Multi-Modal and Multi-Level Qualitative Data Analysis for Complex Cross-border Interactions

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The present paper discusses challenges deriving from the collection, storage and analysis of multi-modal empirical sources. Moreover, it sketches possible approaches to the development of a pipeline of methods and tools to deal with this research design. A case study dealing with Saarlor cross-border cooperation will allow for detailing a possible methodological toolbox. The paper is situated within the working group Bordertextures which is part of the *Center for Border Studies* at the University of the Greater Region (UniGR-CBS, http://cbs.uni-gr.eu). The working group is planning to set up a cooperation with developers to create a technical environment for the processes and presentation of its research in the long-term.

The working group has an interest in analysing complex cross-border textures and interactions on the basis of diverse and multi-modal sources and proposes the approach of *bordertexturing* (cf. AG Bordertexturen 2018, 2020). The method builds on the borderscaping approach (Brambilla 2015) widely accepted within Border Studies, expanding it analytically to better grasp the complexity of structures and processes destabilizing and stabilizing borders. Currently, the working group is looking for project funding to elaborate conceptual and technical tools for data collection, analysis and presentation for several case studies and types of resources, e.g. terminology of Border Studies and industrial films.

Saarlor cross-border cooperation is situated geographically and conceptually in the heart of European Integration. Today's Greater Region, evolved out of Saar-Lor-Lux region (1960s onward), can be considered a laboratory of trans-border cooperation and identity construction (Dörrenbächer 2014:177). It makes the study of Saarlor particularly interesting with regard to structures and processes bringing about peaceful integration of border regions.

The Saarlor case study deals with trans-border joint-stock companies in the field of coal mining and commercialization and offers insights into the challenges of bordertexturing with a huge amount of archival documents. Computational support is necessary in data collection and processing. For many of the research questions a network structure could be useful. However, network analysis alone can not model and visualize the multi-dimensional, textured, situated and interpretive approach of the working group, as tests with Gephi have shown. Different kinds of objects, their characteristics and their relations within and between numerous levels form the data to be modeled. Our goal is however not statistically modelling ties in typical settings on two levels only (cf. e.g. McGlashan et al. 2019). We are interested in visualizing complex singular situations to interpret them qualitatively in a contextualized way, out of a chosen perspective, and in going back to the data.

In agreement with Drucker (2020) and Franken (2023), we do not want to force our data into empirical methods and models that hinder scholars' interpretive processes. We would rather

develop a pipeline of tools serving our needs for humanistic, qualitative bordertexturing using digital methods where they are available and appropriate (cf. Franken 2023:222): The tasks needed are collecting, storing, annotating, modeling, visualizing, querying, and interpreting in iterative processes with emerging categories a great amount of possibly ambiguous, vague, partial, situated data deriving from multi-modal sources. The data are to be stored on the researchers' own computers, not on cloud servers, to respect data protection and licensing. Export of the data into exchange formats (e.g. in XML, CSV) is necessary to apply digital methods like corpus annotation and query, topic modeling or network analyses. The research draws on information about and relations between objects, relative and absolute chronologies, and geo-localization on (historical or customized) maps. The stored information might be displayed at any moment in the research process using filters, allowing to go back to information seizure or interpretation.

It will be necessary to distinguish layers of facticity/interpretation in the material, e.g.
a) the date, place, participants, and agenda of a meeting;
b) the annotation of text segments detected in the minutes as the linguistic category of code-switching;
c) researchers suspecting an imbalance of power between the two parties involved, due to
d) the regional, national, supra-national and global economic and political situation in which the meeting took place.
In this way, the interpretive engagement with the data remains inter-subjectively transparent.

The bordertexturing approach explicitly calls for handling quite diverse objects on several levels like persons, institutions, states, companies, infrastructure, and multiplex relations between their materiality, corporeality, spatiality and temporality. The enormous amount of data as well as the ever-changing realities of Saarlor cooperation call for a scalable reading (Franken 2023:150), changing between close and distant reading in addition to change of perspective in looking at the data and coded interpretations, to gain insights into the textured character in a portion of the borderscape with analyses at micro- and meso-levels. The models and visualizations should support this kind of interpretive, nonlinear engagement with the data and enable emergence to make bordertexturing possible. We are currently thinking of an immersive virtual reality project to allow integration of diverse sources and experiencing of their interwovenness for researchers and public audiences as an experiential rhizome (Deleuze/Guattari 1987).

A machine-readable data model of multi-modal documents in relation to objects, their attributes and their ties is central for the Saarlor project to cope with great amounts of data and model bordertexturing as it can be perceived in the real world, but also in its interpretations by actors and researchers and as a research process. Additionally, machine-readable data allow for computational support and use of digital methods.

Researchers want to be able to observe the state of human-made border-(de)stabilizing structures and processes in order to interpret them. The DH approach will enable the representation (e.g. visualization) of entanglements within a bordertexture at a certain point in

time-space and thus offer pathways into an amount of details impossible to read "by hand" only.

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