Super Pop VR™

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Introduction

This document will help you open and run the *Super Pop VR™* game from Visual Studio. It also has detailed instructions describing the functions of the buttons on the main GUI (user interface), and general descriptions of the buttons in the secondary interfaces. Note that not all of the game's features will be discussed – only the features needed for running the original game for collecting user data.

Super Bubbles are mentioned throughout this document. These refer to the green bubbles that appear on screen from time to time.

Testing Session Protocol

The game protocol depends on the study being conducted, but it's the same for all participants. The following is an example of a common protocol:

- 6 games total (3 for each arm).
- Left hand first.
- Right hand is the affected hand.

The distances between the different components of the equipment should remain constant throughout all of the games and participants. The following are the recommended distances:

- Table to projecting screen: 170 cm
- Kinect to back of chair: 190 cm

Open Visual Studio

After you login to the laptop, click on the Visual Studio icon as shown in Figure 1. Note that you can also run the game with its stand-alone version without having to go through Visual Studio. To do so, find the ".exe" (executable) file and double click. This will open the main interface of the game. If running the game with its stand-alone version, skip ahead to the 'Select Username' section of this manual.

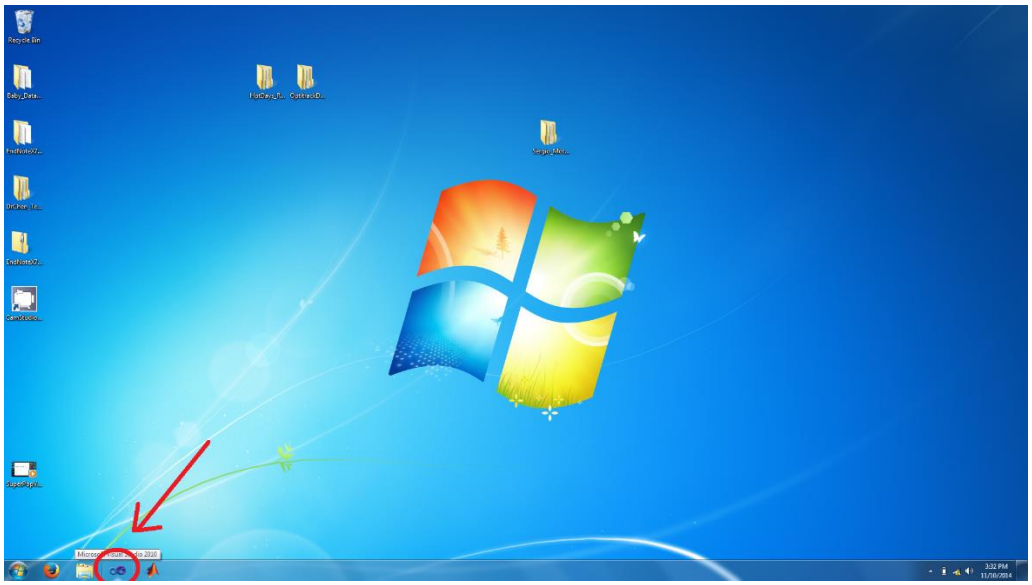

Fig. 1: Open Visual Studio

Load Game

Once you're in Visual Studio's main screen, open the version of the game by clicking on the open icon as shown in Figure 2.

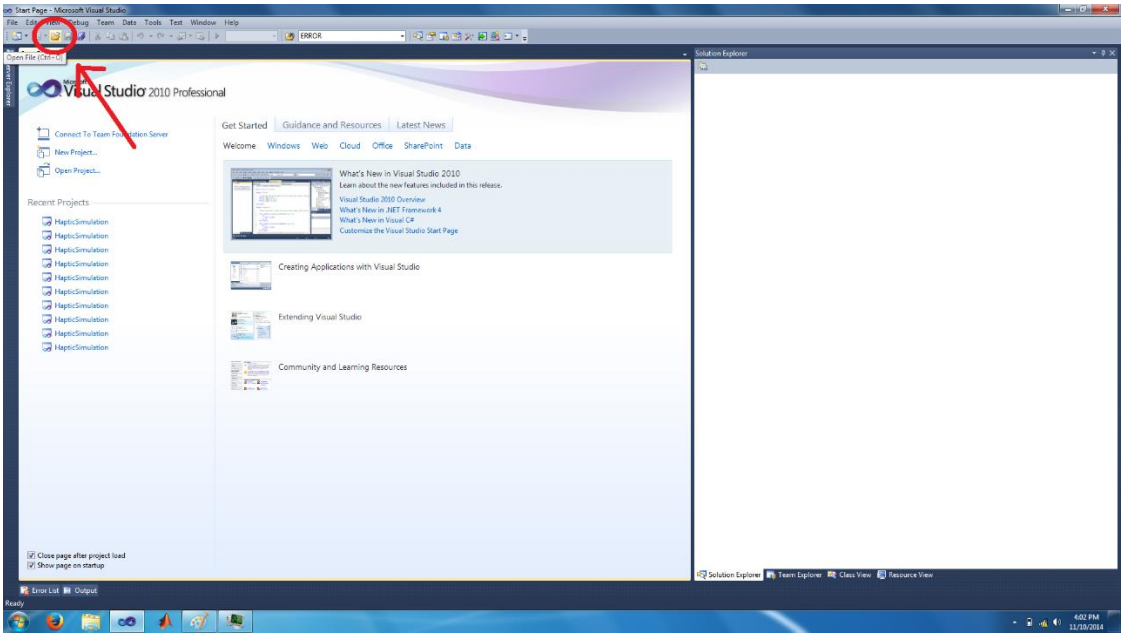

Fig. 2: Open file.

Select Game

The following is the directory path to reach the game file (it can also be seen in Figure 3):

My Documents > Github > HapticSimulation_[version name] > 'HapticSimulation.sln'

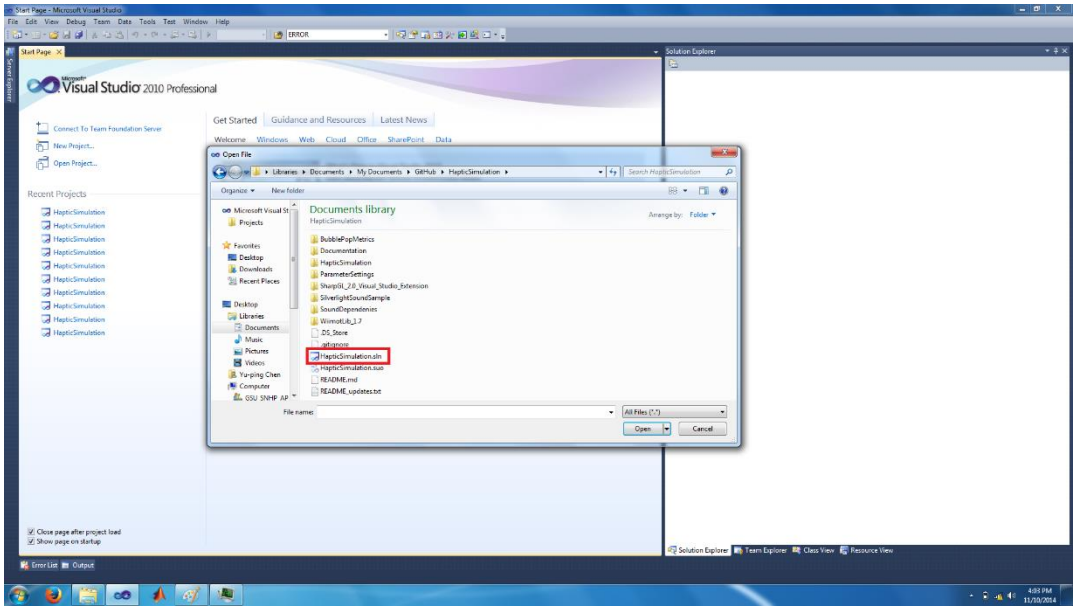

Fig. 3: Open solution file

Start the Game

To start playing a game, click on the 'play' button as shown in Figure 4.

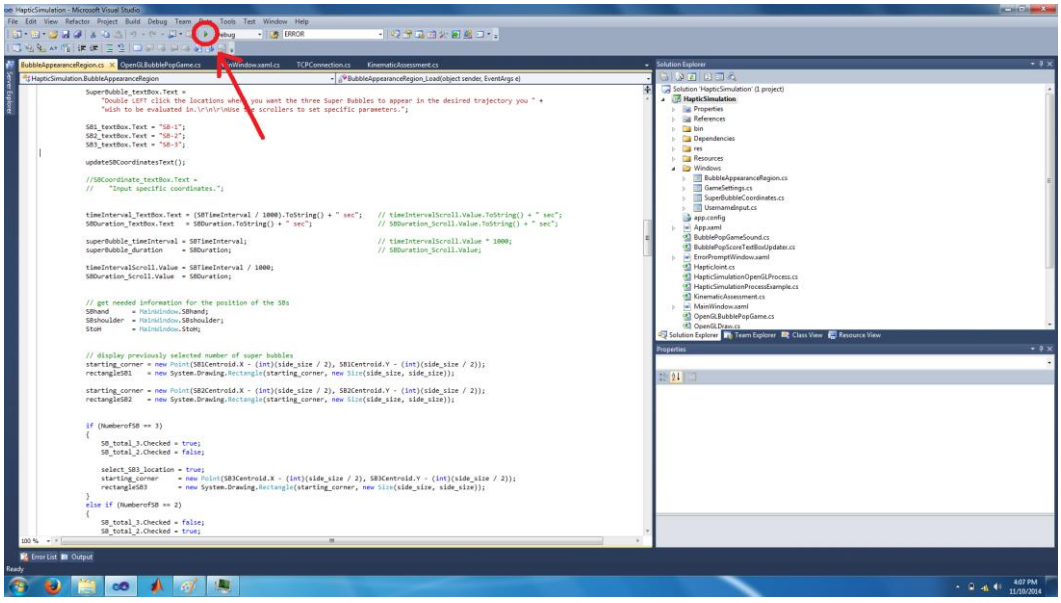

Fig. 4: Play button to start the game.

Select Username

The first button shown on the left side of the main GUI is the 'Select Username' button (Figure 5). If the user has never played before, input the user's name in the provided box and click 'Accept'. If the user has played before, select their name from the list by clicking on the name once and then click 'Accept'.

NOTE: This step has to be done before each game. If this step is skipped, the collected data will be stored in the default 'TestSubject' directory.

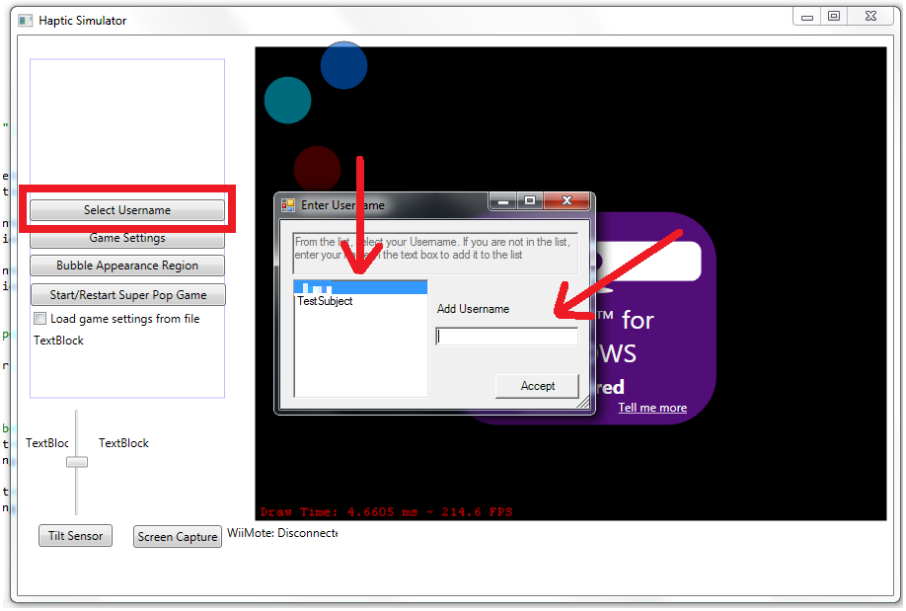

Fig. 5: 'Select Username' button (left), and interface (right).

Game Settings

The second button on the left of the main screen is the 'Game Settings' button (Figure 6). You need to do this only once for the entire testing session. Once you select the game settings, these will be saved for all of the games and users that interact with the game. I recommend that you verify the settings from time to time just to make sure that they haven't changed, but this shouldn't be a problem.

Figure 6 shows the 'Game Settings' interface with the selected settings for regular testing sessions. The following are the game settings for the regular sessions:

- Game Duration: 75 seconds
- Total Levels: 2
- Game Speed: 0.6 bubbles per second
- Bad Bubble Ratio: 10%
- Bubble Size: 8 (constant – by making sure the upper checkbox to the right of the 'bubble size' scroll bar is selected)
- Good Bubble Points: 5 points

- Bad Bubble Points: -5 points

In case there is some problem or the settings get changed, the following are the selections for the secondary settings (located on the left side of the interface):

- Game Difficulty: Custom
- Shapes of Good and Bad Bubbles: Circle
- Sound Options: Twinkle Twinkle Little Star
- Tracking Mode: Seated (all of the other options are to remain unchecked).

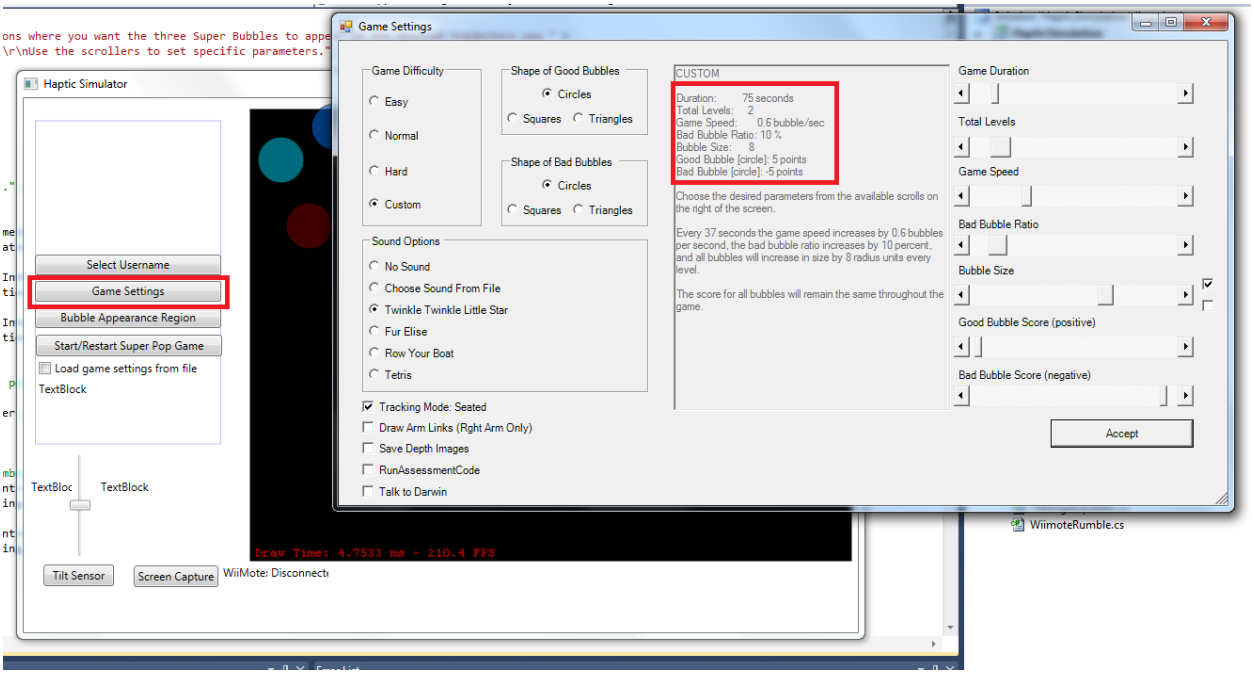

Fig. 6: 'Game Settings' button (left) and interface (right).

Game Appearance Region

Make sure the system is tracking the user's hands and head. Only then, ask the user to raise their arms as high as they can (i.e. straight up reaching the ceiling). Then, press the 'Bubble Appearance Region' button. This will open the 'Bubble Appearance Region' interface as seen in Figure 7. This example does not contain an image of the user because the Kinect was not connected at the moment. When the Kinect is connected, you will see a screenshot of the user with their arms raised up. At this point you can ask the user to put their arms down.

The first thing you need to do is make sure that the arm the system is to evaluate is currently selected. This is a radio button selection that appears at the bottom of the 'Bubble Appearance Region' interface (Figure 7). **NOTE**: When changing the assessment arm, you HAVE TO CLOSE THE GAME AND START IT AGAIN. Otherwise, the system will not save your selection and it will assess the incorrect arm. As such, close the main interface of the game and restart it by clicking on the play button (Figure 4).

On the left side of the 'Bubble Appearance Region' interface you can select the space where the regular bubbles will appear. This is bounded by a red rectangle. To make this selection, drag the laptop mouse to draw the area of interest. Your selection will be saved so there is no need to make this selection before each game.

To select the coordinates of the Super Bubbles, click on the 'Select Coordinates' button that appears on the bottom right corner of the 'Bubble Appearance Region' interface (Figure 7). A third interface will appear. Make sure the checkbox on the bottom of this interface is selected and input the number 90, then click 'Accept'. This will position the three Super Bubbles in a 90 degree configuration with the first bubble appearing on the user's hand.

This step has to be completed before playing with a new arm. For example, select Super Bubbles for the user's right arm, then play as many games as required, then change arms, complete this step again to position the Super bubbles for the user's left arm, and then play as many games as required. In other words, the selected coordinates for the Super Bubbles are stored throughout all games. As such there is no need to re-select the coordinates as long as you continue to play with the same arm.

The following re the secondary settings:

- Regular Bubble Appearance Region: Custom
- Super Bubble Time Interval: 10 seconds
- Super Bubble Duration: 5 seconds

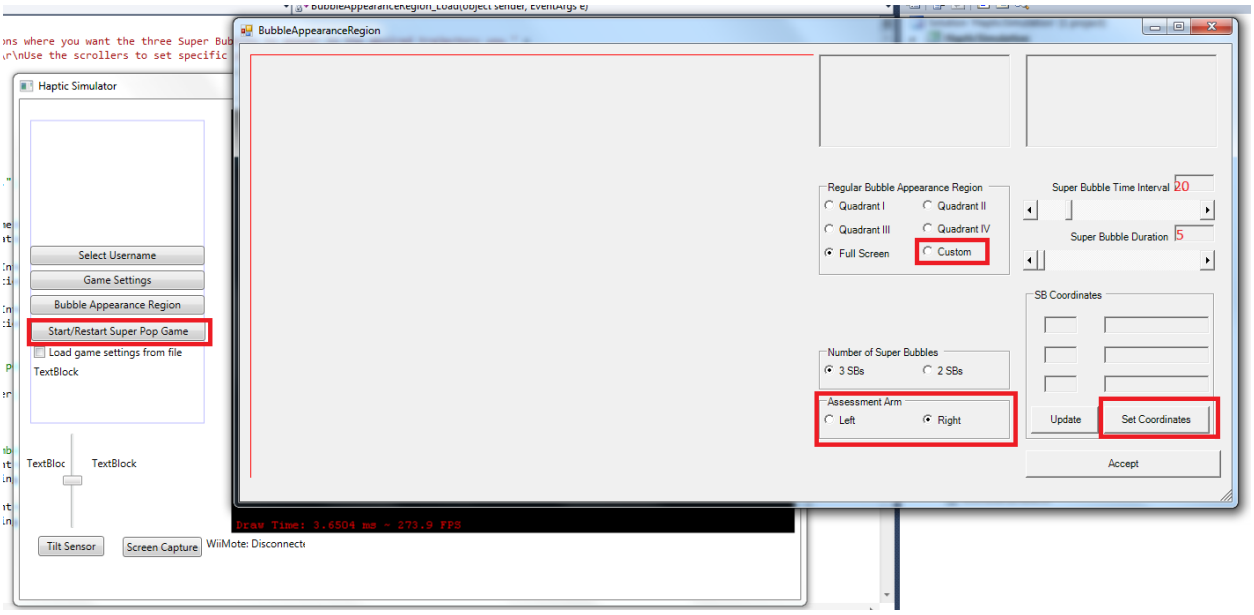

Fig. 7: 'Bubble Appearance Region' button (left) and interface (right).

Start the Game

Once all is selected, click on the 'Start/Restart Super Pop Game' as shown in Figure 8. As a reminder, the game will only start once the user is being tracked, otherwise nothing will happen.

NOTE: The restart button does NOT work. As such, whenever you want to start a new game, you have to close the current game and click on the start button as shown in Figure 4. Clicking on the restart button may change some settings and mess up the current data collection.

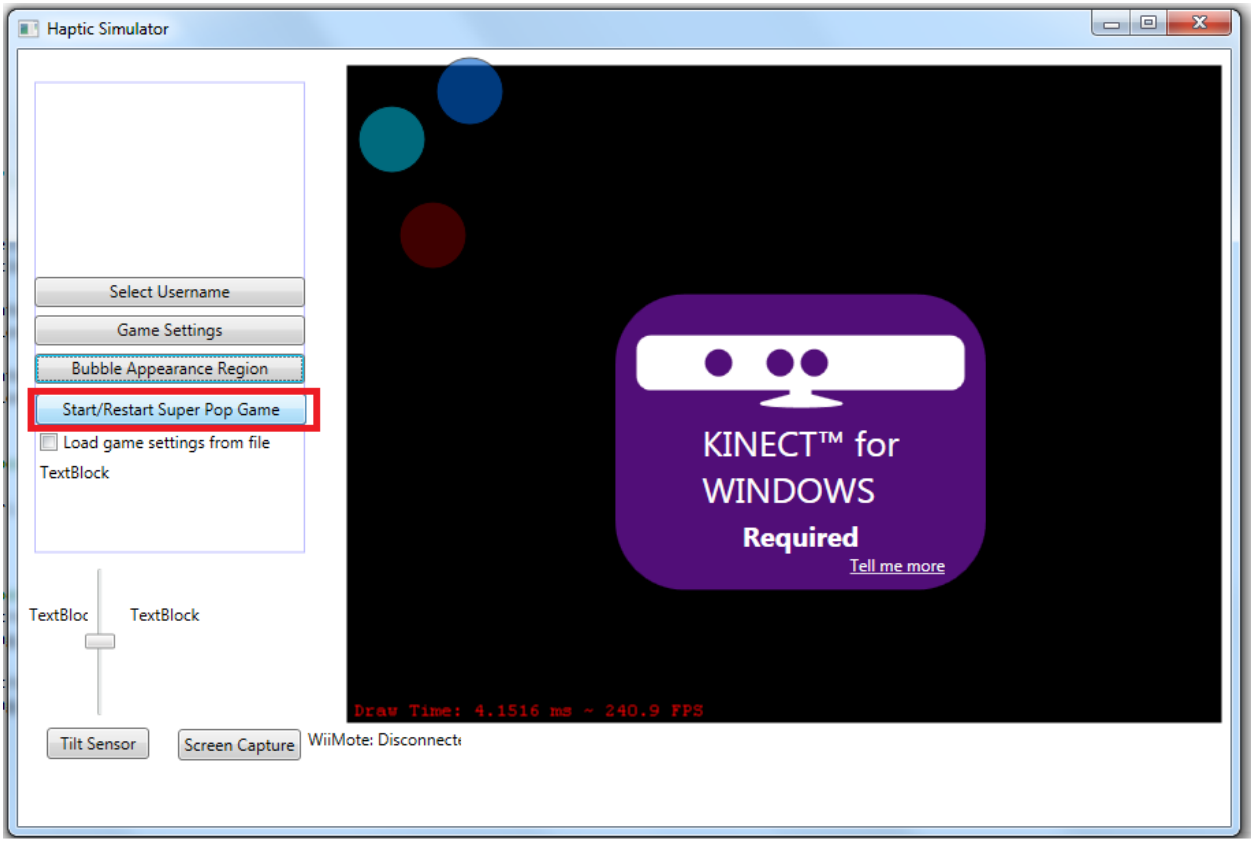

Fig. 8: Click on the 'Start/Restart Super Pop Game' button to start the game.

Troubleshooting

If the game freezes:

- Close the game and start a new one.

If the system does not track the user's skeleton:

- Have the user wiggle their arms.
- Have the user stand up a little bit and/or move a bit closer to the camera. Once the system tracks the user, have the user sit back to the original position.

If the previous doesn't work, follow these steps:

1. Close the game.
2. Disconnect the Kinect camera from the laptop's USB port.
3. Blow on the Kinect's USB connected a little bit.
4. Connect the Kinect to the laptop's USB port.
5. Restart the game.

If the previous still doesn't work:

- Then there may be a lighting problem and need to shed more light onto the user's body.

If a red 'X' appears when you open the 'Bubble Appearance Region' interface:

1. Click on the 'Set Coordinates' button. [The 'Select SB Coordinates' interface will open.]
2. Uncheck the 'Trajectory from angle' option.
3. Make sure that the SB coordinates are 'nice' numbers.
4. Click 'Accept'. [The 'Select SB Coordinates' interface will close.]
5. Click the 'Update' button and make sure that the 'nice' coordinates are displayed correctly.
6. Click 'Accept'. [The 'Bubble Appearance Region' interface will close.]
7. Close the game and restart.
8. Make sure that the Kinect is tracking the user (i.e. the markers are following the user's hands and head), and click the 'Bubble Appearance Region' button. [The 'Bubble Appearance Region' interface will open.]
9. If you followed the previous steps correctly, a screenshot of the user should appear instead of the red 'X'. If so, make sure the SBs have 'nice' coordinates before closing the interface.