

Initial Plan: Motion Driven Computer Game Using Kinect

Project Title

Initial Plan: Motion Driven Computer Game Using Kinect

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Project Description

My project is to design and create a game that uses Microsoft's Kinect for Windows as the primary controller. This is consistent with a recent trend of motion controls being added into games for the Xbox and PC gaming systems. The Kinect device uses a combination of a multi-array microphone, a RGB camera and an infrared projector to detect the movements and the sounds that the user makes. This allows for the games to incorporate gestures, spoken commands and body movements to enhance or at times fully control the game being played.

Currently the games released for both the Xbox and PC, that feature use of the Kinect, are widely varied in the genre and the extent to which they make use of the features available. There are several games out there which focus on the microphone used in the Kinect to allow the user to quickly select between options and actions. The Kinect depth sensor and RGB camera work well to record the users location and movements, as well as capturing an image of the user. The two cameras and a bit of extra processing allows for the Kinect to find the position of the body and all of the joints. This then creates a skeleton frame that is continuously updated to control the game. The motion detection is used for reading in player's actions for something as small as getting their arm gestures to control stroking or feeding a virtual pet to more precise movements such as dancing and exercising.

The overall outcome for the project is a video game that uses the Kinect hardware as the main source of control. My aim is to create an original game with one or more levels from the idea process and carry it through to the implementation and testing. This will involve me first going through a design process, making sure that all of my ideas will work well with what the Kinect sensors are capable of reading. I will then work on developing the game and bringing my ideas to life. I will be responsible for creating both the front and back end of the game, insuring that both run as smoothly and quickly as possible while relaying the actions of the user to process and display the outcome on screen. I aim to make the game enjoyable and fun, as this is a media that is designed to make people happy, I feel that I should also make it one of my aims.

Project Aims and Objectives

Primary Aims:

- The game should feature at least one level of suitable complexity.
 - The game I am making should be developed with an original story or level design, which is unique to anything on the market currently.
- Controls for the game must use the motion detection in the Kinect hardware in intuitive and simple movements.
 - The game should be controlled by the player's actions. Keeping the motions simple will make it easy for the player to remember how to control the game and by making the motions intuitive to the actions should make playing the game feel like second nature.
- An interface should be created that clearly shows the user what is happening in the game.
 - The interface must show a clear reaction of the actions that are being performed. Also, if required, displaying the player's stats in a clear a precise manner.

Secondary Aims:

- Using audio commands through Kinect as shortcuts or to control the game.
 - To enhance the games navigation or to quickly access menus it would be more beneficial to the user for voice commands to also be added. The Kinect hardware supports this function.
- Visually appealing interface
 - To improve the user experience it would be beneficial to make sure that the interface looks visually appealing. As graphics are now looked on as being an important part of the game it is important that I look to improve them providing I have the time.
- Sound effects and background music.
 - Sound in a game provides the atmosphere and therefore plays an important role in game development. If I have time I would like to include sound effects and background music to enrich the experience the user has.
- Variety of difficulty levels
 - As the game progresses or if selected by the user it would be good to have a range of difficulty levels in my game. This will keep the user interested and provide more of a challenge for them.
- Customization
 - To make the game feel more personal for the user it would be nice to add in customization. This could be as simple as allowing the user to choose

what the character wears from a pre-created selection to more complex features such as allowing them to create their own levels.

- Multiplayer/Scoreboards
 - To increase replay value it would be beneficial to add in an option to challenge a friend. This will encourage user to repeat the game in order to beat either their friend, themselves to maintain their high score in either a head to head environment or on a leaderboard where a quantifiable value is used for comparison (for example time).

Ethics

After a brief consultation with my supervisor and checking through the university's supplied research ethics flowchart it is clear that there is no need to seek ethical permissions for this project. This is due to the lack of personal data that will be used in the project and because it is not in collaboration with another school at Cardiff University.

Work Plan

Regular meetings will be held with my supervisor each Tuesday at 11.30am. These meetings will be used to discuss my progress with the project and to insure that I am on track with completing the objective.

Week	Task
1	<ul style="list-style-type: none"> • Write initial plan.
2	<ul style="list-style-type: none"> • Submit initial plan. • Find suitable library, preferably for Java, that allows me to collect the information the Kinect sends to the Computer. • Work on the selected library, do small test projects and get to grips with its capabilities. • Install relevant programs and development kits on my computer. • Design the game. Work with what the library's capabilities and produce a storyline for the game.
3	<ul style="list-style-type: none"> • Finalize game storyline/objectives. • Conceptualize controls that suit the games concept. • Test the actions needed for the controls with the library to insure that they are recognized.
	<p><u>Milestone</u> By the end of week three the game should be planned out and development should be ready to begin.</p>
4	<ul style="list-style-type: none"> • Start coding the basis of the game. • Look into what library to use for the graphics/UI. • Research and finalize graphical style chosen. • Review meeting to discuss the plans for the project.
5	<ul style="list-style-type: none"> • Continue to code the basis of the game. • Start coding basic graphical elements.
6	<ul style="list-style-type: none"> • Continue to code the back end of the game. • Continue to code the graphical elements of the game.

7	<ul style="list-style-type: none"> • Continue to code the back end of the game. • Continue to code the UI of the game. • Review progress and current status of the game with supervisor. Make sure I am on task and check if any alterations need to be made. • Test code and look for any large issues that need to be addressed.
	<p><u>Milestone</u> By the end of week seven the game should near completion. There should be at least one level near completion. The game should be in a state where it is playable.</p>
8	<ul style="list-style-type: none"> • Fix any issues that occur • Begin to expand the game, either by adding more to the current level, or adding a second level.
9	<ul style="list-style-type: none"> • Continue expanding game. • Start working on menus.
Easter Break	<ul style="list-style-type: none"> • Plan final report. • Finish off menus and all other UI. • Test code to find any outstanding issues. • Tidy up code and spend time fixing any issues
10	<ul style="list-style-type: none"> • Begin writing final report • Finish off game.
	<p><u>Milestone</u> By the end of week ten the game should be completed. The game should have no major flaws at this point. The game should feature at least one level, depending on the complexity of the project.</p>
11	<ul style="list-style-type: none"> • Test game. • Correct any issues that occur. At this stage, these should be minor. • Have review meeting to discuss the project outcome. • Finish final report.
12	<ul style="list-style-type: none"> • Review final report, insure that there are no errors and everything is included. • Submit final report.