Virtual Exercise using Kinect Sensor

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Abstract— Proposed system presents the event of a virtual trainer to be used by physiotherapists and patients in exercise based mostly physical therapy programs. System permits a expert to tailor exercise necessities to the specific wants and challenges of individual patients. Patients will choose completely different programs and follow a lecturer avatar to perform recorded exercises supported their wants. The Microsoft Kinect should be implementing as a way to trace user's body movements. This allows immersive and natural interaction between the user and virtual tuition world. most significantly, the recorded skeletal joint information facilitates quantitative chemical analysis and feedback of patient's body movements. Preliminary study shows the potential of using Kinect as a coffee price resolution for virtual physical therapy coaching reception or clinic settings. Most patients requiring neuro rehabilitation continue coaching reception while not direction of their therapists. They need troubles like loss of motivation, routine problem, and lack of a guide to execute a task. System proposes to support these patients with Associate in Nursing application that follows the Magic Mirror paradigm, employing a Natural computer programme and Microsoft Kinect.

Key words: Virtual Physical Therapy, Serious Games, Kinect, Rehabilitation, Computer Game, Interface Video Games, Middleware, Interactive Technologies, Motion Captured Information, Movement Recognition

I. INTRODUCTION

The propose system is to develop a inexpensive virtual coaching pc application for patients to undertake regular work up or psychological feature tasks reception. System can change individuals to follow a course of personalized rehabilitation exercises. The planning of the virtual trainer can adapt to individual wants, variations and progress of user as medical care regime. State of the art motion sensing device Kinect can worker as a way of capturing player as movements, ultimately allowing gestures and movements to become the gameplay input and to be analyze quantitatively for feedback. The proof of construct "Virtual Exercise Trainer" can develop and take a look at. The clinical situation we tend to target is rehabilitation of individuals, however the construct of style is applicable to alternative issues in physical therapy or physiotherapy, like stroke and injuries which may be improved by regular and targeted exercise.

II. MOTIVATION

Following the on top of market trend, this project aims to require Exercise expertise one step more by introducing a brand new approach from the appliance purpose of read work, as there aren't any similar applications for Windows based mostly personal computers. Specifically, gesture set for the particular virtual exercise are going to be delivered to Purposed system. together with a Kinect sensing element and a model of playable game, the most objective of the appliance, which differentiates it from alternative similar virtual applications, is the integration of the Kinect sensing element and therefore the management over diversion application; that is, the shortage of want of holding or maybe touching a keyboard, mouse or controller device to play the sport. This application models can have quite fastened kind moves gestures, but actual diversion setting are going to be able to mimic your moves as within the motion sensing games. However this still provides you an expertise of motion sensing games. This application may be given gesture set for explicit virtual exercise. Therefore user can solely need shopping for Kinect sensing element and not diversion console.

III. LITERATURE SURVEY

This section describes the work done dole out by the varied researchers to date within the command of on Virtual Trainer for physiotherapy using Kinect sensing element.

1) Fernando Cassola, INESC police officer Oporto, Portugal et.al.[1] They increased older citizen's follow of work up, They bestowed the design, development, and pilot testing of a multiuser online gymnasium supported Kinect motion capture and Open Simulator, that aimed to change socialization and direction of exercise follow while not travel necessities. The prototype was tested at the same time with four elders at completely different locations, providing information on the feasibleness of the approach and informing ulterior development and analysis.

2) Ing-Jr ring, Che-Wei chang and Chang-Jyun He, Department of electrical engg, National formosa University et.al.,[2] during this paper, the popular Microsoft Kinect sensing element and therefore the humanoid mechanism is correctly integrated for humanoid mechanism action imitation applications. The humanoid mechanism with hearticial joint servomechanisms may imitate the human's specific active gestures in line with the gesture command created by the take a look at active user. The actor's active gesture captured by the Kinect platform for humanoid mechanism imitations is viewed because the management command. DTW, HMM and eigenspace recognition schemes square measure used for recognizing the gesture management command during this work. Experiments show that the bestowed Kinect based mostly gesture command management technique is effective and potency for humanoid mechanism action imitation.

3) Kyle Rector et.al.[3] Eyes Free Yoga: Associate in Nursing Exergame using Depth Cameras for Blind Low Vision Exercise They developed Associate in Nursing accessible yoga exergame, Eyes Free Yoga, wherever the players act with a "yoga instructor" and receive audio based directions for 6 standing yoga poses. This new accessible exergame will change those who square

measure blind or low vision to access yoga whereas reception, that may improve each their physical and psychological state. They have shown through an analysis with sixteen those who square measure blind or low vision that the sport was pleasurable and provided helpful made-to-order feedback. This project could completely impact over simply those who square measure blind or low vision. as an example, if a sighted person is acting a yoga position wherever their head cannot face the screen, he or she could receive the feedback they have with auditive cues. Exergames with a lot of comprehensive feedback could offer an increased expertise and be accessible to a lot of players. They hope to supply general insights for exergames that use skeletal following.

Following square measure the reference systems:

A. *Exercise Instructors*

Fig. 1: Exercise Instructors

Another cluster of instructors command poses and let the scholars feel them to achieve a stronger understanding. Over all most of the opportunities for those who square measure blind or low vision to have interaction in yoga have required contact with a yoga teacher with the information and knowledge to accommodate.

B. *CD Sets:*

Fig. 2: CD Sets

Multiple sets of CDs were accessible at homes to follow yoga.[1]so that any busy human will follow it with none time compulsion.

C. *So Sound Yoga Board:*

Above fig provides us a thought regarding therefore sound yoga board. It's sometimes utilized by made those who will afford valuable wants. This board is incredibly valuable ,so it's its main disadvantage albeit it's of excellent use.[1] It communicates through our body sensation once the person is out of alignment and indicates that a part of the body square measure underneath stress however this can be terribly valuable

D. *An Exergames*

Fig. 3: An Exergames

One recent trend to extend exercise activity is that the use of exergames, that square measure video games used for exercise. Exergames will offer fitness activities and act as a entranceway to a lot of advance exercises. But many folks cannot play these games owing to having incapacity
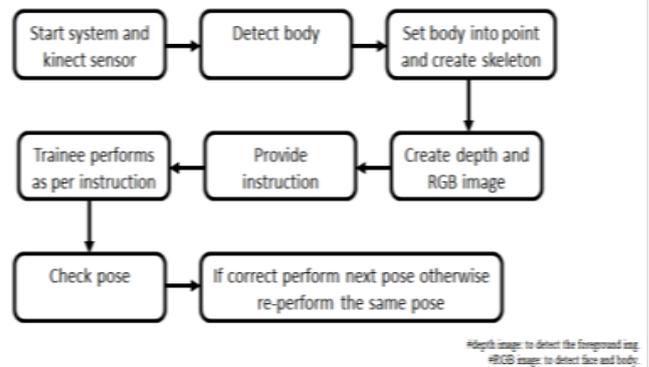
IV. PROPOSED SYSTEM

Fig. 4: Proposed System

This is the essential design of the project. User should begin the system and kinect sensing element to perform the exercise. Input for this device is going to be the voice instruction and therefore the action perform by the user. The kinect sensing element can find the twenty body points of the figure and provides the information to the system. The system can calculate RGB image and depth image. then system can calculate the motion and match it with the rule based mostly instruction. If user performs properly the then system can encourage the user and provides next instruction to perform next exercise.

V. CONCLUSION

The planned system "Virtual Exercise Using Kinect Sensor" is application wherever the players act with a "Virtual trainer" and receive audio based directions for Exercises. This new accessible Exercises will change any cluster of peoples to access exercise whereas reception, that may improve each their physical and psychological state. We tend to examine peoples and supply helpful made-to-order feedback. This project could completely impact over simply mere user. Planned system with a lot of comprehensive feedback could offer an increased expertise and be accessible to a lot of players. We tend to hope to supply general insights for Exercise that use skeleton following.

REFERENCES

[1] Fernando Cassola, INESC TEC Porto, Portugal: Online-Gym: multiuser virtual gymnasium using RINIONS and multiple Kinect devices COMPETE and National Funds through FCT Foundation for Science and Technology under the project FCOMP -01-0124-FEDER-022701.978-1-4799-4056-1/14/$31.00 c 2014 IEEE

[2] Ing-Jr Ding, Che-Wei Chang and Chan Jyun He, Department of Electrical Engineering, National Formosa University: A Kinect-Based Gesture Command Control Method for Human Action Imitations of Humanoid Robots pp. 208-211 978-1-4799-4588-7/14/$31.00 c 2014 IEEE

[3] Kyle Rector, Cynthia L. Bennett, Julie A. Kientz Computer Science and Engineering and 2Human Centered Design Engineering DUB Group University of Washington Seattle, WA98195rectorky, bennec3, jkientz@cs.washington.edu:Eye Free Yoga - An Exergame Using Kinect Assets'13, October 21-23, 2013, Bellevue, Washington, USA. Copyright 2013ACM1-58113-000-0/00/0010$15.00.

[4] Orlando Erazo,Jose A. Pino, Rosario Pino, Carmen Fernandez: Magic Mirror for Neuro rehabilitation of People with Upper Limb Dysfunction Using Kinect, 978-1-4799-2504-9/14 $31.00 c 2014 IEEE DOI 10.1109/HICSS.2014.329 pp.2607-2615

[5] "Microsoft Kinect Sensor and Its EffectRecent" Wenjun Zeng University of Mis-souri.

[6] Z. Zhang,"Microsoft kinect sensor and its effect," IEEE Multimedia, vol. 19, no.2, pp. 4-10, 2012.