Computational Composing

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Overview

- Seriously? This is a thing?
- What it's not.
- Why we compose such song
- "Algorithm" for such a composition
- Examples
- Assessment, Conclusions and Future work

Seriously, it's a thing, and for some time now.

- The Masters
  - <u>Tom Lehrer</u>
  - <u>Weird Al</u>
  - <u>Walter Smith</u>
- In Computing/Tech
  - <u>Donald Knuth</u>
  - <u>David Pogue</u>
  - <u>Michael Littman</u>
  - <u>Steve Wolfman</u>

Don't confuse this with ..

- Computer generated music
- Using bad music to teach debugging
- Ear Sketch
- Media Computation
- Using a computer to record music
- A music app
- Entertainment only

*These are all great, but not what we're doing here.*

An "algorithm" for composing a computational song

1. Select concept
2. Think about it for some time as you listen to music
3. Get sleep
4. As you wake up, does any song you know connect at all to your concept?
5. If no, return to #2
6. Else list all the terms of that concept that you believe should be in the song
7. Substitute into existing song
8. Return newly composed song about a concept!

Advanced: lyrics AND music
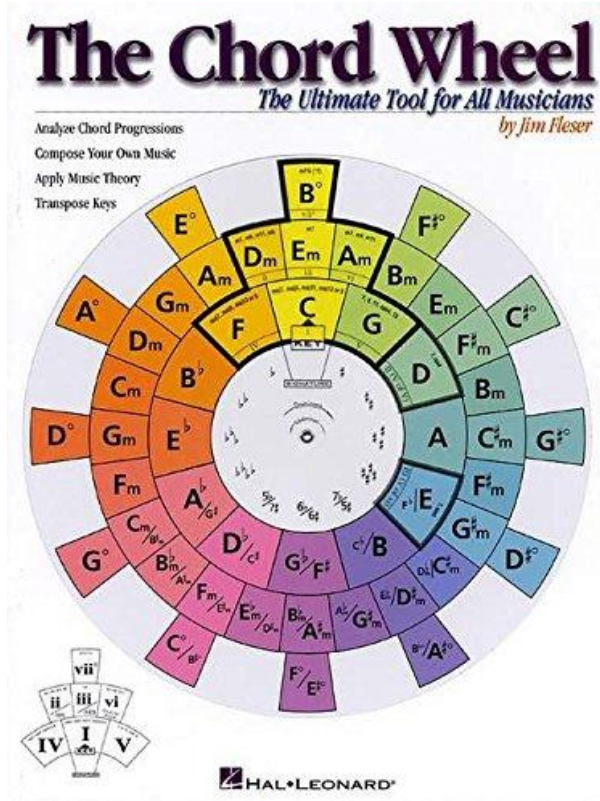
- If lucky, your concept lends itself directly to the music as well as the lyrics
- Examples
  - Recursion
  - Loops, even infinite
  - Function calls and returns
  - Parallelism
  - Changing keys/sounds, as in ...

Data Sonification

- Using sound variations to convey trends in data (often numerical)
- Especially useful to people with vision issues (but not only!)
- Challenged by my panel peers, thought for at least a week, then ..
- Woke up on a Saturday morning, and the song was completed by lunch time
- This is rare, but has happened to me before
- The original: "Do You Hear What I Hear?"
- Now: "Do You Hear What I See?"
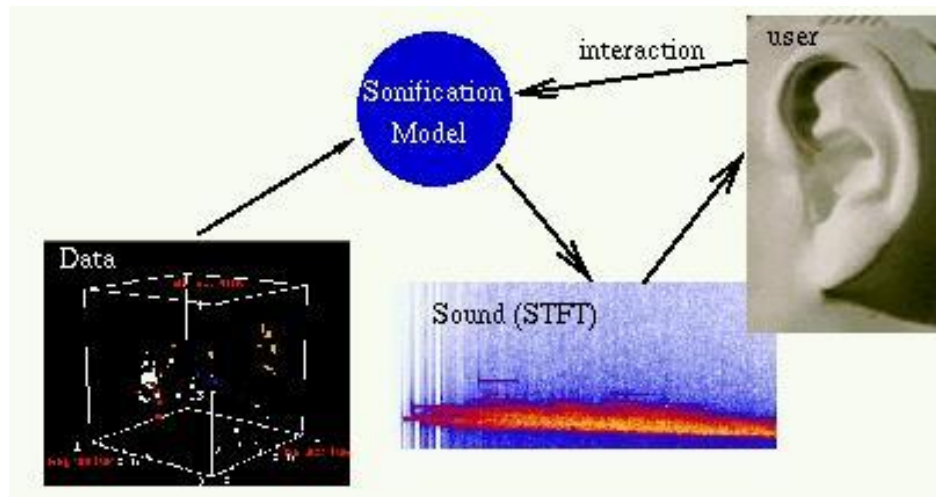
Conclusion & Future Work

- So far I have received positive feedback from students ...
- … students add to my songs …
- ... had students submit complete songs
  - Once before the course started!
- I have also been invited to "perform" at events outside of class, even beyond the campus (*e.g.,* Flame Challenge, CCSCE keynote,)

- **SCAATY** (Still Composing After All These Years)
- Latest work involves songs where the lyrics serve as the pseudo-code for an introductory algorithm
  - Binary search
  - Selection sort
  - Bubble sort

Thank You

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