Tutorial about Web HuTime

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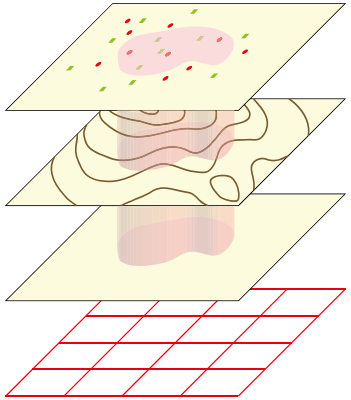
Analysis of spatial (GIS) and temporal information

Search in spatial ranges

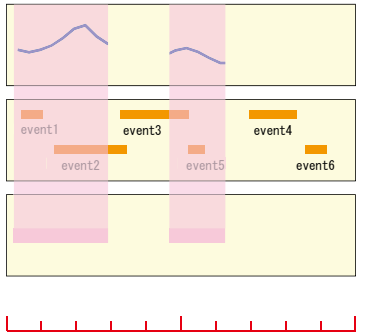
(the spatial rages satisfying the condition XX)



GIS

Search in temporal ranges

(the temporal range satisfying the condition XX)



Line Chart

Chronological Table

Temporal Information Analysis

Time Information System - HuTime

A software specialized for visualization and analysis of temporal information.

Features

- GIS like operation to visualize and analyze temporal information.
- Visualization and analysis of spatial information are omitted on purpose.

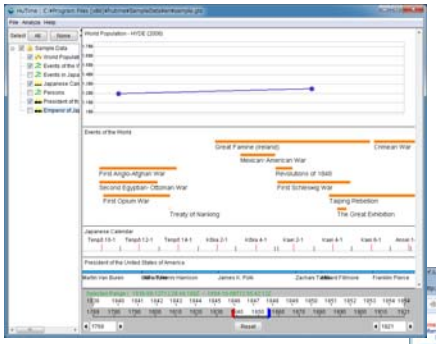
Major Functions

- Chronological tables and charts (line, bar and plot) are displayed on the same temporal axis
- Search and extract of events
- logical operation between layers
- Time ruler according to different types of calendar system

Download site

http://www.hutime.org

Overview: Time Information System - HuTime



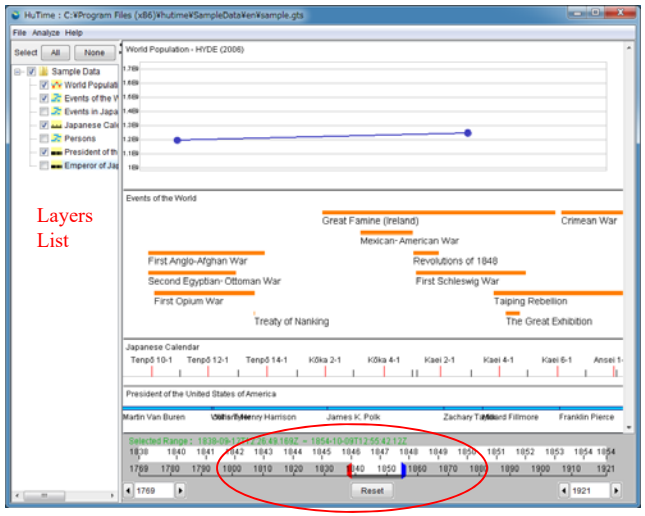
Desktop HuTime
(Stand Alone Version)
for visualization and analysis

There are two versions of HuTime.

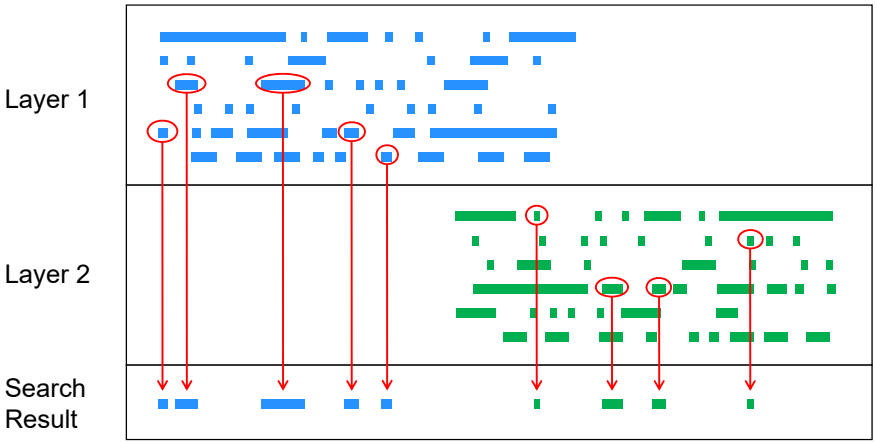
Web HuTime
(embedded in a webpage)
only for visualization

Desktop HuTime

Time Information System - HuTime



Marge of temporal data with HuTime



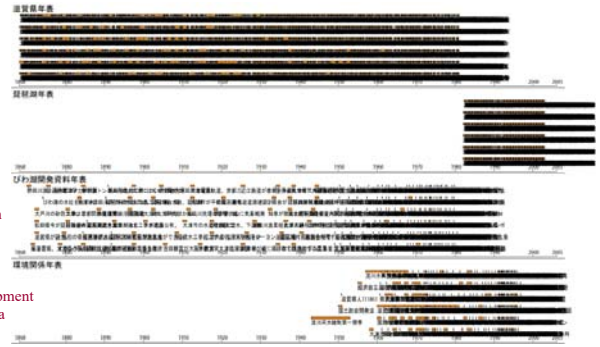
Example for merge of chronological tables

Chronological Table about Shiga Prefecture (Shiga Prefecture)

Chronological Table about Lake Biwa (Lake Biwa Research Institute)

Chronological Table about Documents relating with Lake Biwa Development (Library of Shiga Prefecture)

Chronological Table about Water Resource Development and Environment in Lake Biwa (Executive Committee of Symposium for Issues about Development of Lake Biwa)

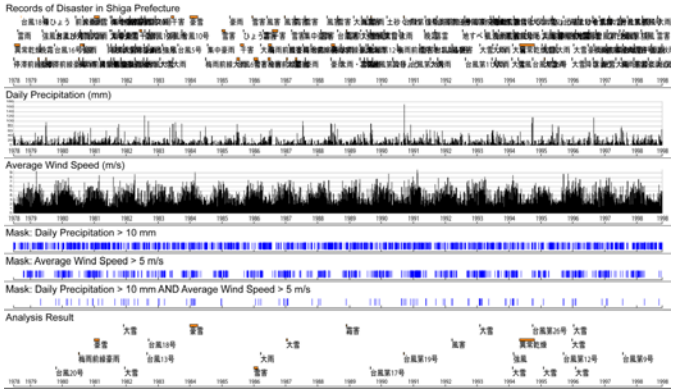


Events including word of "red tide" are extracted from the four tables

" Red Tide Chronological Table in Lake Biwa"

Temporal analysis using HuTime

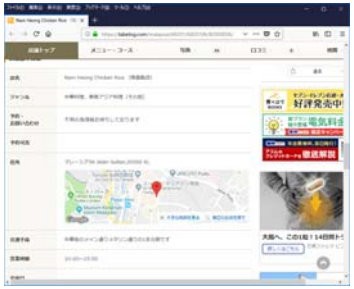
What kind of disasters were occurred during heavy rain fall and strong wind?
(Shiga Prefecture, Japan)



HuTime Web API

Web platform for temporal information

There are many web platform for spatial information



What can we do using Google Maps?

- Embedding a map in a web page
- Intuitive and simple operation
- Customizing a map using API

There is few web platform for temporal information

- There are web applications showing timelines and charts, but available features are limited.
- It is impossible to integrate various kinds of temporal information.

Purpose of the project

Developing Web API for temporal information

Features like Google Maps (API) will be realize for temporal information.

HuTime Web API

Features of HuTime Web API

Visualization

- Changing displayed temporal range (move, zoom in/out)
- Operation about panels and layers (changing size and position)

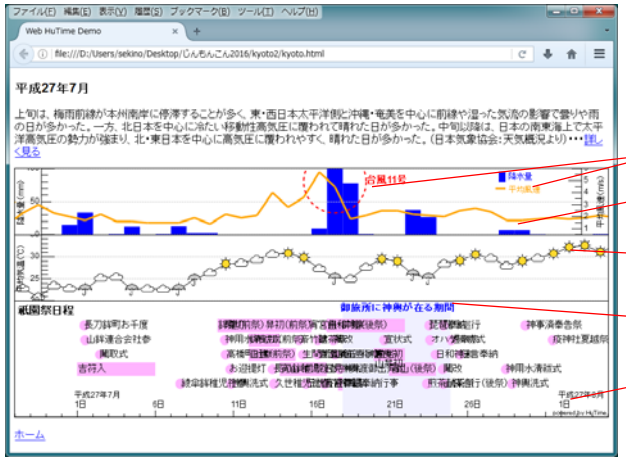
Data

- Loading local and remote data

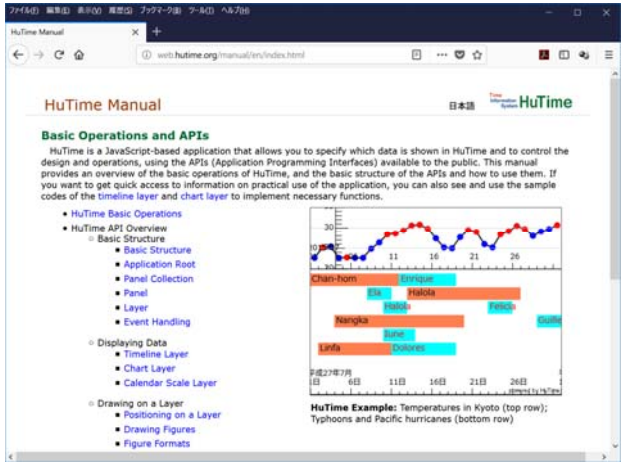
Extended Features

- Time scale according to local calendars
- Figures, characters and images can be shown on a layer
- Customizing original function
- Event handling

An usage example of Web HuTime API



Detailed information is available on the web



http://web.hutime.org/manual/

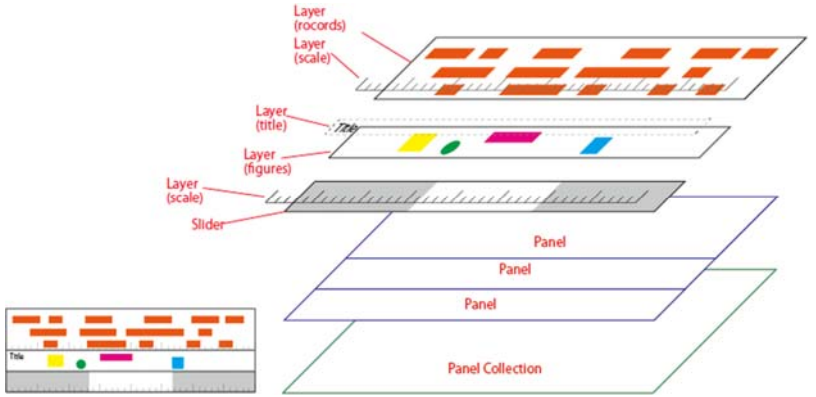
Tutorial (HuTime API)

http://www.hutime.org/tutorial/20180824/

Basic Operation

Operation	PC	Smart Device
Moving temporal range	Drag horizontally	Swipe horizontally
Zoom in/out temporal range	Turn mouse wheel	Pinch horizontally
Scrolling panels	Drag vertically	Swipe vertically
Changing height of a panel	Drag a boundary between panels	Pinch vertically
Changing order of a panel	Drag with SHIFT key	Hold with two fingers and swipe

Basic Structure



Basic structure

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <script type="text/javascript" src="http://web.hutime.org/js/HuTime.min.js"></script>
  <title>Web HuTime Tutorial</title>
</head>
<body>
<div id="timeline"></div>
<script type="text/javascript">
    var ht = new HuTime();
    var pnls = new HuTime.PanelCollection(300);
    ht.appendPanelCollection(pnls, document.getElementById("timeline"));
    var pnl = new HuTime.TilePanel();
    pnls.appendPanel(pnl);

    ht.redraw(HuTime.timeToJd(2014, 1, 1), HuTime.timeToJd(2018, 6, 1));
</script>

</body>
</html>
```

http://www.hutime.org/tutorial/20180824/step01.html

Append a layer of temperature

```
var ht = new HuTime();
var pnls = new HuTime.PanelCollection(300);
ht.appendPanelCollection(pnls, document.getElementById("timeline"));
var pnl = new HuTime.TilePanel();
pnls.appendPanel(pnl);

var lyrTemp = new HuTime.LineChartLayer(
    new HuTime.CalendarChartRecordset(
        "http://www.hutime.org/tutorial/20180824/Climate.csv",
        "date", "date", "temperature"));
pnl.appendLayer(lyrTemp);

ht.redraw(HuTime.timeToJd(2014, 1, 1), HuTime.timeToJd(2018, 6, 1));
```

http://www.hutime.org/tutorial/20180824/step02.html

Sample data

Climate.csv

date	temperature	precipitation
1982-06	27.2	122
1982-07	26.6	109
1982-08	26.5	117
1982-09	26.7	165
1982-10	26	243

```
date,temperature,precipitation
1982-06,27.2,122
1982-07,26.6,109
1982-08,26.5,117
1982-09,26.7,165
1982-10,26,243
```


Append a layer of precipitation

```
var lyrTemp = new HuTime.LineChartLayer(
    new HuTime.CalendarChartRecordset(
        "http://www.hutime.org/tutorial/20180824/TaipeiClimate.csv",
        “date", “date", "temperature",
        null, new HuTime.FigureStyle("red"), new HuTime.FigureStyle(null,"red", 3)));
pnl.appendLayer(lyrTemp);

var lyrPrep = new HuTime.BarChartLayer(
    new HuTime.CalendarChartRecordset(
        "http://www.hutime.org/tutorial/20180824/Climate.csv",
        “date", “date", "precipitation"));
pnl.appendLayer(lyrPrep);

ht.redraw(HuTime.timeToJd(2014, 1, 1), HuTime.timeToJd(2018, 6, 1));
```

http://www.hutime.org/tutorial/20180824/step03.html

Decoration of the layers

```
var lyrTemp = new HuTime.LineChartLayer(
    new HuTime.CalendarChartRecordset(
        "http://www.hutime.org/tutorial/20180824/Climate.csv",
        “date", “date", "temperature",
        null, new HuTime.FigureStyle("red"), new HuTime.FigureStyle(null,"red", 3)));
lyrTemp.style.zIndex = 100;
pnl.appendLayer(lyrTemp);

var lyrPrep = new HuTime.BarChartLayer(
    new HuTime.CalendarChartRecordset(
        "http://www.hutime.org/tutorial/20180824/Climate.csv",
        "date", “date", "precipitation",
        null, new HuTime.FigureStyle("cyan")));
lyrPrep.vScales[0].side = 1;
lyrPrep.showVScaleLine = false;
pnl.appendLayer(lyrPrep);
```

http://www.hutime.org/tutorial/20180824/step04.html

Append timeline layer

```
lyrPrep.vScales[0].side = 1;
lyrPrep.showVScaleLine = false;
pnl.appendLayer(lyrPrep);

var pnl2 = new HuTime.TilePanel();
pnls.appendPanel(pnl2);
var lyr3Typhoon = new HuTime.TLineLayer(
    new HuTime.CalendarTLineRecordset(
        "http://www.hutime.org/tutorial/20180824/Typhoon.csv",
        "From", "To", "Name"));
pnl2.appendLayer(lyr3Typhoon);

ht.redraw(HuTime.timeToJd(2014, 1, 1), HuTime.timeToJd(2018, 6, 1));
```

http://www.hutime.org/tutorial/20180824/step05.html

Sample data

Number	Name	From	To	URL
1001	Omais	2010-03-23	2010-03-26	https://www.data.jma.go.jp/fcd/
1002	Conson	2010-07-12	2010-07-18	https://www.data.jma.go.jp/fcd/
1003	Chanthu	2010-07-18	2010-07-23	https://www.data.jma.go.jp/fcd/
1004	Dianmu	2010-08-07	2010-08-13	https://www.data.jma.go.jp/fcd/

```
Number,Name,From,To,URL
1001,Omais,2010-03-23,2010-03-26,https://www.data.jma.go.jp/fcd/yoho/data/typhoon/T1001.png
1002,Conson,2010-07-12,2010-07-18,https://www.data.jma.go.jp/fcd/yoho/data/typhoon/T1002.png
1003,Chanthu,2010-07-18,2010-07-23,https://www.data.jma.go.jp/fcd/yoho/data/typhoon/T1003.png
1004,Dianmu,2010-08-07,2010-08-13,https://www.data.jma.go.jp/fcd/yoho/data/typhoon/T1004.png
```


Decoration of the layers

```
var lyr3Typhoon = new HuTime.TLineLayer(
    new HuTime.CalendarTLineRecordset(
        "http://www.hutime.org/tutorial/20180824/Typhoon.csv",
        "From", "To", "Name",
        null, new HuTime.FigureStyle("lime"), new HuTime.StringStyle(16, "orange")));
pnl2.appendLayer(lyr3Typhoon);
```

http://www.hutime.org/tutorial/20180824/step06.html

Append calendar scales

```
pnl2.appendLayer(lyr3Typhoon);

var lyrScl1 = new HuTime.CalendarScaleLayer(50, null, 0, "2.1");
lyrScl1.zIndex = 200;
pnl.appendLayer(lyrScl1);

var lyrScl2 = new HuTime.CalendarScaleLayer(50, null, 0, "103.1");
lyrScl2.zIndex = 200;
pnl2.appendLayer(lyrScl2);

ht.redraw(HuTime.timeToJd(2014, 1, 1), HuTime.timeToJd(2018, 6, 1));
```

http://www.hutime.org/tutorial/20180824/step07.html

Basic Temporal Data and Calendar Web API

There is less basic data for temporal analysis

Time Basic data

- Essential for temporal information analysis
- General and Common for various research and education

(1) Base Chronological Table	Base Maps
(2) Event Index ⟺	Gazetteers
(3) Calendar Conversion	Datum Conversion

(1) Obtaining information about a calendrical period

- The next era name of "元禄" in Japanese calendar
- Convert "元禄14年3月14日" into Chinese letters (元禄十四年三月十四日)

(2) Calendar conversion

- Convert "元禄14年3月14日" into date of Gregorian calendar

(3) Adding duration to a calendrical period

- Date after 22 months of "元禄14年3月14日"

(4) Duration between two calendrical periods

- Duration between "延宝8年7月18日" and "宝永6年1月10日"

(5) Relative relationship between two calendrical periods

- Is it true that "延宝4年" > "寛文7年" and "延宝4年" < "元禄14年" ?

Manual of Calendar Web API

http://ap.hutime.org/cal/index.html

※English version is in preparation.

How to access to the API

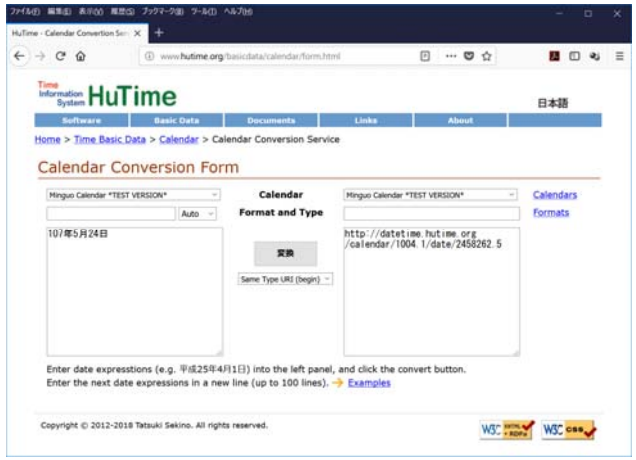
- Set required valuables, and request following URL (GET or POST method)

http://ap.hutime.org/cal/

(An example by GET method)

http://ap.hutime.org/cal/?method=conv&ical=101.1&itype=date&ival=2017-12-09&ocal=1001.1

"9th December 2017" in Gregorian calendar is converted into Japanese Calendar



http://www.hutime.org/basicdata/calendar/form.html

Tutorial
(Calendar API)

Append a form onto the page

```
    ht.redraw(HuTime.timeToJd(2014, 1, 1), HuTime.timeToJd(2018, 6, 1));
</script>
<p>
  <form>
    from <input name="from" />
    to <input name="to" />
    <input type="button" value="redraw" onclick="redrawWithCalendar()">
  </form>
</p>

</body>
```

http://www.hutime.org/tutorial/20180824/step08.html

Append a function to change temporal range

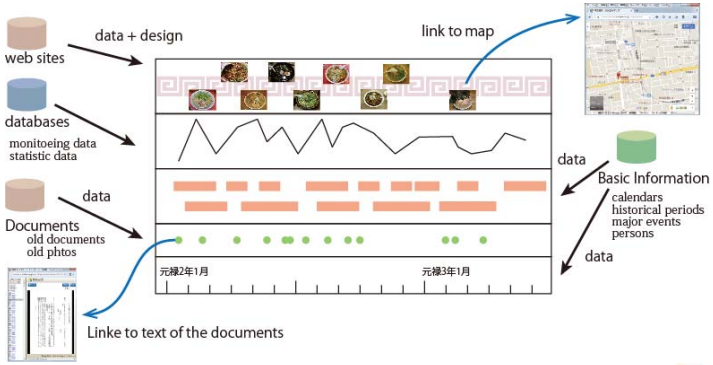
```
    ht.redraw(HuTime.timeToJd(2014, 1, 1), HuTime.timeToJd(2018, 6, 1));

    function redrawWithCalendar() {
        var begin, end;
        var request = new XMLHttpRequest();
        request.open('GET',
            "http://ap.hutime.org/cal/?method=info&ical=103.1&oprop=jdBegin&ival="
                + document.forms[0].from.value, false);
        request.send();
        if (request.status == 200)
            begin = parseFloat(request.responseText);
        request.open('GET',
            "http://ap.hutime.org/cal/?method=info&ical=103.1&oprop=jdEnd&ival="
                + document.forms[0].to.value, false);
        request.send();
        if (request.status == 200)
            end = parseFloat(request.responseText);

        ht.redraw(begin, end);
    }
</script>
<p>
```

http://www.hutime.org/tutorial/20180824/step09.html

Tutorial is completed

Integration of temporal information onto Web HuTime

- As a tool for viewing and analyzing temporal information
  (easy tool for publishing temporal information)
- As a hub for linking various kinds of data on the web, according to time
  (Google Maps has the same role about location)



Thank you for your attention

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It is welcome bug reports.

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