FishViz

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Abstract

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Introduction

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Data

Some time on Friday the data website (https://grunt.sefsc.noaa.gov/rvc_analysis20/) stopped working; while we have the downloaded the data and have luckily set up our own server, this also means we have lost the original description for each data-field.

Sample Data

The sample data is split in the following fields:

- Species Code
- Date
- Location
- Sample Length
- Sample Quantity

Taxonomy Data

The fish-taxonomy data is a static component which describes the last three layers of the modern hierarchical classification of living beings, namely *family*, *genus* and *species*.

Related Work

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Design

The main purpose of our design is that of exploratory analysis with paticular focus on how discovering how fish populations and sizes change over time. To allow the end user maximum flexibility on what kinds of relationships to analyze,

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(a) Full Taxonomy

(b) Filtered Taxonomy

Figure 1: The taxonomy view shows the current state of the taxonomy filter. On top, the full taxonomy tree is shown. On the bottom, a more common taxonomy filter which only contains a number of families, genera and species.

we will need to provide both multiple views with the special purpose of *filtering* the data, and multiple linked views in which the filtered data is to be visualized. Each datum contains many heterogeneous subfields, which implies multiple filtering techniques will be required, e.g. filtering by family, genus and species is going to differ from filtering by time period which is going to differ from filtering by region or location).

Taxonomy View

The taxonomy view shows information about which filter is currently in place. This constitutes a shallow but potentially very wide and dense tree, hence the main issue to be addressed was space efficiency and navigation.

Our initial design (Figure **??**) was a dynamic sunburst chart, with the user being able . However, the angular extension was not sufficient to visualize the whole taxonomy except for big values of the sunburst radius. The circular view also resulted in all the corners being wasted space. So we decided to flatten the sunburst and extend it across the entire screen width, in order to optimize space usage and . This also solves issues concerning finding a certain family/genus/species, since now each can be sorted alphabetically without any ambiguity.

Show taxa-sunburst view

Taxonomy Search   Initial designs included means to navigate the tree in order to add or remove taxonomic elements

(a) FLA KEYS
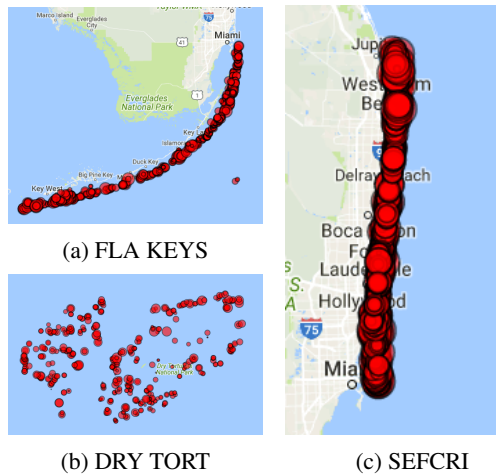
(b) DRY TORT   (c) SEFCRI

Figure 2: Geographic views of the Florida Keys, Dry Tortugas and the Southeast Florida Coral Reef Initiative (SEFCRI) regions, with superimposed fish-sample data.

to the filter.

Geographic View

The geographic view (Figure 2) exploits the Google Maps JavaScript API[1] for various means including showing actual geographic data, zooming and panning. An overlay is build on top of the map view in order to visualize sample data according to its geographic location.

Sample Views

Figure 3 shows the sample views. The user create geographic selections, which open up a more detailed view on a variable of interest (e.g. fish length or population). The user can choose to make the sample-views linked or not, which determines whether the axes of different views are the same or may be different. The former will aid the user make inter-view comparisons, while the latter will make intra-view analysis clearer.

Each sample-view is split into two components:

The time-invariant subview is the single-dimension white-red heatmap depicted on the left, which represents how dense a certain value of the variable of interest is within the sample selection. Each density is estimated using kernel density estimation (KDE), and multiple kernel function and scaling factors are available in order to find the most appropriate combination for any given selection.

The time-variant subview is the scatter plot depicted on the right, which contains full time-data information.

Discussion

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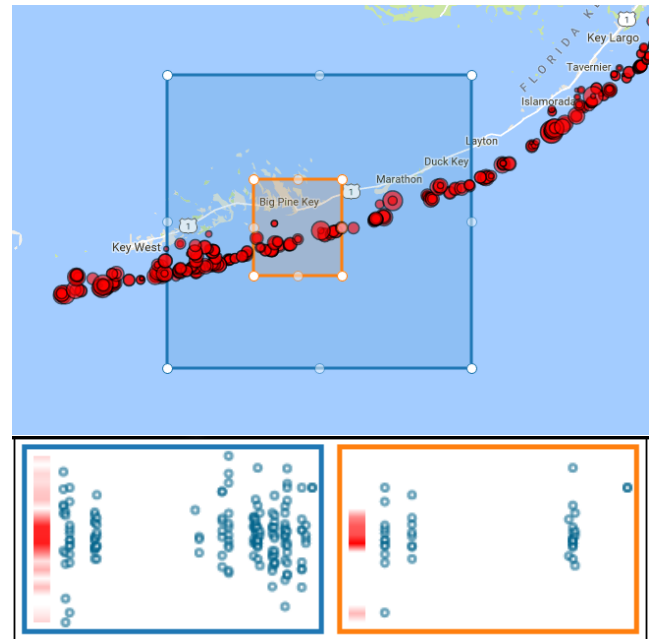[1]https://developers.google.com/maps/documentation/javascript/

Figure 3: Depiction of two overlapping sample views. Each selection rectangle establishes a view specific to the samples contained within. The x-axis represents the time when the sample was taken, while the y-axis is the variable of interest (e.g. fish length).

Conclusions

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