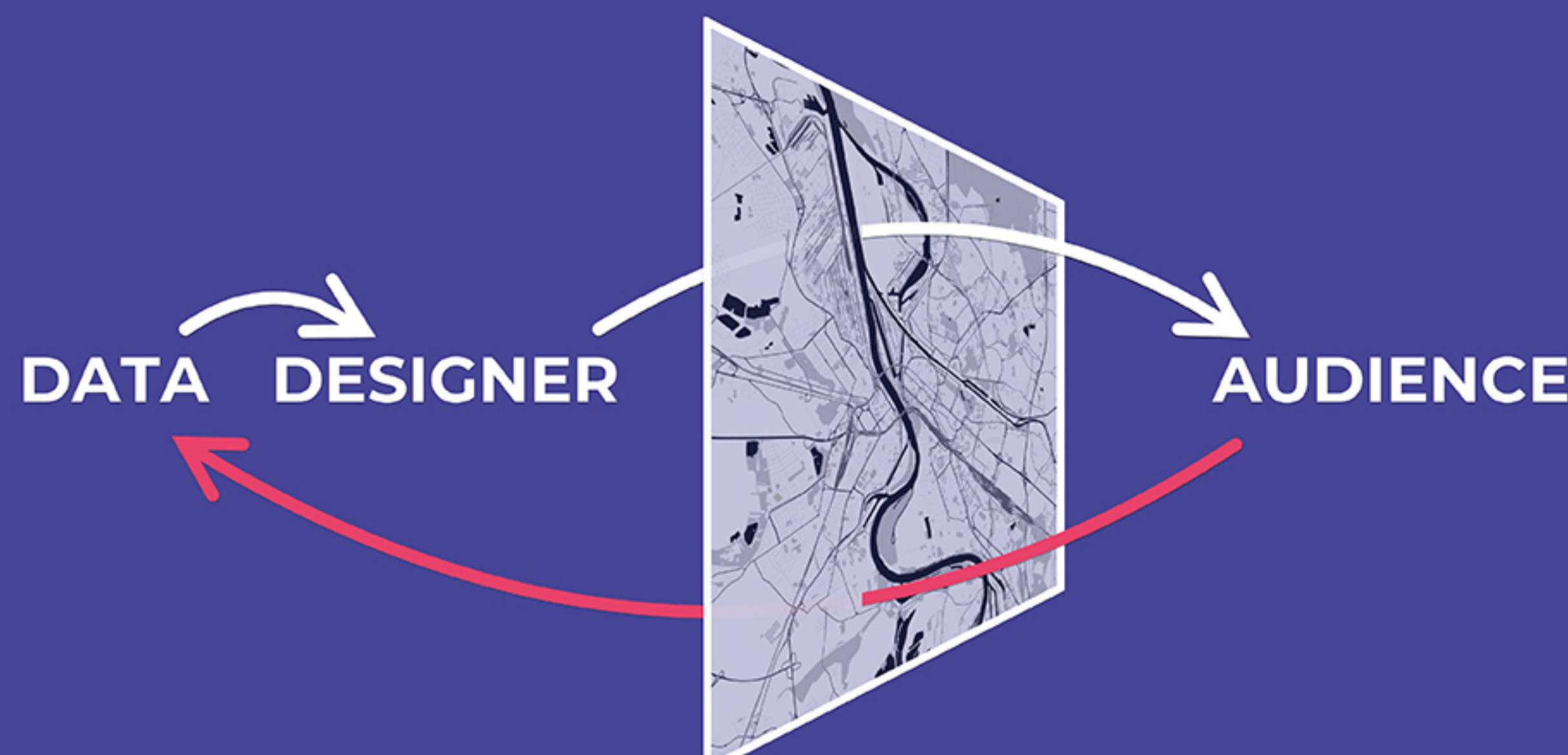


PARTICIPATORY DEEP MAPS

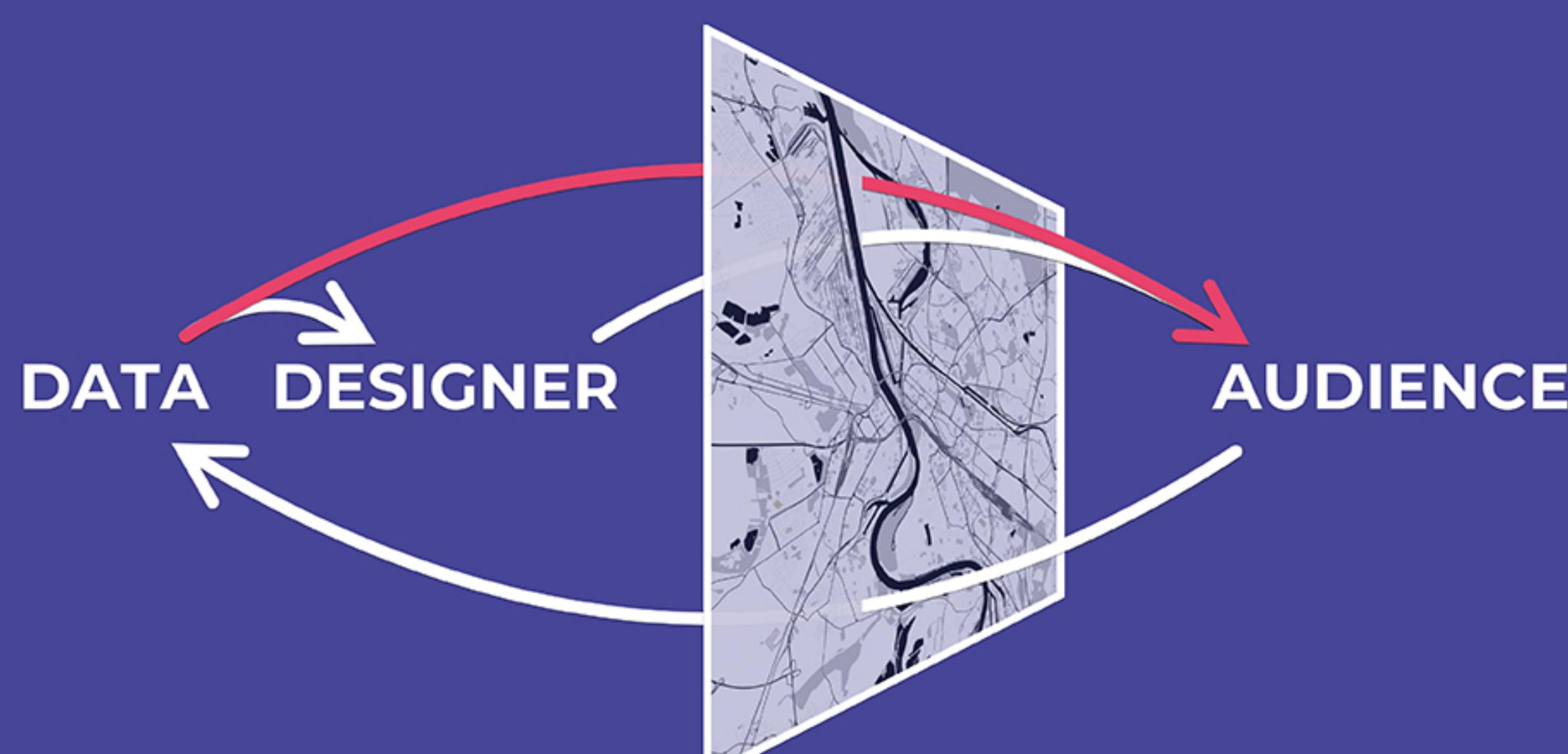
Towards Discursive User Engagement with Data Visualizations



Visualizations remain artifacts of a unidirectional creation and communication process: from the data source to the audience. This process is curated by the cartographer, visualization designers, or any other author. The first towards participation is to **foster engagement** in the audience by calling for ways to author, serialize and share local knowledge.



An active audience requires interfaces that facilitate **integration of additional data** and **personal stories**. Building interfaces that allow augmenting underlying data with own perspectives is a yet unsolved task.



Moderating whose data becomes visible while maintaining visual clarity is a technical and social challenge. Existing visualization techniques have limited ability to represent diverse, uncertain and contradictory data. To foster and **visualize discourse**, we need participatory design patterns that incorporate contestations of the data.

Deep maps¹ include the discursive and ideological dimensions of place: the dreams, hopes, and fears of residents. Here, we are interested in their **participatory potential** and discuss the challenges of democratizing the way local knowledge is collected and shared using interactive data visualizations. Through participatory deep maps, we imagine interfaces that allow residents to annotate visualizations to express opinions, knowledge, and thoughts in an open-ended and ongoing mapping process.

MOTIVATING CASES



Mapping local opinions²

We use situated and quantitative research methods to collect residents' knowledge about their neighborhood. What are interfaces that allow citizens to express opinions, feelings, thoughts, and anecdotes on a street-level?



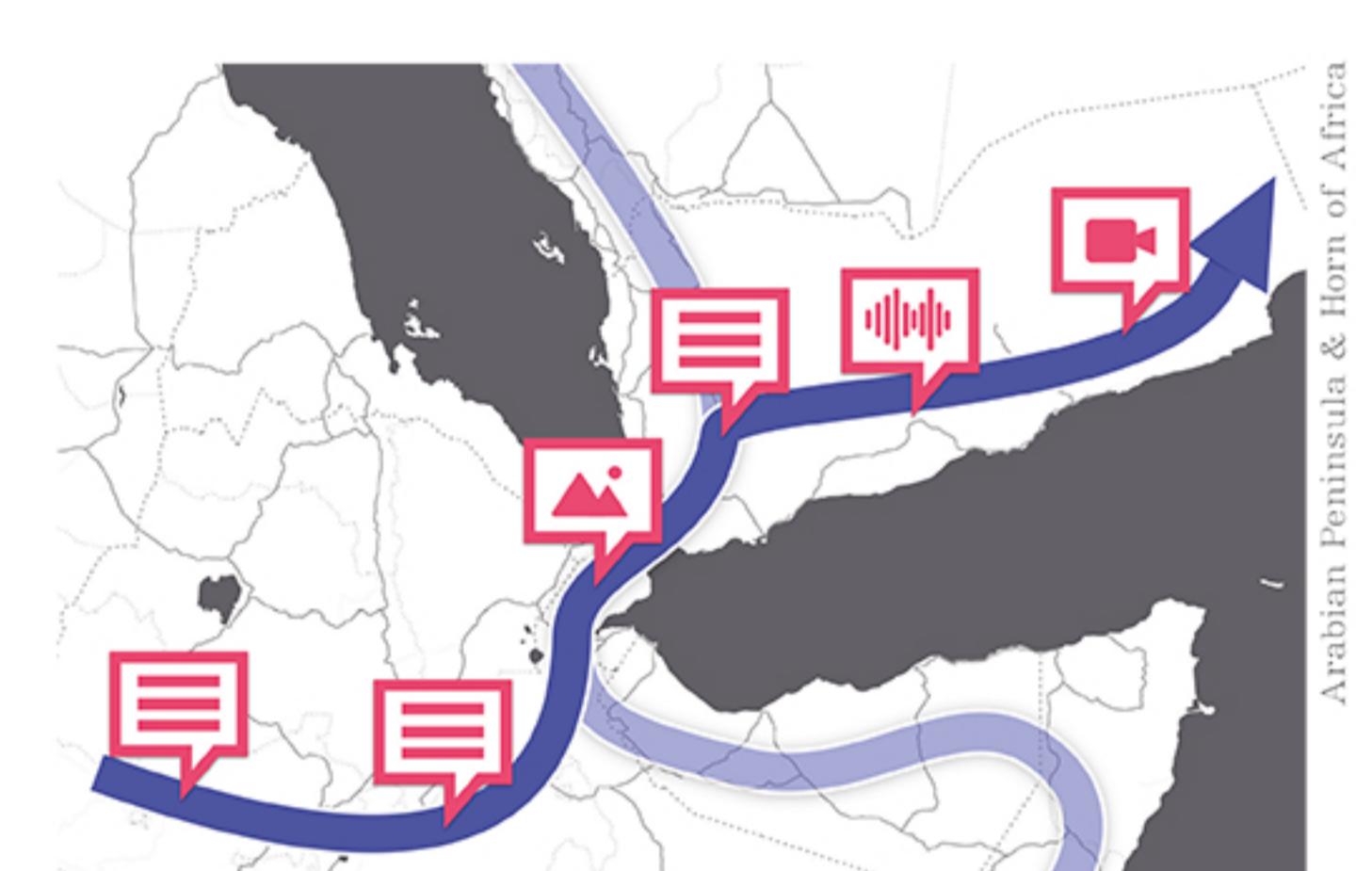
Mapping peace and conflict⁴

Peace processes in conflict regions can be supported by mapping violent attacks. A complete view of such situations is impossible due to incomplete or inconsistent data, subjective opinions, and contrary interests. What are interfaces and visualization techniques for the integration of diverse data sources that can represent uncertain and contradictory information?



Mapping social frontiers³

Social frontiers—"places of sharp difference in social/ethnic characteristics between neighboring communities"—are identified through census data. How do social frontiers relate to residents' knowledge about their neighborhood and how can visualization provide a link between observations in data and explanatory context?



Mapping personal stories⁴

Also in conflict regions, transitional justice can be achieved by making individual stories visible. How can we create feedback channels for people to situate themselves in a visualization and contribute their own experiences and stories?

CHALLENGES

Fostering engagement

Personal visibility, advocating for one's opinion, fun, or monetary rewards can work as incentives for participation and inform engagement strategies. However, engagement can go further by calling for ways to author and share local knowledge across different media and social groups.

Moderation

Human or automated moderation can solve problems such as ambiguous, incomplete, inconsistent, or wrong data. Different moderation styles (centralized vs. bottom-up) can either introduce bias towards the preference of a single group or a mainstream narrative. To the best of our knowledge, no such structures have yet been explored for data visualization.

Telling personal stories

Map visualizations provide a base to tell stories or contextualize displayed data with personal anecdotes. We could not find any interfaces that provide customized interactive and engaging versions for place-based and individual storytelling such as migration stories, travel logs, mapped diaries, or neighbourhood knowledge.

Visualizing discourse

Authors can question, augment, comment, or disagree with the data or other authors' perspectives. Existing visualization design patterns have limited ability to represent this multiplicity and need to be refined to foster and represent participation in discourse. Furthermore, they could visualize this discursive data alongside the original map to highlight places of (dis)agreement and the variety of contributions and topics throughout the map.

Integrating additional data

Conventional interfaces are unable to alter data structures of a visualization through direct input. As of now, there are no interfaces that allow an audience to augment the underlying data with own perspectives and provide for an immediate visualization. Also, there is no clarity about the appropriate anchor and scope of augmentations: Does an audience discuss geographical points, data points, visual marks, or other existing authored contributions?

Analyzing participation

The audience's information and interactions are a rich source of data, that provides insights into disputed areas, ways in which information is discussed, collaboration strategies, the level of visualization literacy and trust with data visualizations.