Supporting an Integrated Paper-digital Workflow for Observational Research. Weibel, et al. IUI. 2011.

What are the core research questions addressed by the work?

- How can digital paper tools support unobtrusive data collection in an observational research setting?

What motivates the work?

- Shortfalls in existing data processing and analysis methods
- Current practices of video analysis which involve associating notes to temporal checkpoints is a time consuming process

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

- Pen and paper still largely present in today's highly digitized work environment
- Paper as a medium has many advantages over the digital media in terms of how people can work with it, both individually and as groups
- Portables, cheap, robust
- More convenient to scan through
- Supports collaborations and interactions difficult to replicate in current digital worlds
- In observational research, standard procedure to take notes in real-time while recording studied phenomena
    - Paper documents only viable way to support flexibility needed
- The process of informal or semi-structured note taking still heavily paper-based
- Practices of arranging papers, post-it notes or scraps in space are recognized as information management techniques
- Personal notebooks let people save, filter, and transform information
- Physical and spatial organization of paper-based notes carry information about ongoing activity and is rarely supported by digital tools alone
- Even if paper presents many affordances, it still does not always exploit the interaction level which is achieved by digital documents
    - Belief: paper and electronic document tools work in concert and organizational processes make optimal use of both
- Paper cannot construct timelines or link multimodal data
- Process of analyzing video data involves a variety of often tedious activities:
    - Visual scanning to identify movements of activity
    - Finding points that match descriptions in the notes
    - Finding points that match descriptions in the notes
    - Finding points to match written times
    - Recording annotations and video codes

What is the target application domain of the work?

- Observational research

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

- Support observational research by linking paper-based notes with video recordings
    - Extends handwritten notes to have a temporal dimension
- Customizable gestures

    - Real-time personal bookmarks created with custom pen gestures
    - Automatic translation to more semantically meaningful annotations to data

How are the proposed extensions implemented?

- Use of Livescribe Pulse pens
    - Recording of every pen stroke and is able to timestamp them in a way that they can be linked back to any other time-based data
    - Enable matching between written notes and video

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

- Technique of capture beneficial when dealing with multiple streams of data that have to in some way synchronized