Affinity Lens: Data-assisted Affinity Diagramming with Augmented Reality. Subramonyam, et al. CHI. 2019.

What are the core research questions addressed by the work?

- How could we expand affinity diagramming (AD) for understanding and working with increasingly complex and mixed data while at the same time supporting the physicality of the movable sticky-note?

What motivates the work?

- While the physical approach to AD is preferred by designers, it prevent the adaptation of AD for understanding data that is increasingly complex and mixed
- Current approaches of looking up quantitative insights that correspond to interview notes and making note of them on the affinity wall is not only time consuming, but also problematic in that coherence between analysis on the wall and on the screen is hard to maintain

How does the work understand the usage, capabilities, and limitations of paper?

- Physical notes can be placed on walls and surfaces in a way that leverages spatial cognition, offers flexibility in grouping and clustering, and then physically persists
- Both individuals and groups can participate when AD is conducted on a large shared surface
- There is generally a designer preference for the traditional, physical, "sticky-note-on-wall" methodology
- The sticky-note-on-wall methodology is less effective when having to work with complex and mixed data (from surveys, sensors, interaction logs, etc.), which is becoming increasingly used to inform the design process

What is the target application domain of the work?

- Practice of affinity diagramming in design, etc.

What are some proposed extensions to paper proposed by the work?

- Supporting interpretation when the recorded textual information is not sufficiently clear with data attributes
- Enabling searching through key terms, etc. to identify common combinations and attributes between notes and data samples
- Support for cluster formation amongst notes in AD
- Support narrative formation through summation across clusters formed in AD

What design constraints or objectives guided the work's implementation of the proposed extensions?

- Maintain affordances of physical notes
- AD is most powerful when used for unstructured data, such as text. So that should be the starting point as opposed to making the process data driven.
- Interactions to acquire data insights should be fast, expressive, low-effort - in other words, not distract from the primary task
- Spatial interactions should be leveraged for data access
- Offer automatic visual insights when possible

How are the proposed extensions implemented?

- Using a mobile augmented reality web application
- Mobile phone for capture and image processing (OpenCV.js, js-ArUco), connection to a Node.js server for data analytics and image storage, and D3.js for visualization
- Insights are overlaid on the phone screen accordingly
- Extensions implemented as lenses
    - Note details lens: Augmenting specific text with additional relevant information from the underlying data
    - Search and navigation lenses: A search lens
    - Clustering lenses: A note comparison lens to support cluster formation, and support for labeling
    - Summarization lenses: Word cloud, histogram, radar plot, heatmap lenses

What findings have been obtained from either the implementation process or an evaluation of the proposed system?

- There is a clear need for integrated sensemaking from qualitative and quantitative data when conducting mixed methods research
- Data-assisted as opposed to data-driven: Though there is value in both deriving insights from data and text, in AD, text (unstructured information) is still the key player
    - New insights were derived from having easier access to data, also data does offer a quicker alternative to generating clusters
- From a technical perspective, FoV constrains scalability when there are a large number of notes, maintaining data representation (mapping between physical and digital) is still an open problem