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IMMERSIVE BICYCLE GAME FOR HEALTH VIRTUAL TOUR OF UIN MAULANA MALIK IBRAHIM MALANG

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Graphical abstract

Abstract

Cancer is the leading cause of death in the world. More than 10 million people worldwide The goal of this research is to promote UIN Maliki Malang using immersive tools bicycle for human health. The system developed using combination of bicycle and computer with various sensors on the wheels, steering and brakes. The device consists of a mountain bike in front of the monitor are useful to display virtual Tour. Children's reactions to the virtual peer indicate that their virtual peer framework is a promising platform for future behavioral studies of peer influences on children's bicycle riding behavior. The system results shows immersive bicycle road in UIN Maliki Malang area. This system is useful for refreshing and relaxing human body.

Keywords: Mountain bike, immersive, virtual tour

1.0 INTRODUCTION

Simulation is a process of imitation of the real thing along with the surrounding circumstances (state of affairs). Action perform these simulations generally describes the properties of the key characteristics of the behavior of a physical system or a system that certain abstract. Simulation is the process of designing a model of mathematical logic of a real system and perform experiments on a model built on the computer [1]. Simulation is a collection of methods and applications that describe the behavior of the system and is usually done on a computer with the right program [2]. Several virtual and human interfaces have been developed for fun game, exercise, training, and education. These interfaces provide feedback to human users through multiple verbal and nonverbal channels such as speech, gestures, and facial expressions. Rea, built by Thorisson and Cassell, is a virtual real estate agent capable of understanding speech and gaze [3]. Rea keeps a model of interpersonal distance with the user, and employs small talk to reduce interpersonal distance if she notices a lack of closeness with the user. Research with Rea demonstrates that using both speech and gesture contribute to virtual humans being perceived as life-like and believable. Slater and coworkers found that theatrical actors and directors could effectively use virtual humans for rehearsals before a live performance [4]. The Mission Rehearsal Exercise (MRE) system is an immersive virtual reality system with life-size virtual humans that was created to teach users leadership skills in task-oriented social situations [4]. The MRE uses fictional scenarios based on the real world to give communicative training. ELECT BiLAT, developed at the ICT at USC, is a game environment with virtual humans that teaches army officers culture specific verbal and nonverbal behaviors in Middle Eastern culture [5]. Babu et al. showed that immersive virtual humans in natural multimodal interaction can teach and train users social conversational nonverbal behaviors associated with south Indian culture [6].

Babu et al. showed that the study and children's reactions to the virtual peer indicate that their virtual peer framework is a promising platform for future behavioral studies of peer influences on children's bicycle riding behavior [7]. In our research, we combine game and exercise to get healthy body and get information about UIN Maliki Malang building.

2.0 METHODOLOGY

This system built is a game application using an immersive control tools bicycle, using a background of a virtual tour road to campus environment UIN Maliki in 3D. The methodology of this research can be seen at Figure 1.

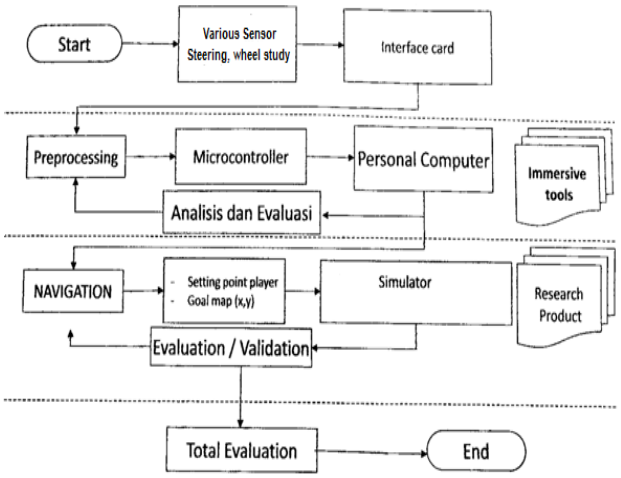

Figure 1 Immersive bicycle Research Methodology

Firstly, we study various sensor to control steering, breaking circuit and wheel systems. Then interface card for connecting bicycle to computer. Secondly, preprocessing with preparing component system. The component divide by software and hardware.

Software component, we used Blender software to create detail parts of object, creating virtual tour based on unity 3D.

Hardware component, we use arduino uno board for connecting mountain bike and computer and electronic sensor for wheel.

Detail Component requirement for building system :

1. Software
   a. Operating System Windows 8 (32 bit).
   b. Game engine Unity Free Version.
   c. MonoDevelop Versi 4.0.1
   d. Arduino Versi 1.6.5
2. Hardware
   Combination Computer and *immersive tools*
   a. Computer Intel Core 2 Duo, memory 3GB.
   b. LCD Monitor,
   c. Keyboard,
   d. Mouse,
   e. Arduino Duo
   f. Bicycle,
   g. 2 potensiometer,
   h. Infra red.
   i. Switch
   j. Photo diode sensor

Thirdly, adding navigation system to route mapping campus location.

There are several building at UIN Maliki Malang:

- Rectorate building
- Information Building
- Library building
- Mosque building
- Sport centre building
- Science and Technology faculty building
- Humaniora Faculty building
- Social Building
- Micro teaching building
- UIN Press building
- Mahad Building
- Medical Building
- Teaching building A and B

Figure 2 show the UIN Maliki Malang Building developed based on Unity 3D.

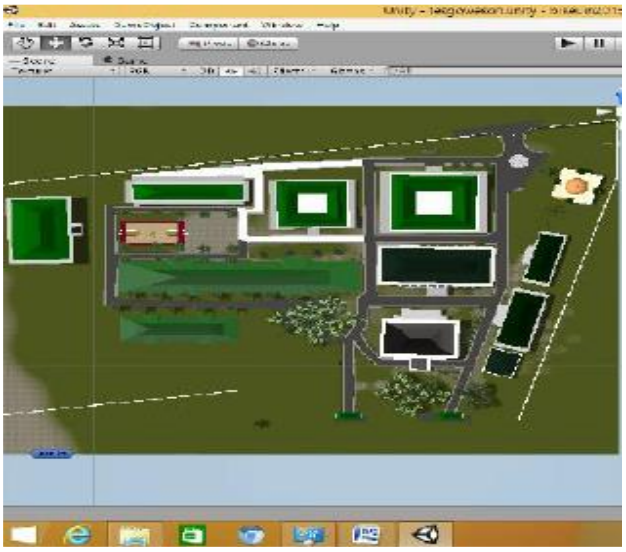

Figure 2 UIN Maliki Malang Building developed based on Unity 3D

The create navigation, we use A* algorithms. The best-established algorithm for the general searching of optimal paths is A* (pronounced "A-star"). This heuristic search ranks each node by an estimate of the best route that goes through that node.The typical formula is expressed as [9][10].

$$f(n) = g(n) + h(n)$$

where: f(n)is the score assigned to node n g(n)is the actual cheapest cost of arriving at n from the

starth(n)is the heuristic estimate of the cost to the goal from n [9].

4.0 RESULTS AND DISCUSSION

4.1 Virtual Tour Interface

In the virtual tour start from Rectorate building Malang and last goal Information building. Figure 3 shows the UIN Maliki Malang Building from up and Figure 4 shows the UIN Maliki Malang Building 2.

Figure 3 UIN Maliki Malang Building from up

Figure 4 UIN Maliki Malang Building 2

On the hand, Figure 5 shows the first coordinate position path and Figure 6 shows the goal coordinate position of the building.

Figure 5 First coordinate position path

Figure 6 The goal coordinate position

The data collected from the several experiment. This system apply using combination bicycle and computer and C# software and java scripts as core. Visual panoramic building design using Unity engine.

The experiment marked coordinate position path player with different goal.

First experiment marked (2422.5) as been shown in Figure 7. The goal coordinate marked (1732.5) see Figure 8. The results as line straight to the goal. From results path through by player.

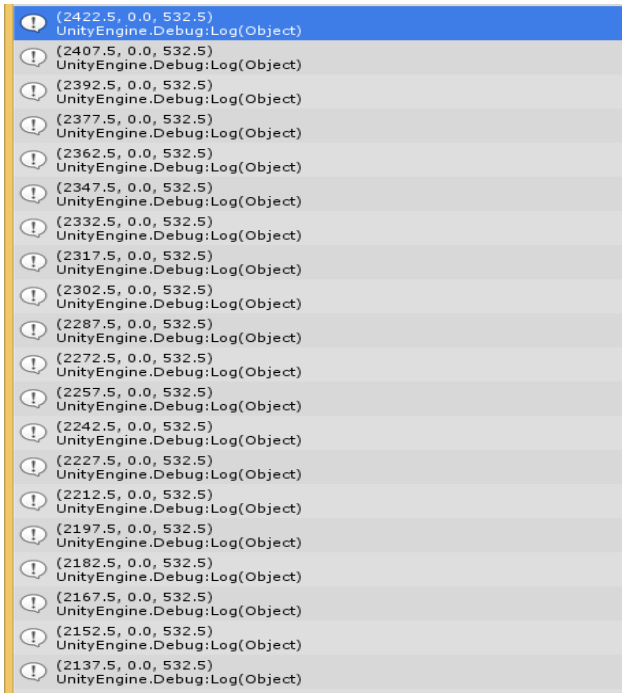

Figure 7 First experiment marked

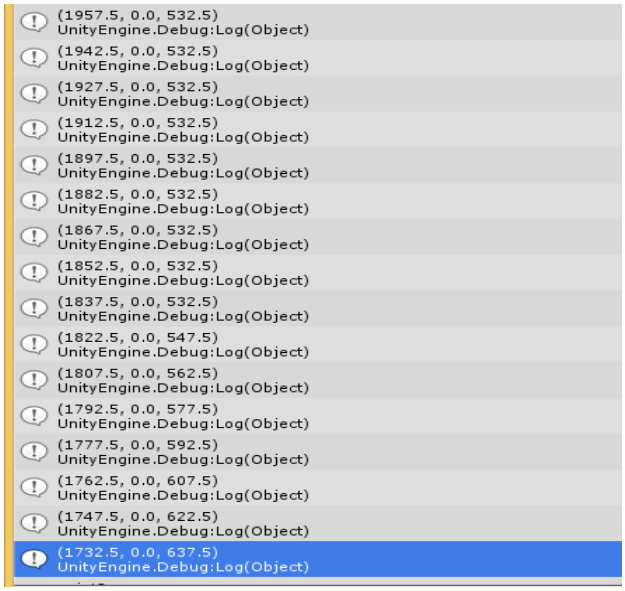

Figure 8 The goal experiment marked

5.0 CONCLUSION

This paper is used to promote UIN Maliki Malang using immersive bicycle. The conclusions for this research are as follows:

1. The system results shows immersive bicycle road in UIN Maliki Malang area.
2. This system is usefull for refreshing and relaxing human body.

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