zoom-cache + scope

There's probably no time for questions so please ask Public questions on G+, tagging me:

+Conrad Parker

Haskell Implementor's Workshop 2012

https://github.com/tsurucapital

- iteratee: parallel stream processor +John Lato

- euphoria + elerea: dynamic FRP network construction and sub-networks as first-class values +Akio Takano
- elerea-network: distributed FRP +Jasper Van der Jeugt
- Uix: GTK+ FRP +Andrew Richards

- parsergen: TH fast parser generator +Michael Baikov

- zoom-cache: a streamable, seekable, zoomable cache file format
- zoom-cache-pcm, zoom-cache-sndfile: summary instances and tools for PCM audio

- scope: an interactive renderer for plotting time-series data
- scope-cairo: a Cairo rendering backend

Motivation

- A coworker once told me that everything I do eventually turns into some kind of DJ tool
- Around 2001 I wrote a sound editor called sweep in C, with fast audio scrubbing but no caching
- I want to be able to implement something better using the world's best imperative programming language.

zoom-cache file format

- Encodes summary blocks while writing data
- Summary blocks contain enough information to render the data (but not enough to process it).
- How to render depends on the information (eg. audio vs. stock prices)

- Encodes summaries of summary blocks

zoom-cache library

- Type-directed serialization, data family interfaces using iteratee, blaze-builder
- type-level Nat indexed lists for multichannel data (NList)
- Instances for (), Bool for timestamps, binary events
- Numeric instances (max, min, mean, rms), toDouble wrappers
- Monoidal summary blocks
- Data.Offset wrapper for iteratee IO tagged by file offset

scope library

- Generates a set of drawing instructions for a range of data
- Reads a zoom-cache file, seeks to the specified range and finds summary blocks
- Provides an abstract API for zooming in and out and seeking
- scope-cairo renders to Cairo and provides GTK+ mouse handling and scrollbars

Demo

Current and future work

- range-space: Range type with vector-space instances +John Lato
- planned use of diagrams library for rendering
- HTML5 canvas rendering
- Applications (profiling, actual user apps)