Computing and Dance

Melany

"Computers are quicker but humans are slicker." This quote (West, 2010) was used in a Cognitive Psychology class last semester in front of a group of students. Computers generally solve problems using algorithms while humans tend to use heuristics and sometimes they may even skip steps in the problem solving process to reach a goal more quickly. Since the beginning of the development of computers and computer science, technology has been advancing to help facilitate the lives of humans and in some cases even replace them. In the world of performing arts, and more specifically dance, computer science is continually developing to help solve some of the many problems that are linked to choreographers' music selection as well as teaching and learning of choreography.

In the past, dancers performed to live music performed by a pianist or an orchestra and although this is still the case in live theatre, most choreographers use a form of digital sound technology to help edit music and combine different pieces of music. There are now programs that can help facilitate the process of cutting and pasting different pieces of music together or even cutting parts out of a particular song. This is done with a mixing console or mixing software application (i.e MJ studios, which is a free downloadable application for personal use). The problem with some mixing software is that it has to make sure to have an algorithm to allow for different music to be recognized on the virtual mixer. Equalizers are used to fade in and out of tracks which allows for smooth transitions between songs or different edited versions. Anyone can download free mixing software, but usually you have more capabilities when you purchase a program.

Choreographers also face other challenges when it comes to creating dance routines, writing down all their dance moves and keeping track of all their routines. It is as though a logging system would be required on a large website for registered dance instructors. This would permit access with a password similar to when you join an organization online. Dance instructors could submit their routines online and keep them under their own private account. Computer scientists would need to use a security algorithm that would permit dance instructors to "share" routines and to hide others. Dance instructors would never have to worry about losing material. This would also help in terms of networking with other instructors all over the world, job opportunities, and a multitude of choreography ideas. This website would require a search engine that could look up different dance routines by style. There are already many websites out there that use technology that would be required to operate this dance website; Facebook is a network example that allows for information sharing, social searching and social browsing. Users create an account and can publish an array of pictures and videos. The one thing that would need to be different for the dancer website is that it would have to include a database with all the registration numbers for the instructors that would recognize a new instructor's number when entered. One problem would be people trying to access privileged information without being a registered instructor, therefore there would have to be appropriate programming that would secure the network.

Dancers, on the other hand, also face challenges in learning new routines/ choreography. Sometimes it is hard to remember all the moves that were taught, especially when dancers leave the dance studio and are at home attempting to rehearse. Although rehearsals usually happen live in the studio, Skype is a computer application that can help facilitate online virtual rehearsals. Skype can be used to make free calls, with or without the use of a webcam, to

someone else who has the application. Users create an account with a user name allowing friends, family, or whoever to add them to their list. When a call is made to someone else the caller's user name appears on the recipients computer display screen. Skype displays who is calling on the user's computer screen. A problem with this application is caller ID spoofing, identity fraud; people mask who they really are under a fake identity. Computer scientists use a program called "ba-sic" security to work against Caller ID spoofing, which uses a strong hash function (Agarwal, Bahl, Chandra, Chin, Gupta, Wolman, n.d.). Computer scientists need to ensure that they are using a safety algorithm that would keep a person's account authentic to them. To help dancers, Sype can be used for instant messaging, transferring choreograph using file transfers, and video conferencing for online dance rehearsal (Baset, Hennings, n.d.). The video conferencing can be done by telephoning other members of the dance group, activating webcam, and microphone usage. In order to use this application, computer scientist would have had to think about high resolution video for interactive communicating using the webcam (Denmark, Hejtmanek, Hladka, Holub, Hutanu, Liska, Matyska, Paruchuri, Radil, & Rebok, 2006). If there high resolution was not taken into consideration then the display on the monitor or laptop would not be clear and this would prevent the dancers from show dance moves over the internet. Computer scientists have also had to design the software for motion detection using the webcam hardware, which is difficult for fast motion (Kirchhof &, Linz, 2005).

Choreographers and dancers also use a wide variety of music. For music recording, there exists an application called a music sequencer. This application is designed to playback the music that was played by a musical instrument (Friberg, 2006). Ideally, in the world of dance this type of recording application does exist through the use of video cameras but does not use the same algorithms for recording. Video cameras require active setup and activation for

recording. For dancers, something similar to this idea of a dance sequencer would be very useful. Studios could be designed with motion recognition sensors that would enable choreographers and dancer's movements to automatically be recorded and appear on a computer screen once performed. This would speed up the process of having to write out dance moves by hand and possibly forgetting a step here and there. Computer science has already developed applications for motion sensors for home security and surveillance but this technology would have to be further advanced with an algorithm for higher resolution playback properties and an application that could recognize which parts of the body are moving as well as who in the dance studio is moving, for this application to run successfully. There are also new "Dance Dance Revolution" video games which include a floor mat onto which you step to recreate the correct dance positions. In the video game, however, the computer is not able to recognize which part of the body the user is actually moving. Perhaps computer science could, somehow use "Senriska" which is the software that is used in webcams that allow webcams to pick up picture and motion (Laforge, 2010). Webcams are already able to detect motion therefore, computer scientists could possibly stem from what they already know to create a dancer/ choreographer friendly application.

Bibliography

Agarwal, Y., Bahl, P., Chandra, R., Chin, K., Gupta, R., &, Wolman, A. (n.d). Wirelsess wakeups revisted: Energy management for viop over wi-fi smartphones. *Google Scholar*. Database

Baset, S. &, Schulzrinne, G. (n.d). An analysis of the skype peer-to-peer internet telephony

protocol. *Department of Computer Science.* Columbia University. N.Y. Google Scholar. Database

Friberg, A. (March, 2006). An expressive sequencer with real-time control of the kth music-performance rules. *Computer Music Journal. 30* (1) pp. 37-48

Denmark, J. Hejtmanek, L. Hladka, E. Holub, P. Hutanu, A. Liska, M. Matyska, L. Paruchuri, R. Radil, J. & Rebok, T. (October, 2006). High-definition multimedia for multiparty low-latency interactive communication. *Future Generation Computer Systems, 8* (22) p. 856

Kirchhof, M. &, Linz, S. (2005). Component-based development of web-enabled ehome services. *Springer Berlin/ Heidelberg, 3272* pp. 181-196

Laforge, M (May, 2010) Interview: support/ application support specialist. Genivar. Ottawa, Ontario