Re: Interpolated Markov model

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- *From*: clemenr@xxxxxxxxxx
- *Date*: 15 Apr 2005 03:08:41 −0700

Many thanks to Dr Jones and Dr Jones for these comments.

In actual fact, these comments are actually too useful and relevant to things I've been thinking about, as they both suggest things too advanced for a "quick hack". The broken line processes are very interesting as it appears (given my current understanding) that the initial points move until some sort of equilibrium is reached. I presume that the equilibrium has some form of emergent properties that are useful in predicting the equilibrium that occurs when water flows in a physical environment, no? I have sat watching the flow in streams, and noticed the complexities of water flows around rocks, including things such as appearing and disappearing tiny whirlpools etc. In terms of generative music and sound, modelling some physical process and then mapping the model to the parameters of sound generation has given some quite interesting results in the past. John Eacott from my uni's commercial music department created a system that modelled the planets and satellites of the solar system, and generated music from that. In general, it seems to work if the physical system being modelled has randomness, but is not so random that a listener can't detect a pattern, and hear the pattern change over time. I did a search on "streamflow simulation" and "music", but found nothing on using streamflow simulation in music. If the water flow sets up a "stationary" pattern, then it would still be possible to predict the paths of leaves floating on the water, mapping these to sound generators. There's a lot more of interest in this model and I could waffle on for quite some while. Unfortunately, while I think this would be a fascinating avenue to explore in generative music, I've had to make very tough decisions about what I am and am not going to research as if I try to do everything I'll end up doing nothing. I do have a piece of Chinese classical music on my computer that makes extensive use of onamatapeia to represent the flow of water from drips of water in a mountain all the way to the sea!

Graham's mention of Markov Random Fields is also very interesting for a different reason. I have an interest (again, one I consider a fascinating field of research but not one I'm following) in automatic derivation of synthesis parameters to reproduce sampled sounds. This is easy to solve sufficiently well using some sort of windowed fft and resynthesis such as a phase vocoder. However, the really interesting

task is to find the parameters for a much simpler synthesis model that approximates the original sound. The method I was familiar was using neural networks, and while I have no evidence against NNs being optimal for this task, and I don't really understand what a "neural oscillator model" is. I've always thought that there would probably be better methods to use than neural network based models. Searching on Markov Random Fields gives a lot of papers in using MRF in image texture analysis and generation. I would imagine that they could be used for analysis and synthesis of audio as well. However, I don't think I could come up with the right search keywords to find work on MRFs and audio without being swamped by image texture work.

Thanks very much for the replies.

Cheers,

Ross−c

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