End of Term Assignment Summer Term 2012
Software Development in Geoinformatics
Course instructor Prof. Dr. Bern Resch

Time Series Visualization

Digital Dynamic Mapping

"Love vs. Hate Tweets in Europe (February 2012)"

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Approach

The main approach of the time series visualization in our project was to show the “love and hate tweets in Europe” for the month February 2012 (29 days). The month was mainly chosen because of Valentine's Day on February 14th. We thought it would be interesting to visualize in how far the internet community acts to Feb. 14th. before, on and after. We found it quite interesting that some countries in Europe do always have “love” tweets and some don’t.
We decided to create a more dynamically tool, which means that the user can do something with it instead of just sitting in front of it.

Dataset Description

The dataset originates from the summer term course “*Location Based Services*” with Prof. Euro Beinat. All files in the datasets are in shape-format, so we used ArcGIS, which can easily be utilized in Java. In this file you could see the tweet-message itself, the tweettime, the username, the coords, the latitude and longitude of the tweet and the own created “LH_Index”, which shows whether it is a “love” or a “hate” tweet. So with this huge set of data (65.091 tweets) we could go on to our implementation.
Of course there are number of other data necessary, like the borderline of europe (ArcGIS Online), the legend JPG and the hearts PNGs (both created in Adobe Photoshop).
The necessary libraries were downloaded from internet resources.
Especially for the shapefiles, it is important to use not too complex shaped or feature rich files, otherwise the performance will suffer substantially.
<u>First steps</u>

Before we started with the development of the tool, we thought about “How can we solve easily and quickly the task”. “Easily and Quickly” not only because it is “reasonable” but also because we are running totally out of time, since we started (and nearly finished) with a wrong assignment (the processing library was missing...).
Anyway, our first concept was to solve the task completely with the processing library as well as the geotools library. However, after a hint of a colleague we also included “mapthink” from

Jon Reades (http://www.reades.com/MapThing/) Especially the implementation of polygons and points (with the bounding box) was more comfortable with this library. The library of Reades is still using the concepts of geotools.

Howsoever, next up we thought about what can we define in the setup() and what in the draw() method. Furthermore we started with a look to other tools respectively examples across the internet. Probably, the most useful site was "http://www.learningprocessing.com" with a lot of tutorilas, examples and exercies.

Implementation Details

NOTE: Generally, the implementation of the data (to the tool itself) was written down as "in-line-code"

It was obvious to see from the "tweets.shp" file itself from which region in Europe the most tweets came from in February - Western Europe and especially Great Britain.

So the first step of implementing the data was to do an IDW (Inverse Distance Weighting) of each day in February in ArcMap.

The most surprising thing about the created IDW was that on February 12th most "love" was spread around the continent while on Valentine's Day, especially Eastern Europe spread mostly "hate". That might be more of a social aspect which cannot be explained in short. Probably most people are excited short before Valentine's Day and on the day itself, which causes hatred for that day on the other side. Anyway...this is just a guess from our side.

The figures below will show some different maps from various dates (02/03, 02/12, 02/14). It has to be said, that the red areas are areas where "love" tweets came from and blue areas those with "hate" tweets.

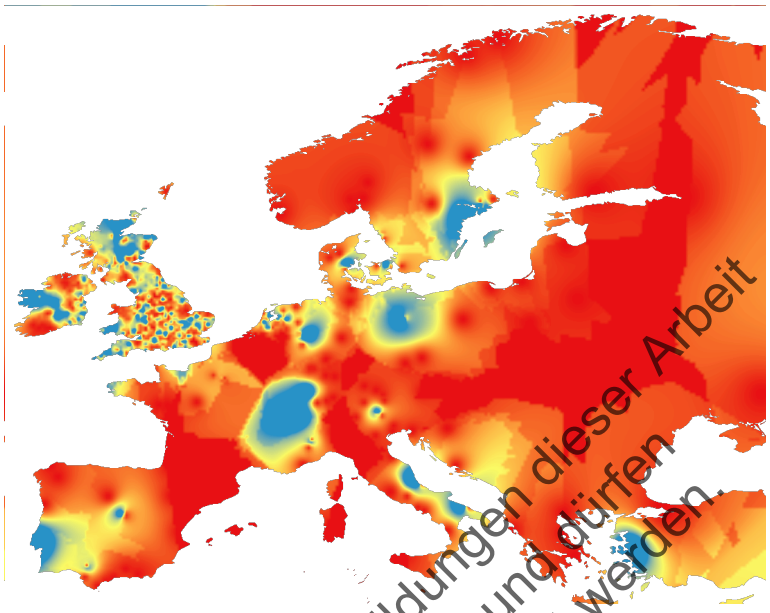
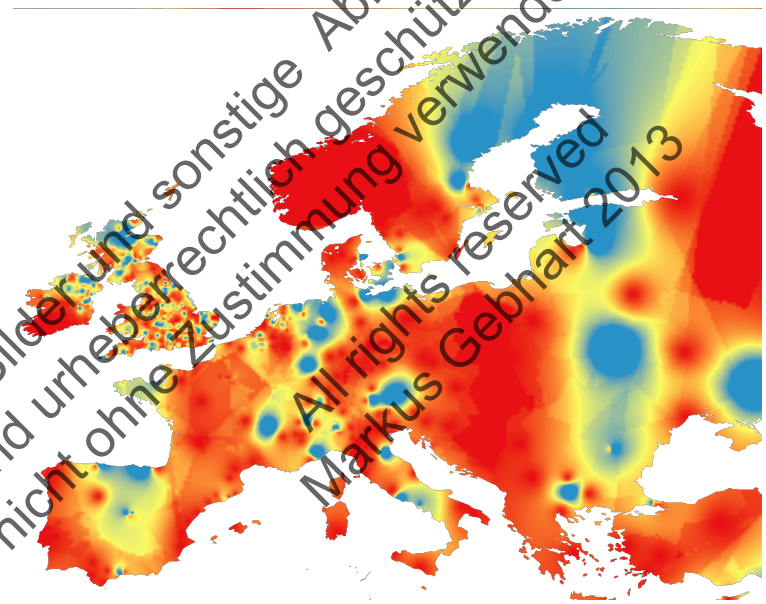


Fig. 1: Love and Hate Tweets in Europe, Feb. 12th



. Fig. 2: Love and Hate Tweets in Europe, Feb. 14th

It can be seen in Fig. 1 that February 12th was a quite “lovely” day in Europe - exception was Switzerland, Northern Italy, parts of Poland and Sweden and smaller regions in Ireland, Great Britain, northern Germany, Turkey and Italy. It has to be said, that all tweets - not only concerning Valentine’s Day - are recognized in that shape-file. So there can be political reasons or just personal reasons for the state of mind of the tweeter. We wanted to find out if people spread more love on a day like Valentine’s Day or not. According to the events that happened in February 2012 - for example the cold wave on February 3rd (see Fig. 4) or the resignation of

the romanian government on February 6th - it is quite hard to say why people are in a good or in a bad mood. As we can see in the comparison (fig. 4 & fig. 5) below the “hate” tweets (blue) are mostly dedicated to the cold regions in Europe (this can also be read in the tweets!).

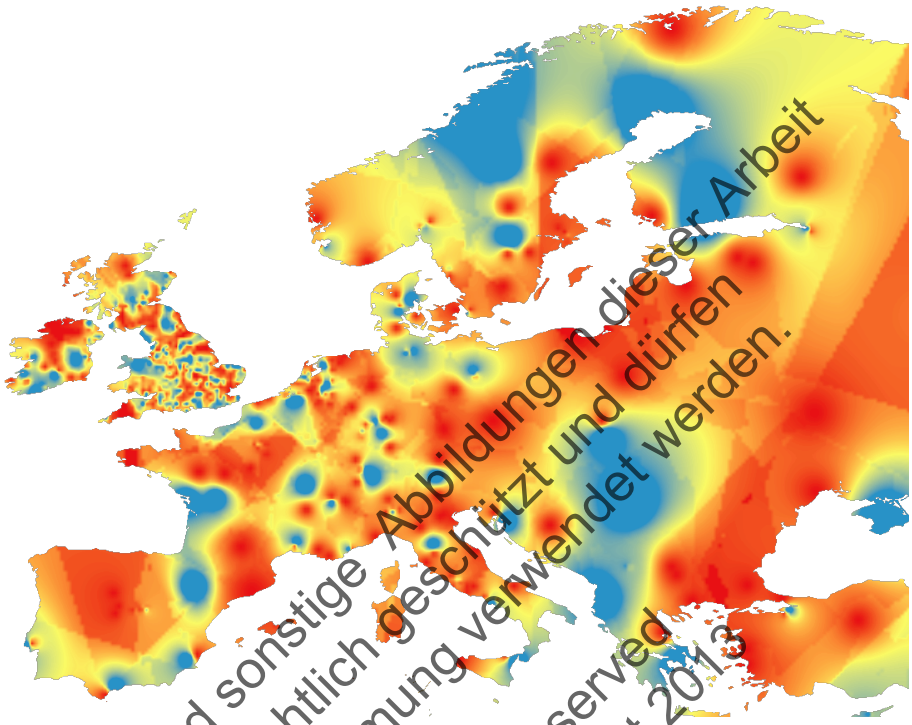


Fig. 4: Love and Hate Tweets in Europe, Feb. 03th

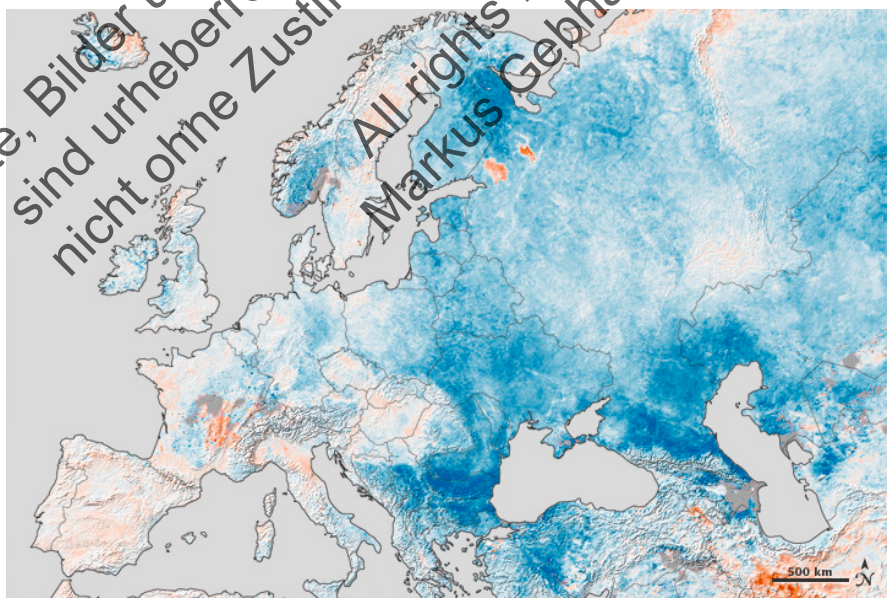


Fig. 5: Cold Wave in Europe (temperature anomaly 2012/01/29 - 2012/02/04) [http://upload.wikimedia.org/wikipedia/commons/5/58/Europe_land_surface_tempature_anomaly.jpg]

In our Java-Applet Europe and some other neighbouring countries (i.e. Turkey) were always activated. The “Love” Tweets on Valentine’s Day are only activated by clicking on a specific button.

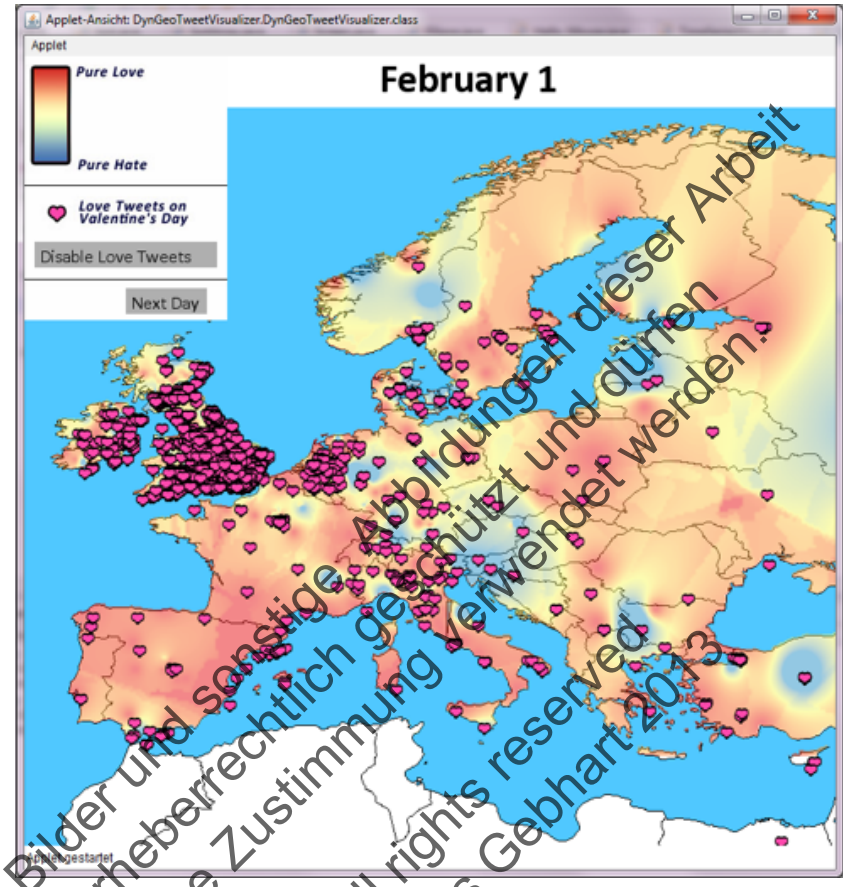


Fig. 6: Applet View of Love/Hate Tweets, Feb. 01st

This function of “disabling and enabling the love tweets” can seen in Fig. 7 and Fig. 8.
Another produced function we included in our small Java Applet is the “Next Day” or “Prev Day” button where the user can choose the exact day by clicking forwards or backwards. Alternatively we also included some lines of code where the images are switched automatically, however these lines of codes were deactivated, since in our opinion manual switching makes more sense (and is more user friendly). We also implemented a Header with Fonts and a legend as a picture. For the text it was necessary to create “VLWs” which are a font-type format. Anyway, for this special format it is recommended to use the “Processing Tool” (in our case version 1.5.1). Figure 9 visualizes this step (in our case it was necessary to do this two times; once for the header and once for the button text).

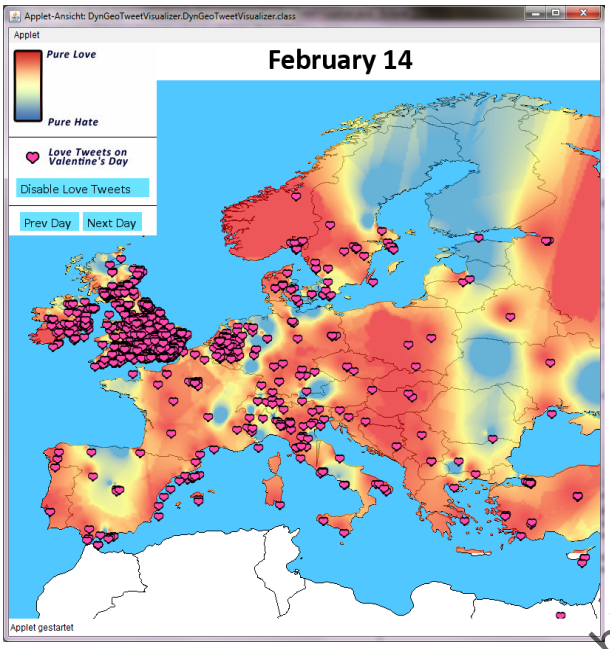


Fig. 7: Enabled Love Tweets

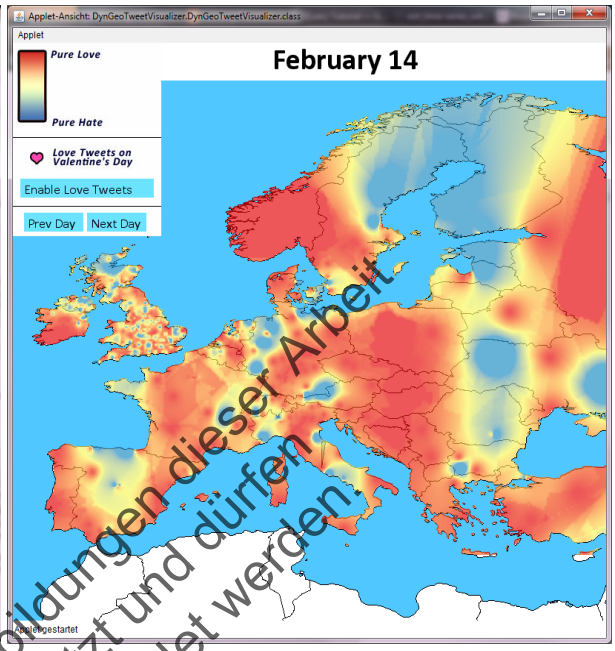


Fig. 8: Disabled Love Tweets

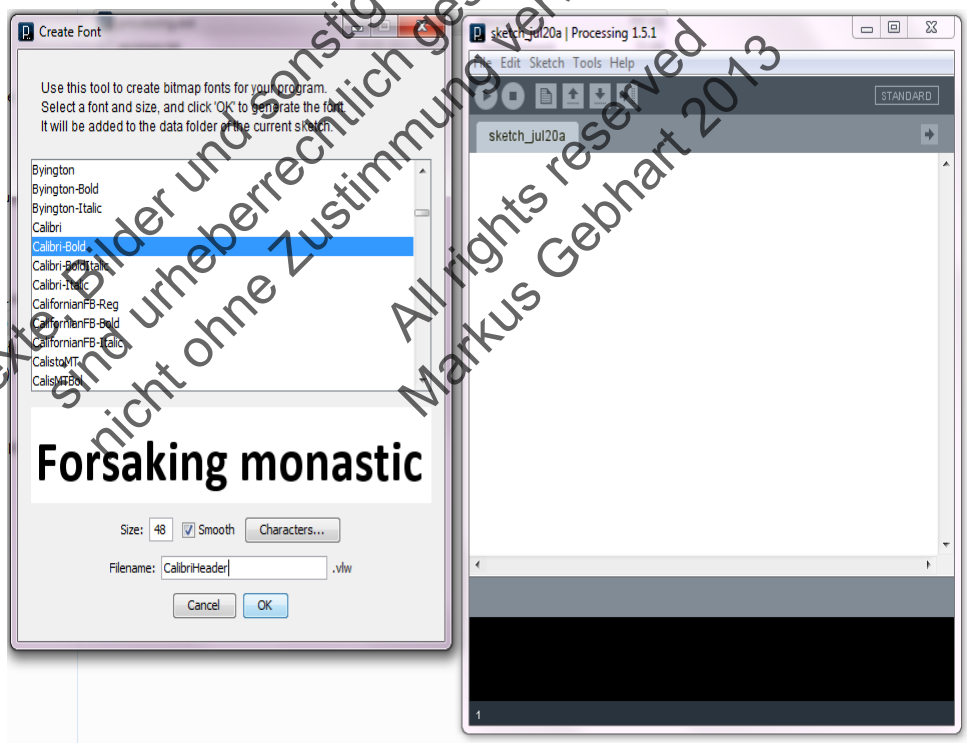


Fig. 9: Creating new font as .vlw

Literature:

- http://www.learningprocessing.com/examples/chapter-5/example-5-5/
- http://www.learningprocessing.com/examples/chapter-15/example-15-4/
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- Walter Savitch (2001²) JAVA. An Introduction to Computer Science & Programming.Prentice Hall: London