**PaperChains: Dynamic Sketch+Voice Annotations. Pearson, et al. CSCW. 2015.**

**What are the core research questions addressed by the work?**

- How to enable access to further types of media and information in resource-constrained communities?

**What motivates the work?**

- Limited access to high-powered devices, laptops, but access to low-end camera phones in resource constrained communities
- Limited mobile data connection access, but potential access to voice-based interactive voice response (IVR) systems
    - Supposedly an accessible, audio-only version of the internet
- Observed and reported difficulties in locating information within IVR (interactive voice response) services

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

- Printed media is entirely visual and provides a good interface for navigating through information, but presents clear barriers with regards to textual literacy
- Voice (via IVR) enables ready access to information, has a lower literacy barrier, but is incredibly difficult to navigate and find desired information
- There are therefore clear opportunities to connect voice and printed media spaces
- Paper is physical, accessible, flexible

**What is the target application domain of the work?**

- Enabling information access in resource-constrained communities
- Collaborative storytelling

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

- Affords rich experiences with physical objects, linking users' photos directly to audio content from a telephone-based service
    - Allow direct interaction with photographs of physical objects to receive audio-based captioning on demand
    - Provide the service via a standard phone line, ensuring that it can be used where mobile internet is costly or unavailable
    - Independent of media it interacts with
- Allow iterable creation of audio-visual content
    - Enable collaborative storytelling through binding between physical media objects and audio

**How are the proposed extensions implemented?**

- Two component implementation
    - Local client: Mobile phone application used to take a photo of an object, allowing panning, zooming, and selection, and help the user interact with the voice service
    - Remote voice service: Standard IVR system, where DTMF tones over the phone line control the resultant audio interaction
- Client design
    - Use of QR codes printed on media to detect the positioning of the interactive object within the photo taken by the user

    - When the user touches the picture they have taken, the coordinate of the current touch point is sent as six DTMF tones to the remote service

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

- Studies demonstrated strong appreciation and desire for the prototype design
- Design potentially beneficial in areas where literacy and data connection access are low
    - Also has benefits for more developed contexts: Where data-costs are higher than usual, internet-based backend where data connectivity is cheap, interactive greeting cards