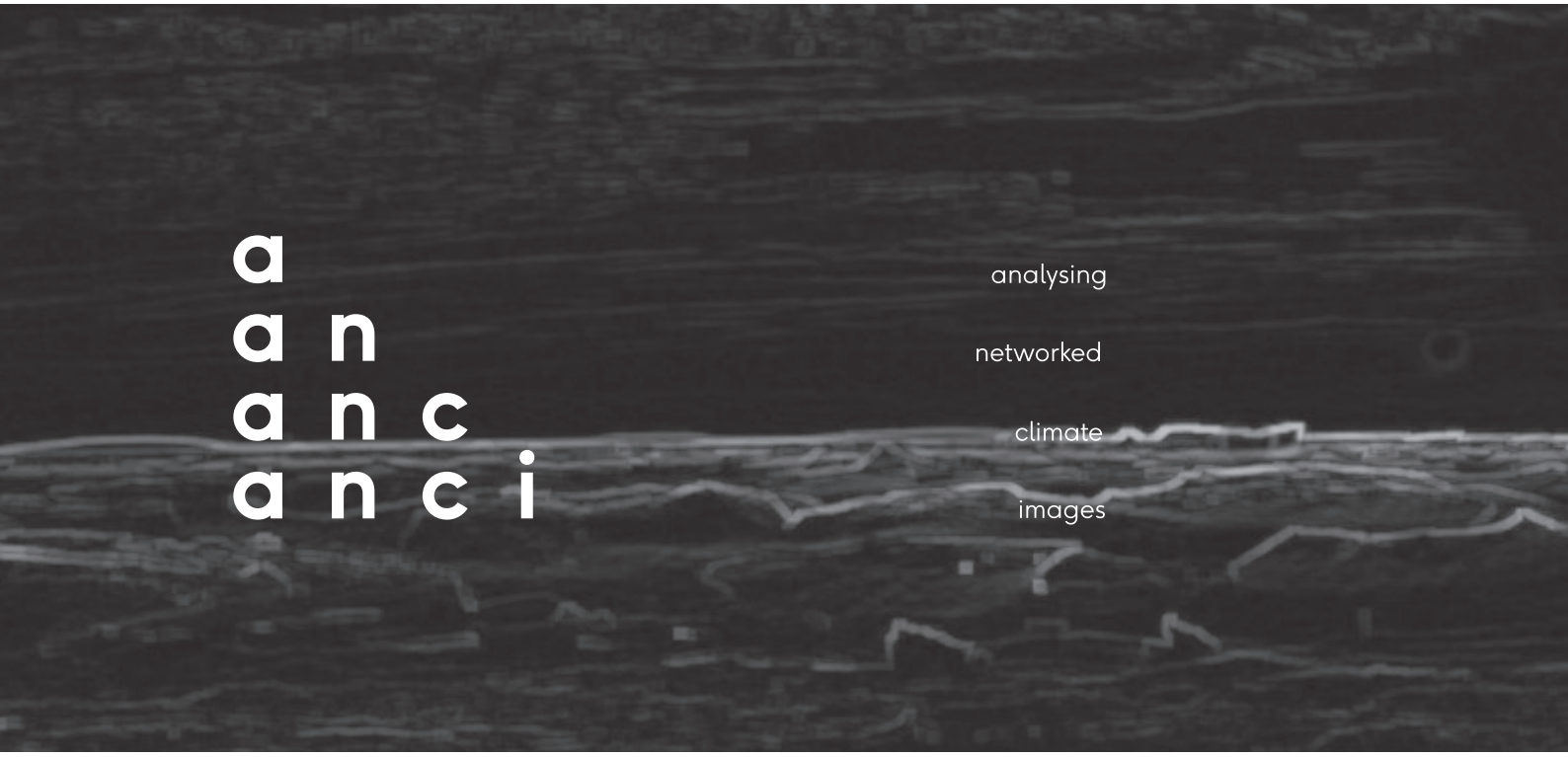
Interim Report 2019



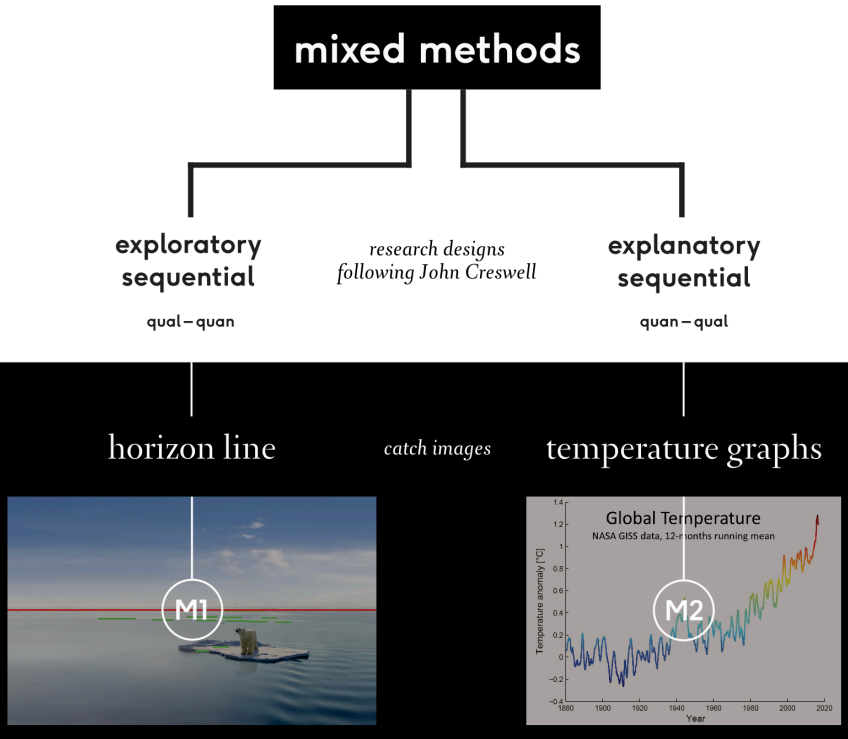
Mixed Methods in the Humanities

– funding initiative of the Volkswagen Foundation

July 2018 – April 2019

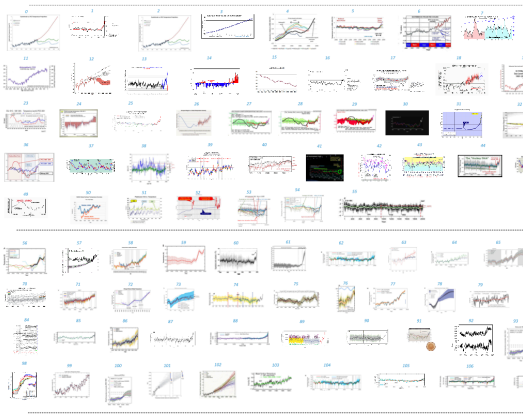
Our second interim report covers the research process of our second image analysis module which we worked on from February 2018 to March 2019. While the first module dealt with the horizontal line within photographs as a rhetorical element in climate change communication, we were then focussing on diagrammatic representations. The research interest was the analysis of formal and stylistic differences between temperature graphs of climate change deniers in contrast to graphs of climate research institutes and the intergovernmental body of the IPCC. Our goal was to determine differences in visual climate communication by comparing the images of these corpora.

Similar to the first module, we were interested in how the translation of quantitative and qualitative image analysis expresses itself and how method-specific questions and similarity criteria may change. Once more, we oriented ourselves towards the mixed method research designs from the social sciences, in particular by John Creswell, who understands the mixed methods approach as a methodology. The second module followed his conception of the explanatory sequential design. Here, the qualitative analysis came after an initial quantitative analysis. The intention was to contextualise results from quantitative methods and fill explanation gaps resulting from a mere number-based evaluation.



1 – Results of the second image survey

anci miner



For the quantitative approach we developed several web scraping and computer vision algorithms of which some merged into re-usable and adaptive tools. For our corpus formation, for example, we developed an in-house tool especially, called anci miner, to create an image corpus on the basis of *Google Image* search queries and according metadata enhanced via simple machine learning.

computer vision & qualitative reflection

In a second step, we used different computer vision algorithms and visualisation techniques to identify iconic criteria with which graphs of climate change skeptics can be distinguished. As a result, the following comparison criteria were able to define four trends how deniers, in contrast to the research-oriented reference groups, communicate:

More horizontal lines – The design of the grid in graphs of skeptics is usually more dense, for example to refer to certain data gradients in more detail.

More characters – Graphs of skeptics show the most extreme maximum values in the usage of characters. A tendency towards an excessive usage of annotation elements.

Higher entropy – Similar to the characters, skeptics graphs show the most extreme values for information density areas calculated by a Shannon-entropy algorithm.

Specific color clusters – The analysis of color usage within graphs of skeptics showed a particular cluster of dominant black values (for annotations) in contrast to the other contexts.

These quantitative distributions were subsequently analysed by qualitative methods on the basis of random samples. The selection of these samples was deliberately based on the quantitative result and its maximum values, that became apparent from the statistical survey and were especially evident in the images of the climate deniers in comparison to those of the *IPCC* and the climate institutes. Qualitatively, the quantitative measurements could be traced in their tendency using diagrammatic, iconic and rhetorical methods. For example, the increased use of dense horizontal lines in the diagram areas within the climate skeptics corpus, could be interpreted as a means only to suggest scientific validity on a stylistic level. In fact, these dense horizontal lines make a scientific reception of the line graph more difficult, because the data of the coordinates cannot be reconstructed. Emphasising the shape of the (mostly non-rising) curve line, the focus in the reception is directed to the negation of climate change.

As an overall reflection to this mixed method design and previous combination of methods, we derive the following core translation problems:

1 — A strict separation of the methods between qualitative and quantitative was difficult to maintain. The qualitative and quantitative image analysis often share components of each other. The errors in algorithms (scraping and quantitative analysis) were compensated by manual qualitative interventions and on the other hand the qualitative interpretation of the image comparison requires quantitative processes such as counting, ordering and collecting when creating the corpus and determining the similarity criterion.

2 — We noticed the shift of the similarity criterion while translating the two methods, for example the case of analysing image entropy when the quantitative pixel density turned into a high dense of semantic annotations from a qualitatively-humanistic perspective.

3 — Dealing with algorithmic images, we had to face their dualistic character. On one hand the material and visible image phenomenon – the underlying image structure as intangible data on the other. Communicating between both turned out to be challenging. Therefore, the role of visualisations as a medium of insight into the data, but also as a mediator between the methods needs to be highlighted.

2 – Research formats and investigations

Next to the process of the actual image analysis of the second module, we expanded our research to various formats of cross-disciplinary theoretical as well as practical exchange during the last year.

Workshop

In September 2018 we held a symposium at the Brandenburg Centre for Media Studies in Potsdam on the topic of the *digital gaze*. Within the framework of this conference, we brought together various perspectives on the comparison of digital images. With the help of a variety of voices from researchers of art history, social sciences, computer vision and information design, we were able to retrospectively highlight three key views: The method-centered clouded view, the alternative perspectives as criticism and re-evaluation of existing techno-centric views as well as the constructed view. A conference report was published **via arthist.net**.

Conference report – https://arthist.net/reviews/20481/mode=conferences

Hackathon

On a more applied level, we organized a hackathon in cooperation with the *Interaction Design Lab* at the University of Applied Sciences Potsdam in November 2018, supported by the newly founded network *Digitale Geisteswissenschaften* of the Potsdam University. Over two days, the hackathon grouped ten cultural and media scientists and programmers to explore common questions on the analysis of climate images

on the Internet using digital analysis methods. Using the datasets of our existing climate image archives as well as pre-scraped datasets from Instagram, we examined the possibilities of analyzing images using a variety of digital methods of comparison. The outcomes range from classical data visualization practices and data journalism projects to machine learning experiments. The outcome of the hackathon is about to be published on our **website**.

anci website – interface.fh-potsdam.de/anci

Seminar

We were also interested in the possibilities of developing new insights with students in a context of teaching. Therefore, we held a bachelor course at the University of Potsdam during the **winter semester 2018/2019**. Under the title of *Der Bildvergleich und sein Medium - Von der Diaprojektion zu den Algorithmen*, the seminar was dedicated to current digital methods and web services in which image comparison occurs as a (conscious) methodology and critically examined its epistemological potential. The main outcome was a glossary of image comparison which will be also published on our website.

Course catalog – https://emw.fh-potsdam.de/studium_vv.php?sort=0&sg=ba&sem_num=38

Conference contributions

Additionally, the research group was active in communicating our research investigations in various gatherings of related digital humanities communities in Berlin and Potsdam. For example, we attended a conference of the *Gesellschaft für Informatik* in September 2018. The according publication can be found in the **Digital Library** of the *Gesellschaft für Informatik*.

Conference paper – https://dl.gi.de/handle/20.500.12116/16994

3 – Expansion and cooperations

We are heavily invested in extending our research network across disciplines. Only now, after the completion of our second module, our project contents, our ideas for digital tools for climate images and our methodological orientation have sharpened to such an extent that contacts with university departments or institutions have increasingly developed. The expansion of our network will take a lot of time and we want to use our previous experience to communicate increasingly large questions on climate change on an image level also outside of science as well.

Connections to DH departments

Since October 2018 we are involved in the efforts around the *Network for Digital Humanities* based at the University of Potsdam. During a research trip to London in March 2019, we also established close contacts with the department for Digital Humanities at the *King's College* and *King's Digital Lab*. We will This enables us to exchange information on our current study on the intercultural image comparison of climate change as well as on current digital methods and visualisation techniques. We are currently expanding these contacts into intensive research collaborations.

Collaborations with research groups

On the other hand, we also reached out to other research and more applied organizations. For example, we are in contact with researchers at *WikiData*, the col-

laborative knowledge archive of the *Wikimedia Foundation*. Additionally, on a methodological level, we try to expand and share our knowledge with connections to the *Digital Method Initiative* led by Richard Rogers in Amsterdam, where we will be part of their Summer School in July 2019.

Going public: Tag der Wissenschaften & Humboldt Forum Berlin

Finally, we also are interested in sharing our knowledge in public contexts. In May 2019 we will share our previous research insights to a public audience during the *Potsdamer Tag der Wissenschaften*, where we will also test the first iteration of an image classification tool.

In cooperation with the *Humboldt-Forum*, which will open in September 2019, we are helping to conceptualize an upcoming interactive media installation about climate change with the help of our research foundations and the research investigations of the upcoming third module.

4 – Outlook

The experiences and insights of the two previous image analysis modules are also those that we want to take into special consideration for our forthcoming third image study. We want to dissociate ourselves more from the sequential design model and want to intertwine both methods during the project more closely or nested, or even dissolve the separation of them completely. An according *anci method design* would especially focus and incorporate flexible image structures, changing similarity criteria, and a flexible and interdisciplinary combination of methods.

We are currently planning this method combination for an intercultural image comparison that analyses the similarities or differences in climate change communication and ask: Which of the so-called *catch images* exist in other countries and how do they differ? Which types of images are globalized and which have specific cultural characteristics? To take up Aby Warburg's term of the migration of images: Which motifs may migrate geographically and change in their style and symbolism depending on the cultural region?