Zombie Fit!: Low-Fidelity Prototyping

Jose Franco Baquera
NMSU
Las Cruces, USA
jose5913@nmsu.edu

Bianca Lujan
NMSU
Las Cruces, USA
bianc19@nmsu.edu

Muhammad Mohsin
NMSU
Las Cruces, USA
zubair@nmsu.edu

Diondra Silva
NMSU
Las Cruces, USA
dsilva40@nmsu.edu

INTRODUCTION

Creating low-fidelity prototypes allows individuals that are involved with the design process to consider different alternative designs without the need of developing high-fidelity prototypes. Low-fidelity prototypes are encouraged over high-fidelity prototypes during the early stages of any design process since the latter is more costly, time consuming, and sometimes even counterproductive if no solid requirements are established before implementation. Alternative designs are important for determining which design (or combination of designs) would best meet users' needs and verify the established requirements. The only way to find this out for this project sequence is to test any low-fidelity prototypes that are implemented with potential users. In terms of our system, we will have two alternative designs available through storyboards and Wizard of Oz prototypes.

USER TASKS

We have four tasks that will be implemented in either one or both alternative designs. These tasks will be performed by users and will allow them to use our system. The tasks include grabbing a virtual object, punching, running in place, and squatting. Each of these will be evaluated to see what configuration participants are most comfortable in using and what can be done to maximize the experience of our game. Ultimately, we want our system to be able to facilitate exercise motivation. The majority of these tasks, with the exception of grabbing a virtual object, were created to aim towards the fulfillment of that motivation goal within users. We will study these tasks carefully in our alternative designs and will decide which to keep and how to implement them based on any data gathered while testing the system with potential users. The following table summarizes essential use cases that are needed to support the accomplishment of user intentions:

Workout Routine	
User Intention	*System Responsibility*
Run to burn calories	Prompt the user to run in place for a certain number of steps in order to escape from a zombie herd
Squat to do leg exercise	Prompt the user to squat a set number of times in order for them to avoid getting bitten
Air box to exercise	Prompt the user to punch virtual zombies
Touch stretch to warmup for workout	Prompt the user to pick virtual items from the floor

Table 1. Essential use cases used to develop the details of accomplishing the four user tasks.

AMERICAN COLLEGE OF SPORTS MEDICINE MODEL

One of our designs is based on an exercise configuration suggested by the American College of Sports Medicine (ACSM). This configuration states that an exercise routine must have a 5 to 10-minute period of warmup, a minimum of 20 minutes of stimulus (i.e. maximum heart rate), and a 5-minute cooldown period of low intensity exercise in order to return the heart rate to resting levels [1]. For our ACSM prototype, we will use this configuration to make our tasks more modular and independent from one another. That is, a user will not be punching and running in place at the same time. This prototype will consist of physical mockups of a virtual reality (VR) headset and controllers, and will use a storyboard to simulate what the user would "see" through their headset. The virtual environment will be set in the Science Hall building at New Mexico State University.

ACSM MODEL PROCESS / TASKS DESCRIPTION

The ACSM model prototype's process/"scenario" is described in this section. This prototype will simulate the user exiting the Science Hall computer lab after a long night of doing homework alone. After exiting the lab, the user will notice that there are zombies in the area. The computer lab will serve as a "safe zone" where no zombies can enter, and the user can retreat to it when needed. After seeing the zombies, the user will enter back into the computer lab and grab a chair using both system controllers. The tasks performed so far will serve as the "warmup" stage in the ACSM configuration. For the "stimulus" stage, the user will have to exit the computer lab and run in place for 30 steps to get close to a zombie. Lastly, the "cooldown" stage will consist of the user hitting a zombie multiple times with the chair. Throughout this process, we will verbally provide more detailed instructions to participants and will also play suspenseful music to immerse them more in the system.

CONSTANT EXERCISE MODEL

The second alternative design will not be based on any configuration models but will instead aim to have the user doing moderate exercise for extended periods of time. That is, the user might be instructed to do two or more tasks at a time, such as running in place and air punching. Even though this prototype will also consist of physical mockups and a storyboard, it will differ on when tasks are presented to users.

CONSTANT EXCERSISE MODEL PROCESS / TASKS DESCRIPTION

The constant model prototype's process/"scenario" is described in this section. This prototype will also simulate the user exiting the Science Hall computer lab after a long night of doing homework alone. However, the user will see zombies further down the hall coming towards him or her. The user is instructed to run back into the lab to gather energy. After resting for a bit, the user will then go back out into the hallway and will run (in place) towards a zombie. The zombie will attempt to attack the user, so he or she will be instructed to squat so that they can dodge these attacks. To defeat the zombie, the user will be instructed to punch it a set number of times. They will achieve this by moving the controllers as if they are punching something in the physical world. As previously mentioned, the user may have to do two or more of these tasks at once in order to facilitate constant moderate exercise. This process might be more fun and realistic (in the real world, we usually do more than one task at a time) than the first process. However, implementing clear instructions on how to multitask might be difficult and might lead to confusion if not done correctly.

REFERENCES

[1] Sinclair, J., Hingston, P., & Masek, M. (2007, December). Considerations for the design of exergames. In *Proceedings of the 5th international conference on Computer graphics and interactive techniques in Australia and Southeast Asia* (pp. 289-295). ACM.