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Exploring Earth and Moon in Virtual Reality

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***Abstract*-The principles of virtual assembly and the process of general assembly are analysed and conversed in this thesis. Meanwhile, parts parametric model creation and assembly, as well as component parts of assembly interference analysis are analysed in Unity .Virtual Assembly, the key to application of virtual reality technology in design and manufacturing, has drawn much courtesies of corporation and investigator. The exact design flow of virtual we assembly was given on the theory of virtual assembly included its gears of diesel engine was acted as an object to as assemble practically. By assembly inspecting and modifying, the assembly of the machine in virtual environment was available. Our VR system has three features; (a) it synthesizes highly realistic VR video from the data captured in actual assembly, (b) it estimates the reaction of the user to the VR spur by capturing the 3D locations of full body parts, and (c) it consists of off-the-shelf devices and is easy to use. Our demonstration provides users with a chance to experience our VR system and give them some quick feedback by visualizing the estimated 3D positions of their body parts.**

***Keywords*-Virtual Reality, Leap Motion, Locomotion, Virtual learning, Unity.**

I.INTRODUCTION

With the rapid development of VR technologies, VR systems are now being used in various fields, such as entertainment, medical care, and education and so on. Our focus is on the use of VR technologies for enhancing sports performance. In general, company must recognize their current situation and decide what actions to take very rapidly. Therefore, the effectiveness of image training is a significant factor in terms of achieving better performance in real life. As VR technologies provide users with a high realistic experience, VR experience can be regarded as a key image training tool.

We reconstruct real life assembly in a VR space and utilize them for more effective image training showed that, for assembly, training in a VR space may take the place of real-world training in terms of temporal control. Since these training session involve just image training, the user's response to the virtual experience, e.g. the training was well understood or not, must be done by themselves. Therefore, unskilled or inexperienced employees who cannot evaluate their own responses accurately may not be able to use these systems effectively. Our research aims to realize more effective sports training by enhancing the user's ability to evaluate VR training. Our key advance lies in introducing "sensing" to conventional systems. This paper focuses on baseball batting actions and introduces a novel VR system that provides highly realistic VR videos while effectively feeding back the user.

II. REQUIREMENTS FOR ASSEMBLY TRAINING

This system satisfies the following three conditions which we found through discussions with professional Companies.

- The system must be easy to use. Complex or troublesome systems cannot be used by worker and staff even if they have rich resources and large budgets. Ease of building up and dismantling the system is essential since teams frequently move during the season.
- Quick and effective feedback must be given to the user and staff. It is important to attract and hold interest in system use. We found through trials with several teams that quick feedback is of supreme importance in developing interest.
- System overview: This section details the architecture of our proposed VR system.

III. A LEAP MOTION CONTROLLER

A Leap Motion is actually quite simple. This sensor recognizes and tracks hands, fingers and finger like tools. The device operates in an intimate proximity with high precision and tracking frame rate and reports discrete positions, gestures, and motion. The heart of the device consists of two stereo cameras and three infrared LEDs. These tracks infrared light with a wavelength of 850 nanometres, which is outside the visible light spectrum. The origin is cantered at the top of this sensor. The x- and z-axes lie in the horizontal plane, with the x-axis running parallel to the long edge of the device. The y-axis is vertical, with positive values increasing upwards (in contrast to the downward orientation of most computer graphics coordinate systems). The z-axis has positive values increasing toward the user.

IV. LOCOMOTION

To deepen our understanding of the performance of locomotion techniques at varying levels of fidelity, we designed an experiment to directly compare a semi-natural locomotion technique with a non-natural technique and a fully natural technique (real walking). The gamepad method was designed similar to a standard gaming border. The VE was displayed to the user with the HMD, and viewpoint was controlled by the joystick. The user was not head tracked for this technique (as would be typical in a desktop gaming setting), and viewing direction and moving direction were coupled.

The maximum movement velocity with the gamepad was controlled to be equal to the average walking speed in real walking technique. In the Virtus here technique, the user’s walking inside the Virtus here was directly mapped (direction and scale) to viewpoint translation in the VE. The viewing direction and walking direction were decoupled. The Virtus here’s movement velocity was adjusted so that the average velocity was equal to the average walking speed in the real walking technique. In the real walking technique, the user’s head position and orientation were tracked while walking in a large lab. The study tested the performance of the three interfaces on the basic walking task of walking on an indicated line.

We hypothesized that the medium-fidelity Virtus here technique would be inferior to the other two techniques. We designed a single-factor, within-subjects experiment to investigate this hypothesis. The independent variable was locomotion interface, with three levels. The dependent variables were task completion time, path deviation, and participants’ opinions of the interfaces. We used path aberration as a measure of correctness. We defined path deviation as the perpendicular distance between the user’s position in the VE and the indicated line. Twelve participants (10 males and 2 females) from the university undergraduate and graduate population were recruited on a voluntary basis for our study. The members fluctuated in age from 18 to 35 years.

V. SENSING 3D POSITIONS OF EACH BODY PARTS

Our system employs two approaches to estimate 3D human pose; one attaches sensors for quick feedback and the other uses Multiview videos for deeper analysis of the user ’s performance. Attached sensor based sensing Our system employs off the-shelf sensors such as Oculus touch. Since these sensors can robustly output 3D positions of each body part in real time, our system can provide rapid feedback to the user and staff. As it is not practical to attach these sensors to all parts, we attach them to the body parts important in determining performance. For the assembly scenario considered here, oculus is attached to the user’s head and another to the bat based following the experiences of user.. Multi-view video based sensing With the rapid development of and improvement in 2D pose estimation, estimating 3D pose from multi-view videos has become a practical way of sensing the user ’s reaction. This approach has several practical advantages, e.g.it provides richer information on human body movement than provided by the attached sensors and does not use markers or sensors.

As true 3D pose estimation from multi-view videos generally demands a lot of professional preparation, e.g camera calibration and synchronization, we avoid such problems by taking the detected (a) 3D pose and the velocities of leg, hip and shoulder estimated from multi-view videos. 2D human pose as calibration patterns from which 3D human pose is estimated as described.In this demonstration, the system provides the user with a VR experience of various types of pitching from the batter ’s viewpoint via HMD. The system processes the data from attached sensors and multi-view videos to estimate the 3D positions of the user ’s body parts during the swing. The feedback is so quick that the user can adjust the timing of their swing motion to the ball according to pitch type.

The user’s 3D pose and the coordination of leg, hip and shoulder movements. This shows that the estimated 3D positions of all body parts can enrich understanding of batter performance. As described above, this system can visualize the user’s reaction to the VR stimuli with the aim of achieving effective sports performance evaluation and training. Understand all the provided review comments thoroughly. Now make the required amendments in your paper. If you are not confident about any review comment, then don't forget to get clarity about that comment. And in some cases there could be chances where your paper receives number of critical remarks. In that cases don't get disheartened and try to improvise the maximum.

1. Shift from Memorizing To Higher Order Thinking

VR-based immersive and experimental learning has the budding to create a deeper level of appointment with target topics, in a distraction free environment. Such an environment creates chances for focus and attention on a topic or idea, which should positively affect retention rates of the subject matter. Of course, such retention rates cannot be legitimately expressed until longitudinal studies have been performed, but anecdotal data suggests there may be a link between VR and increased retention.

2. Building Better Learners

One of the possible advantages of VR is the opportunity to gain real-life experience in certain areas, which can be difficult to achieve, dangerous, or just plain expensive.

VR can connect students with those experiences, from the most specialized skill-set training, such as welding practice, to performing simple lab experiments. With a look-see-do mode of learning, students are encouraged to choose, explore, manipulate, and comprehend subjects in a different way. Of course, this would only be in the case of active participation within the environment, and not as a passive observer.

3. Empowering the Teachers and Students

It can be of great benefit to instructors to have a tool such as the VR at their disposal, but only if paired with the right content. Regardless of the medium, content is king, and always will be. Textbooks, videos and VR part one thing in common, that without proper, examined content, they will certainly end up collecting dust on a shelf. Further to this would be if the VR was properly set up for academic use, funnelling data from a student device, to a teacher. That would empower teachers to better understand a student's connection with the material being taught, to identify possible gaps in knowledge and to attend to those issues in a timely manner. This would make the experience that much more relevant and that much more meaningful, for both students and teachers.

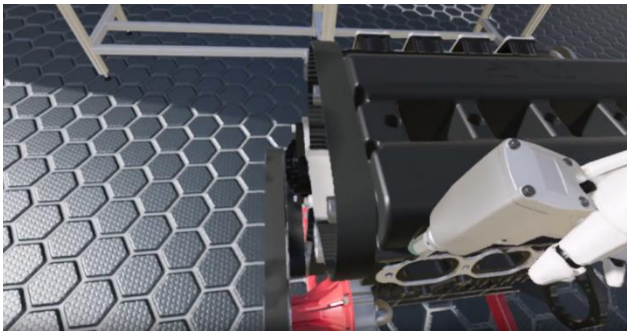

Fig 1 Assembly of screw.

VI. DEMO

In this demonstration, the system provides the user with a VR experience of various types of pitching from worker viewpoint via oculus. The user should use his controller or hand to interact with the environment and learn the equipment and control it. The environment consists of the product of interest and the worker is instructed to learn the environment and the product. The product can be constructed and deconstructed based on the user's input and he decides the outcome of the product. With this type of learning the worker can learn about the environment and the product. Even if there are any error in making the product the worker can restart the work and not waste any time hence saving the companies time and resources. Using VR we can provide a more interactive experience for the user and thus help in his or her development of his knowledge.

Fig 2 Disassembly.

Fig 3 Interacting with the environment.

VII. CONCLUSION

Thus from Our research we have concluded that the vr based learning have a great impact on the learning process and helps the company worker and in turn help the company in their progress and thus profits and the resources management. We have used the concepts like hand tracking and motion sensing to change out environment and adapt accordingly.

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