



Healthcare Gaming based on Human Pose Tracking

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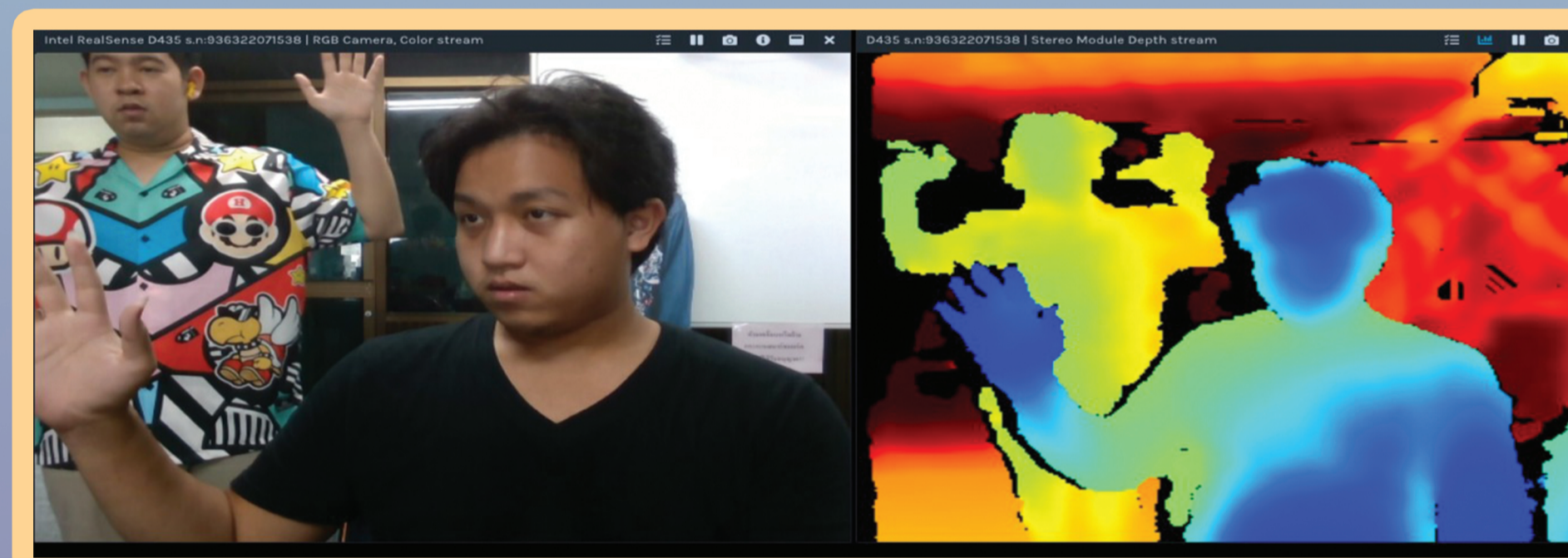
ABSTRACT

This research was proposed to develop a new exercise system for funny dancing. The proposed system will adopt the posture of physical therapy to be a form of choreography in the exercise. The developed system uses the principle of skeleton tracking by using a 3D camera named the Intel Realsense model D435 that precisely measures the distance between the exerciser and camera position. This result controls a simulated 3D model in the exercise system. In addition, this system defines the nature of the scoring in the exercise by using a circle symbol that consists of four scoring areas: left hand, right hand, left elbow, and right elbow. The system will display two types of symbols, Hit or Perfect, to be used in calculating the exercise scores in each physical posture. However, the exerciser hits a missing symbol that the system will not show any symbol. Finally, the finish time of exercise will display a summary score for stimulating the exercise that needs more score.

Related Technologies

1. Depth Camera

Developing healthy games require a special device that measures the distance between an object from a sensor. This project will use a new technology of depth camera named Intel Realsense model D435. This camera has a depth sensor to measure and detect a human structure by using a left and right sensor. In addition, this camera supports high quality depth measurement.



2. Skeleton Tracking

The skeleton tracking is a new algorithm to detect the human structure. This project uses NuiTrack SDK to track human skeletons and implements to detect the gesture recognition. This project detects the 19 joints in each joint having position and orientation for using the recognition of exercise.



- Joints with no error
- Joints with error
- Joints that not using
- Joints that not using with error

Methodology

1. Studying the NuiTrack, Intel Realsense D435 camera and Unity
2. Preparing the equipment tools and experimental workspace
3. Developing the healthcare gaming
4. Testing the healthcare gaming
5. Conclusion the experimental results

Experimental Results

This project puts to the test with the volunteers in the class project. This experiment evaluates the correct and incorrect position when playing healthcare gaming. From the experimental results, this project represents the skeleton tracking performance is 73 percent from all joints (14 of 19 joints) and 80 percent from actual using joints (12 of 15 joints). There are 3 error joints caused by the experimental workspace and unused 4 joints by 2 of 4 joints are error joints.



Conclusion

The healthcare gaming system has been developed including the skeleton tracking, score counting, score area and score symbol. From the experimental results, the proposed system represented effective healthcare gaming for stimulating an exerciser to increase the score of the game.

Reference

[1] "NuiTrack: Overview." http://download.3divi.com/NuiTrack/doc/Overview_page.html (accessed Oct. 19, 2020).

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[3] "Depth Camera D435-Intel® RealSense™ Depth and Tracking Cameras." <https://www.intelrealsense.com/depth-camera-d435/> (accessed Oct. 19, 2020).

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