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Computer Graphics (Literature Review 1)

The primary article chosen by me for my literature review is Computer Graphics Animation for Objective Self Evaluation and written by Yoko Usuni, Katsumi Sato and Shinichi Watabe and the secondary article which has a reference in the primary article is, "Analysis and Evaluation of dancing movement Based on LMA written by Kozabura Hachimura, Katsumi Takashina and Mitsu Yoshimura   presented at IEEE International workshop on Robots and Human Interactive Communication 2015.

I love to dance and I   ended by choosing the primary article as it caught my interest on how the Computer Graphic Animations are used in real time applications like dancing and Human Robot Interaction using motion captures.

So let's talk about the secondary paper referenced in primary paper. As in the title It is mainly talking about how to extract the characteristic poses and highlight parts of dancing movements obtained by the motion capture using LMA (Laban Movement Analysis) .It talks about the components   Effort and Space   which is used to capture the emotions, intentions and attitude of body with features Weight, Time, Shape and Space Flow. After capturing the dancing movements from the object using motion capture which is real time person extraction of the weight motion, space motion, time motion and   shape flow motion using the 3D Convex Hull and Rectangular Parallelepiped for the body model then the data is compared with real time expert of LMA.

Weight feature is calculated referring to the kinetic energy of each body part in a unit interval as weight feature. We have root marker for entire body and the markers for limbs-right and left. Fingers and Toes are used to explain the movement of limbs around the corner that is root of the body. The normalized values are calculated which can be used to know the energy movements of the object. All the marker weights are added and then final weight is calculated. Similarly the various required calculation are performed for shape, time and shape features. Based on the root movement and after the normalization to alignment of X and Y and Z coordinates this can be used in shape feature. Shape flow can

obtained by the either rectangular parallelepiped to cover the whole body or X, Y, Z co-ordinates which also covers whole body.

Observing the change of weight feature for strong and light motion does extractions on weight motion. Extractions are also done for the space, which show the motion where body flies up towards a point forward. For Time motion extractions are done for quick and sustained movements. For space extractions are done to view spreading motion and Enclosing motion. For shape flow extractions of widening and narrowing motion are calculated.

Evaluation: The motions corresponding to the effort, which are extracted, are then compared with the specialist's values who has official qualification of analysis of LMA? After observing with the intervals of the specialist and the processed intervals by authors the specialist agrees with threshold values weight factor and time Factor. However the results of the comparison of the space factor are not satisfactory because threshold values are set to ad hoc and systematic examination is required.

This concludes that the numerical formulation of LMA is possible to some degree, however insufficient formulation in space. This can be improved by the quantification of the LMA factors more definite. But this concept is not used in real time application to see how far this can be utilized which can be helpful to the users in real –world.

Here we come to the first article - *Computer Graphics Animation for Objective Self-Evaluation written by the*

Yoko Usui

Tohoku Gakuin University

Katsumi Sato and Shinichi Watabe

Tohoku University

This article written by authors talks   about how the animations, which are created using the motion capture data can be   used in real time dancing applications. They did an experiment on the 12 students of high school where they measured them using motion capture. A video with accurate dancing movements was shown to students initially to practice the dance. After the practice the 12 students are measured using Xsens MVN motion capture. Different animations are created and students are given the   PC to view their animations by setting the preferred view angles to practice for one month. Students check the animation

daily before practice and try to correct their mistakes. After month time students are interview individually to see how they improved. By comparing the animations of their friends and their own motion capture students commented that they need to improve the bending of the waistline.

Students also were aware of their motions for first time by viewing animations and decided to change the heights to correct ones during dancing. To check this authors calculated the vertical change of the height of waistline based on the motion capture data to examine the change. It revealed that students improved their dance position of waist height by lowering to 10 cm. Some Students mentioned that their perceptions were wrong about the dance movement and they improved their dance after viewing the animations and correcting themselves. Because of the learners point of viewing they made use of the characterized body movements in the practice and improved a lot.

The animations used characters with the simplified frame so it became easy to view the movements of joints hands and waists. This frame gives clear view to learners to find their movements in any view. Another benefit was the using this technique it helps everyone to reach the target with group dancing like Hula. This concludes that the measuring students using the motion capture and having them use the animations helped them a lot to improve dancing skills further.

But Advance dance learners can easily learn dance from the video but for beginners it really a hard time to know their mistakes and improve further. Also other experiments with more student objects- subjects and long- term practice can get the accurate results and can be introduced as application to high- school level students for practice However the dance can be improved without motion capture but the comparative analysis to see if there is any difference between the cases of using the motion capture and not used should be made.