

Summary of the Workshop on Visual Methods and Analyzing Visual Data in Human Computer Interaction

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Abstract

Visual methods have become increasingly vital in Human Computer Interaction (HCI) research, particularly as we analyze and interpret the complex visual data that emerges from various interaction modalities. However, the methodologies for analyzing this visual data remain underdeveloped compared to textual data analysis. This workshop seeks to unite HCI researchers who work with visual data—such as hand sketches, photographs, physical artifacts, UI screenshots, videos, and information visualizations—to identify, name, and categorize methods for analyzing visual data in HCI.

CCS Concepts

• **Human-centered computing** → **HCI theory, concepts and models.**

Keywords

Research Methods, Qualitative Coding, Analyzing Visuals

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1 Motivation

As visualization (VIS) and human computer interaction (HCI) scientists, researchers and practitioners, we are deeply involved in analyzing visual data. We use the term, visual data, to mean artifacts that have been created to be seen, for instance, hand sketches [26], photographs [5], physical artifacts [2], screenshots of graphical user interfaces [10], videos [12, 22], information visualizations [19], and others. However, while we are rapidly moving towards more active use of qualitative methods in empiricism, the emphasis on qualitative approaches has favored verbal and textual analysis (verbatim,

transcript, etc.). In contrast, more and more researchers in psychology [20] and ethnography [18] and other domains are describing new methods for analyzing visual data. However, the recognition of and formulation of these methods in HCI and VIS still remains poorly defined. For instance, we do not have a common methodological language and vocabulary to speak about the variety of visual methods that are already in use. This workshop is especially relevant for the ACM interactive surfaces and spaces community because 1) visual data is an emerging trend, 2) visual data is particularly relevant for studying diverse interaction modalities, and 3) visual methods have proven their usefulness in studying surface applications and human interactions [11, 22, 24].

In this workshop, we aim to gather the HCI community of researchers who use qualitative methods when analyzing visual data to identify and clarify their specific findings. We aim to collect and reflect on the strategies, processes, and challenges of using visual data as material for qualitative analysis. We will explore the methodologies and workflows involved in analyzing visual materials within qualitative human-centered research. In particular, we would like to address the challenges of the visual data analytical pipeline from raw data to the final analysis results. Both static and moving visuals play a pivotal role in qualitative inquiry, notably within the visualization community that engages in the collection, analysis, interaction with, and presentation of visual data. Different in form but in some ways in parallel to text, visual data presents distinct challenges necessitating specialized analysis techniques, processes, and expertise for thorough analysis and theory development. Researchers often find themselves modifying existing qualitative methods or innovating new approaches to meet the unique demands of visual data. In this workshop, we want to gather people in HCI community who are interested in using and discussing the use of visual methods in their research to build a common language and outline the challenges and opportunities of these approaches.

2 Background

The history of scientific objectivity, from detailed visual observations to theory development, highlights the crucial role of visuals in science. Iconic illustrations, like Leonardo da Vinci's anatomical studies in the fifteenth-century [9], eighteenth-century botanical atlases [15], and snowflake catalogs in the late nineteenth century [4] show how visual data has profoundly influenced scientific inquiry and knowledge sharing.

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Similarly, in social sciences, visual methods help uncover societal dynamics, explore cultural artifacts, and understand human behaviors, underscoring their lasting importance in academic research [3, 21].

In the digital era, visuals remain central to scientific inquiry, evolving with new technologies. The expanding field of data visualization illustrates the ongoing importance of visuals in science and communication, where visual methods are key to analyzing and sharing complex data. This field fosters innovative techniques and tools, enhancing our understanding of how humans interact with data visualizations.

Visuals of various forms are commonly used in qualitative studies, however, they have received less attention in terms of methods for qualitative research. Compared to textual data, visual data poses unique challenges in interpretation and analysis. Visual data often requires specialized tools, techniques, and expertise for effective analysis, which may not be as available or standardized as those for textual data analysis. The complex nature of visual information, including its non-verbal aspects, subjective interpretation, and contextual nuances, further complicates the development of comprehensive research methods.

As a result, researchers working with visual data often need to adapt existing qualitative methods or develop innovative approaches to suit the specific characteristics and demands of visual materials. Current techniques for qualitative coding with visual data, such as hand sketches, photographs, physical artifacts, screenshots, videos, and information visualizations, involve a blend of traditional and digital methods. Approaches like thematic analysis and grounded theory are often adapted to include visual content, where researchers identify recurring patterns and themes directly from visual elements [8, 16]. Tools like NVivo¹ and Atlas.ti² have evolved to support coding visual data, allowing researchers to annotate images and videos, link visual elements to codes, and analyze these alongside textual data. This integration of visual data into qualitative analysis helps uncover nuanced insights that might be missed with text alone [21].

However, there is still room for development and refinement in this area to fully unlock the potential of visual data in qualitative research. The recent rapid adaptation of emerging technologies for capturing, storing, presenting, and analyzing visual data calls for thorough exploration to unlock its full potential. Our workshop explores visual methodologies used in qualitative research with or for HCI and visualization, thereby deepening understanding and enhancing qualitative research. In light of this workshop, we aim to reveal the rich space of qualitative methods with visual data.

3 Visuals and Qualitative Research in Human Computer Interaction & Visualization

Visual data is a staple in HCI-related research. There are two primary categories of visuals by production: 1) Visuals from design endeavors, such as artifacts manifested as visuals crafted by workshop participants, and visualizations by practitioners (e.g. dynamic or static visualization techniques, sketches, and physicalizations, and disseminated across social media, news media, exhibitions, and

other mediums). Such artifacts are rich data repositories and enable researchers to delve into practices like design patterns and design space exploration (e.g., [1, 2, 14, 25, 28]). 2) Visual data harvested through empirical investigations. Contrary to a machine-centric approach leveraging statistics and algorithms for data processing, data visualization has witnessed a paradigm shift towards a human-centric focus, accentuating the perceptual and interactive facets with individuals and societal contexts (e.g., situated visualization and input visualization [6, 7, 17, 27]). Empirical inquiries channel qualitative research to fathom subjective feedback, and delineate challenges by scrutinizing the process entailed in the work practices or experience with visualizations, through observation [13, 29]. Innovations in design study methodologies have emerged, drawing inspiration from qualitative methods inherent in ethnography, and action research, encompassing observational techniques like fly-on-the-wall [23].

Visual data plays a pivotal role across qualitative research within visualization and HCI. A thorough examination of contemporary methodologies for collecting analyzing and utilizing visual data in qualitative research can enrich the methodological arsenal of the HCI community, and concurrently broaden the reach of visual methods employed within this community across the expanse of social science research.

4 Goals

Our goal during the workshop is to specifically address the following points:

- Gather a community of practice of qualitative visual methods inside the Human computer interaction and Information Visualization community.
- Building a common methodological vocabulary for visual methods.
- Start a collective reflection on visual methods in HCI including, sharing strategies, practices and processes.
- Identify and list the challenges for visual data analysis including the one relative to mixed methods, qualitative and quantitative analysis.
- We would like also to discuss tools and systems for assisting visual methods.

5 Topics

In this workshop, we mainly focus on visual data produced by humans in the context of HCI and Visualization research. We would like the researcher to send us reflections on their visual data analysis practice either on the work done during a published paper or an ongoing work. Topics include

- Reflection on the challenges, opportunities and needs of visual data analysis methods in HCI.
- Reflection on visual data analysis methods.
- Objectives and motivation of coding visuals data.
- Coding techniques and methods for coding visual data.
- Reflecting of the pipeline of coding visual data.
- Description of new analysis methods of visual data.
- Reflection and development of new tools to support qualitative coding of visual data.
- Reflection, Opinions, critics to existing visual methods.

¹<https://lumivero.com/>

²<https://atlasti.com/>

- Reflection on the adaptation of coding methods from other fields (e.g., Graphic design, Art history, Cultural study, Ethnology, Psychology) to visualization and HCI
- Combining qualitative and quantitative methods in visual data analysis (e.g., AI) to support coding, identify rich insight from visual materials
- Reflection on the epistemology of visual methods.

6 Submission format and deadlines

We will invite contributions of different types: 1) reflexive notes on your own experience to analysis visual data in their actual or previous research, 2) Discussion on other relevant research using visual data or visual methods, 3) Future ideas of visual methods and/or visual data analysis. Contributions length is between 1 to 3 pages. It could be made as normal double-column paper or as pictorials: focus on describing and illustrating the process of analyzing the visual materials in one work or works done before.

The timeline for the workshop organization is as follows:

- October 10, 2024: Deadline for Paper Submission
- October 17, 2024: Notification

7 Agenda

We plan to have a half-day workshop with both paper presentations and more interactive activities. To facilitate group discussions in this workshop and ensure engagement from both online and offline participants (a hybrid chair will be in charge of taking care of remote participants), each table will have a laptop with an active Zoom meeting. Additionally, an instructor (a volunteer from among the participants) will be assigned to each table to take notes on the Miro board.

Introduction & Paper Presentations - 1 hour First, the Workshop chair will quickly introduce the session. Then, each accepted paper will have approximately 5 minutes for presentation. During the presentation, we will ask the audience to list their questions in a Miro Board. Then participants will go to the coffee break and during this period the organizer will cluster the questions of the Miro Board to define the topics of the group discussion.

Coffee break

Affinity diagram activities - 1 hour 30 minutes : After the coffee break, we will invite the participants to sort printed cards that represent research papers and position papers including the one submitted to the workshop. The sorting of these papers will happen through a visual method: a gigantic physical affinity diagram (and a virtual one for remote participants). We will invite participants to identify differences and commonalities between the methods used, and the types of data and characterize clusters of opportunities and challenges. If we have a large number of participants, they will be divided into subgroups.

Presentation and conclusion - 30 minutes: We will ask the participants to report the results of their discussion to the audience of the workshop in 2 minutes and we will discuss these results collectively. After the report, we will organize a quick conclusion that will include a discussion of future possible research agendas and actions.

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