DOI: 10.5281/zenodo.5702576

Transforming Research through Innovative Practices for Linked Interdisciplinary Exploration

[30 SEPTEMBER 2021]

Advancing Open Scholarship

D5.4 – REPORT ON THE VISUALISATIONS

Version 1.0 – Final
PUBLIC

H2020-INFRAEOSC-2019
Grant Agreement 863420

The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 863420

Report on the Visualisations

Project Acronym:	**TRIPLE**
Project Name:	**Transforming Research through Innovative Practices for Linked Interdisciplinary Exploration**
Grant Agreement No:	**863420**
Start Date:	**1/10/2019**
End Date:	**31/03/2023**
Contributing WP	**5**
WP Leader:	**Net7**
Deliverable identifier	**D5.4**
Contractual Delivery Date: 09/2021	**Actual Delivery Date: 09/2021**
Nature: Other	**Version: 1.0 Final**
Dissemination level	**PU**

Revision History

Version	Created/Modifier	Comments
0.1	Peter Kraker (OKMAPS), Maxi Schramm (OKMAPS), Jan Konstant (OKMAPS) Christopher Kittel (OKMAPS)	First draft
0.2	Stefano De Paoli (AU), Nikodem Wołczuk (IBL-PAN), Tomasz Umerle (IBL-PAN)	Internal review
0.3	Peter Kraker (OKMAPS), Maxi Schramm (OKMAPS)	Revisions
1.0	Peter Kraker (OKMAPS)	Final version

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Acronyms

CSS	Cascading Style Sheets
DOM	Document Object Model
EOSC	European Open Science Cloud
HTML	Hypertext Markup Language
ID	Identifier
IO	Input/Output
JS	JavaScript
LDA	Latent Dirichlet Allocation
ML	Machine Learning
MVP	Minimum Viable Product
NMF	Non-negative Matrix Factorization
PDF	Portable Document Format
SCSS	Syntactically Awesome Style Sheets
SSH	Social Sciences and the Humanities
UI	User Interface
UX	User Experience
WP	Work Package

Publishable Summary

Every year, millions of papers, datasets, and other products of the research life cycle are published. List-based search interfaces alone are not sufficient any more for exploration and discovery of this huge amount of knowledge available. As a result, visualisations have become increasingly relevant in discovery. They can provide a much quicker overview of and insight into a set of research outputs than a pure list-based approach.

In this deliverable, we describe two sets of visualisations developed by Open Knowledge Maps that are integrated in GoTriple as part of the innovative services. The first set are complex, interactive visualisations, knowledge map and streamgraph. They are based on the longstanding open source framework Head Start, which is adapted and extended within TRIPLE for the needs and requirements of the Social Sciences and Humanities domain. While these two visualisations can be embedded within other interfaces, they are usually used on their own. The second set are less complex diagram components. They are not meant to be used as standalone interfaces. Instead, they are meant to enhance the information included on other pages within the GoTriple platform such as search results and landing pages.

The visualisations described in this deliverable are very well suited to help researchers overcome their information overload issues. This was supported by the user research in this project. In a workshop on innovative visualisations, the visualisations were received well in general. Especially the knowledge map and streamgraph seemed to have the most potential in giving additional insights and context to the research results. Overall, participants agreed that visual discovery tools can solve many challenges related to finding relevant information on the GoTriple platform.

The innovative visualisations will support the GoTriple users in a unique way. As one of the first discovery platforms, GoTriple brings both visualisation approaches together. The simpler, diagram-like components can be used as needed across the platform to provide additional insight into the data. The more complex, stand-alone visualisation interfaces can be offered to users who seek a topical or temporal overview or are interested in a more serendipitous search experience.

In this deliverable, we describe the visualisations and their integration into the GoTriple platform in detail, both from a design perspective and from a technical perspective. Furthermore, we describe the work done in the associated task T5.4. This work includes the development of the diagram components, which encompasses research, their design, specification, and implementation, as well as improvements to the Head Start visualisations, such as the development of new features, integration of new algorithms, and UX improvements.

1| DESCRIPTION OF THE SERVICE

Every year, millions of papers, datasets, and other products of the research life cycle are published. As a result of the huge amount of knowledge available, list-based search interfaces alone are not sufficient any more for exploration and discovery. The unstructured result lists work well when a user's information needs are already clearly defined. However, if a user wants to get an overview of a research topic, they have to examine each item by hand to get an understanding of the most important topics, publication venues and authors. This process, which will be familiar to many researchers and students, includes familiarising yourself with the item, following references, inspecting incoming citations (i.e. citations to a certain piece of research) and then moving on to the next item. The downside with this way of getting an overview is that it can take weeks, if not months, before the overview emerges.

In most scenarios, researchers do not have that much time and as a result, discovery is a process that usually falls short and leaves blind spots behind.

To overcome these issues, visualisations have become increasingly relevant in discovery. Visualisations can provide a much quicker overview of and insight into a set of research outputs than a pure list-based approach. Two main approaches have emerged: the first are complex, interactive visualisations, which are usually self-contained. Examples include Open Knowledge Maps and Iris.AI (see also Deliverable D7.1 of the TRIPLE project for an in-depth discussion of Iris.AI). The second are less complex, diagram-like visualisations such as bar charts and line charts that are usually used in context with other information. One example for this approach is Lens.org, which is also discussed in depth in D7.1.

In this deliverable, we describe two sets of innovative visualisations developed by Open Knowledge Maps. The first set are complex, interactive visualisations, knowledge map and streamgraph. They are based on the longstanding open source framework Head Start, which is adapted and extended within TRIPLE for the needs and requirements of the SSH domain. While these two visualisations can be embedded in other pages, they are usually used on their own. The second set are less complex diagram components. They are not meant to be used as standalone interfaces. Instead, they are meant to be used on various pages within the GoTriple platform. The diagram components are developed specifically for TRIPLE.

1.1 Head Start visualisations

Head Start is an open source framework developed by Open Knowledge Maps that provides interactive, web-based interfaces for research discovery (Kraker et al. 2019). Head Start brings together textual and visual interface components to provide overview and insight for research topics, authors, and projects. Head Start comes with a backend that is capable of automatically creating the input for the user interfaces. In this deliverable, however, we only focus on the visualisations included in Head Start. For an in-depth description of the backend and the integration of textual and visual user interfaces, please refer to the related deliverable D5.6 "Discovery system".

Head Start currently includes two types of visualisations: a topical overview, called a knowledge map, and a temporal overview, called a streamgraph. These two visualisation types are described in the following two chapters.

1.1.1 Knowledge Map

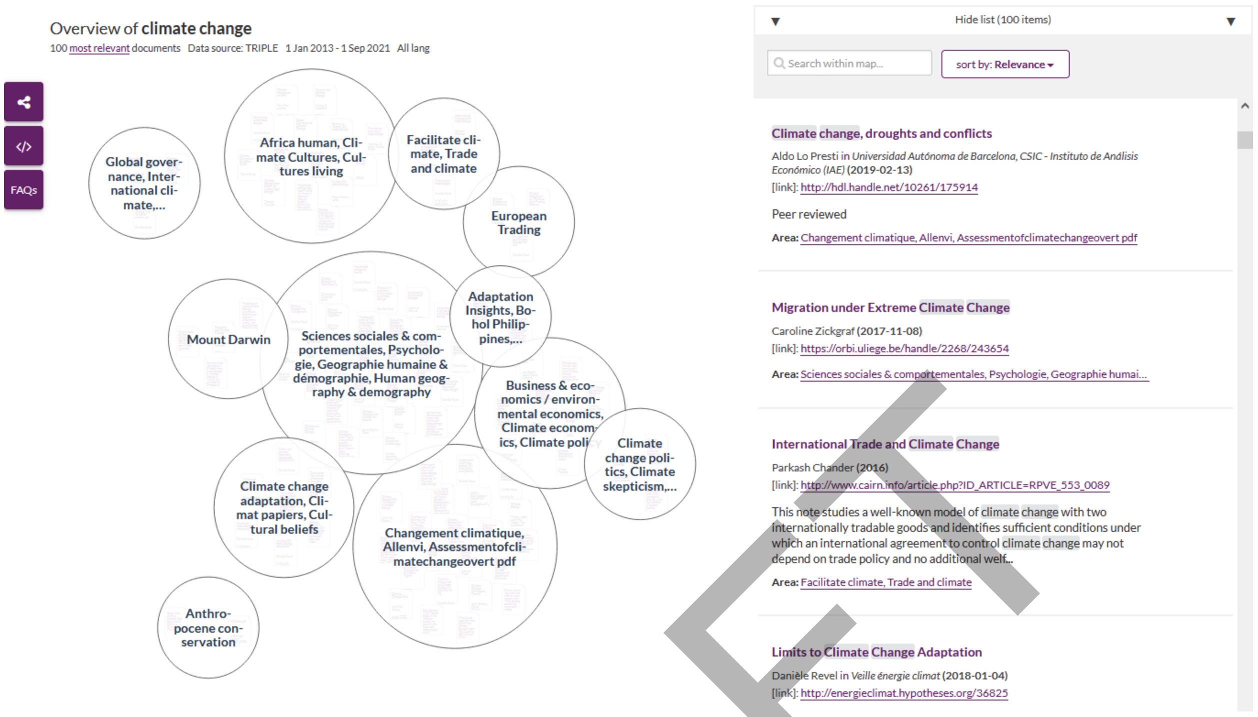
A knowledge map (see **Error! Reference source not found.** for an example) provides a topical overview of a set of resources by showing the main areas at a glance, and resources related to each area annotated with keywords, comments and tags. This makes it possible to easily identify useful, pertinent information. In theory, a Head Start knowledge map can be applied to any set of resources. Presently, it is used to provide overviews of research topics, projects and authors.

In a knowledge map, research areas are displayed as bubbles. By clicking on one of the bubbles, users can inspect the resources assigned to it (see Figure 2). The size of the bubbles is relative to the number of resources assigned to it. Closeness of bubbles implies subject similarity. The closer two bubbles, the closer they are subject-wise. Centrality of bubbles implies subject similarity with the rest of the map, not importance. The closer a bubble is to the center, the closer it is subject-wise to all the other bubbles in the map.

Areas and resources can be scaled according to several metrics, providing an indication as to which outputs have gathered more attention/impact in different services. Available metrics at this point are citations (data source: Crossref) as well as tweets and Mendeley readers (data source: Altmetric).

The knowledge map has been developed based on findings from cognitive science and information visualisation. It follows the "Overview first, zoom and filter, then details-on-demand" mantra popularized by Shneiderman (1996). This is primarily done to keep the cognitive load, i.e. the number of resources presented in each view and the number of levels of resources included in the visualisation in total, at a manageable level. It therefore works best for 50 - 150 resources clustered into up to 15 bubbles. For most use cases, knowledge maps are set to contain up to 100 resources.

In addition, the knowledge map seeks to accommodate change blindness, i.e. the fact that humans are bad at recognizing changes in a scene (Simons & Rensik 2005). This is problematic in interactive visualisations, especially when it comes to animations. To counteract this problem, animations are kept to a minimum, and when they occur, ample context is provided to make it easier for users to situate themselves within the map. Finally, the knowledge map works with recognizable iconography to increase its user friendliness. One example of this is that papers are displayed as paper icons and not another bubble.


Overview of climate change
100 most relevant documents Data source: TRIPLE 1 Jan 2013 - 1 Sep 2021 All lang
FAQs
Global governance, International climate,...
Africa human, Climate Cultures, Cultures living
Facilitate climate, Trade and climate
European Trading
Mount Darwin
Sciences sociales & comportementales, Psychologie, Geographie humaine & démographie, Human geography & demography
Adaptation Insights, Bohol Philippines,...
Business & economics / environmental economics, Climate economics, Climate policy
Climate change politics, Climate skepticism,...
Climate change adaptation, Climat papiers, Cultural beliefs
Changement climatique, Allenvi, Assessmentofclimatechangeovert pdf
Anthropocene conservation
Hide list (100 items)
Search within map...
sort by: Relevance

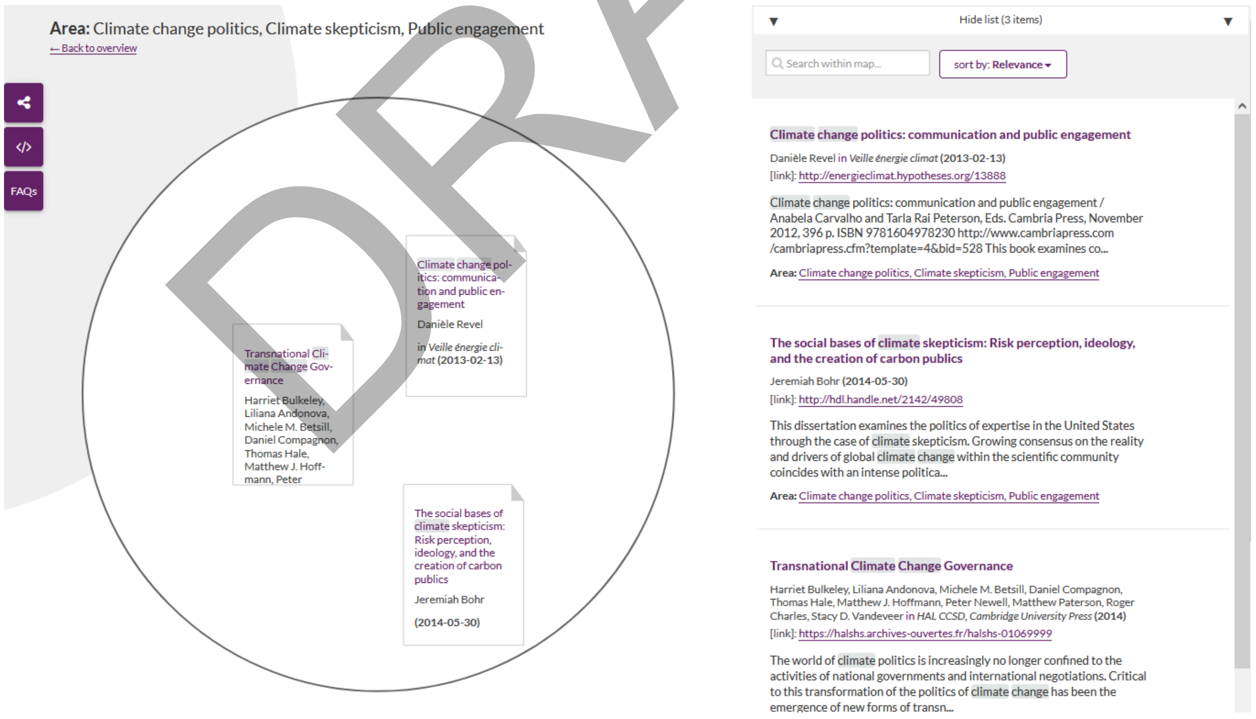
Climate change, droughts and conflicts
Aldo Lo Presti in *Universidad Autónoma de Barcelona, CSIC - Instituto de Análisis Económico (IAE)* (2019-02-13)
[link]: http://hdl.handle.net/10261/175914
Peer reviewed
Area: Changement climatique, Allenvi, Assessmentofclimatechangeovert pdf

Migration under Extreme Climate Change
Caroline Zickgraf (2017-11-08)
[link]: https://orbi.uliege.be/handle/2268/243654
Area: Sciences sociales & comportementales, Psychologie, Geographie humai...

International Trade and Climate Change
Parkash Chander (2016)
[link]: http://www.cairn.info/article.php?ID_ARTICLE=RPVE_553_0089
This note studies a well-known model of climate change with two internationally tradable goods and identifies sufficient conditions under which an international agreement to control climate change may not depend on trade policy and no additional welf...
Area: Facilitate climate, Trade and climate

Limits to Climate Change Adaptation
Danièle Revel in *Veille énergie climat* (2018-01-04)
[link]: http://energieclimat.hypotheses.org/36825

FIGURE 1. EXAMPLE OF A KNOWLEDGE MAP ON CLIMATE CHANGE


Area: Climate change politics, Climate skepticism, Public engagement
← Back to overview
FAQs
Climate change politics: communication and public engagement
Danièle Revel
in Veille énergie climat (2013-02-13)
Transnational Climate Change Governance
Harriet Bulkeley, Liliana Andonova, Michele M. Betsill, Daniel Compagnon, Thomas Hale, Matthew J. Hoffmann, Peter
The social bases of climate skepticism: Risk perception, ideology, and the creation of carbon publics
Jeremiah Bohr
(2014-05-30)
Hide list (3 items)
Search within map...
sort by: Relevance

Climate change politics: communication and public engagement
Danièle Revel in *Veille énergie climat* (2013-02-13)
[link]: http://energieclimat.hypotheses.org/13888
Climate change politics: communication and public engagement / Anabela Carvalho and Tarla Rai Peterson, Eds. Cambria Press, November 2012, 396 p. ISBN 9781604978230 http://www.cambriapress.com /cambriapress.cfm?template=4&bid=528 This book examines co...
Area: Climate change politics, Climate skepticism, Public engagement

The social bases of climate skepticism: Risk perception, ideology, and the creation of carbon publics
Jeremiah Bohr (2014-05-30)
[link]: http://hdl.handle.net/2142/49808
This dissertation examines the politics of expertise in the United States through the case of climate skepticism. Growing consensus on the reality and drivers of global climate change within the scientific community coincides with an intense politica...
Area: Climate change politics, Climate skepticism, Public engagement

Transnational Climate Change Governance
Harriet Bulkeley, Liliana Andonova, Michele M. Betsill, Daniel Compagnon, Thomas Hale, Matthew J. Hoffmann, Peter Newell, Matthew Paterson, Roger Charles, Stacy D. Vandeveer in *HAL CCSD, Cambridge University Press* (2014)
[link]: https://halshs.archives-ouvertes.fr/halshs-01069999
The world of climate politics is increasingly no longer confined to the activities of national governments and international negotiations. Critical to this transformation of the politics of climate change has been the emergence of new forms of transn...

FIGURE 2. KNOWLEDGE MAP ON CLIMATE CHANGE, ZOOMED INTO THE AREA "CLIMATE CHANGE POLITICS, CLIMATE SKEPTICISM, PUBLIC ENGAGEMENT"

1.1.2 Streamgraph

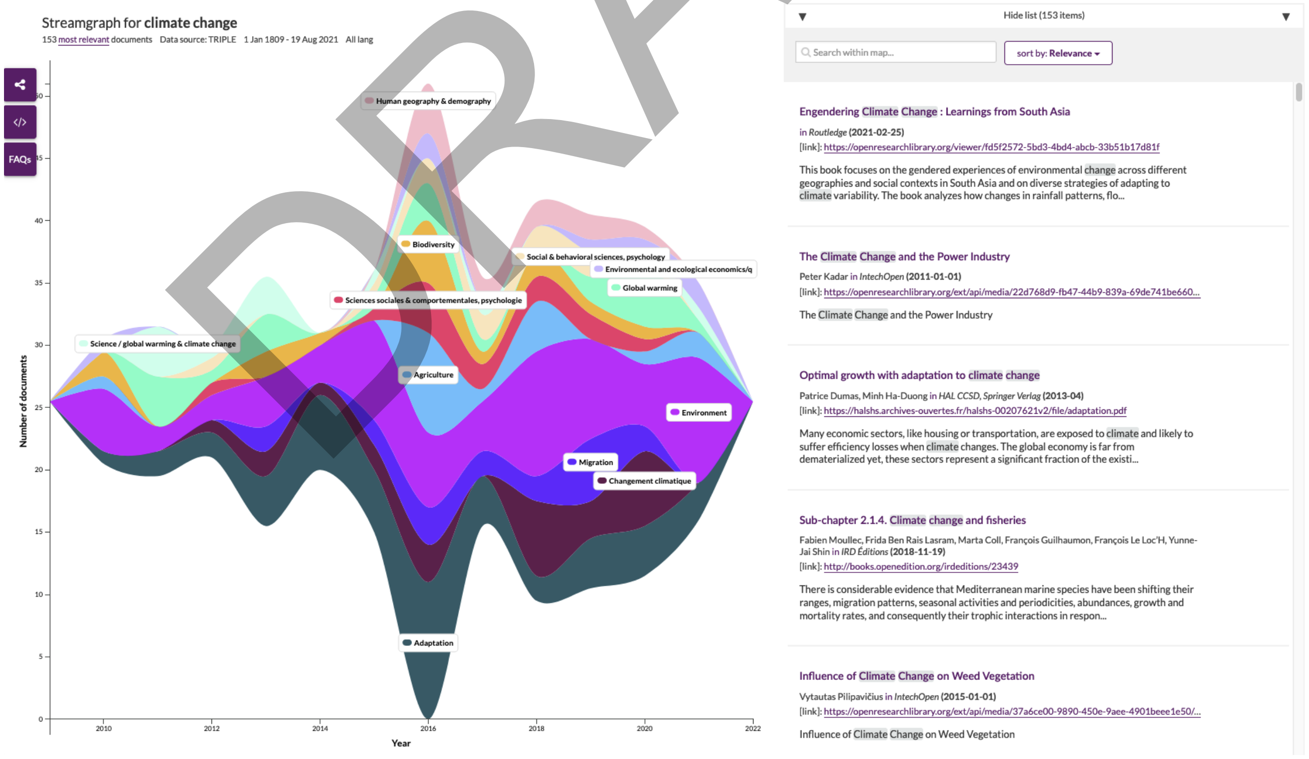
A streamgraph presents users with a temporal overview of a set of resources over time (see Figure 3 for an example). In Head Start, streamgraphs can currently be applied to topics and authors. Streamgraphs are particularly useful for investigating the evolution of keywords over time and to analyse trends in research.

The main keywords of the resources included in the streamgraph are represented as colored streams. Time is plotted on the x-axis whereas the number of resources is plotted on the y-axis. The height of a stream therefore represents the number of resources with this keyword at a specific time. It is important to note that the number of documents matches the relative height, not the absolute height of the stream.

When a user hovers over a stream, a popover shows the number of resources related to that particular stream at that particular time. Users can also click on the streamgraph to see the resources related to this stream in the associated list.

In comparison to the knowledge map, the streamgraph can aggregate more data without overloading the user. As a result, more than 1000 resources can be taken into account when creating the streamgraph.

Streamgraphs were originally developed for the New York Times. You can find more information on them in the seminal paper by Byron and Wattenberg (2008) entitled “Stacked graphs — Geometry & aesthetics”.


Streamgraph for **climate change**
153 most relevant documents   Data source: TRIPLE   1 Jan 1809 - 19 Aug 2021   All lang
FAQs
Number of documents
0
5
10
15
20
25
30
35
40
45
50
Year
2010
2012
2014
2016
2018
2020
2022
Human geography & demography
Biodiversity
Social & behavioral sciences, psychology
Environmental and ecological economics/q
Global warming
Sciences sociales & comportementales, psychologie
Science / global warming & climate change
Agriculture
Environment
Migration
Changement climatique
Adaptation
Hide list (153 items)
Search within map...
sort by: Relevance

Engendering Climate Change : Learnings from South Asia
in *Routledge* **(2021-02-25)**
[link]: https://openresearchlibrary.org/viewer/fd5f2572-5bd3-4bd4-abcb-33b51b17d81f

This book focuses on the gendered experiences of environmental change across different geographies and social contexts in South Asia and on diverse strategies of adapting to climate variability. The book analyzes how changes in rainfall patterns, flo...

The Climate Change and the Power Industry
Peter Kadar in *IntechOpen* **(2011-01-01)**
[link]: https://openresearchlibrary.org/ext/api/media/22d768d9-fb47-44b9-839a-69de741be660...

The Climate Change and the Power Industry

Optimal growth with adaptation to climate change
Patrice Dumas, Minh Ha-Duong in *HAL CCSD, Springer Verlag* **(2013-04)**
[link]: https://halshs.archives-ouvertes.fr/halshs-00207621v2/file/adaptation.pdf

Many economic sectors, like housing or transportation, are exposed to climate and likely to suffer efficiency losses when climate changes. The global economy is far from dematerialized yet, these sectors represent a significant fraction of the existi...

Sub-chapter 2.1.4. Climate change and fisheries
Fabien Moullec, Frida Ben Rais Lasram, Marta Coll, François Guilhaumon, François Le Loc’H, Yunne-Jai Shin in *IRD Éditions* **(2018-11-19)**
[link]: http://books.openedition.org/irdeditions/23439

There is considerable evidence that Mediterranean marine species have been shifting their ranges, migration patterns, seasonal activities and periodicities, abundances, growth and mortality rates, and consequently their trophic interactions in respon...

Influence of Climate Change on Weed Vegetation
Vytautas Pilipavičius in *IntechOpen* **(2015-01-01)**
[link]: https://openresearchlibrary.org/ext/api/media/37a6ce00-9890-450e-9aee-4901beee1e50/...

Influence of Climate Change on Weed Vegetation

FIGURE 3. STREAMGRAPH FOR THE TERM “CLIMATE CHANGE”

1.2 Diagram components

The diagram components are a set of components based on widely known diagram types for use in GoTriple. The diagram components are designed to be employed in different scenarios and to handle a wide variety of input data. They support limited interaction via popovers and sliders, and they broadcast events that other components can listen to. They are updateable, responsive and mobile-friendly. The diagrams are open source as part of the GoTriple platform repository. Three different diagram types have been implemented: bar chart, line chart, and geo map.

A bar chart "presents categorical data with rectangular bars with heights or lengths proportional to the values that they represent" (Wikipedia contributors 2021, see Figure 4). The bar chart developed for GoTriple is available both in horizontal and vertical format. In the vertical format, it supports a slider to limit the categories on the x-axis (e.g. the number of years displayed). When a user hovers over a bar, category name and value are displayed.

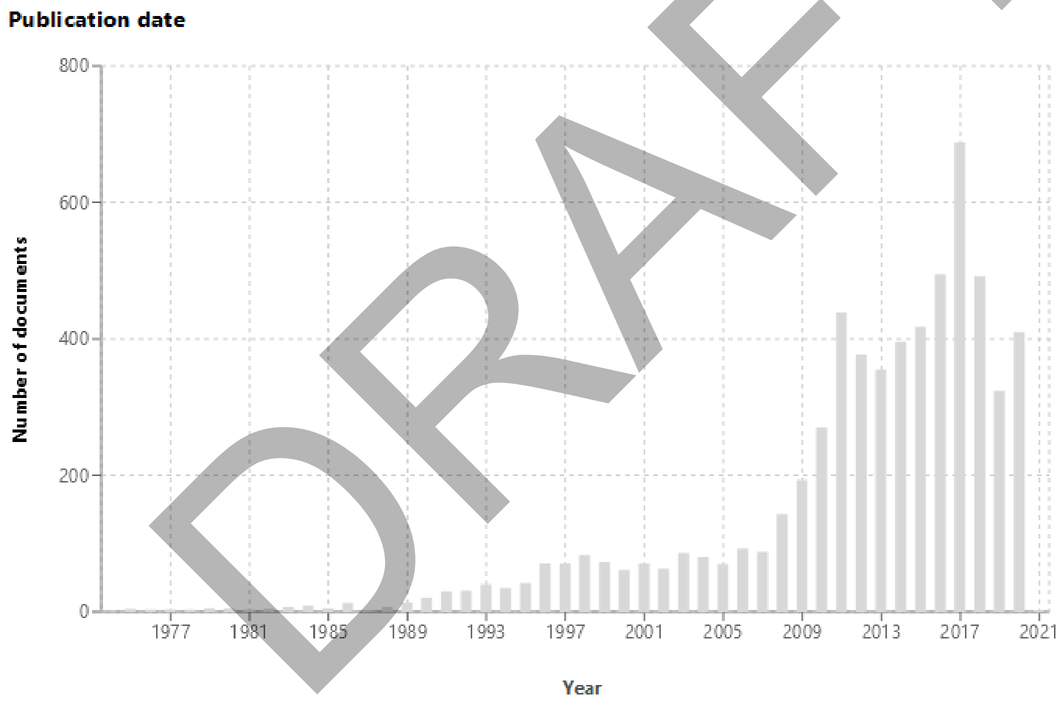


FIGURE 4. BAR CHART SHOWING THE DISTRIBUTION OF PUBLICATION DATE OVER TIME

A line chart "displays information as a series of data points called 'markers' connected by straight line segments" (Wikipedia contributors 2021, see Figure 5). The line chart developed for GoTriple is optimized to handle up to seven series of data points in a single diagram. Particular care was given regarding the accessibility of the component for color-blind users: only four easily distinguishable colors are used and further disambiguation is done via line width and dashed lines. A legend is displayed next to the chart to show the series names, but users can also get information by hovering over the markers to see the series name and value at that marker. As in the bar chart, a slider can be used to limit the categories on the x-axis (e.g. the number of years displayed).

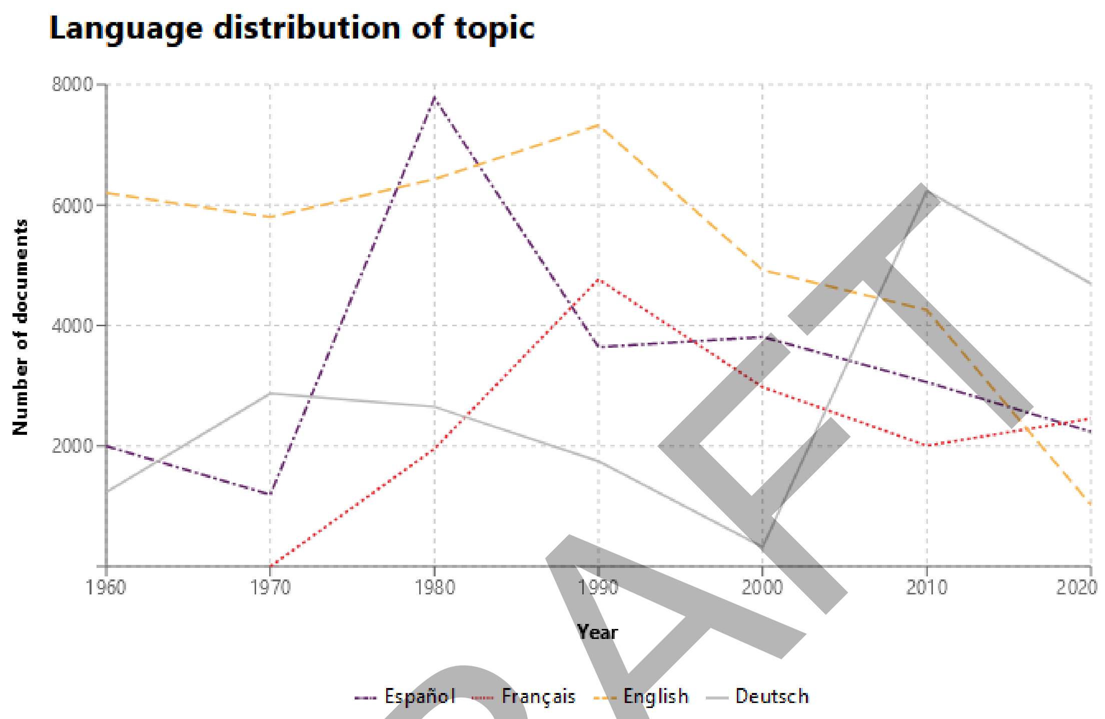


FIGURE 5. LINE CHART SHOWING THE DISTRIBUTION OF DIFFERENT LANGUAGES OVER TIME

A geo map (or geographic map) is a representation of the Earth upon a flat surface (Wikipedia contributors 2021, see Figure 6). In the geo map developed for GoTriple, the equal earth projection is used. The geo map can display categorical data where the color intensity corresponds to the value that is assigned to the country (e.g. the number of documents published on a topic in that country). Users can zoom in and out of the map to explore different regions, and they can interact with the visualisation by hovering over countries, which displays a popover with the name of the country and the value assigned to this country.

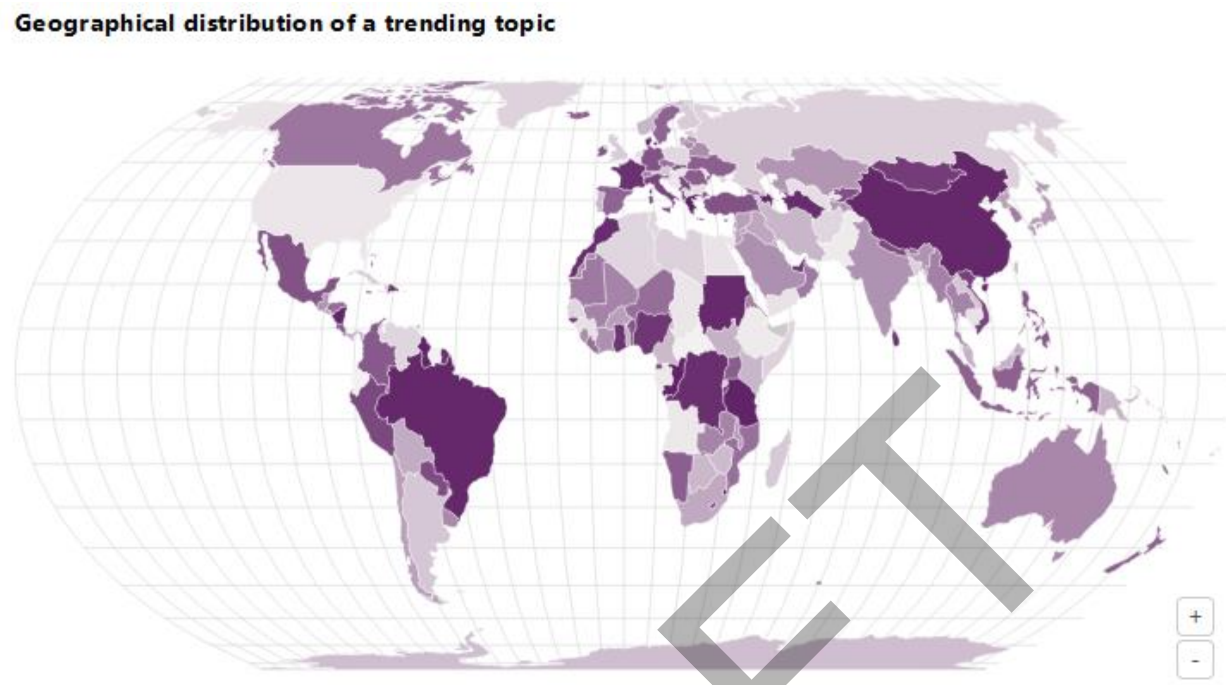


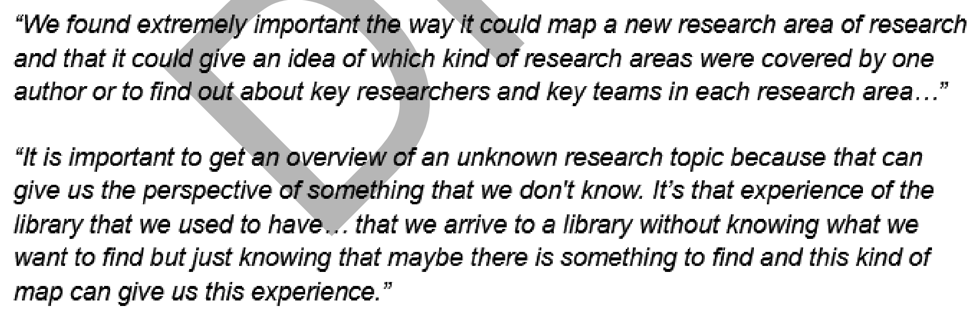
FIGURE 6. GEO MAP SHOWING THE GEOGRAPHICAL DISTRIBUTION OF A TRENDING TOPIC

2| THE SERVICE IN TRIPLE

The information overload issue in research outlined in section 1 also affects the social sciences and the humanities. This is evidenced by the outcomes of the user research carried out in Work Package 3. In the workshop on visual discovery (see Deliverable 3.4), for example, participants agreed that it is very challenging to find resources that are really relevant for their topic of interest. They also found it difficult to keep up-to-date on relevant information for their projects. Several participants mentioned that contents are not well described on search platforms. It was also stated that digital platforms do not provide the possibility to find ideas or get inspired when one doesn't know yet what one is looking for.

The innovative visualisations as described in this deliverable are very well suited to help researchers overcome these issues. This was confirmed by the participants in the abovementioned workshop, where they were introduced to both the complex, interactive visualisations and the simpler diagram components. The visualisations were received well in general. Especially the knowledge map and streamgraph seemed to have the most potential in giving additional insights and context to the research results. Overall, participants agreed that visual discovery tools can solve many challenges related to finding relevant information on the TRIPLE platform.

There was a high consensus on overview-related use cases and the usefulness of the knowledge map. Participants mentioned that the knowledge map could also be of interest to other stakeholders e.g. students, citizen scientists. In addition, it was seen as a great source for inspiration, for example in an exploratory search, as illustrated by the quotes from Deliverable D3.4 in Figure 7. Participants also found many potential use cases and usage scenarios for the streamgraph, but there was less consensus on the importance of each use case as they seem to be discipline-dependent.



"We found extremely important the way it could map a new research area of research and that it could give an idea of which kind of research areas were covered by one author or to find out about key researchers and key teams in each research area…"

"It is important to get an overview of an unknown research topic because that can give us the perspective of something that we don't know. It's that experience of the library that we used to have… that we arrive to a library without knowing what we want to find but just knowing that maybe there is something to find and this kind of map can give us this experience."

FIGURE 7. QUOTES FROM THE WORKSHOP ON VISUAL DISCOVERY (SOURCE: D3.4)

For the diagram components, use cases related to getting a better understanding of a set of resources were seen most important. Otherwise, they were seen as more useful for management/meta research. Standard diagrams such as bar charts had the highest consensus.

The visualisations enable GoTriple to support its users in a unique way. The simpler, diagram-like components can be used as needed across the platform to provide additional insight into the data. The more complex, stand-alone visualisation interfaces can be offered to users who seek a topical or temporal overview or are interested in a more serendipitous search experience. As one of the first discovery platforms, GoTriple brings both visualisation approaches together.

3| SOFTWARE ARCHITECTURE

3.1 Head Start visualisations

This section gives an overview of the Head Start frontend architecture and the machine learning procedures used to calculate the visualisations. As discussed in section 1, the backend of Head Start is discussed in a separate deliverable, D5.6, which is why the architecture of the backend is also described there.

The Head Start frontend is a standalone and independent JavaScript library. It can be used directly in a website - it is simply loaded as a single script.

The Head Start frontend has a complex interface and uses many different parts and components that often interact with one another. For this reason, our priority during the architectural design was to develop a platform that makes it easy to maintain the user interface codebase and keep the state management clean and centralized. Another requirement was to run sophisticated animations in the user interface. These priorities guided our decisions on the technologies and frameworks described in the next section.

3.1.1 Head Start frontend

Head Start frontend is written mainly in JavaScript with additional pieces of HTML templates and SCSS styles. All parts are glued together during the build process: we use Webpack for it. The most important JavaScript (JS) libraries we use are React and Redux. Usage of these two libraries and of the design patterns and best practices that come with them significantly shape the Head Start frontend architecture.

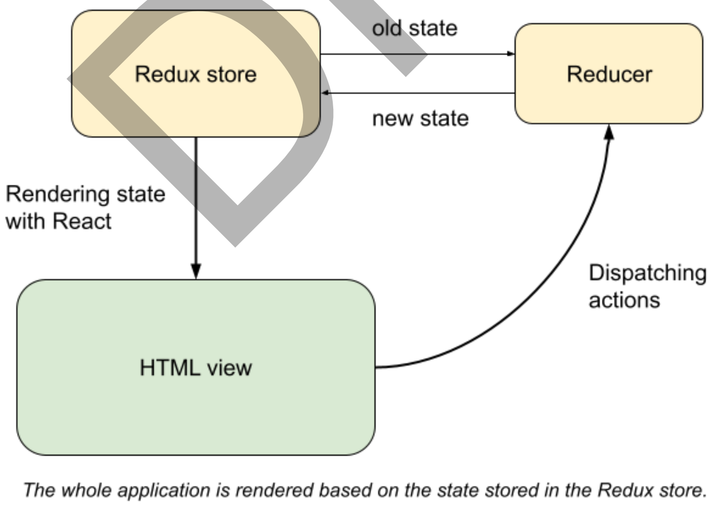

Redux store
old state
Reducer
new state
Rendering state with React
Dispatching actions
HTML view
The whole application is rendered based on the state stored in the Redux store.

FIGURE 8. STATE MANAGEMENT IN HEAD START

Since we use Redux, we have a central data store that contains the whole application state (see Figure 8). Each re-render is entirely based on this state. The rendering is done by React, so the whole application interface is defined with a declarative approach, forming a tree structure. The application state changes when the interface dispatches an action. This action is processed by the Redux reducer and a new state is determined as a function of the previous state and the action type and payload.

Another key library we use is the d3 visualisation library. It handles the knowledge map zoom animations and renders the streamgraph visualisation. Combining d3 and React is complicated, since both libraries manipulate DOM. Our solution to this problem is that we always use d3 on the lowest level of the component hierarchy.

The UI components are defined in a hierarchical tree structure (see Figure 9). Most of the UI components are created and designed by OKMaps, but for some exceptions (buttons, dialogs, dropdowns), we use the Bootstrap framework.

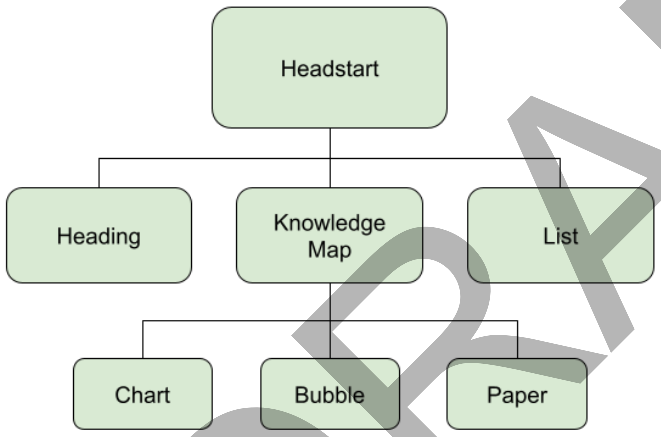


FIGURE 9. HEAD START UI COMPONENTS HIERARCHY

The Head Start frontend has recently been rewritten in a major refactoring project. However, a small part still consists of legacy code, which takes care mostly of the application initialization and data pre-processing. The legacy part of code consists of several VanillaJS modules tied together with a central module called the mediator (see Figure 10). The mediator was a central component in the past, but after the refactoring, its job is mainly to initialize the Redux store (in cooperation with the so-called IO module) and hand the control over to the Redux & React. After that, it also performs logs and watches for some specific updates that it still handles, such as a data source change.

The control handover is done through a special middleware that we call the intermediate layer. This layer runs the Redux & React and sometimes talks back to the mediator. In future, all the remaining functionalities will move from the legacy code to the intermediate layer and the Redux reducers.

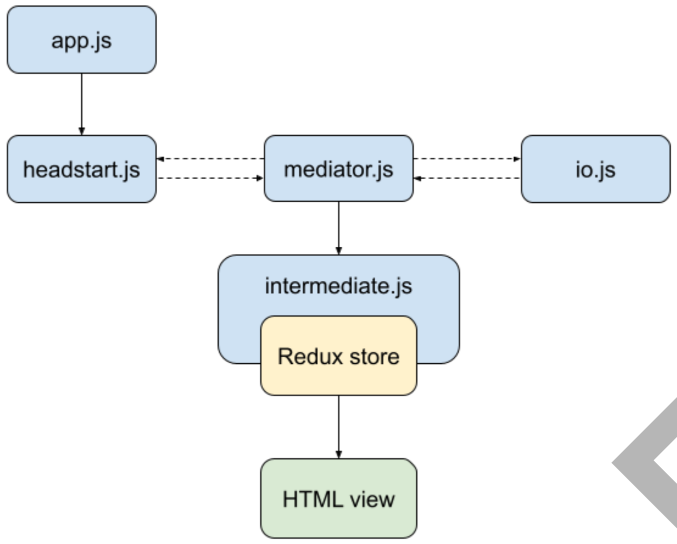


FIGURE 10. HEAD START MODULES AND THEIR INTERFACES WITH REDUX & REACT

The Head Start frontend is configurable in three different ways: during the build time, using an integration configuration, and by the context provided with the source data. The integration configuration gives us a lot of flexibility in terms of feature activation and deactivation or customizing the application appearance.

3.1.2 Head Start ML procedures

The Head Start visualisations are calculated by a set of machine learning (ML) procedures, written in R. For the knowledge maps, we chain a mixture of summarization techniques and similarity measures together, as shown in Figure 11. The raw inputs are the metadata for the most relevant resources related to a topic, author or project (see chapter 1.1.1 for more details), which were retrieved from a data source by a data client.

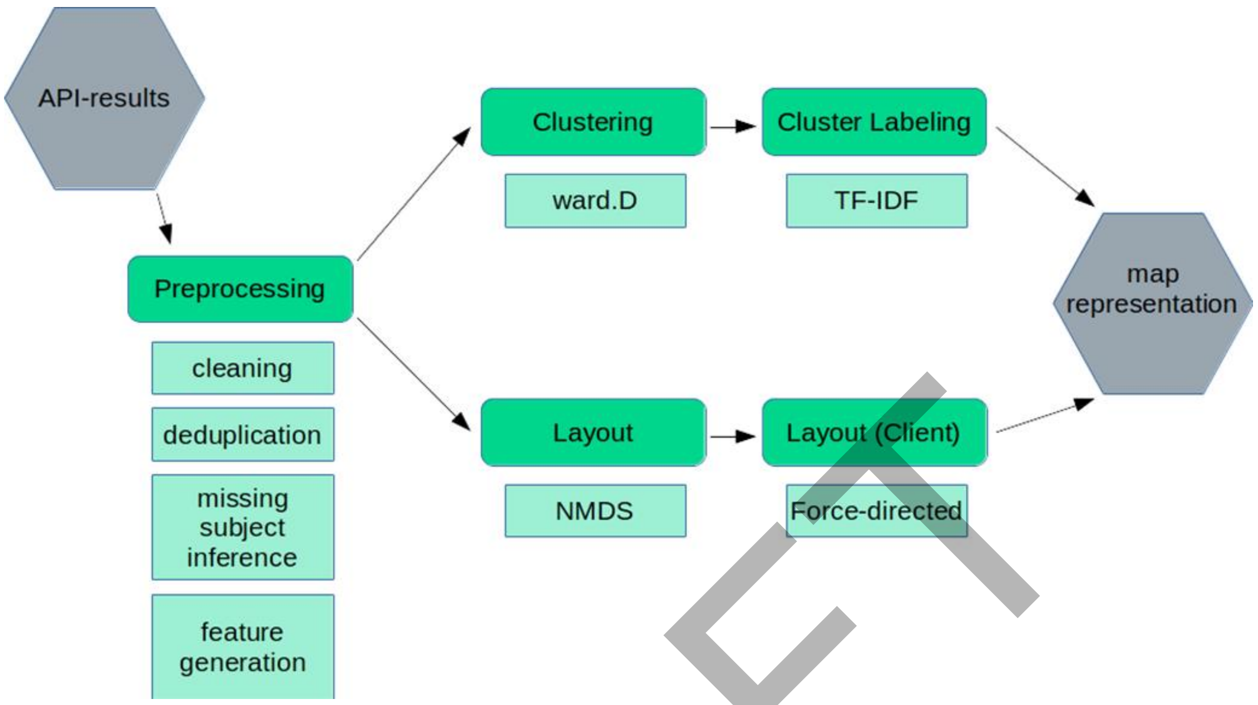


FIGURE 11. HEAD START MACHINE LEARNING PIPELINE FOR KNOWLEDGE MAPS

First, a number of preprocessing steps are performed. Metadata is cleaned (e.g. classifications removed from keywords) and normalized (e.g. date formats). Duplicate results are removed, as far as confidently detectable by the Levenshtein distance of their titles. Missing subject metadata is inferred from subjects and titles, where possible. A bag-of-words corpus is then compiled using document title, journal name, author names, subject keywords and the abstract, whenever these fields are available. To reduce the dimensionality of the resulting term-document matrix, documents are preprocessed by removing punctuation, filtering stopwords, transforming to lower-case and stemming. The term-document matrix is then transformed into a similarity matrix by calculating the cosine similarity between documents, to be used as feature input for the machine learning algorithms.

Clusters are computed with Ward's method of minimum variance (Hair et al. 2010), which is known to join smaller clusters and to produce clusters of approximately the same size (Tan et al. 2007). The number of clusters is determined by the *elbow* method, which chooses a number of clusters *k* that explains at least 80% of the model variance, and the increment is lower than 1% for *k*+1. We set a maximum of 15 clusters regardless of *k*. Cluster labels are generated by treating the collection of keywords from each cluster as a document (we therefore have *k* keyword documents) and applying a Term Frequency - Inverse Document Frequency (TF-IDF) weighting to the *k* documents. For each cluster, the top three keywords by TF-IDF score are selected.

The spatial representation of documents (the layout on the knowledge map) is calculated using non-metric multidimensional scaling. In this step, the many dimensions of the similarity matrix are reduced to two dimensions, meaning each document can be placed on a 2D-plane. This is an iterative procedure strongly dependent on the starting conditions, but reproducible visualisations can be achieved by setting a fixed seed. A final adjustment to the 2D-layout happens every time a map representation is loaded in the client, when a force-directed algorithm (Force-Atlas) is used to de-clutter the map.

3.2 Diagram components

Diagram components are a thin layer over existing visualisation libraries. This thin layer should make it very easy to include the components within GoTriple and includes selecting appropriate diagram types and characteristics and setting good defaults catering to the specific use cases of TRIPLE. At the same time the diagram components are flexible/customizable enough so that they work with a variety of data and integration scenarios.

The diagram components' architecture is influenced by the GoTriple platform context, by the target diagram types we wanted to implement and by the visualisation library we chose for the implementation. All three factors are discussed below.

3.2.1 Platform context

Our aim was also to make the integration of the diagram components as simple as possible for the GoTriple developers. In order to achieve this, we adopted the principle of convention over configuration. Most of the components' parameters have a carefully chosen default setting - thanks to that, each component can be used out of the box and only minimal configuration is required. In most use cases, only the data is required as a parameter. At the same time, all the components still offer a wide range of customization options. The default settings can be overridden by parameters and that way the components can be customized.

The philosophy of the diagrams is that they only display data - there is no data processing involved in the components. The reason for this is that any data processing inside the diagram components would lead to less understandable component interface for the other developers and possibly also to unpredictable behavior. Therefore, data processing is left to the users of the diagram components, in TRIPLE's case the developers that integrate the components into GoTriple.

3.2.2 Technologies

The diagram components are implemented using third-party visualisation libraries. We decided to use the Recharts visualisation library for the bar charts and line charts and React Simple Maps for the geo map. The decision was based on our own evaluation which compared several different visualisation libraries and frameworks. The evaluation and its results are described in detail in section 5.1.

We also use some supporting libraries: the React Tooltip library for rendering tooltips on mouse hover in some diagrams and the d3-scale library for determining the geo map countries colors.

3.2.3 Component interface

Each diagram component has a mandatory data parameter. The data is an array of objects where each object is a single unique entry (bar/observation in time/country, depending on the chart type). Each diagram can be further customized by providing some optional parameters - e.g. title, x and y axis labels, color palette etc.

4| INTEGRATION STRATEGIES OF THE SERVICE IN GOTRIPLE

As depicted in Figure 12, the visualisations are a tightly integrated innovative service in TRIPLE. Tight integration means in this context that the visualisations are used throughout the GoTriple platform. This integration is done in close collaboration with WP3 for the design aspects and WP4 for the technical aspects of the integration. In the following two chapters, the strategies for the integration of both the Head Start visualisations and the diagram components are described.

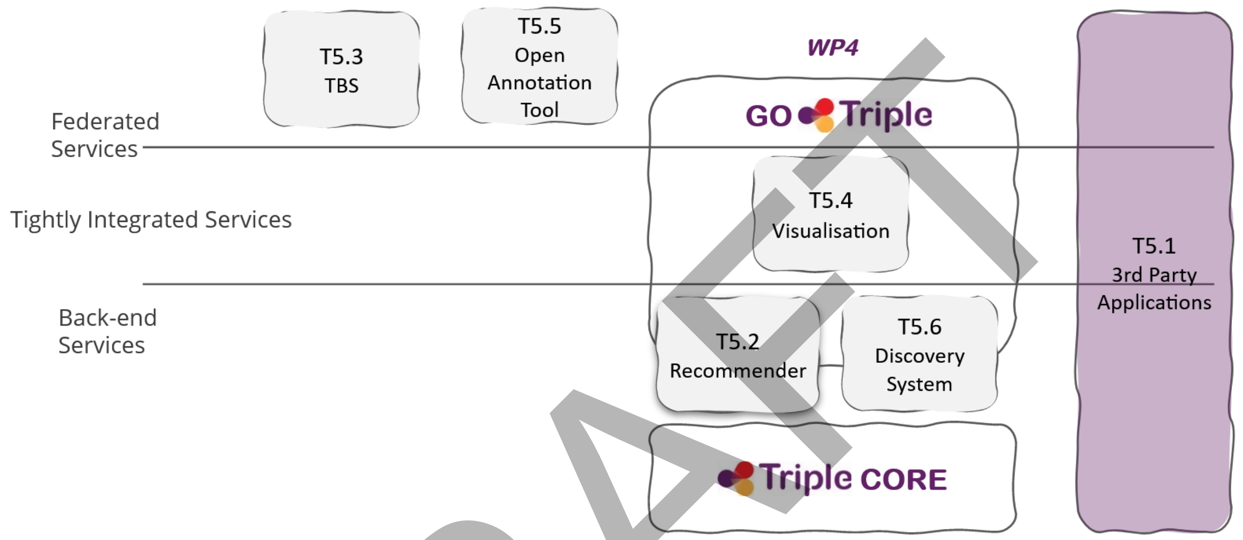
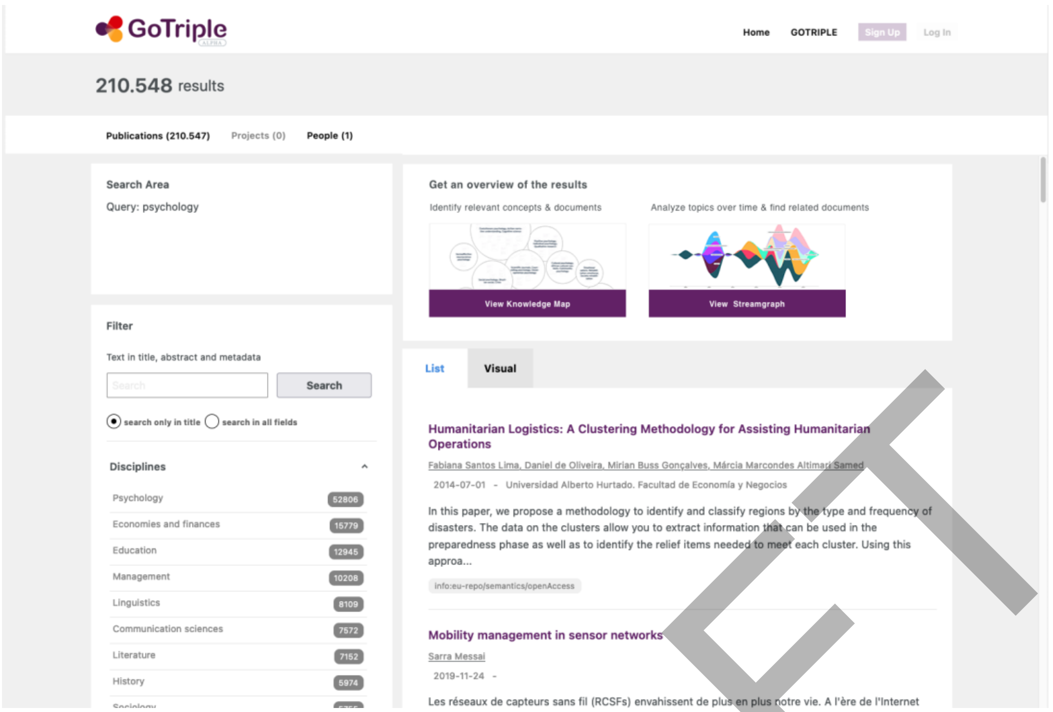


FIGURE 12. INNOVATIVE SERVICES IN TRIPLE AND THEIR LEVEL OF INTEGRATION (SOURCE: D6.2)

4.1 Head Start visualisations

The Head Start visualisations are integrated via the Head Start discovery system (described in D5.6). Users can currently access the discovery system via the search results page (see Figure 13). The integration is modeled after popular web search engines that link to additional services and interfaces directly within their search results page. In GoTriple, this concept is applied to an academic search. For a given user search, a Head Start interface can be created, including either a knowledge map or a streamgraph as well as textual components, such as the metadata of the resources included in the visualisation, providing further information and context. As such, the user can get either a topical or a temporal overview of their search, depending on their current use case.

After clicking on a generic preview image within the search results page in the GoTriple frontend, a new tab showing a waiting page is opened. While the user is on the waiting page, the discovery system produces the visualisation, stores it in the database and returns a persistent ID to the frontend. If successful, the waiting page will redirect to a frontend, which contains a Head Start interface (see Figure 14). For more information on the technical aspects of the integration as well as the Head Start discovery system itself, please refer to D5.6.



210.548 results

Query: psychology

Disciplines

Psychology	52806
Economies and finances	15779
Education	12945
Management	10208
Linguistics	8109
Communication sciences	7572
Literature	7152
History	5974
Sociology	

Humanitarian Logistics: A Clustering Methodology for Assisting Humanitarian Operations

Fabiana Santos Lima, Daniel de Oliveira, Mirian Buss Gonçalves, Márcia Marcondes Altimari Samed

2014-07-01 - Universidad Alberto Hurtado. Facultad de Economía y Negocios

In this paper, we propose a methodology to identify and classify regions by the type and frequency of disasters. The data on the clusters allow you to extract information that can be used in the preparedness phase as well as to identify the relief items needed to meet each cluster. Using this approa...

info:eu-repo/semantics/openAccess

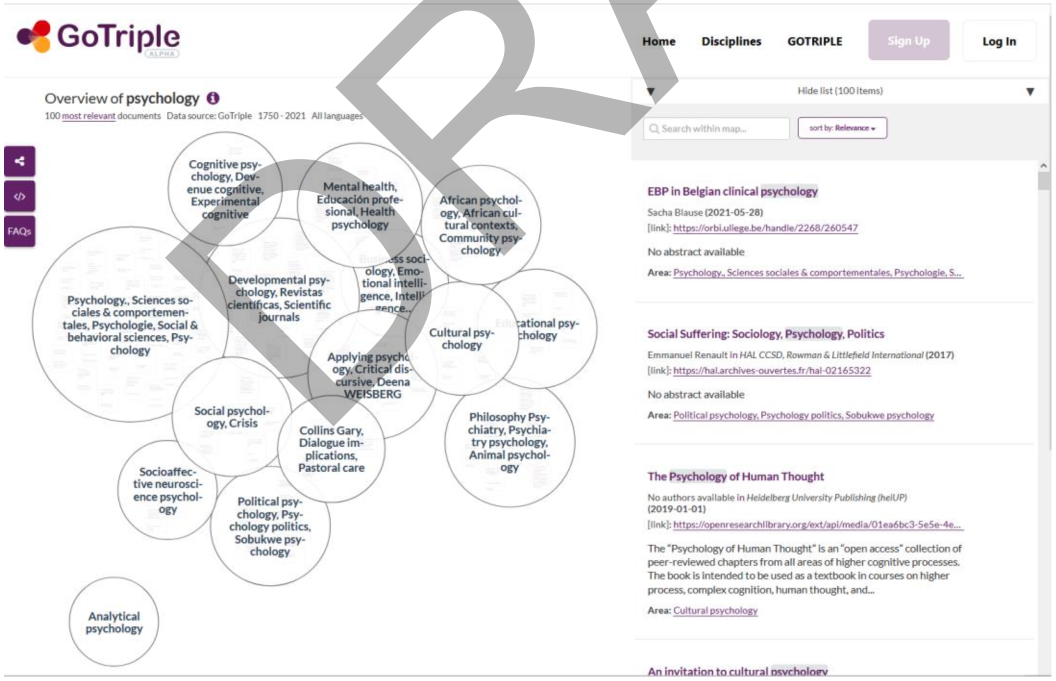
Mobility management in sensor networks

Sarra Messai

2019-11-24 -

Les réseaux de capteurs sans fil (RCSFs) envahissent de plus en plus notre vie. A l'ère de l'Internet

FIGURE 13. SKETCH OF THE INTEGRATION OF THE COMPLEX VISUALISATIONS ON THE GOTRIPLE SEARCH RESULTS PAGE


GoTriple
ALPHA
Home
Disciplines
GOTRIPLE
Sign Up
Log In
FAQs
Hide list (100 items)
Search within map...
sort by: Relevance
Cognitive psychology, Devenue cognitive, Experimental cognitive
Mental health, Educación profesional, Health psychology
African psychology, African cultural contexts, Community psychology
Psychology., Sciences sociales & comportementales, Psychologie, Social & behavioral sciences, Psychology
Developmental psychology, Revistas científicas, Scientific journals
Business sociology, Emotional intelligence, Intelligence..
Cultural psychology
Educational psychology
Applying psychology, Critical discursive, Deena WEISBERG
Social psychology, Crisis
Collins Gary, Dialogue implications, Pastoral care
Philosophy Psychiatry, Psychiatry psychology, Animal psychology
Socioaffective neuroscience psychology
Political psychology, Psychology politics, Sobukwe psychology
Analytical psychology

Overview of **psychology**

100 most relevant documents Data source: GoTriple 1750 - 2021 All languages

EBP in Belgian clinical psychology

Sacha Blause (2021-05-28)

[link]: https://orbi.uliege.be/handle/2268/260547

No abstract available

Area: Psychology., Sciences sociales & comportementales, Psychologie, S...

Social Suffering: Sociology, Psychology, Politics

Emmanuel Renault in *HAL CCSD, Rowman & Littlefield International* (2017)

[link]: https://hal.archives-ouvertes.fr/hal-02165322

No abstract available

Area: Political psychology, Psychology politics, Sobukwe psychology

The Psychology of Human Thought

No authors available in *Heidelberg University Publishing (heiUP)* (2019-01-01)

[link]: https://openresearchlibrary.org/ext/api/media/01ea6bc3-5e5e-4e...

The "Psychology of Human Thought" is an "open access" collection of peer-reviewed chapters from all areas of higher cognitive processes. The book is intended to be used as a textbook in courses on higher process, complex cognition, human thought, and...

Area: Cultural psychology

An invitation to cultural psychology

FIGURE 14. SCREENSHOT OF A KNOWLEDGE MAP ON THE TERM "PSYCHOLOGY" INTEGRATED ON GOTRIPLE

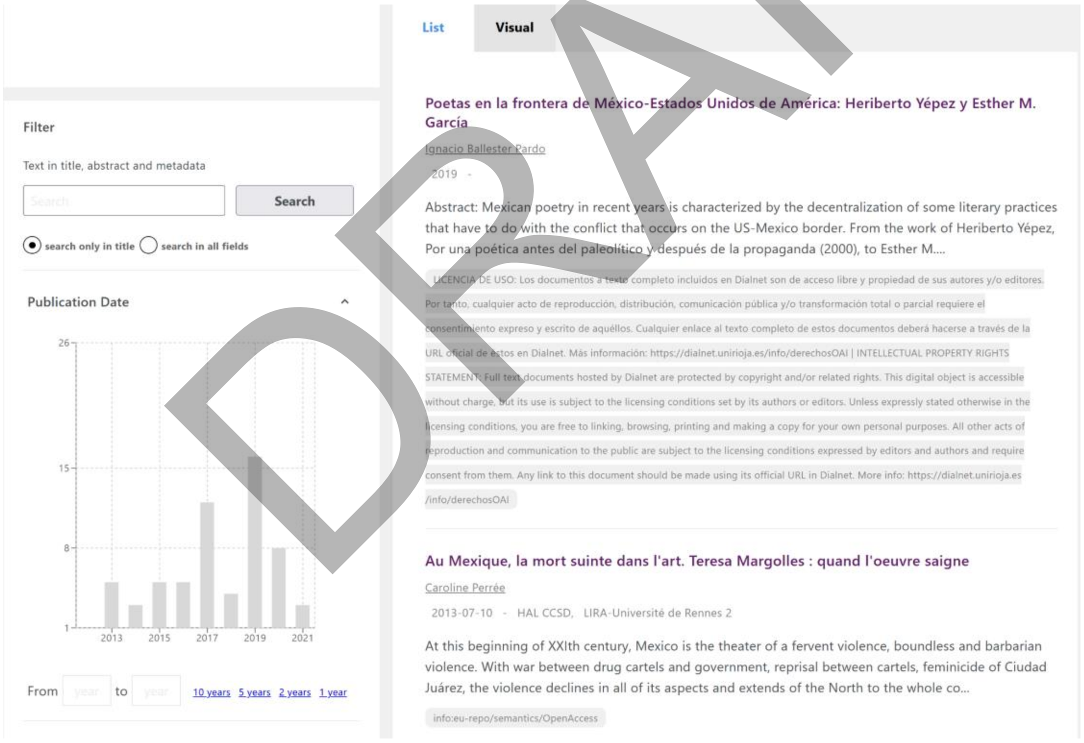
4.2 Diagram components

4.2.1 Frontend integration

The diagram components are provided by Open Knowledge Maps, but how they are integrated is ultimately decided by the platform design team of WP3. Nevertheless, Open Knowledge Maps have conducted extensive research on the diagram components and provided detailed recommendations as to how the diagram components could be integrated.

Currently, diagram components are integrated on the search results page and the landing pages. On the search results page, they act as visual filters that show both the distribution of a certain property within the search (e.g. publication year, see Figure 15). When a user clicks on a bar in the bar chart, they are presented with only search results from the year represented by the particular bar. Furthermore, diagram components are found in the visual tab on the search results page. There, they provide further insight into the search results, e.g. the distribution of authors and disciplines within the search results.

On landing pages, diagram components are used to show certain statistics about the item, e.g. its shares and views (see Figure 16).



Poetas en la frontera de México-Estados Unidos de América: Heriberto Yépez y Esther M. García

Ignacio Ballester Pardo

2019 -

Abstract: Mexican poetry in recent years is characterized by the decentralization of some literary practices that have to do with the conflict that occurs on the US-Mexico border. From the work of Heriberto Yépez, Por una poética antes del paleolítico y después de la propaganda (2000), to Esther M....

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Au Mexique, la mort suinte dans l'art. Teresa Margolles : quand l'oeuvre saigne

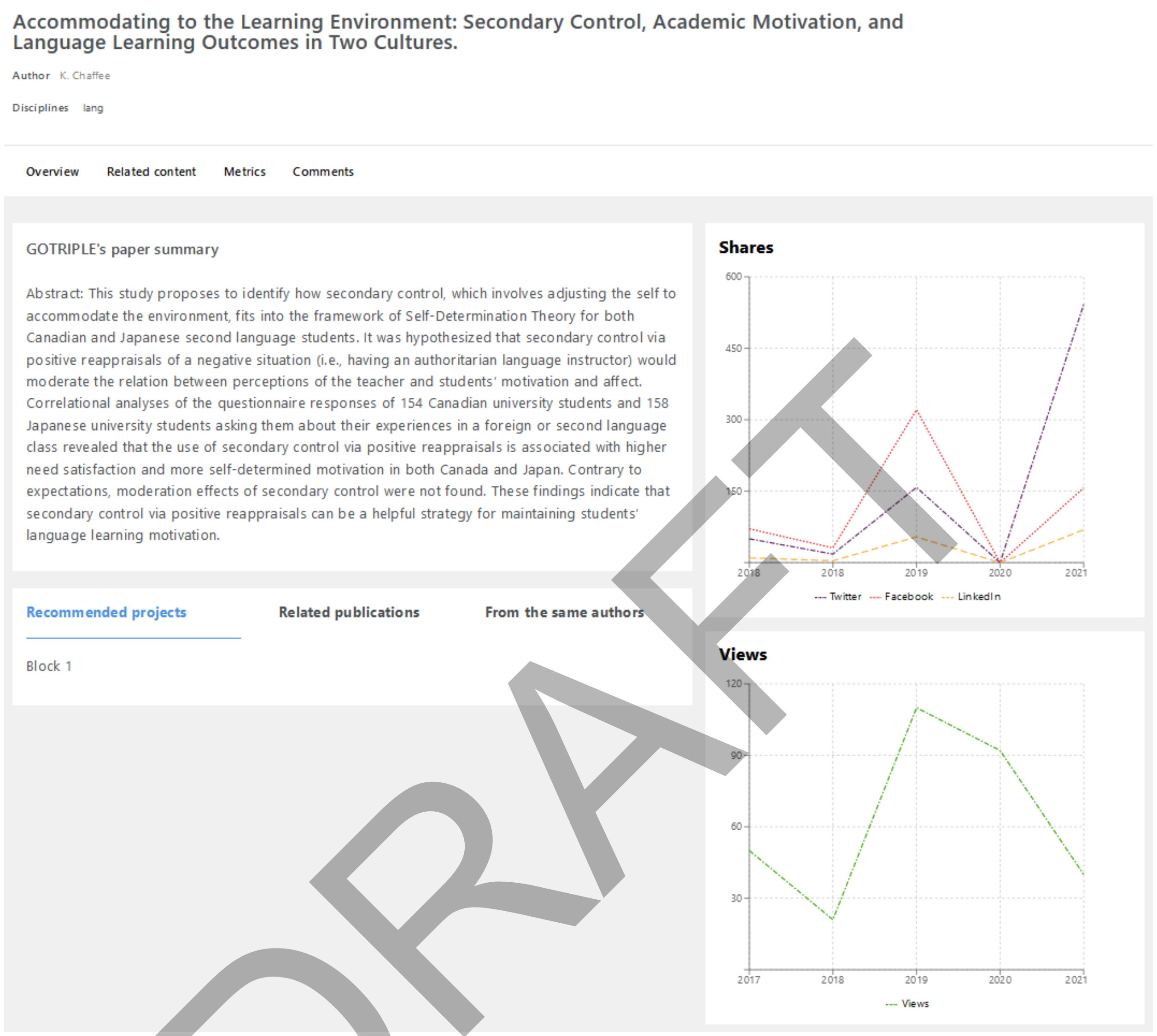
Caroline Perrée

2013-07-10 - HAL CCSD, LIRA-Université de Rennes 2

At this beginning of XXIth century, Mexico is the theater of a fervent violence, boundless and barbarian violence. With war between drug cartels and government, reprisal between cartels, feminicide of Ciudad Juárez, the violence declines in all of its aspects and extends of the North to the whole co...

info:eu-repo/semantics/OpenAccess

FIGURE 15. DIAGRAM COMPONENT BAR CHART AS VISUAL FILTER IN GOTRIPLE


Accommodating to the Learning Environment: Secondary Control, Academic Motivation, and Language Learning Outcomes in Two Cultures.

Author K. Chaffee

Disciplines lang

Overview Related content Metrics Comments

GOTRIPLE's paper summary

Abstract: This study proposes to identify how secondary control, which involves adjusting the self to accommodate the environment, fits into the framework of Self-Determination Theory for both Canadian and Japanese second language students. It was hypothesized that secondary control via positive reappraisals of a negative situation (i.e., having an authoritarian language instructor) would moderate the relation between perceptions of the teacher and students' motivation and affect. Correlational analyses of the questionnaire responses of 154 Canadian university students and 158 Japanese university students asking them about their experiences in a foreign or second language class revealed that the use of secondary control via positive reappraisals is associated with higher need satisfaction and more self-determined motivation in both Canada and Japan. Contrary to expectations, moderation effects of secondary control were not found. These findings indicate that secondary control via positive reappraisals can be a helpful strategy for maintaining students' language learning motivation.

Recommended projects Related publications From the same authors

Block 1

FIGURE 16. LINE CHARTS ON LANDING PAGES IN GOTRIPLE

Further screens of GoTriple where diagram components would be useful are user profiles and dashboards and on the GoTriple start page to e.g. to highlight stats of the collections.

4.2.2 Technical integration

The diagram components are created by Open Knowledge Maps, but integrated in GoTriple by the TRIPLE core development team. As such, the diagram components are developed in the TRIPLE Gitlab and the core development team is more strongly involved in the whole process than with the Head Start visualisations.

In the Atomic Design Methodology adopted by TRIPLE, the diagram components are on the molecules level, i.e. "relatively simple groups of UI elements functioning together as a unit" (see https://atomicdesign.bradfrost.com/chapter-2/). In addition, several atom-level components have been developed to be shared among different diagram types (e.g. labels and tooltips).

For each of the diagram types (bar chart, line chart, geo map), Open Knowledge Maps created a feature branch based on the current development branch. Once the work on the diagram type is finished, Open Knowledge Maps opened a merge request for the core development team to review and merge.

The diagram components include extensive documentation for the core development team, both inline documentation and separate textual documentation. The diagram components are integrated as React components on GoTriple. A simple bar chart for example could be integrated as follows:

```
const data = [
  { author: "Mullen, Sarah", docs: 60, label: "Mullen, S." },
  { author: "Ferdi, Mohammed", docs: 45, label: "Ferdi, M." },
  { author: "DiAngelo, Giulia", docs: 30, label: "DiAngelo, G." },
];

return (
  <HorizontalBarChart
    data={data}
    dataKey="author"
    dataValue="docs"
    title="Top authors of topic A"
    unit="documents"
    xAxis={{ label: "Number of documents" }} />
);
```

5| DESCRIPTION OF THE WORK DONE IN TASK D5.4

5.1 Development of diagram components

The diagram components have been specifically developed for TRIPLE. For that, we followed a structured process that included five steps: (1) research for use cases and diagram types, (2) design and specifications, (3) research for suitable libraries, (4) implementation and testing, and (5) documentation. This process is described below in more detail.

5.1.1 Research for use cases and diagram types

First, we collected our use case ideas and diagram types recommendations (e.g. pros and cons of each diagram type). Our use case suggestions were based on outcomes of the personas and requirements created as part of D3.1. Our diagram types recommendations were based on our research in task D7.1 and an additional review of the use of visualisations and diagrams in other discovery services.

Second, we organized an internal workshop with select partners from the TRIPLE consortium to evaluate the use cases and diagram types that we had collected thus far. Partners were asked to take a look at the existing ideas and prepare their own suggestions prior to the workshop. The workshop brought about many new ideas and we used the outcomes to inform the questions and discussion points for our user workshop.

Third, we conducted a group discussion with seven participants in order to better understand the specific needs and challenges that SSH researchers face in their discovery process. Researchers were asked to give feedback on the existing use cases, diagram types suggestions and come up with their own ideas. For more information and the detailed results of the user workshop, please refer to D3.4.

We based our final choices of diagram types (bar chart, line chart and geo map) and recommendations for use cases and integration scenarios on the outcome of the user workshop, technical feasibility and the effort to implement.

5.1.2 Design, specifications

Once we had established which diagram types to focus on we were in the position to move on to the design and specification phase. Although we had established some important use cases and integration scenarios during our research phase we knew that the diagrams might be used throughout the TRIPLE platform for other purposes as well. The challenge therefore was to keep the components as flexible as possible while establishing good defaults that could work for the majority of use cases.

For the specifications we established:

- Must haves (e.g. good strategy for label abbreviation)
- Nice to haves (e.g. animations)

- Edge cases from a technical point of view (e.g. too few data entries)

First, we made sketches which we then evaluated in regards to technical feasibility and effort to implement. From there we arrived at our first set of design and technical specifications. During the development and review phase we adjusted (if necessary) our specifications again. This was necessary for example for UX issues that are hard to identify on paper.

This iterative process was repeated for each diagram type. We started with the bar chart, our minimum viable product (MVP) in this case, as it is a simple well-known visualisation type yet complex enough in terms of technical edge cases. Then we proceeded to develop the line chart and finally the geo map.

5.1.3 Research for libraries

There is a wide choice of JavaScript visualisation libraries and frameworks available. We evaluated and compared them based on the following criteria:

Functional requirements (offered features)	Non-functional requirements
- Tooltips - Animations - Mouse event handlers - Flexibility - Responsiveness - Supported diagram types: - Bar charts (horizontal, vertical) - Line chart - Geo map	Non-functional requirements: - Source repository issues - Community - Usage code style - Documentation - Bundle size - Learning curve - Compatibility with Next.js

Five libraries in total made it to the shortlist: Nivo, Recharts, visx, Victory and React Simple Maps. Then we created a simple bar chart prototype in each of the libraries to evaluate some of the non-functional requirements and also to test how difficult it is to work with the library.

Recharts was a clear winner in terms of documentation, community support, learning curve, code style and even the bundle size. Unfortunately, it doesn't support geo maps. Therefore, for the geo map, we use an additional library. We chose React Simple Maps for similar reasons as Recharts: it is also well documented, easy to use, it has a readable code style and the bundle size is low.

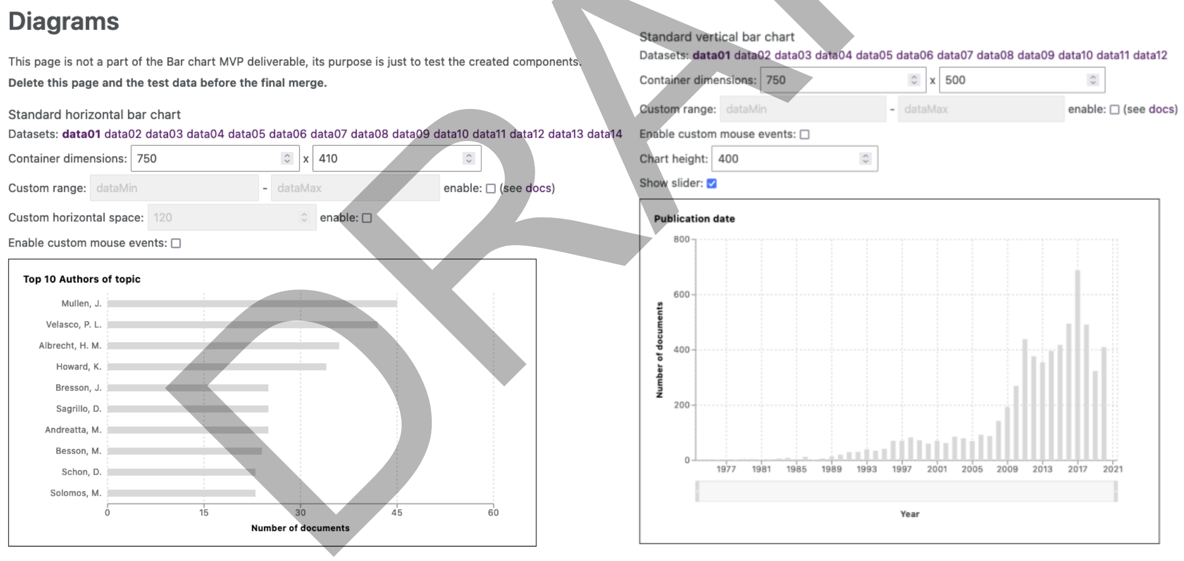
5.1.4 Implementation and testing

The diagram components development consisted of multiple iterations. Each iteration was divided into two phases: implementation and review. In the first implementation phase, we developed a fully functional diagram prototype that tried to be as close as possible to the design sketches and requirements. During the subsequent review, the working version of the diagram was tested and evaluated and some requirements were added, changed or dropped. On average we needed two to three iterations for one diagram component, whereby one iteration took between three and six weeks to complete.

The diagram components are being developed as part of the GoTriple platform Gitlab repository. The installation of the libraries into the GoTriple codebase was seamless and we did not encounter any problems there.

In order to test the components, we prepared 10-25 different sample data sets for each of the diagram components. These sets also covered our technical edge cases, determined during our specifications phase. The sample data was aggregated from randomly sampled queries from the Isidore/GoTriple data, unless there was no metadata available yet (e.g. geolocation). In these cases, we generated our own sample data based on random distributions.

For development and testing purposes, we created our own standalone testing page (see Figure 17) that included some custom debugging tools - namely a resizable container, a control panel to dynamically change diagram component parameters (e.g. the chart data range) and a possibility to switch between various data sets. This way we could quickly review multiple combinations of different settings and determine good defaults that work well for most use cases.



Diagrams

This page is not a part of the Bar chart MVP deliverable, its purpose is just to test the created components.
Delete this page and the test data before the final merge.

Standard horizontal bar chart
Datasets: **data01** data02 data03 data04 data05 data06 data07 data08 data09 data10 data11 data12 data13 data14
Container dimensions: 750 x 410
Custom range: dataMin - dataMax enable: ☐ (see docs)
Custom horizontal space: 120 enable: ☐
Enable custom mouse events: ☐

Standard vertical bar chart
Datasets: **data01** data02 data03 data04 data05 data06 data07 data08 data09 data10 data11 data12
Container dimensions: 750 x 500
Custom range: dataMin - dataMax enable: ☐ (see docs)
Enable custom mouse events: ☐
Chart height: 400
Show slider: ☑

FIGURE 17. TESTING PAGE EXAMPLES FOR THE DIAGRAM COMPONENTS

5.1.5 Documentation and support for the GoTriple development team for integration of diagram components

For the diagram components, we created both inline documentation and separate textual documentation.

The inline documentation consists of a description of each component. We declare the component parameters using TypeScript interfaces and types. Each parameter also has a short textual description that explains the parameter's usage and purpose. This way each parameter’s type is precisely documented and checked during build time.

The separate textual documentation consists of a component description together with basic usage examples, examples of the data accepted by the component, a data generation and pre-processing description, and a semi-automatically created documentation of the component parameters generated from the inline documentation.

5.2 Improvements to Head Start visualisations

In this section, we describe improvements that were made with respect to the visualisations of the longstanding open source knowledge mapping framework Head Start.

5.2.1 Frontend adaptations to TRIPLE data

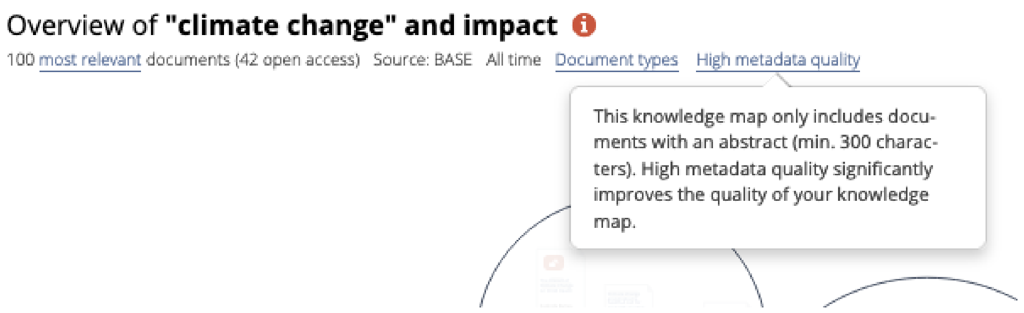
We adapted the Head Start interface to TRIPLE data, including context line and list items. When the respective TRIPLE data had not been included in the index yet, we decided to hide these items and functionalities in the meantime (e.g. PDF localization, open access filter etc.). We also added a new item to the context line that takes the language parameter specified in the search. We also enabled sharing and embedding functionality for the two visualisation interfaces. Finally, we created a TRIPLE skin where we adapted the CSS of the visualisations to the GoTriple design.

In the streamgraph, minor adjustments were made for the “to” and “from” date parameters in the context line to better reflect the time period for “most-recent” streamgraphs.

5.2.2 Improvements to knowledge map quality

During the work for this Task we substantially improved the knowledge map quality. First, we added a new parameter that gives users control over the quality of the documents included in a knowledge map. This filter also has an effect on the overall quality of the maps. Users can choose between “low” and “high metadata quality”. Knowledge maps based on high metadata quality only include documents with an abstract (min. 300 characters).

High metadata quality significantly improves the label quality of a knowledge map, as it provides more data for our keyword detection heuristic and the clustering and layout algorithms. Knowledge maps based on low metadata quality include documents with and without an abstract. Low metadata quality may significantly reduce the label quality of a knowledge map. In addition to the filters we added the information to our title and context line within the interface (see Figure 18).



Overview of **"climate change" and impact**

100 most relevant documents (42 open access) Source: BASE All time Document types High metadata quality

This knowledge map only includes documents with an abstract (min. 300 characters). High metadata quality significantly improves the quality of your knowledge map.

FIGURE 18. EXAMPLE OF HIGH METADATA QUALITY IN CONTEXT LINE

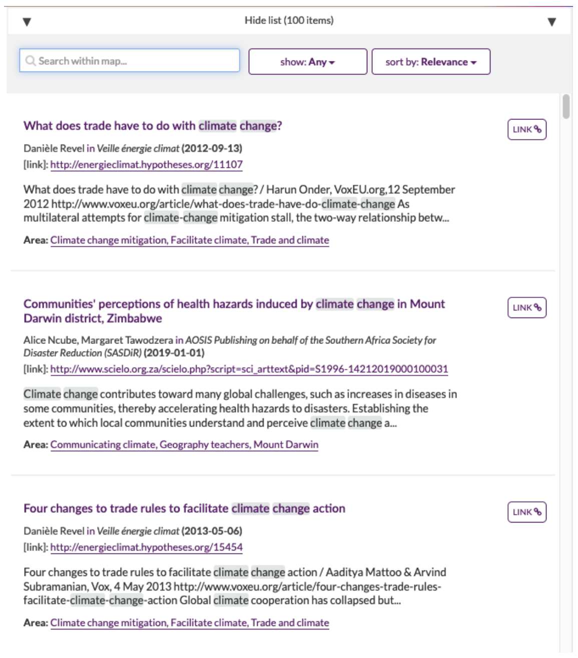
In terms of improving labels on knowledge maps, we were able to achieve significant improvements in comparison to the earliest prototypes developed on Isidore data. These improvements were not due to changes to the core machine learning pipeline, but came from additional metadata cleaning steps. These cleaning steps are tailored to the metadata of the GoTriple index and for example include removal of library classifications.

This is in line with experiences from similar projects, and validates our emphasis on upstream data quality. Since TRIPLE is still in the phase of adding aggregators and data sources, it is expected that keeping the data cleaning up-to-date is going to be an iterative process.

5.2.3 Highlighting of search terms

The feature pictured in Figure 19 was a request from users of our service on openknowledgemaps,org, who wanted to better understand why a document was included in the knowledge map. Popular search engines like Google Scholar provide a similar feature. The functionality helps users to put the search results into context and they can more quickly identify whether the document is relevant to their research.

We decided to highlight the users' search query within the documents title, journal, keywords and abstract. For the technical implementation of this feature, we have chosen the library *react-highlight-words*. Using the library, we developed a standalone component that automatically highlights either the search query terms, or the page search box terms. With this component, we can enable highlighting in any plain text on the page. It also supports text hyphenation and has basic configuration options.



What does trade have to do with climate change?

Danièle Revel in *Veille énergie climat* **(2012-09-13)**

[link]: http://energieclimat.hypotheses.org/11107

What does trade have to do with climate change? / Harun Onder, VoxEU.org,12 September 2012 http://www.voxeu.org/article/what-does-trade-have-do-climate-change As multilateral attempts for climate-change mitigation stall, the two-way relationship betw...

Area: Climate change mitigation, Facilitate climate, Trade and climate

Communities' perceptions of health hazards induced by climate change in Mount Darwin district, Zimbabwe

Alice Ncube, Margaret Tawodzera in *AOSIS Publishing on behalf of the Southern Africa Society for Disaster Reduction (SASDiR)* **(2019-01-01)**

[link]: http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S1996-14212019000100031

Climate change contributes toward many global challenges, such as increases in diseases in some communities, thereby accelerating health hazards to disasters. Establishing the extent to which local communities understand and perceive climate change a...

Area: Communicating climate, Geography teachers, Mount Darwin

Four changes to trade rules to facilitate climate change action

Danièle Revel in *Veille énergie climat* **(2013-05-06)**

[link]: http://energieclimat.hypotheses.org/15454

Four changes to trade rules to facilitate climate change action / Aaditya Mattoo & Arvind Subramanian, Vox, 4 May 2013 http://www.voxeu.org/article/four-changes-trade-rules-facilitate-climate-change-action Global climate cooperation has collapsed but...

Area: Climate change mitigation, Facilitate climate, Trade and climate

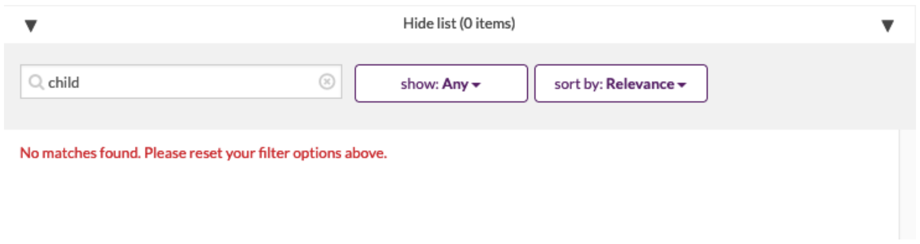
FIGURE 19. HIGHLIGHTING OF SEARCH TERMS FOR THE QUERY CLIMATE CHANGE

5.2.4 Improved behaviour of list filters

Most UX improvements aim to lower the barrier for users to interact with a tool. One way to achieve this is helpful feedback after an interaction leads to (from the user's point of view) unexpected behaviour e.g. no search results.

We provide additional search functionalities and filter options within our interface thus it is very likely that some searches lead to no results and in our case also to empty areas. In one of our previous user studies outside of TRIPLE we noticed that users were left quite confused by these empty areas and lists and some users couldn't figure out what to do next (e.g. reset filter). We decided to implement a helpful error message including a tip on how to proceed. We also implemented a delete button for the search box so users can more easily reset their search query (see Figure 20).

In order to reduce search errors, we have also improved the search capabilities. We now search for example within the tag fields. We also implemented a fall-back solution for cases where the keywords of a document are missing. Instead of leaving the field empty we added "not available" to the description.


Hide list (0 items)

child

show: Any

sort by: Relevance

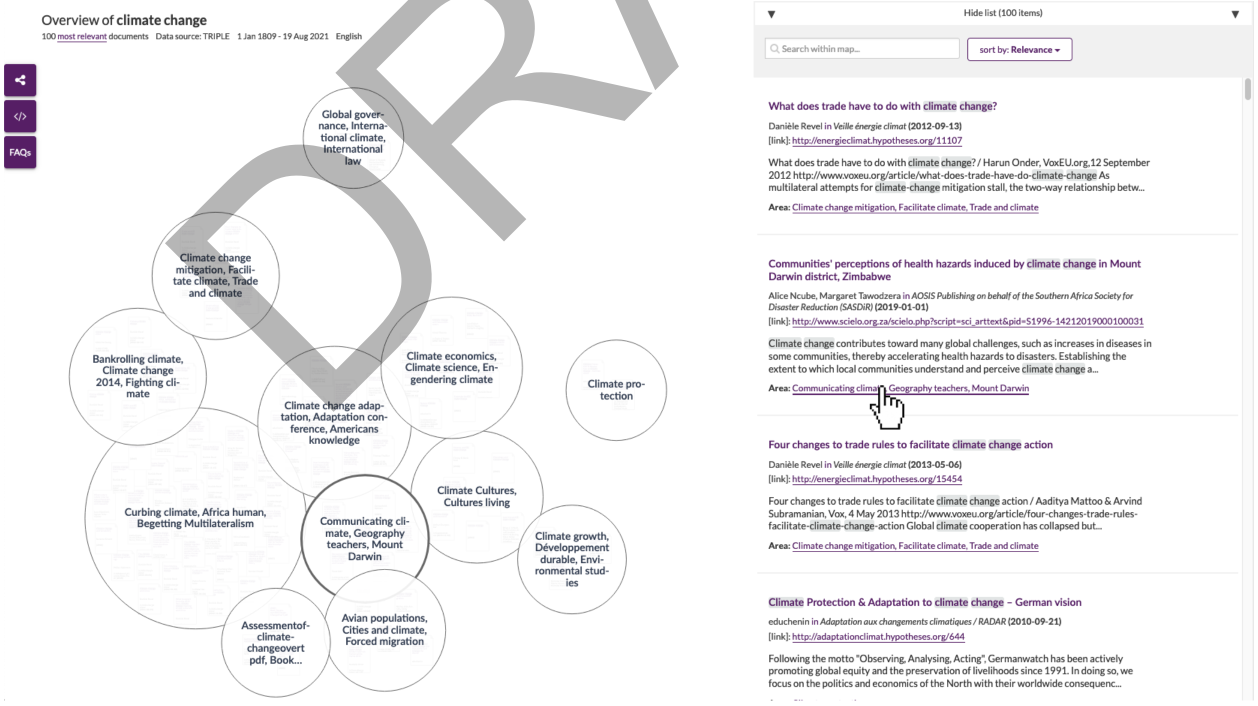
No matches found. Please reset your filter options above.

FIGURE 20. FALLBACK SOLUTION FOR EMPTY LIST SEARCH

5.2.5 UX improvements in the knowledge map

In order to better connect the map with the list items we decided to add a link to the research area (bubble) of each document. When hovering the link, the bubble is highlighted (thicker circumference) on the left (see Figure 21). This way users can easily identify what area the document belongs to and (roughly) locate the document on the map. When clicking on the link the user can see all documents related to the same research area. This feature was suggested by both our team and users independently.

We also improved the behaviour of the list when a document is selected and in a next step the user zooms out of the bubble. In this case, the list now automatically scrolls to the previously selected item (see Figure 22). The old behaviour (a zoom out would reset the list to its original state) confused our users because they would "lose sight of" the document. This improvement was proposed by our regularly recurring users.


Overview of climate change
100 most relevant documents Data source: TRIPLE 1 Jan 1809 - 19 Aug 2021 English
FAQs
Global governance, International climate, International law
Climate change mitigation, Facilitate climate, Trade and climate
Bankrolling climate, Climate change 2014, Fighting climate
Climate economics, Climate science, Engendering climate
Climate change adaptation, Adaptation conference, Americans knowledge
Climate protection
Climate Cultures, Cultures living
Curbing climate, Africa human, Begetting Multilateralism
Communicating climate, Geography teachers, Mount Darwin
Climate growth, Développement durable, Environmental studies
Assessmentof-climate-changeovert pdf, Book...
Avian populations, Cities and climate, Forced migration

Hide list (100 items)

Search within map...

sort by: Relevance

What does trade have to do with climate change?

Danièle Revel in *Veille énergie climat* **(2012-09-13)**
[link]: http://energieclimat.hypotheses.org/11107

What does trade have to do with climate change? / Harun Onder, VoxEU.org,12 September 2012 http://www.voxeu.org/article/what-does-trade-have-do-climate-change As multilateral attempts for climate-change mitigation stall, the two-way relationship betw...

Area: Climate change mitigation, Facilitate climate, Trade and climate

Communities' perceptions of health hazards induced by climate change in Mount Darwin district, Zimbabwe

Alice Ncube, Margaret Tawodzera in *AOSIS Publishing on behalf of the Southern Africa Society for Disaster Reduction (SASDiR)* **(2019-01-01)**
[link]: http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S1996-14212019000100031

Climate change contributes toward many global challenges, such as increases in diseases in some communities, thereby accelerating health hazards to disasters. Establishing the extent to which local communities understand and perceive climate change a...

Area: Communicating climate, Geography teachers, Mount Darwin

Four changes to trade rules to facilitate climate change action

Danièle Revel in *Veille énergie climat* **(2013-05-06)**
[link]: http://energieclimat.hypotheses.org/15454

Four changes to trade rules to facilitate climate change action / Aaditya Mattoo & Arvind Subramanian, Vox, 4 May 2013 http://www.voxeu.org/article/four-changes-trade-rules-facilitate-climate-change-action Global climate cooperation has collapsed but...

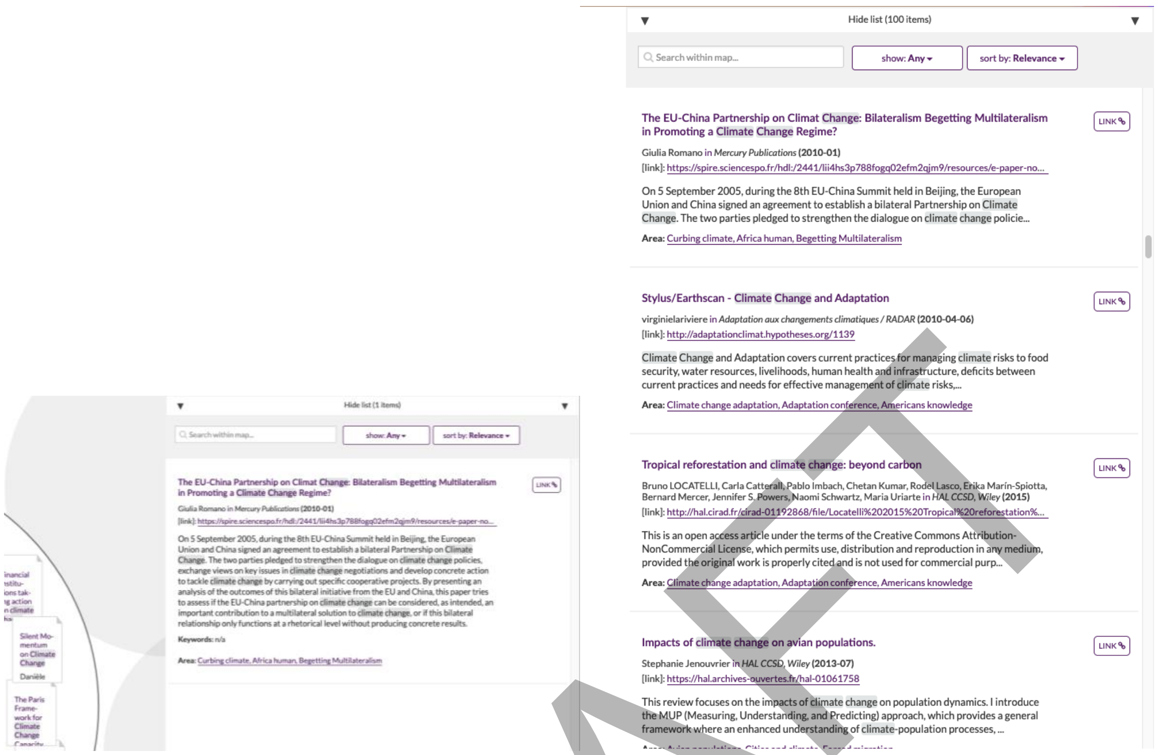
Area: Climate change mitigation, Facilitate climate, Trade and climate

Climate Protection & Adaptation to climate change – German vision

educhenin in *Adaptation aux changements climatiques / RADAR* **(2010-09-21)**
[link]: http://adaptationclimat.hypotheses.org/644

Following the motto "Observing, Analysing, Acting", Germanwatch has been actively promoting global equity and the preservation of livelihoods since 1991. In doing so, we focus on the politics and economics of the North with their worldwide consequenc...

FIGURE 21. HOVER ON LINK OF AREA TITLE IN THE LIST HIGHLIGHTS AREA ON THE MAP


Financial institutions taking action on climate
Silent Momentum on Climate Change
Danièle
The Paris Framework for Climate Change Capacity

▼ Hide list (1 items) ▼

Search within map... | show: **Any** ▾ | sort by: **Relevance** ▾

The EU-China Partnership on Climat Change: Bilateralism Begetting Multilateralism in Promoting a Climate Change Regime? LINK

Giulia Romano in *Mercury Publications* **(2010-01)**
[link]: https://spire.sciencespo.fr/hdl:/2441/lii4hs3p788fogq02efm2qjm9/resources/e-paper-no...

On 5 September 2005, during the 8th EU-China Summit held in Beijing, the European Union and China signed an agreement to establish a bilateral Partnership on Climate Change. The two parties pledged to strengthen the dialogue on climate change policies, exchange views on key issues in climate change negotiations and develop concrete action to tackle climate change by carrying out specific cooperative projects. By presenting an analysis of the outcomes of this bilateral initiative from the EU and China, this paper tries to assess if the EU-China partnership on climate change can be considered, as intended, an important contribution to a multilateral solution to climate change, or if this bilateral relationship only functions at a rhetorical level without producing concrete results.

Keywords: n/a

Area: Curbing climate, Africa human, Begetting Multilateralism

▼ Hide list (100 items) ▼

Search within map... | show: **Any** ▾ | sort by: **Relevance** ▾

The EU-China Partnership on Climat Change: Bilateralism Begetting Multilateralism in Promoting a Climate Change Regime? LINK

Giulia Romano in *Mercury Publications* **(2010-01)**
[link]: https://spire.sciencespo.fr/hdl:/2441/lii4hs3p788fogq02efm2qjm9/resources/e-paper-no...

On 5 September 2005, during the 8th EU-China Summit held in Beijing, the European Union and China signed an agreement to establish a bilateral Partnership on Climate Change. The two parties pledged to strengthen the dialogue on climate change policie...

Area: Curbing climate, Africa human, Begetting Multilateralism

Stylus/Earthscan - Climate Change and Adaptation LINK

virginielariviere in *Adaptation aux changements climatiques / RADAR* **(2010-04-06)**
[link]: http://adaptationclimat.hypotheses.org/1139

Climate Change and Adaptation covers current practices for managing climate risks to food security, water resources, livelihoods, human health and infrastructure, deficits between current practices and needs for effective management of climate risks,...

Area: Climate change adaptation, Adaptation conference, Americans knowledge

Tropical reforestation and climate change: beyond carbon LINK

Bruno LOCATELLI, Carla Catterall, Pablo Imbach, Chetan Kumar, Rodel Lasco, Erika Marín-Spiotta, Bernard Mercer, Jennifer S. Powers, Naomi Schwartz, Maria Uriarte in *HAL CCSD, Wiley* **(2015)**
[link]: http://hal.cirad.fr/cirad-01192868/file/Locatelli%202015%20Tropical%20reforestation%...

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purp...

Area: Climate change adaptation, Adaptation conference, Americans knowledge

Impacts of climate change on avian populations. LINK

Stephanie Jenouvrier in *HAL CCSD, Wiley* **(2013-07)**
[link]: https://hal.archives-ouvertes.fr/hal-01061758

This review focuses on the impacts of climate change on population dynamics. I introduce the MUP (Measuring, Understanding, and Predicting) approach, which provides a general framework where an enhanced understanding of climate-population processes, ...

Area: Avian populations, Cities and climate, Forced migration

FIGURE 22. EXAMPLE OF AUTOMATIC SCROLL (LEFT: SELECTED PAPER, RIGHT: AUTOMATIC SCROLL AFTER ZOOM OUT)

In addition, we enabled users to give knowledge maps a custom title. The automatic title is created from the query and is: "Knowledge map for [query]". This is fine for simple queries, but with advanced boolean queries, the title can become long and meaningless. Therefore, we enabled users to specify a custom title via a URL parameter.

5.2.6 Implementation of different keyword selection algorithms in the streamgraph

The selection of keywords to show in the Streamgraph is a crucial step in the pipeline. In the current state of the application we select keywords for streamgraphs by counting their occurrences and selecting the top keywords by absolute count. This method creates streams which are directly derived from the metadata without a layer of statistical intermediation. .

Additionally, we have implemented more advanced algorithms, among them non-negative matrix factorization (NMF) and Latent Dirichlet Allocation (LDA). NMF is a dimensionality reduction algorithm. NMF tries to find the main structural characteristics of a collection of documents by ranking keywords according to their "contribution to meaning".

LDA assumes that there exists an underlying distribution of topics, and each topic has a distribution of words. To find these distributions, LDA iteratively adjusts generative probabilities, until it finds distributions that produce the given documents. For each of the topics, the keyword with the highest probability of occurring is selected.

Over the course of the TRIPLE project so far, we have regularly evaluated the available algorithms whenever the upstream metadata in the TRIPLE database changed significantly. So far, one major adjustment has been to increase the input data set size by an order of magnitude from 100 to 1000, in comparison to the 100 documents we use for knowledge maps. This resulted in better-defined streams, which makes it easier to identify trends or to understand how much research has been done on the subject over time.

We also experimented with different metadata fields included in the GoTriple index for the labels. We started out with concepts, but found that the resulting streamgraphs showed uniform distributions that reflected the total number of documents at a given time rather than uncovering actual trends (see Figure 23). Keywords showed a less uniform distribution (see Figure 24), which is why we have settled on them for now. They are more specific and change more frequently than concepts, which makes them more suitable for use in the streamgraph. This is, however, not the end of the line and we will surely continue to experiment with the labels going forward.

5.2.7 Improvements to the streamgraph readability and understandability

One of the biggest challenges in Streamgraph visualisations is their overall readability. We have already implemented a guide that appears when users hover each stream. But in order to improve the readability of labels at first glance we have added the color of their respective streams to the label itself (Figure 24). Users can now clearly identify which stream belongs to each label.

In order to make the overall graph better discernible we decided to automatically narrow down the time frame in the backend to avoid long tails as pictured in Figure 23. We remove the first 5% of documents by means of cumulative counting sorted by publication date, and cut the time frame around the remaining 95%. This value is arbitrary but, in most cases, a good heuristic. This strategy has improved the readability of individual streams considerably (see Figure 24).

Finally, streamgraphs are based on up to 1000 documents. But not all of these documents can be assigned to the top keywords. In an earlier version all of the 1000 documents were included in the list. The problem however is that users have a hard time to understand the gap between the list and visualisation. It also creates the false implication that the streams represent all 1000 documents. For these reasons we decided to remove those documents from the list that couldn't be assigned to any of the streams.

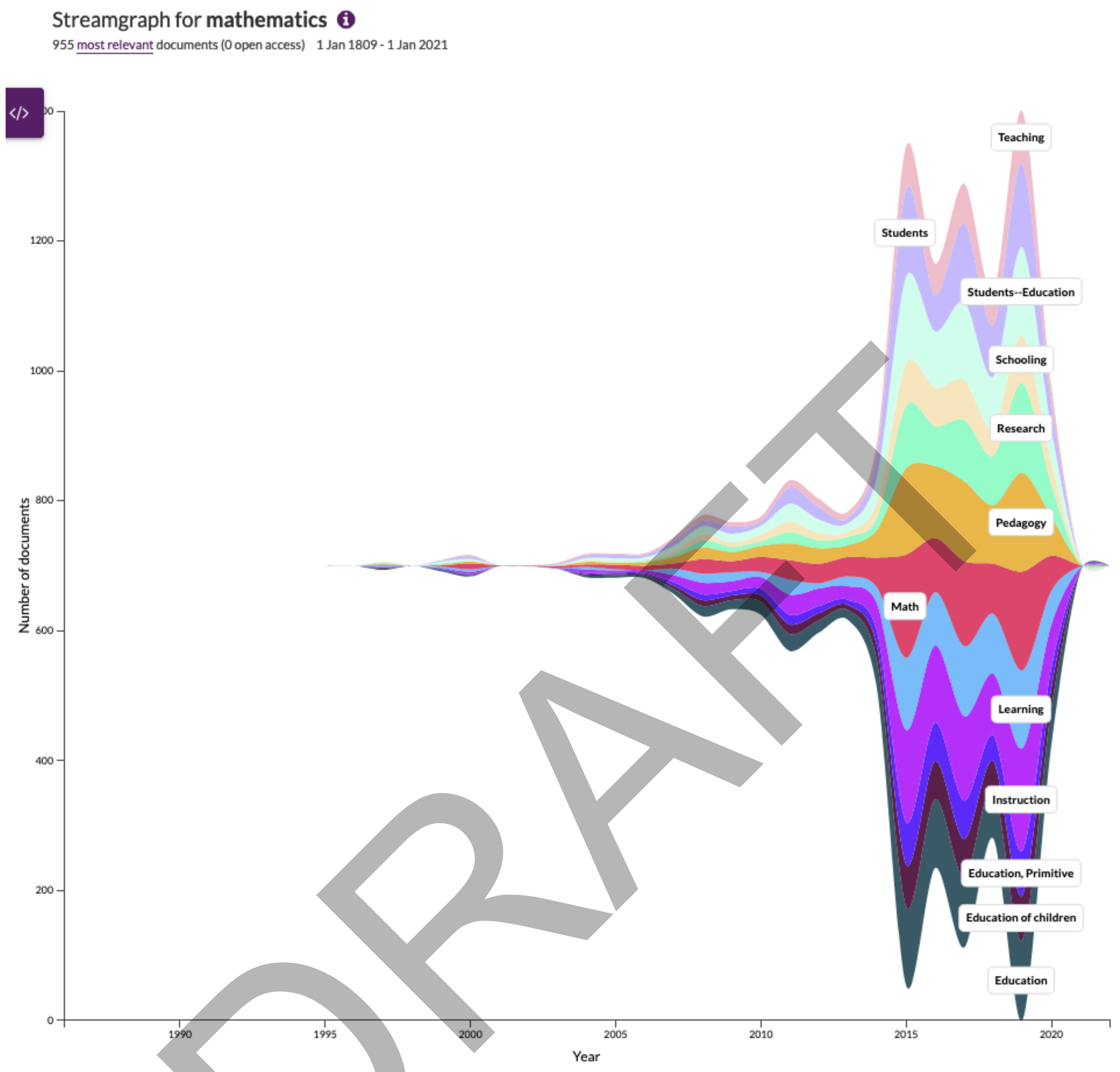


FIGURE 23. STREAMGRAPH BEFORE IMPROVEMENTS WITH A LONG TAIL AND LABELS BASED ON CONCEPTS

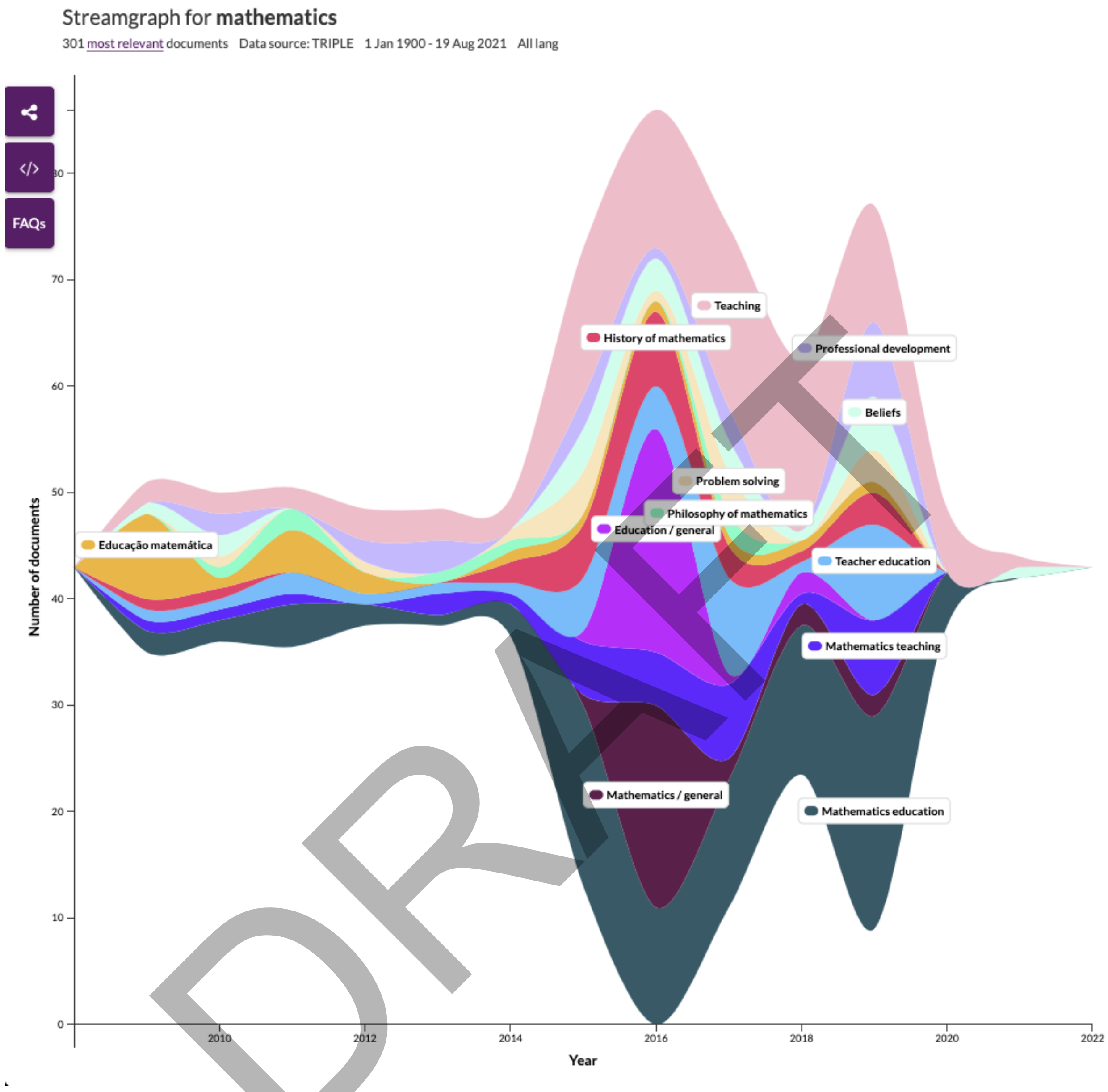


FIGURE 24. STREAMGRAPH AFTER IMPROVEMENTS WITH AN AUTOMATIC TIMEFRAME AND LABELS BASED ON KEYWORDS

5.2.8 Maintenance and bug fixing

In addition to new development we had to perform overall maintenance tasks. This includes bug fixes as well as security updates of 3rd party software that our Head Start client depends on. A security audit and related updates are performed on a regular schedule.

In the knowledge map, we also resolved several bugs related to animations, interactions, filters, and our Hypothesis integration. When it comes to the streamgraph, we solved bugs such as a delay that occurs when selecting a stream, and empty streams caused by faulty keyword selection.

In the streamgraph list, we refactored the filter feature. The list is filtered when a stream is selected (clicked) - only the papers that have the selected stream’s keyword are displayed. Originally the filter compared the selected stream keyword with each paper’s keywords. This could lead to bugs though, so we decided to filter the papers based on their IDs instead. Each stream has metadata that contains a set of paper ids that belong to that stream. When a stream is selected, we simply display only the papers with IDs from the set.

6| NEXT STEPS AND EVOLUTIONS

The development of the diagram components has been completed in the first 24 months of the project. In the remaining project time, we will provide support for them to the GoTriple development team and fix potential bugs that emerge down the line. There are, however, no further enhancements planned beyond that. Beyond the runtime of TRIPLE, we plan to explore integrating the diagram components with Head Start. In this way, we could for example make the geo map a standalone interface by integrating the diagram component with the textual components of Head Start (title, context line, list).

As for the Head Start visualisations, the following improvements are planned for M24-40. With respect to the knowledge map, we will design and implement new features related to citing papers and exporting the metadata to reference management systems. To be able to incorporate these new features, we are going to improve the layout of the list items. We will introduce further tooltips to provide more context and rearrange some existing items on the knowledge map (e.g. the cite this map feature) to improve their accessibility. We are also planning to refactor some components to reduce complexities in the code and achieve more flexibility for future integrations.

We will also continue to evaluate possible improvements when it comes to knowledge map quality. These include missing metadata enrichment based on syntax parsing and entity recognition. As for the labeling of areas, we will look into adaptive-length labeling and new quantitative measures of evaluating label quality.

Regarding the streamgraph, we will continue to experiment with the GoTriple metadata as it evolves and prototype mechanisms to improve the labeling of streams. The ultimate goal is to give users better insights and context to search results (e.g. visualize trends in research) that standard filter options of search result lists (e.g. filter for discipline) cannot provide. Furthermore, further UX improvements are planned (e.g. color scheme of streams).

Finally, we will continue adapting knowledge map and streamgraph to GoTriple data and enable functionalities once the required metadata becomes available (e.g. filter for open access documents).

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