Herbert – A Motion-Controlled Mobile Game

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Abstract

Smartphone games lack the hardware interface afforded by other gaming platforms like gamepads, keyboard, mouse or joysticks. Therefore, many popular games for smartphones focus on puzzle mechanics using the touch screen interface, such as *Angry Birds*[1] or *Cut the Rope*[2]. We focused on skill-based, reactionary gameplay with an intuitive control scheme in *Herbert*, where the player moves the character around the world by tilting the device and free oneself from traps by shaking the device to exploit all the possibilities of the accelerometer sensors. We did this in order to minimize on-screen GUI clutter found in other games such as *OMG Pirates!*[3], *Street Fighter IV*[4] and *Zombieville, USA*[5] while retaining the challenge enjoyment, and intuitiveness of skill based gaming.

Author Keywords

Mobile devices; Accelerometer; Shake; Skill game; Chasing; Kiting; Intuitive controls; Motion controls

Introduction

Generally, being infected with a virus is a bad thing, but what if there were a virus that just wanted to live peacefully within the body? In this game, the player takes on the role of Herbert the virus. Herbert is an unlikely hero who leads the White Blood Cells depicted as the body's internal police force to the dangerous

germs named Sal Monella. Possessing only the ability to move and to enter his dormant state where he cannot be detected by the White Blood Cells, Herbert cannot destroy his enemies alone. Being a virus, he also must avoid capture by the same white blood cells he must lead to the enemy.

The game is played on mobile devices and controlled using the device's accelerometer as well as touch-screen controls and features an original score.

Target Audience

As of 2012, 46% of adults in the USA own a smartphone, and of cell phone users, 19% own an iPhone[6]. This fact means the iPhone is a prevalent gaming platform to which many people have access. Since a wide array of gamers with different skillsets have access to the platform, *Herbert* is designed to be casual and easy to learn, yet challenging, allowing for players to play as much or as little as they want. Since the game is mobile, it lends itself to short gameplay sessions, such as down time between other activities like when one is waiting for the bus. Due to its relative simplicity in its control scheme and difficulty curve, the target audience is casual smart phone gamers.

Technical Innovations

As we wanted *Herbert* to be accessible to a large audience, it had to be relatively easy to learn the control scheme. We decided to use the features unique to the smartphone platform. We devised a unique control scheme whereby the character's movement was determined entirely by the tilt of the device as measured by the iPhone's accelerometer. In doing so, we were able to give users an experience where they could intuitively control the player character by tilting

Figure 1 A comic-book styled cutscene explains the premise to the player

the phone in the direction in which they wanted the character to move. The sharper the angle at which the user tilts the phone, the faster his movement speed in that direction will be. The character's movement can be thought of as similar to how a ball rolling on a flat surface will behave when the surface is tilted.

When stuck on a sticky surface or stuck to a special sticky enemy, the player can free Herbert by shaking the device. This is also accomplished using the accelerometer by detecting abrupt changes of direction.

Lastly, the player activates Herbert's "dormant" or hiding power by tapping anywhere on the touch screen, except for the pause button, while the game is not paused and Herbert has energy to use the ability.

By not having on-screen virtual controls like up/down/left/right buttons, a button to shake off sticky surfaces, a button to activate his dormancy power, etc., the user interface is very Spartan and uncomplicated. There are only 3 parts of the heads up display (HUD): the remaining time, the pause button, and Herbert's energy bar. This is critical to the user experience as an iPhone 5 has a relatively small display compared to other gaming media, so screen space is precious.

Gameplay Innovations

Many skill-games feature the player winning by directly attacking and defeating his or her enemies. This can be seen in such early games as *Pac-Man*[7], where the player must control Pac-Man in order to eat ghosts and collect pellets, or even *Super Mario Bros.*[8], where the player takes on the role of Mario or Luigi to defeats Goombas and Koopas by jumping directly on them. We, instead, took a different approach.

Figure 2 Above, the GUI elements such as pause, energy level, and time as well as Player-Controlled Character Herbert (center), Non-Player-Character WBC, Cholesterol, and Plaque Spikes as well as DNA collectable.

Herbert is a virus hero with absolutely no offensive capabilities who is highly vulnerable to the enemies in his environment like the White Blood Cells. All he can do is move, hide, and shake his way out of traps. Herbert cannot directly attack the enemy germs in the body and he can't defend himself against the White Blood Cell "cops" patrolling the level. Instead, he must attract the attention of the cops and lead them to the more dangerous germs and then hide himself so the cops will attack the more dangerous germs.

This mechanic of using one's enemies to eliminate one's other enemies is something that is distinctly unique to our game. In the following subsections we explain each object of the game and how they influence the gameplay/mechanics.

Main Character (Herbert)
The playable character is a benign virus living peacefully within his host. He is an unlikely hero, timid and classically nerdy. His graphical depiction is designed to reinforce the game's main kiting and hiding mechanics.

Non Playable Characters
The *White Blood Cells or WBCs* are units in the game that are used to destroy the germs in order to progress to the next level. However, they will apprehend Herbert if they catch him, as he is a virus. Herbert must "kite" (approaching the target unit closely enough so as to cause it to attack and then flee outside of its attack range, causing it to give chase, staying far enough to avoid being caught while remaining close enough to keep the enemy chasing)[9] to the germs and then hide so as not to be caught. They can be guarding a location or patrolling. Since it is a skill-game the camera is so close that you cannot oversee the patrol routes and plan a strategy. Therefore we aid the player with a green arrow pointing the nearest WBC.

This will reinforce our goal to make a reactive game rather than a tactical game.

Sal Monellas are the true enemies of the game. The objective is to remove every one of them from a given level before the player can proceed to the next stage.

Environmental Hazards
We added some environmental hazards with two objectives: first we can increase the difficult of the level adding objects that can kill immediately the player (*Plaque Spikes and Calcified Spikes*); and secondly we can reduce the mobility of the player by totally immobilizing it (through sticky green stuff aka "*Cholesterol*") or little dark creatures (*Platelets*) that they will stick to the player and slowing his movement. If the player wants to release himself, they should shake the device (adding a new mechanic and making the game more fun).

Graphical User Interface
Pause Button
Since tapping the screen puts the player in the dormant, state a separate pause button was added. The pause menu also features a way back to the level select screen allowing a player to restart the current level or revisit any previously unlocked level.

Energy Bar
Utilizing the dormant state consumes energy. Energy consumption and collection is displayed along the bottom of the GUI interface housed in a lightning bolt container.

Time Indicator
Each level features a countdown timer represented by a graphical clock and white text that ticks down.

Mechanics and Controls

Movement

The player moves Herbert by tilting the device in the direction they would like Herbert to move. Data from the accelerometer is read in and the x and y values are combined to form a two dimensional vector that governs his movement direction and speed.

Dormant State

Herbert can enter his dormant stat when he has energy and the player taps the phone. In this state, the WBCs will ignore Herbert and he is invulnerable.

Shaking the Device

The accelerometer can detect when the device is shaken. This is used to get out of sticky traps or shake platelets off of Herbert.

Conclusion

Herbert is a unique game play experience for the iPhone 5 or newer. Its novelty comes from both the skill involved in the mastery of the tilt-based movement controls, and the unique kiting techniques the player must perform in order to win the game. The tilt-based movement system is intuitive harkening back to days of playing with ball bearings in wooden mazes.

Playing as Herbert, the timid hero of the story, players can appreciate the way they are able to achieve their goals without directly attacking. This is a unique position in video games with few exceptions such as *Oddworld: Abe's Oddysee*[10] and the results of such gameplay are novel.

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