

Visualizing a GeoJSON file using Leaflet and Lefalet.Timeline

In our project, we visualized a GeoJSON file containing data on US dronestrikes in Pakistan ranging from 2004 to 2013. To realize this, we used the Leaflet standard library, as well as the plugin Leaflet.timeline, uploaded on Github by Jonathan Skeate.

Structure

The core piece of our project is the index.html file, containing the references to the additional data: The GeoJSON file, the leaflet library, the leaflet.timeline plugin, the css file and the images. Most of our styling regarding the structure of the webpage is held in the .css file, while some minor styling instructions are written directly in the index file. The GeoJSON file contains the data, which is the time of the strike, the location and several information on casualties. These data is visualized by clickable popup markers, displaying the before mentioned information, which are drawn in the map in the order they happened after the time sequence is started. We provided two different basemaps, one displaying the terrain and some features like cities, waterbodies and borders, and the other one displaying satellite images. They can be switched by the user in a legend integrated in the webpage. For more information on the data we provided the page with a link to the homepage of the Bureau of Investigative Journalism, where we got the data from.

Timeline/Time Slider

The timeline shows any changing geospatial data over time in an animated sequence, from points to polygons. We used here the timeslider plugin provided by Leaflet, but we had to edit it because our features didn't have the same properties as those provided in the example.

First, we edited the drone strikes layer in ArcGIS Software, by changing some attributes. We deleted those features that didn't contain a valid date. Next, we added two date fields, one with start of the attack and one with end of the attack, which represent practically the same day. But in order to keep the markers for the attacks displayed in the map after they appeared, we changed all the 'end' dates to the date of the last attack in 2013.

Next, we edited the plugin and the main script (index). Here we have two classes which are essential: L.Timeline and L.TimelineSliderControl, where L.Timeline is a subclass of

L.GeoJSON. A function named `getInterval` is used here, which returns an object with start and end properties.

The other class, `L.TimelineSliderControl` is the actual control that allows playback and several other functions. It can control multiple `L.Timelines`. Here we added and modified many functions:

- **start:** earliest start in GeoJson file. Is the minimum value of the timeline;
- **end:** latest end in GeoJson file. Is the maximum value of the timeline;
- **enablePlayback:** show playback controls (i.e. prev/play/pause/next – in our case true);
- **enableKeyboardControls:** allow playback to be controlled using the spacebar and right/left arrow keys (false);
- **duration:** minimum time, in milliseconds, for the playback to take. Will almost certainly actually take at least a bit longer -- after each frame, the next one displays in duration/steps ms, so each frame really takes frame processing time PLUS step time. We set a value of 2000;
- **steps:** How many steps to break the timeline into. Each step will then be (end-start) / steps. Only affects playback. We set a value of 6000 milliseconds;
- **showTicks:** Show tick marks on slider, representing changes in values (true).

Next, we referenced the plugin in the main file and created two objects:

- slider, which takes `L.timelineSliderControl` and allows the playback;
- pointTimeline, which takes `L.timeline` and add features and slider to the map.

Group

As we were just two group members and worked alternately on the code, it is not easy to specify who did what. But basically, Linda took care of the GeoJSON integration and the general structure of the map, while Miroslav integrated the timeline plugin. We also wrote the documentation together. We both contributed equally.