

COSC 729: Virtual Reality (Spring 2017)



Zombies Hunter

A Virtual Reality Game

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Overview:

This project is to develop a game called “*Zombies Hunter*”. It is a single-player with two-level game where the player should hunt as much zombies as possible within a predefined time period throughout the city. The single player controls one avatar (main view/camera). For each hunt, the player gets scores. Depending on where the player hit the zombie, he/she will receive different points.

Goals and objectives:

In this project, our group worked towards developing a game called “*Zombies Hunter*” which is a single-player game. The game is held on a small village. In the first level, the player should find Zombies inside buildings in daytime or on streets during nighttime and hunt them. The player uses a weapon to hit the Zombies. Also, the player can use measurement tool to estimate the distance. If the player enters to zombie’s area, the player will go back to the original location in level 1, or die in level 2. When the player gets a certain score he/she will proceed to the next level, (Level 2) where the Zombies in this level walk toward the player (Main View). The village is designed by 3Ds max application while the code is written in python by using Vizard platform. The avatars ‘Zombies’ are inbuilt avatars in vizard after changing their faces to become zombies. Some avatars are not zombies; the player must avoid shooting them.



Figure 1: “*Zombies Hunter*” environment

Modeling/ Environments:

Zombies Hunter game is held on a small village. The player should chase the Zombies in each building then hunt them. There are many buildings in the game that the player may find zombies in, the buildings are designed in 3Ds max application. Some buildings designed by SketchUp application. The game is written in Python language by using Vizard platform, as shown in figur2. The avatars used in the game are INBUILT avatars in Vizard.

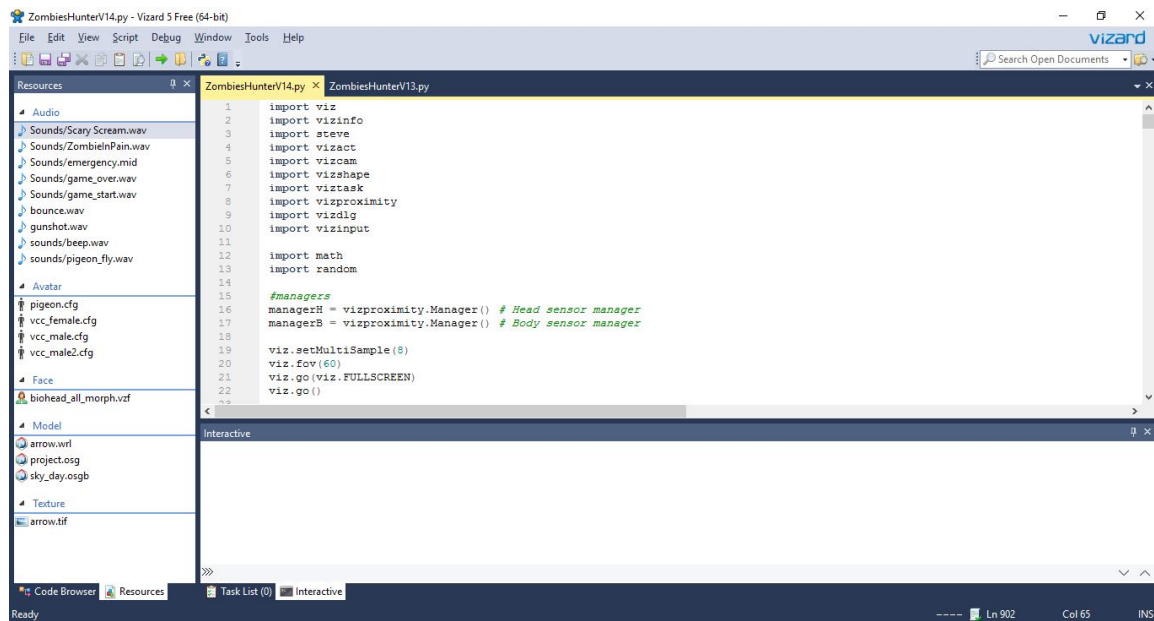


Figure 2: Python Language in Vizard Platform

We changed some avatars' faces to convert them into zombies, while others are regular people the player should avoid shooting them. The people are distributed over the city as well as pigeons. To avoid shooting the regular people, the player should start evacuation plan that force the people to run into safe place at the beginning of the game. To support the player, we provide a city map that can show player position around the city.

In game environment, we let the user to choose the day or night sky time, as shown in figure 3 . When the player chooses *day time*, the zombies would only appear inside buildings, because zombies cannot live under the sun light. When the player chooses *night time*, the zombies would be all over the village, anywhere. At the day time, the sun would appear on the sky and the light is reflected on the ground and buildings. However, in night time, the sky would be dark with rain and there is no light reflection.

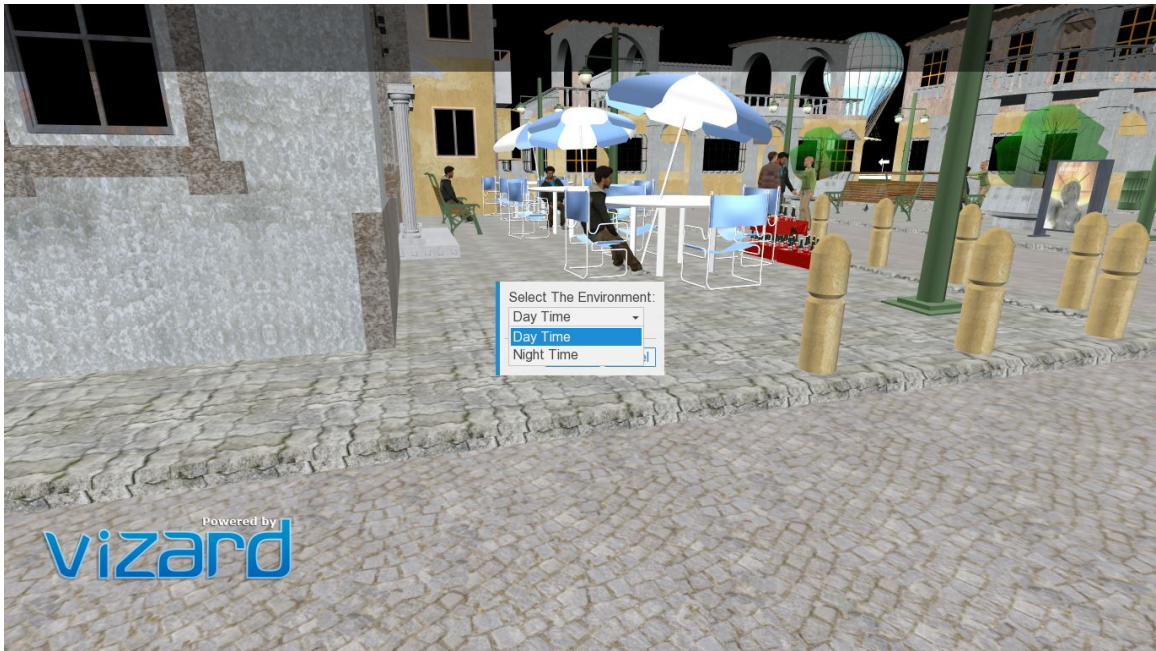


Figure 3: The player can choose between day or night time



Figure 4: Welcome message and game rules

Game Rules:

1. The game is two-level, with 45 seconds for each level.
2. The player uses keys [ASDW] to move, and the Mouse to change directions.
3. During the game the player can press the following keys:
 - [h] to show/hide help menu.
 - [k] to show/hide the city map.
 - [v] for evacuation.
 - [m] to show /hide zombies' head sensors
 - [n] to show /hide zombies' chest sensors
 - [j] to show/hid range's sensor around zombie area in level 1.
 - [b] to show/hide sensor around zombie body in level 2.
4. Three scores for hunt a zombie will be adding to player score if the player hit on the head, two in chest (upper body) and one in rest of the body (lower body).
5. Avoid shooting normal people, it causes decrease player score by one point.
6. After the time is end, a message will appear to the player showing the score and waiting for the player to press (spacebar).
 - If the player gets high score, greater than 5, he/she will move to next level (Level2)
 - If the player gets low score, less than 5, the game will end.
7. In level 2, the Zombies walk toward the player. If the zombie touches the player, the game will end. However, if the time end and the player still alive, means the player finish all game levels and his/her score for both level will appear in the screen.



Figure 5: decrease the player score after shooting normal people.



Figure 6: in level1, if the player gets low score, less than 5, the game will end.



Figure 7: If the player gets high score, greater than 5, the player moves to level two.



Figure 8: In level2, if the zombie touches the player, the game will end.



Figure 9: In level2, the time end and the player finish both levels.

Vizard Functionality:

- **Lights:** The player can choose either day or night environment. The light will be the sun when the player chooses day environment, and the dark sky with rain when the player chooses night environment. If the player chooses the day time, the zombies hid inside the building because zombies cannot live under the sun light. If the player chooses the night time, the zombies walk outside the building. If the player chooses cancel option, then the player exits/quits from the game.

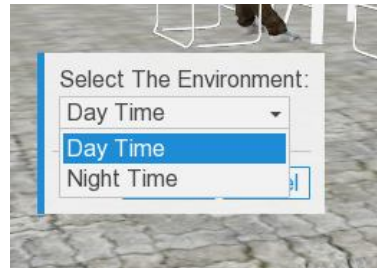


Figure 10: Select environment options



Figure 11: Night time option

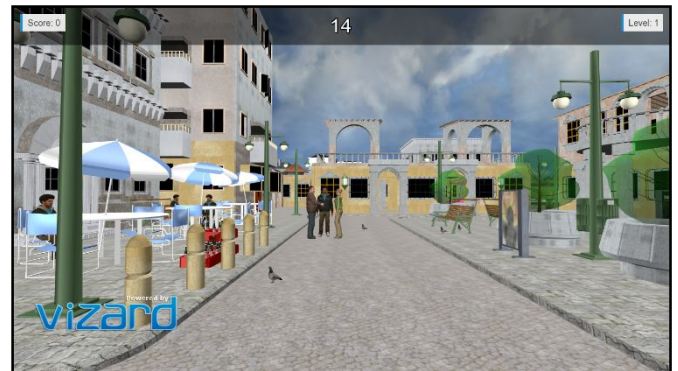


Figure 12: Day time option

- **Times:** There is a sensor of time, the game should end after 45 seconds for each level, show the score of the player and level number. If the remain time is 5 secs, it will trigger beep sound and the timer numbers convert to red color.



Figure 13: Timer countdown before reach 5 secs



Figure 14: Timer countdown after reach 5 secs

- Keyboard and Mouse functions: The player can use the keyboard to control the game –going left, right, front, and back by “wasd”, also can use ‘h’ key to show or hide help menu. In addition, the player uses the mouse to shoot the zombies – left mouse button for bullets, and right button for measuring distance. Finally, the player can press “k” to show/hide city map.

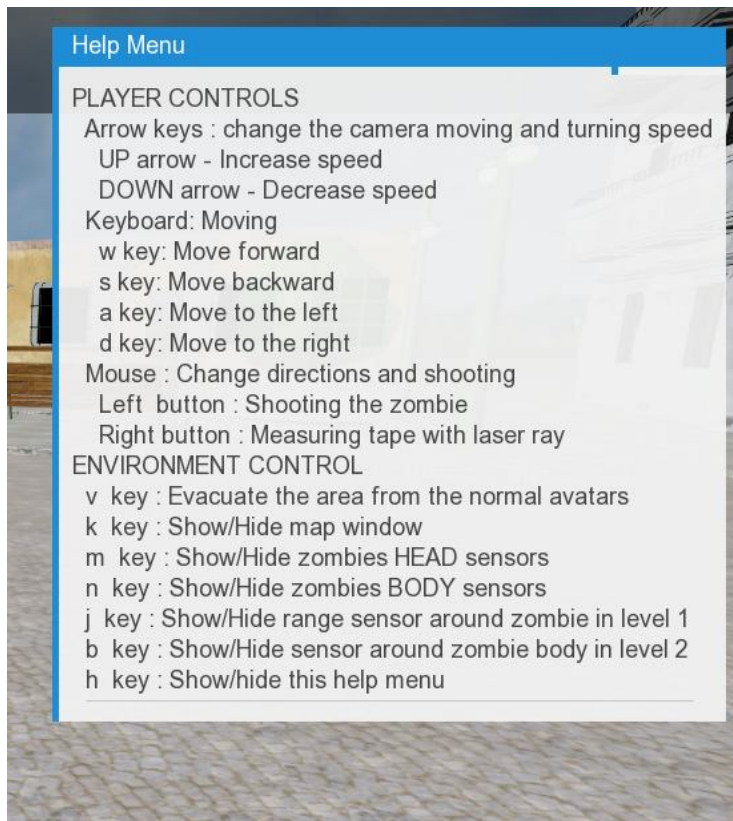


Figure 13: Press 'h' to show/hid help menu



Figure 14: Press 'k' to show/hide city map

- Avatar animation: We used INBUILT avatars in Vizard after changing some faces with zombies face, and left others to be normal people. The animation that we used in the game is walking for the zombies avatars, and running for non-zombies avatars. The zombies' bones changed to be their hand into the front and shock their bodies as movement. In level2, zombies walk toward the player (Main View).



Figure 15: Zombie face and body



Figure 16: In level2, zombies walk toward the player (Main View).

- Create action events in the environment: To help the player to find zombies and avoid the normal people, the player has “evacuation” option. This option will trigger alarm sound which force the people to run to safe place at the city side. Also, the pigeons on street will disappear/fly once the evacuation start.

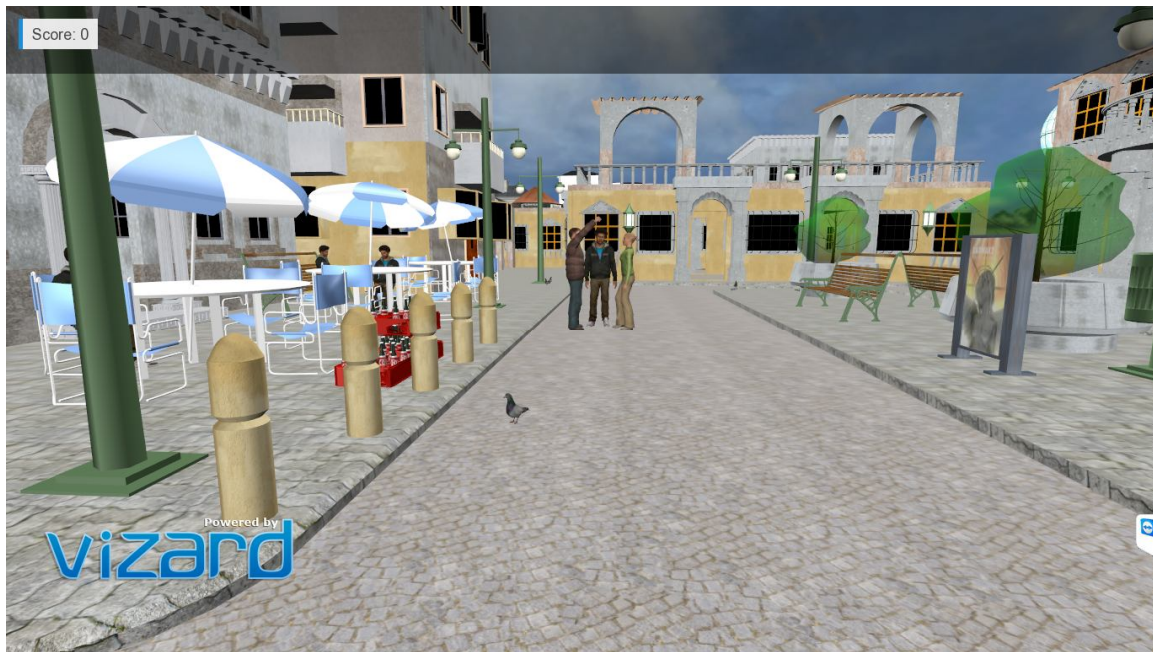


Figure 17: before evacuation plan start

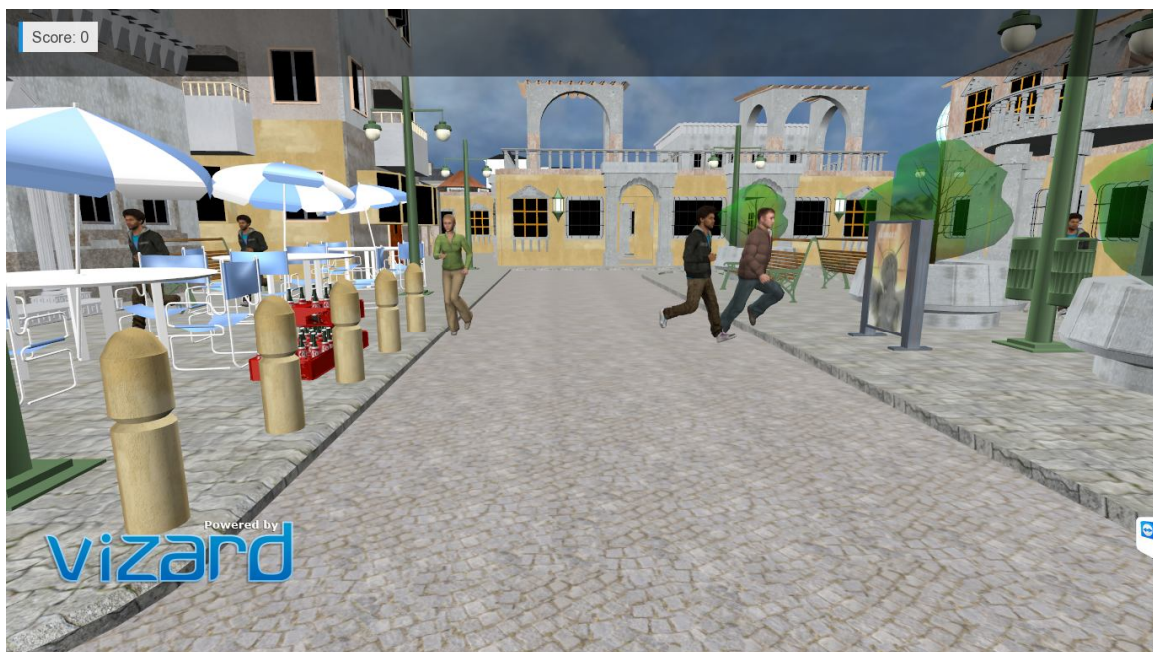


Figure 18: After press 'V' start evacuation plan



Figure 19: The people in city side after evacuation plan

- Vision: we use 3ds max models and Sketchup models.
- Sound: We added all necessary audio sounds such as, game beginning sound, shooting sound, alarm sound, zombies' screaming sounds, game over sound if player get score less than 3 in level 1, or if the player touches/enters in the zombie's area in level 2, etc.
- Interactivity: The player can choose the time between day or night, the player can increase and decrease mouse speed for moving and turning by press up arrow and down arrow keys. After the player shoot the zombie, zombie body will disappear but his head will be in ground in a scary action. The zombie in level 2 will stop walking when being shoot and fall down. His body will disappear after shooting as well.



Figure 20: Shoot zombie action



Figure 21: Measuring the distance



Figure 22: After shooting the zombie



Figure 23: In level2, after shooting the walking zombie.

Sensors: There here are different types of sensors in the game

- * Sensor for hitting the target to make it die,
 - The player gets three points if hit the zombie's head.
 - The player gets two points if hit the zombie's chest (upper body).
 - The player gets one point if hit the zombie in the rest of the body (lower body)
- * Sensor for non-zombies to decrease the score by one when the player shoots them.
- * Timer sensor to count the time for stopping the game.
- * Range sensor around zombies is different in each level,
 - In level 1, this sensor is in sphere shape, its function to return the player to original location if he/she enters this range.
 - In level 2, this sensor in rectangular shape, its function to end the game and close the Vizard window if the player touch this sensor.

If the player press "m", "n", it will show zombie sensors which are head sensor around zombie' head and body sensor around zombie's body.



Figure 24: showing zombie' sensors

If the player press “j”, it will show range's sensor which is around zombie' area. once the player touches/enters this area, the player will go back to the original position.



Figure 25: showing range's sensor around zombie area.



Figure 26: Rectangle sensor on whole zombie body.

- Avatars: in the game the zombies are one of INBULT avatars in Vizard after we changed some faces to zombies. Other avatars remained as regular people. Also, we added some pigeons that involved in evacuation plan.
- Implementation software and hardware: In this project, we used “3ds Max 2015” to design the city model along with “SketchUp”. Also, we used “Vizard” to implement the game along with Python editor.

Why is it Useful?

This project, as a game, uses some of the techniques used in VR to give the player the feeling of immersion. Using such techniques in this game will increase the player’s concentration and improve his reactions.

Problems Encountered

We had problem to make different score when hitting different part of the zombie’s body. We solved this problem by creating manager to the head sensor and another manager for the chest, body, sensor and count different score when the bullet enter each sensor.

In level 2 after the time is up, un-killed zombies kept walking toward the player resulting change of the result from winning to losing. This problem was solved by changing the status of the zombies to idle.

Remaining Shortcomings

Making normal avatars to help the player by shooting the zombies.

Using a gun and bullets rather than arrow to kill the zombies.

Recommendations for Further Improvements

Add more levels for the game, and make them harder by add more zombies or make the time shorter.

User's Manual:

1. Choose day or night time.
 - a. You will find zombies inside buildings if you choose day time
 - b. You will find zombies inside and outside the buildings if you choose night time
2. You have 45 seconds to hunt as much zombies as you can.
3. Use keyboard keys [WASD] to move, and mouse left button to shoot.
4. You will earn the following scores:
 - a. 3 points for shooting head
 - b. 2 points for shooting chest (upper body)
 - c. 1 point for shooting other parts (such as legs or hands)
5. Try to avoid entering into the zombie's areas, or you will jump to the beginning location which waste your time
6. You should avoid shooting the normal avatars, or you will lose a point.
7. You should earn 5 points or more to move to next level.
8. In level 2, the zombies will chase you.
9. If any zombie touches you, the game will over, you will die.
10. If you want to win in level 2, you should hunt all zombies, or avoid touching any zombie until the time is up.