

News Globe: Visualization of Geolocalized News Articles

Supplementary Material

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Additional Use Cases

Spatial distribution.

When interested in the spatial distribution of all news articles, or a subset of news articles, the sphere visualization provides a clear overview. The clustered points show the region with the most referenced location as the representative. The point size visually indicates the number of articles in this region. Figure 1 shows an example of the spatial distribution of articles in the United States, referencing Donald Trump.

Category distribution.

The pie charts give insights into the spatial category distribution, as well as on the overall category distribution of the dataset. When only selecting a few categories, we can compare the sizes of the individual pie chart sections, as well as of the same pie chart sections at other locations.

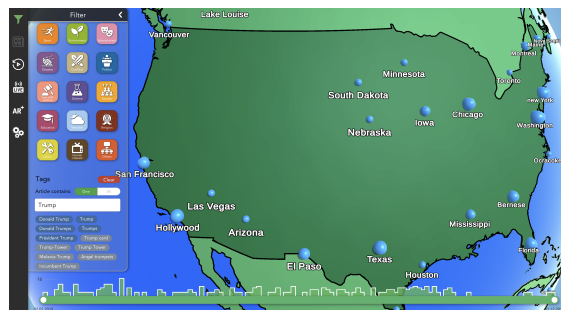


Figure 1: Spheres show the spatial distribution of news articles from our dataset referencing Donald Trump.

By comparing the four categories environment, sports, disaster, and economy in Figure 2, we can observe that the dataset contains more articles on economy and sports than disaster and environment. However, we also see a few deviations from this distribution. For example, in the Sahara, there are more articles on the environment, and on the Atlantic, there are comparably more articles in the disaster category.

Location references.

For articles with direct geographic references, the line drawing feature shows all connected places to the user and provides geographic information for the possibly unknown location names. For example, while exploring the different locations on the globe, we came across an article on the most beautiful beaches worldwide. This article is a good use case for the line connection visualization, which directly shows the geolocation of all beaches that are mentioned in this article. Figure 3 shows the line connections to the referenced locations of this article.

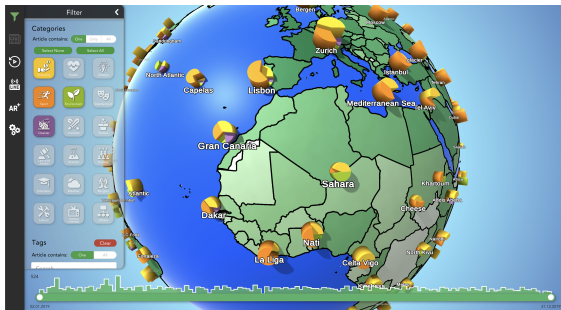


Figure 2: This figure Shows the spatial distribution of four selected categories using pie charts.



Figure 3: Here, the referenced locations of a selected article are shown.

Tag filtering.

Tag filters can be used to search for days on which specific events occurred, such as thunderstorms. The histogram on the timeline then gives an overview of the event distribution. If we want to see where events in a specific period occurred or read about them, we can select the range with the handles on the timeline and select the location and the associated articles. Figure 4 shows the tag filtered articles on the globe and the histogram.

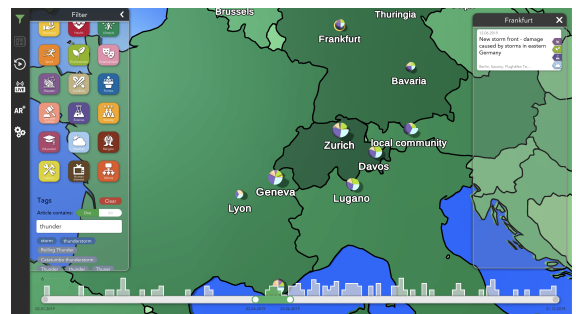


Figure 4: Example of tag-based search for thunderstorm reports within a selected time range.



Figure 5: An article on an earthquake in Tirana appears live during exploration, indicated by the location marker.

Live articles.

Inserting live articles in the visualization notifies the user about current matters and their relation to previous events, which can be filtered by topics of interest. To simulate the insertion of live articles, assume the current date is in the past. For example, When using the application on 30.11.2019, a news notification will appear together with a location marker in Tirana about the earthquakes in Albania. Figure 5 shows the appearance of the new article with a location marker and its summary in the news section. By navigating to this location using the location marker, the user can browse through all previous articles on this specific news topic in the area, or use tag filtering to find other news on earthquakes in general and their spatial distribution.

Location tags.

Location names are also included in the tags of the dataset. This allows observing the temporal distribution of location references of a selected location tag. In Figure 6, London is selected as a location tag. This filter can reveal activity

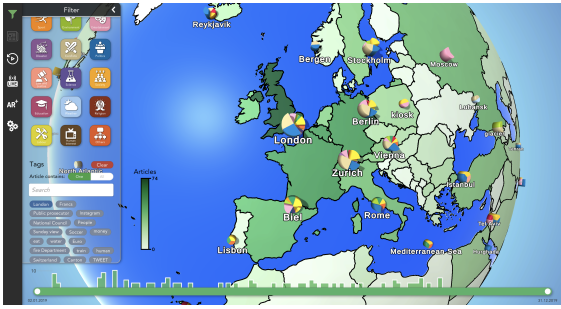


Figure 6: The timeline shows the temporal distribution of the selected location tag.

peaks on the timeline during which the location is referenced frequently. To further inspect these peaks, a temporal filter can be applied.

Responsive Design

This section explains the differences in the design decisions and interaction metaphors between desktop and tablet devices. Many decisions were made with both output devices in mind to preserve consistency. To respond to different screen sizes making use of the available space on larger screens and ensuring readability on smaller ones, the size of the user interface, as well as the globe elements are adjusted. The size of the UI and the globe elements can be customized by the user through the settings menu. Figure 7 shows the differences between a large desktop screen (top, 4k resolution 27 inch) and a tablet display (bottom, 10.5 inch). On larger screens the UI elements are relatively smaller to provide more space for the globe visualization. The histogram on the timeline makes use of the additional space with finer granularity of the bins. For the globe visualization, the points, line connections and country borders are relatively smaller on larger screens. The reduced size of the globe points allows to show more locations on the same scale without overlap. Besides the visual changes, we implemented different interaction schemes on desktop and tablet devices. On desktop devices, the user can drag the globe with the mouse to rotate and zoom using the mouse wheel. On tablets we implemented pan gestures for rotating the globe and pinch gestures for zooming.



Figure 7: Design differences between a large desktop (top, 4k resolution 27 inch) and a tablet (bottom, 10.5 inch) screen.

User Study

Task descriptions

Each task consists of a question and an answer, see Table 1. Some of the tasks start with a description of a specific scenario to set up a situation for the following question.

User experience

To gather the user feedback related to their experience when using the tool, we asked the participants to report their agreement with 9 statements on a 5-point Likert scale (1: strongly disagree, 5 strongly agree). The results of the questionnaire are reported in Table 2. The participants agreed (4) or strongly agreed (5) with the majority of the statements. Only for participants P1, P4 and P7 the average rating was 4 and below. This can be related to their experience in solving the tasks. P1 and P7 were able to solve only 3 of the 7 tasks correctly without help. P1 experiences color vision deficiencies. The temporal statements got slightly better ratings (only neutral and above) than the spatial ones.

Q1	Scenario	You are interested in articles either related to Economy, Sport or Entertainment.
	Question	How are these categories ranked in Hawaii in terms of number of articles in Hawaii?
	Answer	Entertainment (the most), Economy, Sport
Q2	Scenario	You are interested in the topic Sport.
	Question	Are there more articles about this topic at the North Pole or in Reykjavik, the capital of Iceland?
	Answer	Reykjavik
Q3	Question	Are there more articles connected to Germany or France in 2019?
	Answer	Germany
Q4	Scenario	You are looking for articles about beaches (keyword search with 'Strand'). In Caracas you find an article about pink beaches.
	Question	Where is the closest one to Switzerland?
	Answer	Elafonisi, Mediterranean Sea
Q5	Scenario	You are interested in the articles related to both, Environment and Politics. In Buenos Aires you find an article (the first one) about the movement Extinction Rebellion.
	Question	In how many cities in Australia and New Zealand are they active as well according to the connected locations?
	Answer	4
Q6	Question	Which category had the most articles in Alaska in February 2019?
	Answer	Entertainment
Q7	Question	When does the continuous news coverage about Christmas start?
	Answer	Mid November

Table 1: Questions and answers for the user study tasks.

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
It was easy to understand the presented information.	4	5	5	4	5	4	4	4	5	5
The tool helped me to solve the presented tasks.	3	5	5	3	5	5	5	5	5	5
Overall, NewsGlobe is aesthetically pleasant.	5	5	5	4	4	5	4	4	5	5
The tool is useful to explore a large corpus of news articles.	5	5	5	4	5	5	4	5	4	5
I would likely use this tool, if it was integrated in a News WebPage.	4	4	5	4	4	3	2	4	4	5
I was able to find spatial connections related to an article.	5	5	5	2	5	5	4	5	5	5
The tool helps to give a feeling for spatial distances.	4	4	5	3	5	5	4	5	4	4
The timeline is helpful to find news in a specific timeframe.	4	4	5	5	5	5	4	4	5	5
The timeline helps to find temporal clusters about a topic.	3	5	5	4	5	5	4	4	5	5

Table 2: Likert scale ratings from 1 (lowest) to 5 (highest) in the questionnaire. Rows list the questions (general Q1–Q5, spatial Q6–Q7, temporal Q8–Q9) and columns list the participants.