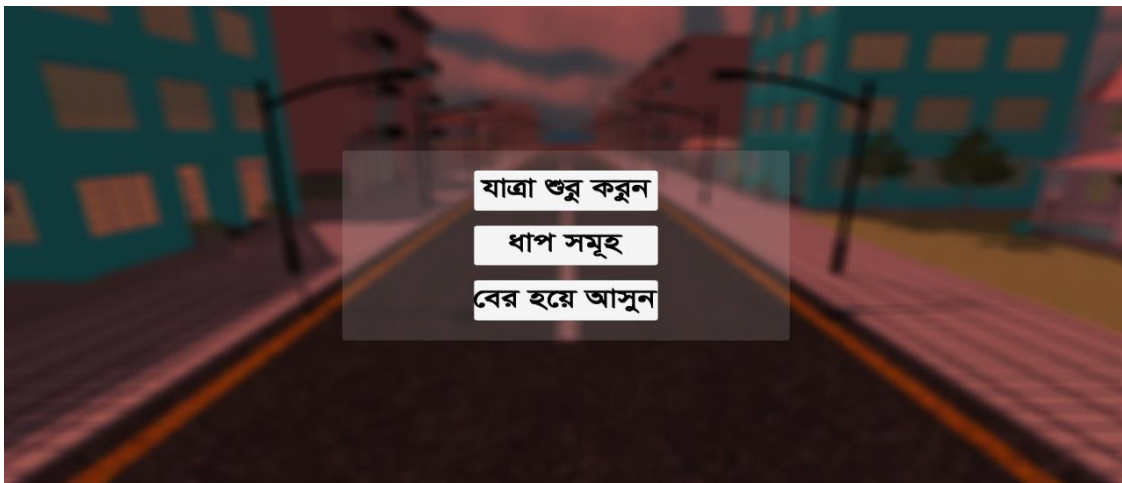
Figure 5.1: Implemented main GUI of the game

5.2 Testing Implementation

After implementation, we test our project. We click on the play button and the player is running on the road as shown in the figure 5.2.

Figure 5.2: Implemented game of taking part in a Testing mode

5.3 Test Result and Report

Test Reports represent the result of the test in a formal way. Report contains the data which that we have evaluated in a professional and organized manner. After testing we get our expected result which is shown in figure 5.1. It will display how the player can play the game. The gaming steps and what can see in the game we have explained this from the figure 4.2 to figure 4.12. So we just want that a user can gather knowledge about our countries famous monuments and get some social awareness through the posters that we have given. Also the player can collect the coin and get an amount of collecting coins which shown in the following figure 5.3. So, we can say that our app is error free and user acceptable.

Figure 5.3: Result after completing the game

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

The chapter is about the conclusion and the future scope and some limitations of our project. An application cannot be completed fully by the user requirement. It's a long process; system can be changed, developed time to time to give better performance and new facilities in the system. So our project is not different from other project.

6.1 Limitations

Like any other system our system has also limitations. They are given below:

- This app will work only in Android smartphone though it has high graphics.
- No online database to store user information.
- Internet support.
- Fewer activities.

6.2 Future Scope

Improvement is a basic need of any system. In future, we will add some new features so it can be more attracted for the users to use our application. There are some features that we want to develop for future development.

- Multiple character
- Better database to store user information
- Add more graphical view of our countries structure
- Add more activities
- Multilanguage Translation

6.3 Conclusion

Completing a project is a great experience itself. It's a wonderful learning experience for us to work on this project. Now a day android application projects are more popular than any other project. Gaming application is more popular than any applications and more effective for the usefulness of the smartphone. It can be install and used on any smartphone supporting Android operation system.

Kids are addicted for using the smartphone. So, it's a good way to give them education while game playing. By this game application, a child can play the game and learn the famous structure of our country. So it gives them knowledge about the structures though it is written in Bengali. There are a lot of social awareness posters that will increase their social knowledge as well as it reduce the pressure of parent or guardian about using smartphone by their children.

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APPENDICES

Appendix A: Project Reflection

We have started our journey to make an application of our own from summer 2018 to implement this android application. We tried to make a user friendly interface of our project. The main feature of our project is to give educational and social awareness knowledge to the kids and also represent our country's famous monuments. We believe that our application will be a positive and effective for users.

We have used Unity 3d game engine for the design of this game app and C# code for developing the whole game also use JavaScript for the designing for develop the whole app. The code for the main functionality of this app is given below:

Appendix A.1: Code for game manager of this game.

GameManager.CS

```
using System.Collections;
using UnityEngine;
using UnityEngine.UI;
using UnityEngine.SceneManagement;

public class GameManager : MonoBehaviour
{
    public static GameManager gameManager;
    private int sceneIndex;

    private void Start()
    {
        gameManager = this;
        DontDestroyOnLoad(gameObject);
    }
```

```csharp
    private void Update()
  {
    sceneIndex = SceneManager.GetActiveScene().buildIndex;
    if(Input.GetKeyDown(KeyCode.Escape)) {
      if(sceneIndex > 0) {
        sceneIndex -= 2;
        LoadScene();
      }
      else {
        Exit();
      }
    }
  }


private IEnumerator LoadingBar(){
    if(sceneIndex == 1) {

      Slider LoadingSlider = GameObject.Find("Main Menu").GetComponentInChildren<Slider>(true);
      LoadingSlider.gameObject.SetActive(true);

        LoadingSlider.gameObject.GetComponentInChildren<Text>().text = (int)(progress * 100f) + "%
Loading...";
        yield return null;
      }
    }
    else {
      SceneManager.LoadSceneAsync(sceneIndex);
      yield return null;
    }
  }
}
```

Appendix A.2: Code for character of this game.

RigidBodyCharacter.CS

```csharp
using System.Collections;
using System.Collections.Generic;
using UnityEngin
```

```csharp
public class RigidbodyCharacter : MonoBehaviour
{

    public float Speed = 5f;
    public float JumpHeight = 2f;
    public float GroundDistance = 0.2f;
    public float DashDistance = 5f;
    public LayerMask Ground;

    private Rigidbody _body;
    private Vector3 _inputs = Vector3.zero;
    private bool _isGrounded = true;
    private Transform _groundChecker;

    void Start()
    {
        _body = GetComponent<Rigidbody>();
        _groundChecker = transform.GetChild(0);
    }

    void Update()
    {
        _isGrounded = Physics.CheckSphere(_groundChecker.position, GroundDistance, Ground,
QueryTriggerInteraction.Ignore);


        _inputs = Vector3.zero;
        _inputs.x = Input.GetAxis("Horizontal");
        _inputs.z = Input.GetAxis("Vertical");
        if (_inputs != Vector3.zero)
            transform.forward = _inputs;

        if (Input.GetButtonDown("Jump") && _isGrounded)
        {
            _body.AddForce(Vector3.up * Mathf.Sqrt(JumpHeight * -2f * Physics.gravity.y),
ForceMode.VelocityChange);
        }
```

```
    void FixedUpdate()
    {
        _body.MovePosition(_body.position + _inputs * Speed * Time.fixedDeltaTime);
    }
}
```

Characters.CS

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Character : MonoBehaviour
{
    public float Speed = 5f;
    public float JumpHeight = 2f;
    public float Gravity = -9.81f;
    public float GroundDistance = 0.2f;
    public float DashDistance = 5f;
    public LayerMask Ground;
    public Vector3 Drag;

    private CharacterController _controller;
    private Vector3 _velocity;
    private bool _isGrounded = true;
    private Transform _groundChecker;


    void Start()
    {
        _controller = GetComponent<CharacterController>();
        _groundChecker = transform.GetChild(0);
    }
    void Update()
    {
        _isGrounded = Physics.CheckSphere(_groundChecker.position, GroundDistance, Ground,
QueryTriggerInteraction.Ignore);
        if (_isGrounded && _velocity.y < 0)
            _velocity.y = 0f
```

```csharp
        Vector3 move = new Vector3(Input.GetAxis("Horizontal"), 0, Input.GetAxis("Vertical"));
        _controller.Move(move * Time.deltaTime * Speed);
        if (move != Vector3.zero)
            transform.forward = move;


        if (Input.GetButtonDown("Jump") && _isGrounded)
            _velocity.y += Mathf.Sqrt(JumpHeight * -2f * Gravity);
                {
            Debug.Log("Dash");
            _velocity += Vector3.Scale(transform.forward, DashDistance * new Vector3((Mathf.Log(1f /
(Time.deltaTime * Drag.x + 1)) / -Time.deltaTime), 0, (Mathf.Log(1f / (Time.deltaTime * Drag.z + 1)) / -
Time.deltaTime)));
        }



        _velocity.y += Gravity * Time.deltaTime;

        _velocity.x /= 1 + Drag.x * Time.deltaTime;
        _velocity.y /= 1 + Drag.y * Time.deltaTime;
        _velocity.z /= 1 + Drag.z * Time.deltaTime;

        _controller.Move(_velocity * Time.deltaTime);
    }


}
```

Appendix A.3: Code for the camera which is following the player.

PlayerFollowingbyCamera.CS

```csharp
using UnityEngine;


namespace HutongGames.PlayMaker.Actions
{
        [ActionCategory(ActionCategory.Transform)]
        [Tooltip("Moves a Game Object towards a Target. Optionally sends an event when successful. The
Target can be specified as a Game Object or a world Position. If you specify both, then the Position is used as a
local offset from the Object's Position.")]
```

```
        {
                [RequiredField]
                [Tooltip("The GameObject to Move")]
                public FsmOwnerDefault gameObject;

                [Tooltip("A target GameObject to move towards. Or use a world Target Position below.")]
                public FsmGameObject targetObject;

                [Tooltip("A world position if no Target Object. Otherwise used as a local offset from the
Target Object.")]
                public FsmVector3 targetPosition;

                [Tooltip("Ignore any height difference in the target.")]

    private GameObject go;
    private GameObject goTarget;
        private Vector3 targetPos;
    private Vector3 targetPosWithVertical;

                public override void OnUpdate()
                {
                        DoMoveTowards();
                }

                void DoMoveTowards()
                {
    if (!UpdateTargetPos())
    {
      return;
    }

    public bool UpdateTargetPos()
    {
      go = Fsm.GetOwnerDefaultTarget(gameObject);
      if (go == null)
      {
        return false;
      }
```

```csharp
        goTarget = targetObject.Value;
        if (goTarget == null && targetPosition.IsNone)
        {
            return false;
        }

        if (goTarget != null)
        {
            targetPos = !targetPosition.IsNone ?
                goTarget.transform.TransformPoint(targetPosition.Value) :
                goTarget.transform.position;
        }
        else
        {
            targetPos = targetPosition.Value;
        }

        targetPosWithVertical = targetPos;
        {
            targetPos.y = go.transform.position.y;
        }

        return true;
    }

    public Vector3 GetTargetPos()
    {
        return targetPos;
    }

    public Vector3 GetTargetPosWithVertical()
    {
        return targetPosWithVertical;
    }
    }
}
```

Appendix A.4: Code for collecting the coin by the player.

CoinCollecting.CS

```csharp
using UnityEngine;

namespace HutongGames.PlayMaker.Actions
{
        [ActionCategory(ActionCategory.Physics)]
        [Tooltip("Detect trigger collisions between GameObjects that have RigidBody/Collider components.")]
        public class CoinCollecting : FsmStateAction
        {
    [Tooltip("The GameObject to detect trigger events on.")]


        public FsmGameObject storeCollider;

          // cached proxy component for callbacks
          private PlayMakerProxyBase cachedProxy;

                public override void Reset()
                {
                   gameObject = null;
                        trigger = TriggerType.OnTriggerEnter;
                        collideTag = "";
                        sendEvent = null;
                        storeCollider = null;
                }

                {
                        return
ActionHelpers.CheckPhysicsSetup(Fsm.GetOwnerDefaultTarget(gameObject));
                }
        }
}
```

Appendix A.5: Code for enemy effect in the game.

EnemyEffect.CS

```csharp
using UnityEngine;
```

```
namespace HutongGames.PlayMaker.Actions
{
        [ActionCategory(ActionCategory.Physics)]

        [Tooltip("Detect collisions between Game Objects that have RigidBody/Collider components.")]

          public override void OnPreprocess()
         {
           if (gameObject.OwnerOption == OwnerDefaultOption.UseOwner)
           {
             switch (collision)
             {
               case CollisionType.OnCollisionEnter:
                 Fsm.HandleCollisionEnter = true;
                 break;
               case CollisionType.OnCollisionStay:
                 Fsm.HandleCollisionStay = true;
                 break;
               case CollisionType.OnCollisionExit:
                 Fsm.HandleCollisionExit = true;
                 break;


          public override void OnEnter()
         {
           if (gameObject.OwnerOption == OwnerDefaultOption.UseOwner)
             return;

      if (cachedProxy == null)
        GetProxyComponent();

                public override string ErrorCheck()
                {
          return ActionHelpers.CheckPhysicsSetup(Fsm.GetOwnerDefaultTarget(gameObject));
                }
        }
}
```

Appendix A.6: Code for generating the road of the game.

RoadGenerator.CS

```
using UnityEngine;

namespace HutongGames.PlayMaker.Actions
{
        [ActionCategory(ActionCategory.Transform)]
        [Tooltip("Gets the Position of a Game Object and stores it in a Vector3 Variable or each Axis in a Float
Variable")]
        public class RoadGenerator : FsmStateAction
        {
                [RequiredField]
                public FsmOwnerDefault gameObject;

                [UIHint(UIHint.Variable)]


                        z = null;
                        space = Space.World;
                        everyFrame = false;
                }



                var newObject = (GameObject)Object.Instantiate(go, spawnPosition,
Quaternion.Euler(spawnRotation));
#endif
        storeObject.Value = newObject;

                                //newObject.transform.position = spawnPosition;
                                //newObject.transform.eulerAngles = spawnRotation;
                        }

                        Finish();
                }

        }
```
Appendix A.7: Code for road destroying in game

RoadDestroyer.CS

```
using UnityEngine;

namespace HutongGames.PlayMaker.Actions
{
        [ActionCategory(ActionCategory.GameObject)]
        [Tooltip("Destroys a Game Object.")]
        public class RoadDestroyer : FsmStateAction
        {
                [RequiredField]
                [Tooltip("The GameObject to destroy.")]
                public FsmGameObject gameObject;



}
```

Appendix A.8: Code for enemy generates.

RandomEnemyGenerator.CS

```
using UnityEngine;

namespace HutongGames.PlayMaker.Actions
{
  [ActionCategory(ActionCategory.Array)]
  [Tooltip("Add an item to the end of an Array.")]
  public class RandomEnemyGenerator : FsmStateAction
  {
    [RequiredField]
    [UIHint(UIHint.Variable)]
    [Tooltip("The Array Variable to use.")]



                public override string ErrorCheck()
                {
                        if (FsmEvent.IsNullOrEmpty(equal) &&
```

```
                                FsmEvent.IsNullOrEmpty(lessThan) &&

                                FsmEvent.IsNullOrEmpty(greaterThan))

                                return "Action sends no events!";

                    return "";

            }


#if UNITY_EDITOR
        public override string AutoName()

        {

            return ActionHelpers.AutoName(this, integer1, integer2);

        }
#endif

        }


}
```

Appendix B: Related Diagrams

To implement our proposed application at first we build a model of our app. We use some diagrams and use case model to analyze how we can implement our app. The first diagram we create the use case diagram. From the use case diagram we can know about user of our app and what is their activity in the app. In our দৌড়াও: A RUNNIG GAME app there is only one user. We also use business process model which acts a flow chart. In this section we describe the activity of the user and how they interact with the system. We implement our application using unity 3D and 3D max. In this section we add some diagrams from the user interface and back-end. Figure B.1 shows the use case diagram.
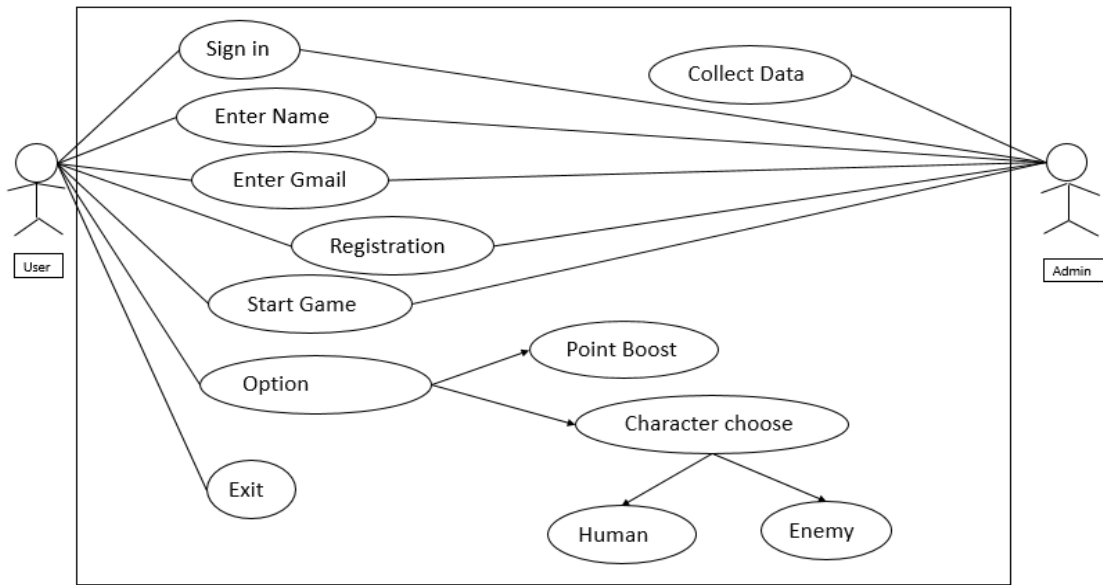
Figure B.1: Use Case Model of the app

Figure B.2 shows the scoring result of the player that how much coin collect and how much road the user has crossed. It works as the back-end work of this application.
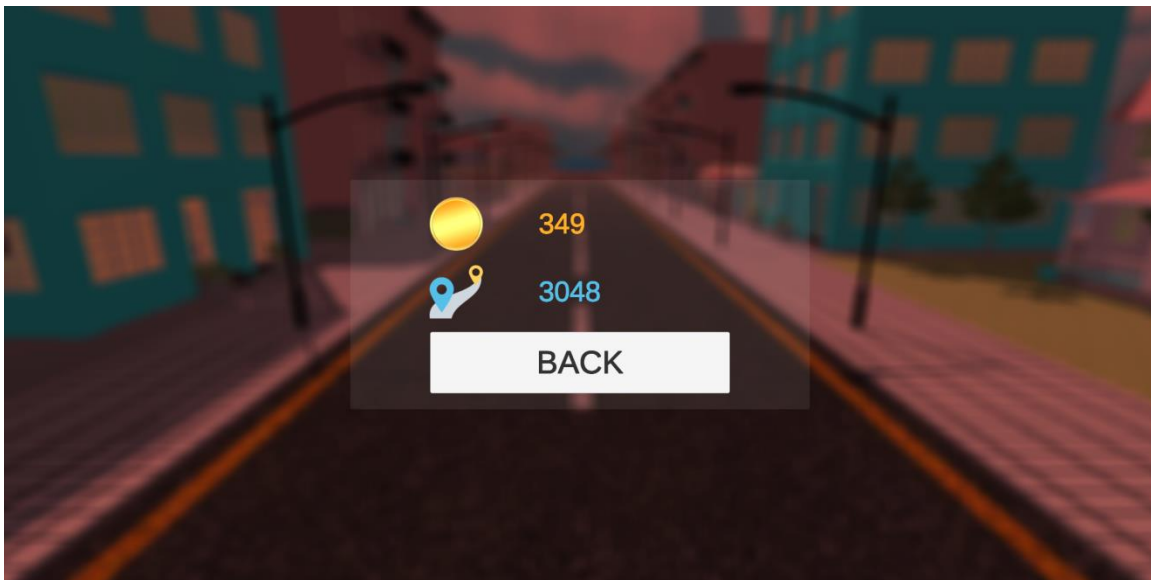

Figure B.2: Scoring and collecting the coin