



a
a n
a n c
a n c i

analysing

networked

climate

images

Interim Report 2020

Mixed Methods in the Humanities

– funding initiative of the Volkswagen Foundation

May 2019 – May 2020

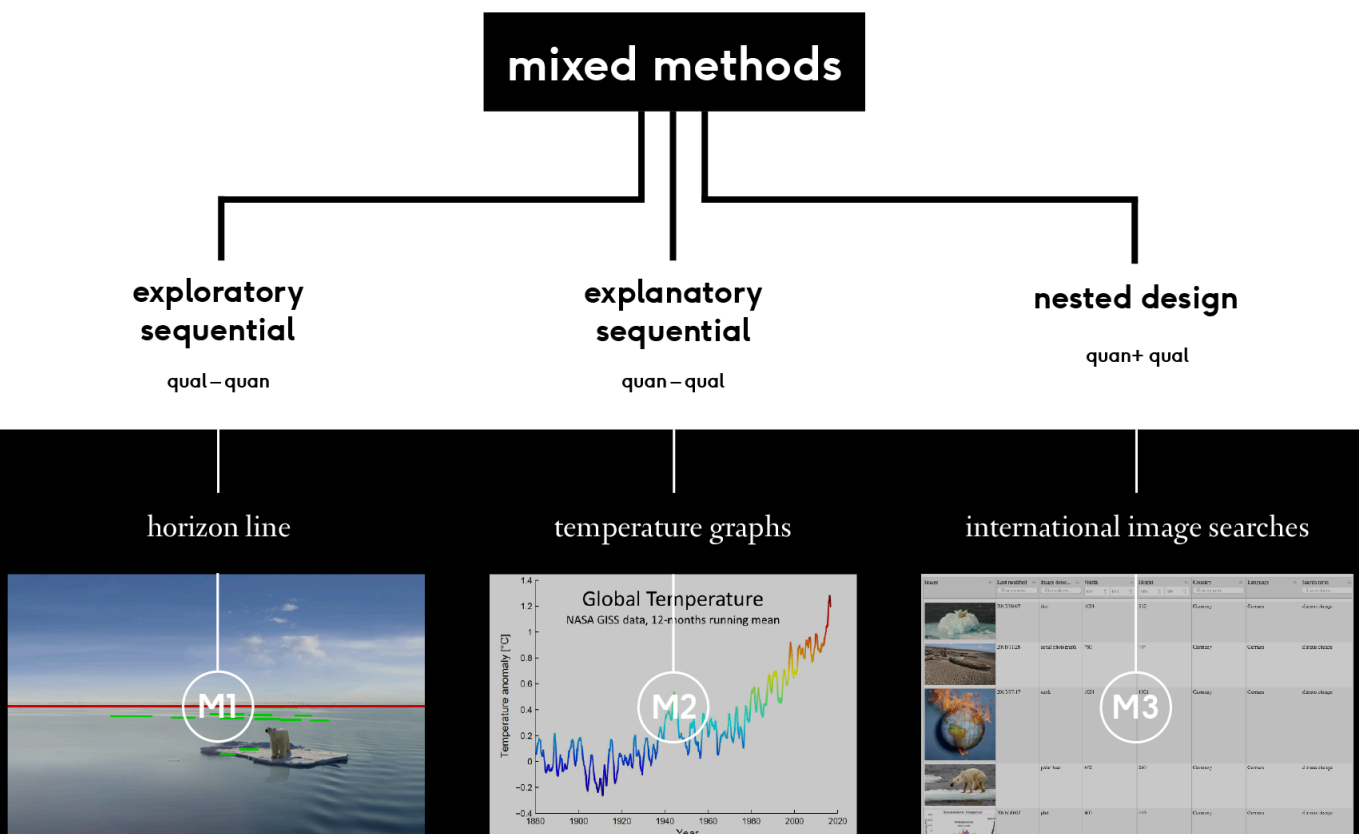
Our third interim report predominantly covers the research process of our third image analysis module. While the first module dealt with the horizontal line within photographs as a rhetorical element in climate change communication and the second module focused the analysis of stylistic differences between temperature graphs from different climate communication contexts, we now take a look at climate images in intercultural comparison.

This module is based on the assumption that the globally distributed archive of climate images created by different actors on the Internet contains essential insights that can be gained by analysing the distribution, migration, image types and frequencies of specific images. We pursued several small research approaches with the aim of analysing different locations and scales of climate communication on the Internet. The primary focus of this study was a cross-national set of images collected via the online search engine Google Images.

After two sequential method designs in the previous modules, a third mixed-methods approach, the so called *nested design* according to John Creswell (2003), allowed qualitative and quantitative research methods to be combined depending on the research focus, allowing a strong dialogue between methods because of their simultaneity and interdependence.

Creswell, John W. (2003)

Qualitative, quantitative and mixed methods approaches Thousand Oaks, Calif.: SAGE, S. 208-225.

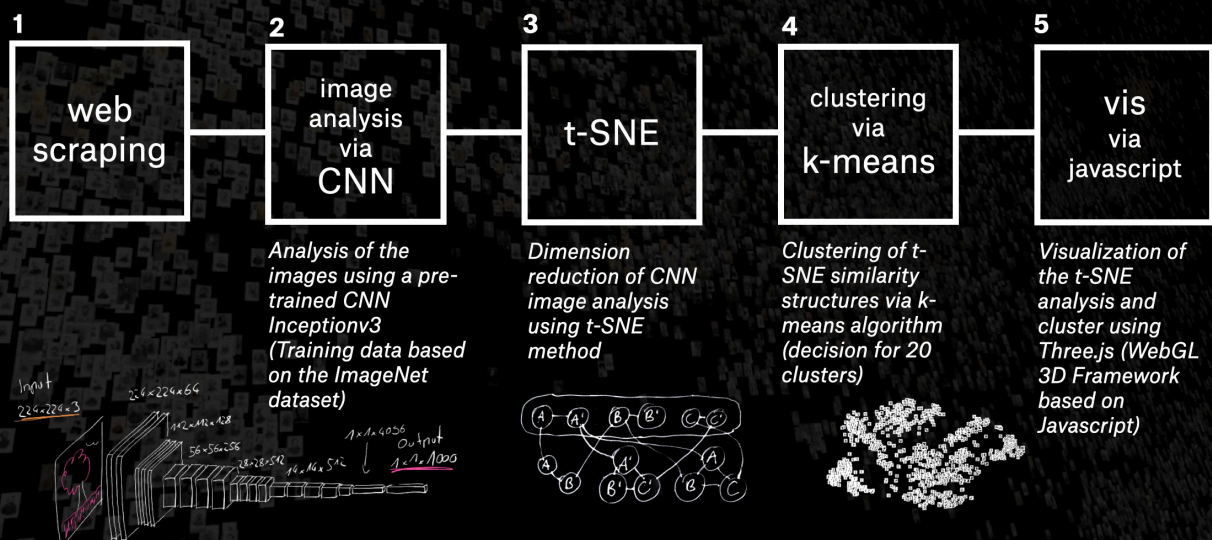


1 – Results of the third image survey

technical stack

After the preliminary conceptual considerations and the selection of spatial interest areas, so called locales, by a combination of quantitative and qualitative methods, we set up a stack of individual modules of quantitative data generation by web scraping, data analysis by means of machine learning algorithms, namely CNN (Convolutional Neural Network) and t-SNE (t-Distributed Stochastic Neighbor Embedding), and the subsequent presentation and visualization questions via Javascript-Frameworks in 5 sub-steps. We speak of the construction of a so-called method pipeline. The following graphic gives an overview and visualizes the content process:

method pipeline



qualitative analysis

Our qualitative approach is the so-called *visual framing* (cf. Entman, Robert (1993); Grittmann, Elke (2013); Geise, Stephani; Lobinger, Katherina (2013); Rodriguez, L., Dimitrova, D.M. (2013); Wozniak et al. (2014) in connection with the art historical approach of iconology (cf. Panofsky, Erwin: (1978) [1955]), since both methodologies of image definition have close similarities. The visualizations were viewed as a whole and then qualitatively clustered to their similarity criteria according to image types and main motifs. Following the four main frame elements of communication science, the international Google image outputs were assigned to their motifs according to the *criteria problem definition, representation of causes, approach to solution and moral responsibility*.

The creation of a screenshot table served as a basis for size comparison and a derivation of the results. The international Google image results could be divided into three predominant image types. Here sorted by size:

Photographs – divisible into a) a group of pictures on the subject of environment, nature, landscape, b) a group of people (conferences, politics towards protests/demonstrations), c) a group of pictures depicting the Earth and d) a group of pictures on the polar bear

Text-image documents – including pure text documents, documents with diagrams, covers of books and brochures, individual slides with text, activist posters with slogans, individual cards, cartoons or cartoon-style graphics, infographics and charts

Highly artificially designed photomontages (especially representations of contrast)

With regard to the photographs that formed the main object of analysis, it can be stated that Google's visual climate change communication is dominated by global, stereotypical content, which is characterized by recurring formal-stylistic features. The image clusters of cause representation (with the motives for CO2 emissions) and problem definition of the consequences (vulnerability: ice melting, flood disaster,

Entman, Robert (1993)

Framing: Toward Clarification of a Fractured Paradigm, Northwestern University

Geise, Stephani; Lobinger, Katharina

(2013) »You cannot unsee a picture!« Der Visual-Framing-Ansatz in Theorie und Empirie" In: Dies. (Hrsg.) (2013): Visual Framing. Perspektiven und Herausforderungen der Visuellen Kommunikationsforschung

Grittmann, Elke (2013)

Framing Visuals. Visual Frames – Framing Visuals. Zum Zusammenhang von Diskurs, Frame und Bild in den Medien am Beispiel des Klimawandeldiskurses. In: Geise, Stephanie/Lobinger, Katharina (Hrsg.): Visual Framing. Perspektiven und Herausforderungen der Visuellen Kommunikationsforschung. Köln: von Halem, S. 95-116.

Panofsky, Erwin (1978) [1955]

Sinn und Deutung in der bildenden Kunst, Köln: DuMont

Rodriguez, L.; Dimitrova, D.M. (2013)

The levels of visual framing. Journal of Visual Literacy, 30(1), S. 48-65

Wozniak, Antal; Wessler, Hartmut;

Lück, Julia (2014) Frames, Stories, and Images: The Advantages of a Multimodal Approach in Comparative Research on Climate Change. In: Environmental Communication: A Journal of Nature and Culture.

Results

drought, forest fire) dominate. An evident cluster is that of persons, which as the visual frame of the actors (clusters of persons on the subject of politics and protest) tends to be assigned to the solution-oriented frame. Various motifs point to the moral responsibility and emotions of the recipients: Striking in the Google images are in this respect concise clusters of images with photo montages, which show the earth in contrast as green and burning planets.

With regard to the country comparison, region-specific differences in the size of the image clusters as well as in the image content could be identified in individual cases:

Example 1 – While the Google search query on Bangladesh and Kenya contained the largest proportion of political (and local) person representations, the American, Australian and German queries contained hardly any or no images with persons from the political context.

Example 2 – The forest as a motif is shown internationally primarily as a burning problem of the consequences of climate change. Photographs showing the forest in its dryness with bare tree trunks only appear as clusters in the German t-SNE visualization. Photographs of forest fires dominate especially in Google images of the USA, Australia, the United Arab Emirates and Brazil.



reflections on the work with machine learning

On a technical-methodological level, questions were raised as to what role digital infrastructures such as web search engines play in the presorting and ranking of climate images and what the t-SNE method can achieve for digital methods of visualising image collections. In addition, the aim was to investigate whether qualitative human annotations were consistent with the t-SNE cluster.

The combination of machine learning and visualization is a challenging and productive method for studying large image data sets. It offers an alternative to graph-based layout methods and an alternative to purely keyword-based image research, where clusters are created by language alone. It also helps in the search for framings and the exploration of images per se. In the course of the study it became clear that this approach profoundly changes the epistemic practice of image analysis. Ultimately, it could still be made productive for qualitative image analysis, since it is still based on human interpretation.

2 – Research formats and investigations

Next to the process of the actual image analysis of the third module, we continued to expand our research to various formats of cross-disciplinary theoretical as well as practical exchange but also continued certain endeavours during the last year.

Hackathon II on climate images

We organised a second iteration of our hackathon format, this time with more international researchers. Over two days in mid September 2019, the hackathon brought together cultural and media studies scholars with programmers and interface designers to explore common questions on the analysis of (climate) images on the Internet using digital analysis methods. The outcomes range from classical data visualisation practices and data journalism projects to machine learning experiments which will be published soon on our website: anci.fh-potsdam.de.



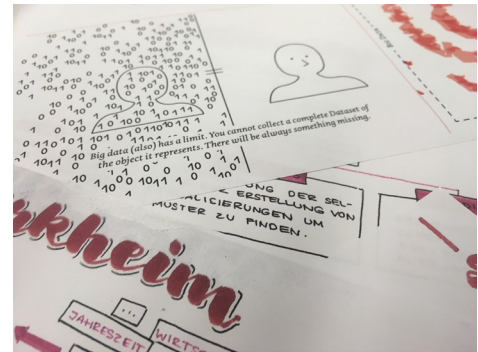
Workshop at DMI Amsterdam

In July 2019, we held a workshop during the Digital Methods Summer School 2019 with the theme of „Trolls, bots and dictators“ at the University of Amsterdam under the title „Climate image spaces – comparison of international image searches“. The workshop focused on the online circulation of images returned by search engine queries for climate change. The research results were documented on a publicly available wiki: wiki.digitalmethods.net/Dmi/ClimateImageSpaces#A_5:_Climate_Image_Spaces.



Seminar at Uni Potsdam

We also continued our teaching efforts during the last year. Therefore, we held a bachelor seminar at the University of Potsdam and the University of Applied Sciences Potsdam during the winter semester 2019/2020. Under the title of *Failed data images*, the seminar was dedicated to the limitations of visualisation and modelling techniques in general but also within a specific scope of climate modelling. The main outcome was a vocabulary of aspects of failed visualisation culture which will be also published soon on our website.



Academic contributions

Additionally, the research group was active in communicating research investigations in various gatherings of related digital humanities communities internationally. For example, we are preparing the publication of our research report of module two on the analysis of temperature graphs as well as an article contribution for the „Open Media Studies-Blog“ of Zeitschrift für Medienwissenschaft.

The individual research endeavours of our PhD students also resulted in some contributions. Paul Heinicker, for example, presented his research at the general assembly of the European Geosciences Union in May 2020 on the panel on „State of the Art in Earth Science Data Visualization“.

Heinicker also co-authored a chapter in reader of media theorist Jussi Parikka on the topic of planetary diagrams.

Open Media Studies Blog – <https://www.zfmedienwissenschaft.de/online/open-media-studies-blog/blog/digitale-medien-und-methoden>

EGU 2020 – <https://meetingorganizer.copernicus.org/EGU2020/session/35811> (<https://meetingorganizer.copernicus.org/EGU2020/session/35811>)

Chapter contribution – Heinicker, Paul, & Likavčan, Lukáš. Planetary diagrams: Towards an autographic theory of climate emergency. In: Dvořák, Tomáš – Parikka, Jussi (eds.), *Photography Off the Scale: Technologies and Theories of the Mass Image*, Edinburgh University Press, Edinburgh, forthcoming)

3 – Expansion and cooperations

We are still invested in extending our research network across disciplines. Last year efforts to increase our outreach to both research peer groups as well as a public audience was greatly successful. Especially the research of module 3 was a highly collaborative effort that was gathered during the mentioned workshops and various discussions within our DH network in Potsdam as well as particular affiliated researchers within our network.

Connections to climate researchers

On site in Potsdam, we are working on the foundation of a new working group in 2020 within the framework of the Network for Digital Humanities of the University of Potsdam. The working group with the working title *Digital Cultural Data* will deal within the digital humanities with digital cultural data from GLAM institutions (galleries, libraries, archives, museums).

Internationally, we continued to take part in cross-discipline exchange, for example we attended the *Visual Climate Change* workshop in January 2020 in Exeter, UK. This event allowed in depths conversations with leading industry partners of climate communication like World Press Photo Foundation and Getty Images and various British climate communication researchers.

Ongoing collaborations

We were to establish a solid network of climate researchers after, for example, last years visit at the Department for Digital Humanities at the *King's College* with whom we collaborated at the DMI workshop in Amsterdam, namely Jonathan Gray and the visualisation experts of the Density Design Lab in Milano, and started to conceptualise the research plans of our fourth module together.

Going public

In terms of efforts towards a more public engagement we both engaged in strategising potential pathways for the future of our research insights as well as a general communication towards a broader audience. Regarding the former we participated in the *Idea Converter* which is an event format for the further development of scientific ideas in line with the University of Potsdam's understanding of transfer. Using creativity methods, we further developed the scientific results of the *anci* research project to reflect on applications and potentials during and after the funding period. In terms of the latter, our project also participated in the Potsdam Day of Sciences and Humanities in May 2019 as part of the network for digital humanities to inform guests and visitors about digital methods of image analysis in the field of visual climate communication.

The project *anci* will be part of the Humboldt Labs exhibition at the Humboldt Forum, opening in September 2020 (might be delayed due to the covid-pandemic). Since March 2019, the team of the DH project *anci* has been cooperating with the Humboldt Lab *Bild Wissen Gestaltung*: In the exhibition space *Die Krise der Natur (The Crisis of Nature) within the Humboldt Forum*, part of the current image study on the topic of international climate image comparison will be on display. Both methods of digital image science will be presented as well as the results of the digital methods for visual climate change communication based on the international Google search query.

4 – Outlook

The experiences and insights of the three previous image analysis modules are also those that we want to take into special consideration for our forthcoming fourth and last image study. After getting closer to a more profound method combination following Creswell's nested design in contrast to our earlier experiments with his sequential method designs, we want to intertwine both quantitative and qualitative methods during the project even more closely or to a distinct where it is very hard to separate them at all. Due to our perennial experience it became clear that there are aspects of each method type in its respective counterpart and a more thorough method design would benefit in terms of analysis depth.

We are currently planning the method design for an analysis of the visual meandering of networked images across platform on the Internet as our upcoming fourth module. We are interested how climate images actually travel across the Web. Still following the notion of catch-images, we want to understand how certain image tropes get generated in certain contexts, how they transfer into different places across the Web and particular platforms, and which parties are included in the sharing process.

In our last months of the funding schema we are also wrapping up the whole research process by preparing our insights for our website which we recently have redesigned and are now busy with filling with content. Additionally the whole project will conclude in a conference setting later this year, which can hopefully take place despite the Covid-19 circumstances.

