

The Design and Implementation of a Website for Natural Disaster Monitoring based on multiple social media.

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OUTLINE

Part 1: The purpose of the project

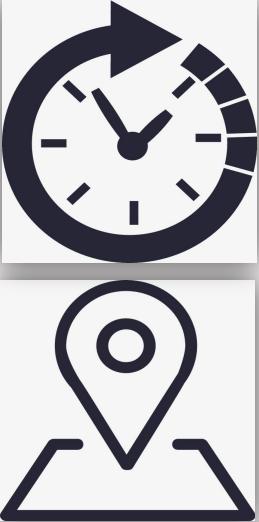
Part 2: Background

Part 3: Design

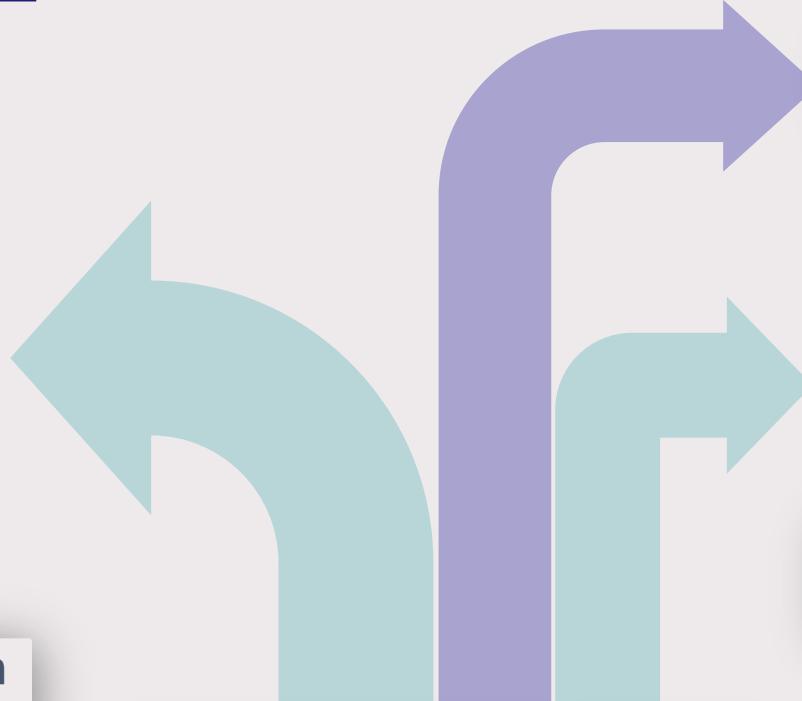
Part 4: Implementation

Part 5: Future work

PURPOSE



Time & Location
Information



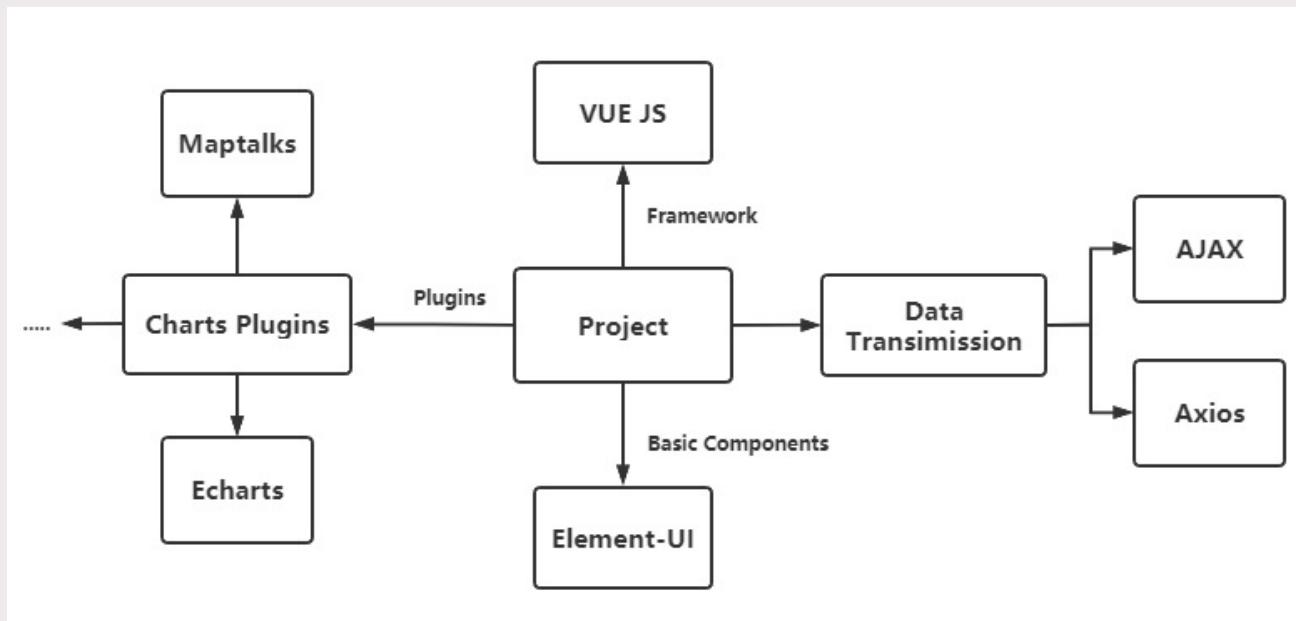
Visualization



Warning, Review,
Record, Analysis

Multi-media
Platforms & App

PURPOSE - VISUALIZATION



Project Structure

VUE JS as framework, based on front-end & back-end separation.
Element-UI as basic components



Data Transmission

2 simple ways to enquire data from backend
AJAX and Axios



Charts Plugins

MapTalks for map layer & markers
ECharts as main charts/diagram plugins
Other components for visualization

BACKGROUND

Element-Ui

Main structured components and material.
Easy to use, simple, powerful
(Vue 2.0 library)

MapTalks

A mainstream map engine for JS.
Open source 2D/3D map graph library.



The screenshot shows the Element-Ui documentation homepage. It features a navigation bar with tabs for '指南' (Guidelines), '组件' (Components), '主题' (Themes), '资源' (Resources), and a version dropdown set to '2.15.0'. Below the navigation is a search bar labeled '搜索文档'. The main content area is divided into two sections: 'npm 安装' (npm Installation) and 'CDN'. The 'npm 安装' section contains a code snippet: `npm i element-ui -S`. The 'CDN' section contains a note about using unpkg.com/element-ui and provides a code snippet for including the library in a project:

```
<!-- 引入样式 -->
<link rel="stylesheet" href="https://unpkg.com/element-ui/lib/theme-chalk/index.css">
<!-- 引入组件库 -->
<script src="https://unpkg.com/element-ui/lib/index.js"></script>
```

The screenshot shows the MapTalks documentation website. At the top is a navigation bar with tabs for '指南' (Guidelines), '组件' (Components), '主题' (Themes), '资源' (Resources), and a version dropdown set to '2.15.0'. Below the navigation is a search bar labeled '搜索文档'. The main content area features a large image of a 3D map visualization with various buildings and data overlays. To the right of the image is a section titled '2D/3D' with the following text: 'MapTalks integrates 2D/3D maps together by pitching and rotating 2D maps. Get one more dimension for mapping, visualizing and analyzing, with simplicity of 2D maps.' Below this is a code snippet for integrating 2D and 3D maps:

```
<!-- 引入样式 -->
<link rel="stylesheet" href="https://unpkg.com/element-ui/lib/theme-chalk/index.css">
<!-- 引入组件库 -->
<script src="https://unpkg.com/element-ui/lib/index.js"></script>
```

Apache ECharts

一个基于 JavaScript 的开源可视化图表库

[快速入门](#) [所有示例](#) [API 文档](#)



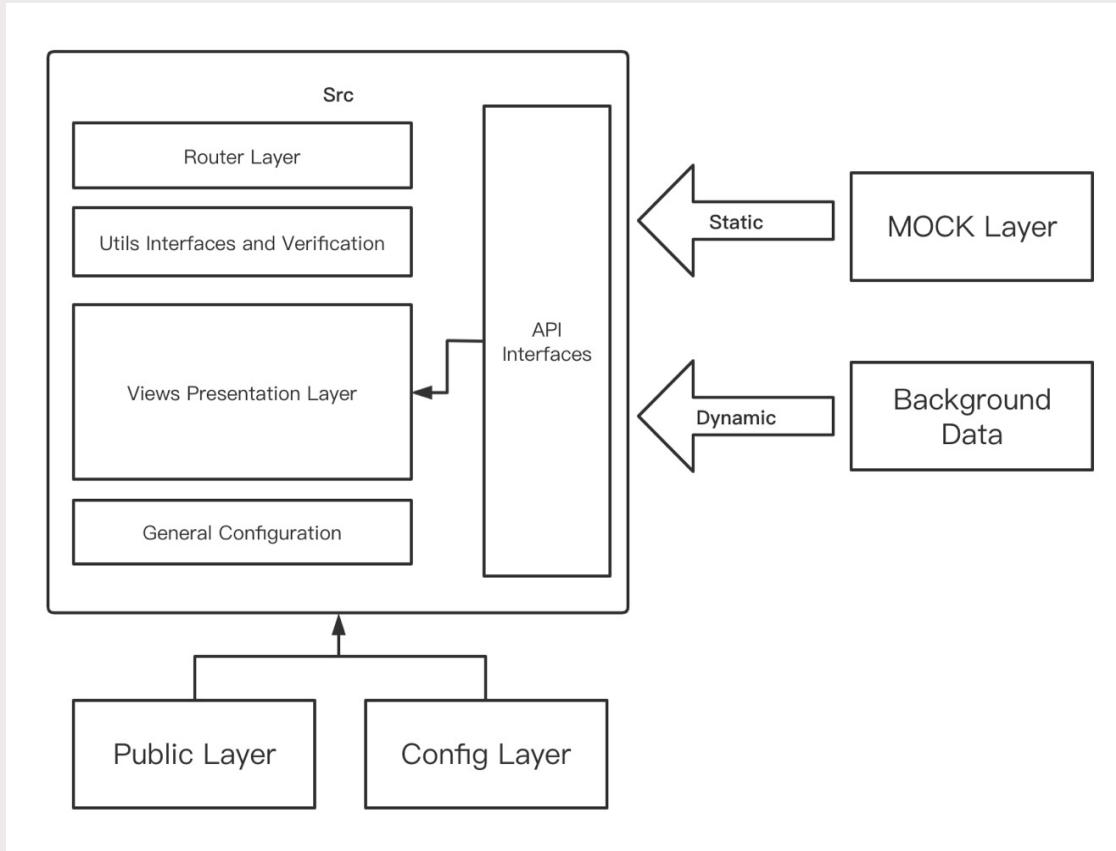
Apache ECharts

Open-source visualization graph library based on JS.
Manifold and powerful.
With faster render speed and high loading efficiency

Other plugins

Npm : eslint, prettier, tasksfile, chalk.
Chrome library : JSON Formatter, npmhub, visbug...
Common library : layui, screenful.js, jquery, pagemap...

DESIGN



Vue/Vuex

Designed framework of Vue. Powerful visualization functions & Data binding of the components.

Vue has manifold core library and easier format for deployment.

Mock/Background Data (Model)

Mock layer is designed for simulative data without frequent updates; Background data is extracted from DB for multiple analysis and presentation.

Source Layer (View & Controller)

The main package of the project.

Router for pages logic and redirection; API layer contains all the formal requests as controllers; Utilization layer mainly for interface calling and permissions; View layer is the main presentation layer

Public/Config Layer

Public layer stipulates some static methods and universal tools.

Config layer acts on the whole package, including deployment, components, IDE criteria, version information, plugins, etc.

DESIGN

● Pages – View/Presentation Layer

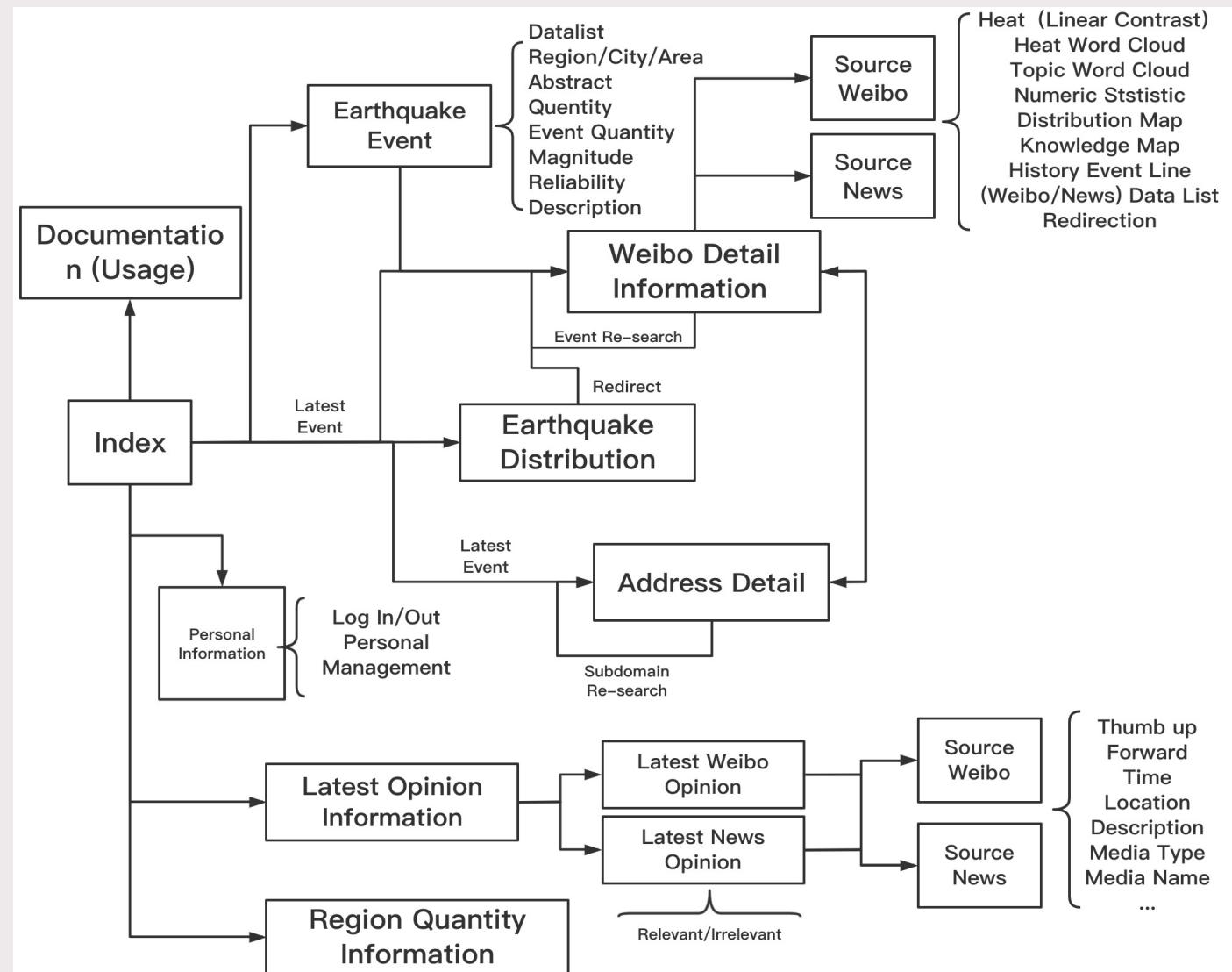
This logic flow indicates all the existing static and dynamic pages.

● Pages - Logic

The arrows indicates the jump and redirection between pages.

Usually, user will jump to other pages with incidental data or parameters to inquire.

Key idea for design: flexible, re-search, reasonable, relevance



IMPLEMENTATION

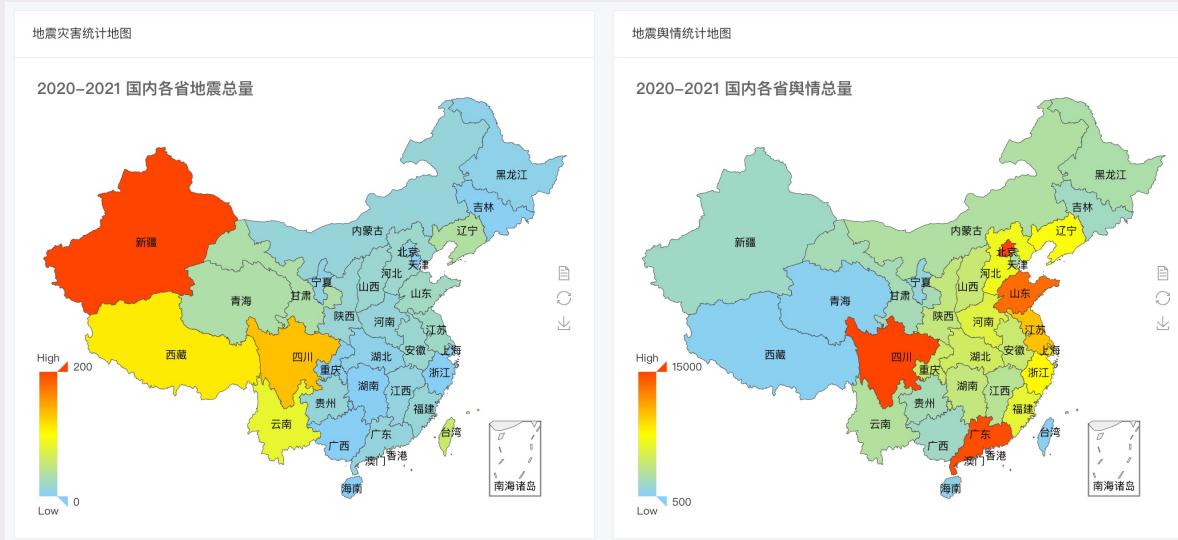
● Index page

Designed as a menu

Navigation tags/buttons

Overall statistical data & Magnitude

Time varying earthquake information



● Map distribution in Index

Two small maps of China

Quantity ranking - colored in each region

Both for earthquake numbers & opinions

IMPLEMENTATION

● Earthquake events

Dynamic data list for earthquakes.

Including relevant information and data records

Region selection & query form

可信度

省份

Q 查询



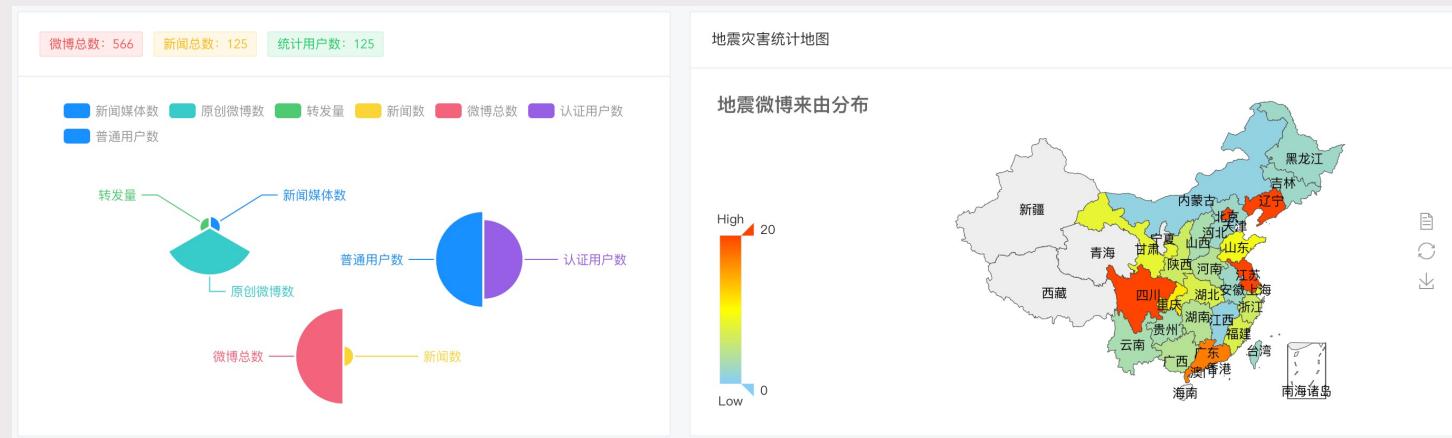
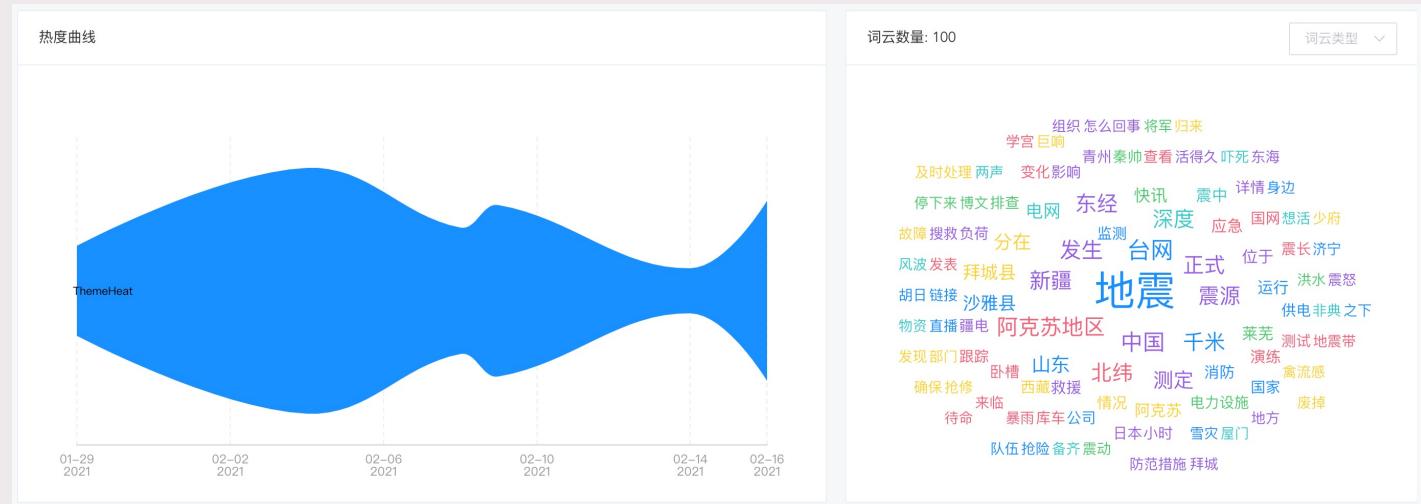
可信度	市级地区	县级地区	地区	时间	事件简介
高可信度	玉树藏族自治州	治多县	青海省	2021-03-27 14:43:00	3.2级地震,震源深度10千米
高可信度	阿克苏地区	沙雅县	新疆维吾尔自治区	2021-03-27 07:11:00	4.7级左右地震
高可信度	山南市	错那县	西藏自治区	2021-03-27 03:05:00	4.8级左右地震
高可信度	塔城地区	乌苏市	新疆维吾尔自治区	2021-03-26 09:37:00	3.1级地震,震源深度9千米
高可信度	玉树藏族自治州	治多县	青海省	2021-03-26 08:27:00	4.0级地震,震源深度10千米
高可信度	顺义区		北京市	2021-03-25 01:01:00	2.3级地震,震源深度10千米
高可信度	西安市	周至县	陕西省	2021-03-24 10:30:00	1.6级地震,震源深度10千米
高可信度	阿克苏地区	拜城县	新疆维吾尔自治区	2021-03-24 08:13:00	3.4级地震,震源深度11千米
高可信度	阿克苏地区	拜城县	新疆维吾尔自治区	2021-03-24 05:27:00	5.4级地震,震源深度10千米

IMPLEMENTATION

Weibo details

Heat theme river and word clouds (both for popular words and topic words).

(Notes: if the user does not choose the event from earthquake event page, this page will show the latest information of certain event.)

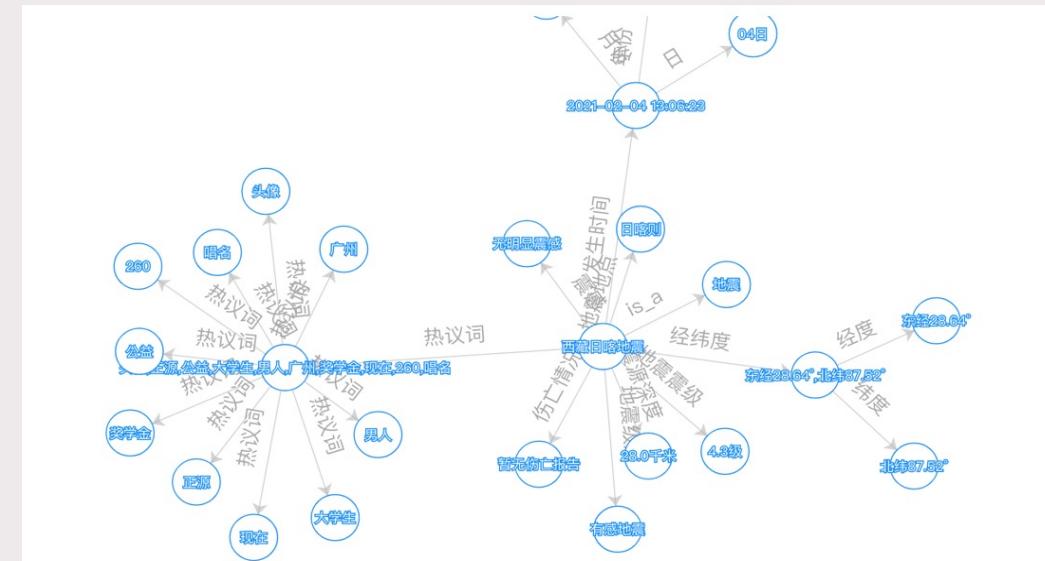


Statistical details

Statistic calculation for some data and their comparison.

Weibo source information distribution indicated in China map.

IMPLEMENTATION



Event line

Comprehensive view for certain place with earthquake information in the order of time;

Click on certain event card to re-search and explore.

Knowledge graph

Dynamic and draggable.

Including their relevant attributes and content.

Source information cards

Both for Weibo and News & relevant attributes.
Redirection to source message if clicked.

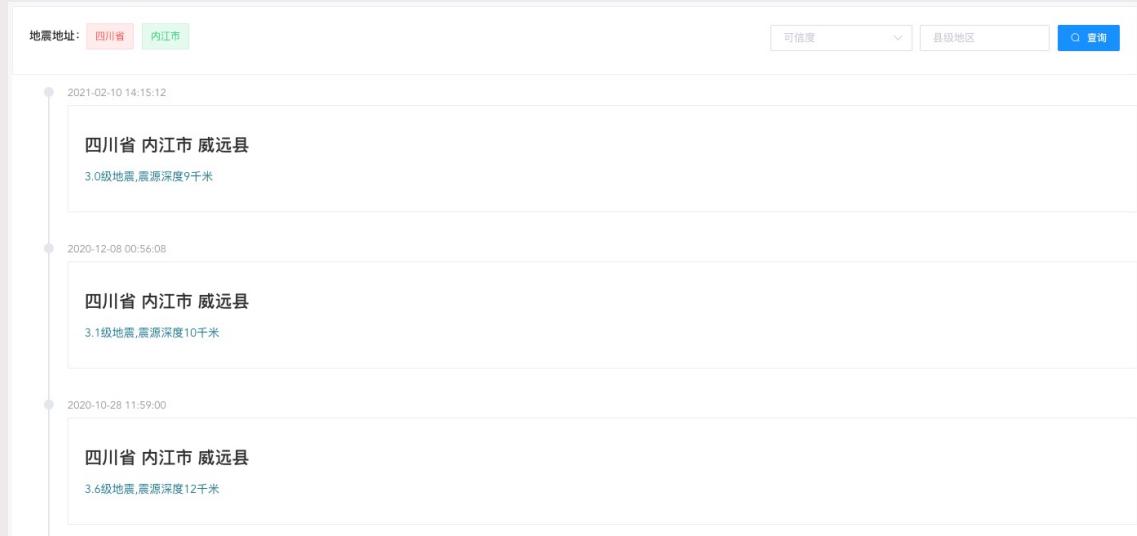
Three source information cards, each with a green "数据来源: 微博" button and a red "数据来源: 新闻" button. Each card includes a timestamp, comment count, share count, like count, and a "数据来源: 微博" button.

- 陕西省地震局:**
中国地震台网正式测定: 2021年03月27日14时32分在青海玉树州治多县(北纬34.82度, 东经91.08度)发生3.2级地震, 震源深度10千米。
- 四川省地震局:**
【测试】【国家台网正式报】2021-03-27 14:32:56.2在青海玉树州治多县(北纬34.82度, 东经91.08度)发生3.2级地震, 震源深度10千米。
- 中国地震台网:**
地震快讯中国地震台网正式测定: 03月27日14时32分在青海玉树州治多县(北纬34.82度, 东经91.08度)发生3.2级地震, 震源深度10千米。 (@中国地震台网)

IMPLEMENTATION

Map marker distribution

Map (China Map) markers for general location label.
Each marker will trigger an information card that contains the relevant information of that event.
It will redirect you to certain place/event if clicked.



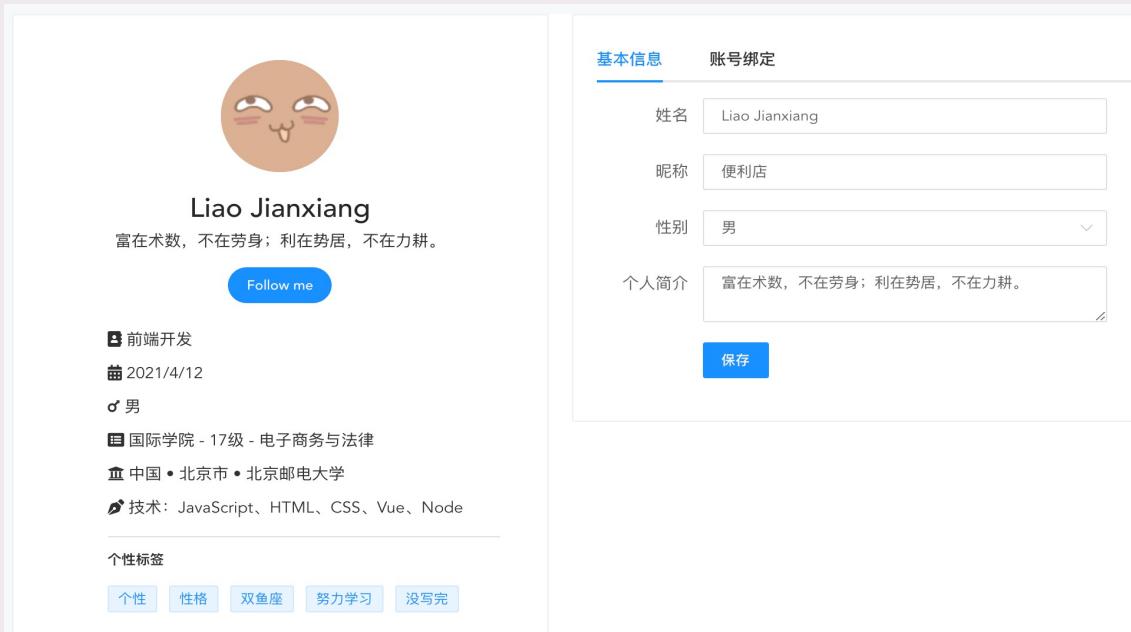
Timeline for each location

After clicking at certain marker, a time-line of certain location for jump and redirection will appear.
Options for reliability & Query form for location

IMPLEMENTATION

User information

A special interface for user information
Mock data enquiry as test
Simulative saving for adjustment



The top half of the slide shows a user profile for "Liao Jianxiang". It includes a circular profile picture of a cartoon character, the name "Liao Jianxiang", a personal motto "富在术数，不在劳身；利在势居，不在力耕。", a "Follow me" button, and a detailed bio section. The bio lists: 前端开发 (Frontend Developer), 2021/4/12 (Joined on 2021/4/12), ♂ 男 (Male), 国际学院 - 17级 - 电子商务与法律 (International College - Class of 2017 - E-commerce and Law), 中国 • 北京市 • 北京邮电大学 (China • Beijing • Beijing Jiaotong University), and 技术: JavaScript、HTML、CSS、Vue、Node (Technologies: JavaScript, HTML, CSS, Vue, Node). Below the bio is a "个性标签" (Personal Tags) section with buttons for 个性 (Personality), 性格 (Personality), 双鱼座 (Pisces), 努力学习 (Study Hard), and 没写完 (Not finished).

The bottom half of the slide shows a screenshot of a user management interface. It features a table listing three users: admin, editor, and ljj02263, with columns for 电话 (Phone), 用户名 (Username), 邮箱 (Email), 权限 (Permissions), 修改时间 (Last Modified), and 操作 (Actions). Each row has a checkbox for selection and buttons for 编辑 (Edit) and 删除 (Delete). A search bar at the top right allows for querying by username. At the bottom, there are buttons for "添加" (Add) and "批量删除" (Batch Delete), and a pagination section showing 10条/页 (10 items per page) and page 1.

User/Role Management

Mock data enquiry
Simulative saving for adjustment
Add/delete/enquiry actions for user account

IMPLEMENTATION

About use

Work as the documentation of user manual.

Introduce about data, parameters, formulas, words implications.

Sun map designed for describing the system logic.

APIS/tools versions & Update information



地震信息

[地震信息](#) 页面罗列了所有近期的地震，以及其相应的数据信息。

全国各月地震灾害数量 - 该指标囊括了统计的最近几个月地震数量，并以月作为单位进行了折线表示

- "月均地震灾害数量" - 总统计地震数量/统计月数 的平均值，代表该年或时间段的地震频率
- 全国各月微博数量 - 该指标囊括了统计的最近几个月有关于地震的微博数量，并以月作为单位进行了条形统计图表示
- "月均地震微博数量" - 总统计微博数量/统计月数 的平均值，代表该年或时间段的讨论关于微博的热度
- 全国地震震级分类 - 该指标对所有囊括的地震数据信息进行了分类，并以饼状图的形式区分出不同的震级水平，并统计了不同震级对应的地震数量
- "强地震" - 指震级 (M) 等于或者大于 6 的地震
- "中强地震" - 指震级 (M) 大于 4.5, 小于 6 的地震
- "有感地震" - 指震级 (M) 大于 2, 小于 4 的地震
- "弱地震" - 指震级 (M) 小于 3 的地震，这里大部分与有感地震吻合

系统依赖信息

部署时间:2021-4-16 09:54:15

@vue/cli版本	^4.5.6	vue版本	^2.6.12
vuex版本	^3.5.1	vue-router版本	^3.4.3
element-ui版本	^2.13.2	axios版本	^0.20.0
eslint版本	^7.9.0	prettier版本	^2.1.2
sass版本	^1.26.10	mockjs版本	
zx-layouts版本	^0.6.13	lodash版本	^4.17.20

粗略写了点系统更新的功能时间线，撰写报告以及report

2021-04-16

更改热度曲线为主题河流；修改数据质量
2021-04-12

重构主页，改变数据布局；移动地图分布至主页
2021-04-06

重构详情页面，提升数据价值；补充条件渲染知识图谱；更换各地图为彩色
2021-04-05

提升用户选择自由度，补充各类选择框体，优化页面跳转逻辑
2021-04-05

构建系统主页，添加按钮指引及系统信息
2021-03-10

全局axios请求全面支持Status Code拦截处理
2020-2-25

修重构地震事件详情相关内容，增添事件线以及新闻内容展示，同期事件线完善可点击
2020-2-20

添加vue-amap组件，补充/重构详情页饼状分类以及对比信息
2020-2-13

FUTURE WORK

● Data dimension

1. Extend the data range from 2 years to 5 years.

● Disaster types & Media types

1. When the existing functions are mature, new types of disasters, such as typhoon, rainstorm and epidemic disease, may be added.
2. New media types may be added, such as post bar, blog, red books, etc.

● Data visualization

1. Improve data visualization into more diverse type.
2. Utilize better plugins for map layer and markers.
3. Maybe import 3D diagrams for time and statistical description.



THANK YOU
