Paper Augmented Digital Documents. Guimbretière. UIST. 2003.

What are the core research questions addressed by the work?

- Exploring the potential of paper-digital cohabitation

What motivates the work?

- Inspired by a phenomenon faced by knowledge workers: while a majority of users prefer to review a document in a printed form, annotations, once made on paper, are time consuming to incorporate back into the original digital document
- Existing tension between affordances provided by paper and digital documents

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

- Affordances of paper:
    - Light, flexible, easy to annotate. Perfect medium to carry pieces of information and annotate them even in difficult environments, such as a construction site or public transportation where there is tight space, awkward settings and poor lighting conditions may be expected
    - Paper is easy to navigate using tactile input, making it possible to read and navigate at the same time
    - Paper can provide large, inexpensive, high resolution display surfaces either by using large sheets or by creating a dynamic display of smaller pieces
- Limitations of paper:
    - Paper is static, cannot be modified, relayout, searched or indexed
    - Paper is expensive to duplicate and distribute
    - Paper is expensive to archive

What is the target application domain of the work?

- Knowledge work
    - Specific uses of proof-reading and collecting “as built” designs

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

- Proposes a new paradigm to thinking about using paper and digital documents: PADD (Paper Augmented Digital Documents)
    - Digital documents which one can manipulate either electronically or on paper
    - Seamlessly providing affordances of both paper and digital documents
- PADD: primarily digital documents
    - Stored in digital format, edited using computers, easy to duplicate, transmit, or archive
    - Allows printing when affordances of paper are needed:
        - (1) Creation of PADD as digital documents
        - (2) When paper copy needed, document printed on special paper using an absolute addressing system
        - (3) Systeem records page of document printed and which sheet of paper, as well a digital snapshot of document to be used later
        - (4) Document used as a normal printout, transform back to digital version by synchronizing digital pen

How are the proposed extensions implemented?

- Anoto digital pen technology

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

- Idea of “paper as a form filling device”
    - Paper as a general input device for interacting with user content
- Proposed system differs from coupling
    - Coupling: Requires concurrent use of paper and computers, brings interactivity to paper but comes at a cost of limiting paper affordances
- Calibration errors
    - Pen reading: Pen might be inaccurate
    - Printer repeatability: Printer might place the user content at an inconsistent position on the page
    - Pre-printed paper repeatability: The relationship between the Anoto pattern and the sheet of the paper might vary