

Assignment 3

This document provides a short report for the final assignment for the class *Geovisualization and Advanced Cartography*. The report is subdivided in XX sections.

Idea

In this class we were introduced into a concept of interactive maps called flow-maps. These kind of maps are designed to show the user different flows (goods, traffic, air-travel etc.) between points $[x_{1,2,3,...,n}]$ and points $[y_{1,2,3,...,m}]$. While this mapping function is already provided by software like Tableau¹ or ArcGIS², potential users still must pay licensing fees for using the software³⁴. Those fees and the overhead of software being installed to create a flow-map brought the author to the idea to develop a simple, modular, and extendable web-mapping application to create a flow-map.

Vue

To implement the application, Vue.js is the framework of choice. Vue.js is a lightweight JavaScript framework to build modular web applications⁵. It provides developers with modularity to easily exchange, add and delete components from an application without the need of re-programming complete parts of a web-page. This provides potential users of the flow-map application to integrate it into own web-applications without a lot of programming.

Leaflet.Canvas-Flowmap-Layer by jwasilgeo

The *Leaflet.Canvas-Flowmap-Layer* by *jwasilgeo* is a GitHub repository containing plain java-script code, as well as demo applications for web-based flow-maps under the MIT License. Because it is a plain java-script file, it is mainly designed to be used in HTML applications, rendered in a browser.

¹ https://help.tableau.com/current/pro/desktop/en-us/maps_howto_origin_destination.htm

² <https://storymaps.arcgis.com/stories/a99b52c4de174b47bdf3e42232c9bc63>

³ <https://www.tableau.com/pricing/individual>

⁴ <https://www.esri.com/de-de/arcgis/products/arcgis-desktop/buy>

⁵ <https://vuejs.org/>

The Project

After the decision was made to use the Vue framework to build the application, as well as using the Leaflet.Canvas-Flowmap-Layer for visualization purposes, the application needs to be build. Therefore, three Vue-components are developed, as well as one java-script file for handling and creating the flow-map layer.

Vue component	Functionality
Map.vue	The Map.vue component takes care of rendering the map. Furthermore, layers for the map can be added and deleted.
FlowLayer.vue	The FlowLayer component takes care of the creation of a FlowLayer. To create a FlowLayer, it imports Wrapper_CanvasFlowmapLayer.js. It is integrated into the Map.vue (component).
FileDropper.vue	The FileDropper component gives the user the possibility to drop data on the map. It is integrated into the FlowLayer.vue and forwards data to be rendered to the FlowLayer component.

JS	Functionality
Wrapper_CanvasFlowmapLayer.js	This class is a wrapper for the CanvasFlowmapLayer.js library provided by jwasilgeo, to make its functionalities available to the Vue components.

Map.vue

Function	functionality
setupMap()	Sets the map up and renders it
addLayer(layer)	Adds a given layer to the map

FlowLayer.vue

Function	functionality
loadFromFileUpload(file)	Receives a file and loads the files content

createFlowMapLayersFromCSV(csv)	Receives a csv-string and calls createCanvasFlowMapLayer to create a FlowMapLayer out of the csv-string. Passes the layer to addLayer from Map.vue.
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FileDropper.vue

Function	Functionality
addFile(e)	Transfers a dropped file to loadFromFileUpload by FlowLayer.vue

Wrapper_CanvasFlowmapLayer

Function	functionality
constructor(window)	Constructor for the class. Takes the window object from the DOM
parseCSV(csv)	Takes a csv-string and parses it into a GeoJSON using the PapaParse ⁶ library
createCanvasFlowMapLayer(geoJsonFeatureCollection, props)	Takes a GeoJSON FeatureCollection object and properties (optional) for rendering to create a FlowMapLayer using Leaflet.Canvas-Flowmap-Layer ⁷

⁶ <https://www.papaparse.com/>

⁷ <https://github.com/jwasilgeo/Leaflet.Canvas-Flowmap-Layer/>



Figure 1 Screenshot of the application with sample data

Conclusion

This final assignment was a fun project to get in touch with the Vue.js framework and how it can be used for mapping applications. While it is a very lightweight application with a very special use case, it still shows how the modularity of the Vue.js framework can be used to implement Web-mapping applications for various use-cases using exchangeable components. For people who are more interested in building their own web-GIS application, I recommend reading the documentation of Wegue⁸.

⁸ <https://meggsimum.github.io/wegue/#/?id=quickstart>