Music Driven Walk Cycle For Humanoid Character

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What is the problem you are tackling?

In animation clips, when a character is walking, the walk cycle is backed by a music track that sets the environment. For instance, if the scene is adventurous, the music track is up beat and walk cycle is confident with firm steps. The animation of this walk cycle is created manually and then mapped with the music beats manually. We propose a system that will generate the walk cycle for the given music piece by aligning Audio and Motion Signals.

What are the main challenges?

First of all, posture of the character heavily depends on the mood or tone of the music. The shoulder position and head alignment is one example. Hence, we first need to decode the scale of emotions in the music. Happiness, confidence, energy are some of the emotions to be considered. Every person perceives music differently depending upon his own emotional state. Hence the level of emotions in a music piece is subjective and it is difficult to analyse numerically.

Secondly, tempo of music is not always constant. Some tracks have raps, or silent gaps. Some songs have progressive tempo, the beats are not even. In such cases, the walk cycle should have halts or sudden jogging step. Implementing this would be a challenge.

What is your proposed approach?

Music Signal Processing-

- Decide which emotions to consider and how to extract the level of those emotions
- Process the music to understand beat that we have to map with the walk cycle

Walk Cycle Generation-

- Analyse factors to consider for posture such as emotions of music, age of the the character, etc
- Generate walk cycle by using points on the skeleton of the model based on the emotional scale of the music
- Align the walk cycle with the beats of the music
- Render the animation