Importance of Procedural Animation and Modeling (Extended Abstract)

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Animation is well known term, which means change of features in time. It is important mean of expressing artistic aim from the first attempts of animation in 1600 BC through 1824, when *persistence of vision* was analyzed by Peter Mark Rodget [Williams and Sutton, 2001]. Moreover, from this point, whole animation has been separated into discreet time steps, frames. It was time consuming to generate each frame by a hand of an artist. This is when Keyframe animation came as an idea of faster and cheaper animation. Idea is that an artist draws only important frames for the movement and support artist draws inbetweens.

Computers are used everywhere nowadays, also in animation. Computer animation is defined as change of features in computer graphics in time. Keyframes are still drawn by artists, not on the paper, but in the computers. Role of support artist is now delegated to the computational power of computers. Instead of looking for a skilled person, computer graphics deals with finding an algorithms that would create inbetweens.

Algorithms and mathematical description allows artists not only calculate transitions between keyframes, it allows them to do even more. Various effects are important for realistic output. These effects could be oftentimes described by physical and mathematical equations and include fire, smoke, water, etc. These effects would be very hard and time consuming to just draw frame-by-frame, or even using keyframe animation. Realistic effect would be close to impossible, but with the good description of physical laws and mathematical equations it is now possible and is almost realistic. In computer graphics descriptions are changed to algorithms, algorithms to procedures and procedures to real implementations. Therefore effects are described by procedures and this is called procedural modeling. When output is an animation it is procedural animation.

Various procedural techniques are developed to simplify work of graphical designers and artists. Moreover it brings more irregular features to the objects. These imperfectness and irregularities are more natural and interesting. Creating objects more imperfect with wrinkles, noises, turbulence, scratches on the textures have been interesting for the researchers which proves classical book of procedural modeling and texturing [Ebert et al., 2002]. Moreover, it is interesting also nowadays, which could be proven by the SIGGRAPH 2010 conference, where were some of wrinkles for the human face [Lau et al., 2010] presented.

Procedural techniques can be used also for animation, not only physically based, but also for more efficient motion manipulation or crowd control. Animation created by hand could be even more time consuming and techniques which are more automated are welcome. Therefore researchers are trying to solve animation problems even partially to help animators with calculations instead of manual manipulation. Proof of this assumption can be seen in SIGGRAPH 2010 papers dealing with procedural motion [Liu et al., 2010].

References

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