Non Real-Time Systems
Submission 1

s1878250

For Submission March 4, 2019

Ode to an Ever Warming World is a study in sonification, specifically looking at both historical and contemporary climate data to drive and interpret the music. Several different data sets were used to create a corpus to work from including: average temperature per month per year (converted from degrees Celsius to Fahrenheit to better fit the midi note range (historical MetOffice data)); hours of sunlight per month per year (historical MetOffice data); millimeters of rain per month per year (historical MetOffice data); height of tide per hour (several per quarter hour) per day per year (historical BODC data); up-to-date wind speed, degree and gust data (open weather API).

Several data sets have been modified to better conform with ranges for specific parameters, such as the master note duration, which takes the wind degree multiplied by the wind speed, subtracting the average water height and dividing quite considerably. So too has the master sync BPM been a result of multiplying the wind speed by twenty. Finally several of the midi note modules have had additions to the data set to help relieve the mid range from being bombarded.

The initial aim was very much aimed at the final product, rather than the process itself, and included splitting the midi data to different channels and ports to create a fulsome musical experience. The project was then pruned back to focus more on utilising one instrument (preferably keyboard) and spending more time on the process. I have included some photographic documentation of my basic workflow/planning behind this process. You can see from the notation that starts off very product heavy, before falling back to the process.

At it's core, the project is a series of first order Markov chains that trigger new modules to progress the process, whilst in turn constraining the process with self-timed kill switches set to trigger at opportune moments in relation to the golden ratio. To help create a more believable performance, each midi note has it's own velocity of attack - much like a human performer would. This was calculated by a Markov chain utilising historical sun hour or rain millimeter data from the town the patch is named after, before being scaled to a range of twenty-five to seventy-five. Not necessarily a great diversity of velocity, however

in my opinion, the subtle difference of hits creates a more realistic performance.

Each module is a reproduction of the previous, with the exception of the Markov chain corpus, which is unique to each iteration. Within the modules are a sub-patch that regulate rhythm by manipulating a slave tempo object's beats per cycle variable, independent of the master sync clock. There were two third-party sub-patches that were utilised in the project, namely the *Getting Weather Into Max* patch (renamed WeatherData) by Tom Mudd, and the csv2coll patch, taken from the Cycling '74 forums, created by user Justin G. This patch allowed me to convert my handpicked csv data files to a readable coll object within Max.

This was a difficult project for me, as I am not very process focused - especially when constrained to using only midi notes (something I have not done much of). When it came to manipulating the process, my mind immediately started looking for filters and effects, rather than modifying the base code itself. To this end, I am starting to put this process mindset to use and am continuing to apply it to other ongoing projects.

s1878250
approx. word count: 571

Markov Chain coupled with Sonification
(weather?). Could train the Markov Chain
using weather data → Possibly °F as
Midi notes?

Ode to an ever Warming World?   Vizzie?
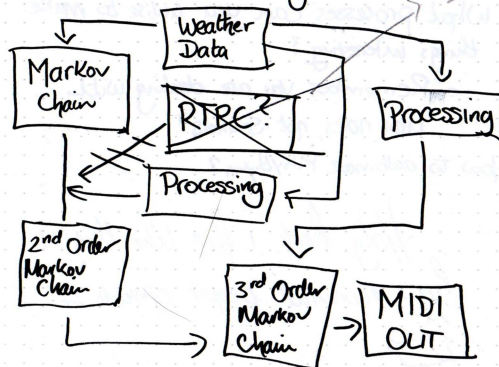
BRIEF

- 2-4 minute Algorithmic Piece.
- Once Started You Cannot interfere

To think about

- How does it end? → Follows the tide. Out, then back in.
- How does the algorithm progress?
- What processes can you utilise to make things interesting?
  - Remember you are dealing with MIDI notes, not Sounds!

- How to automate Rhythym?

1) RTS Submission - I Plans

Sonification Using various weather data patterns.

Main Weather Data

Temp

Range 30 - 62 → 32 Midi notes

Av 47

Sun 48636

Use weather An to Control filters etc → Rechargility?

List of Available Data Points

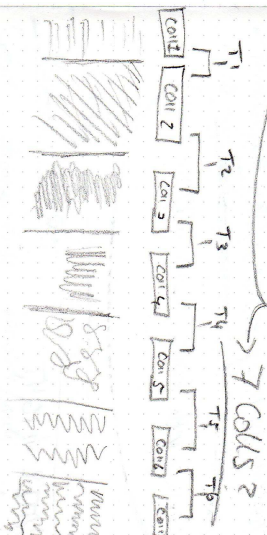- TEMP; Min/MAX/Av.
- Wind; Gust/Speed
- Sun hours
- Rainfall

Using All Stations in Scotland → LARGE AREAS ←

Why this Data?

→ Global Warming Effects in Scotland

→ Weather Stations

→ CoUS?

REFINED

GLOBAL WARMING EFFECTS ACROSS SCOTLAND

TIME