PaperID: A Technique for Drawing Functional Battery-free Wireless Interfaces on Paper. Li, et al. CHI. 2016.

What are the core research questions addressed by the work?

- What if we could (nearly) as easily make interfaces that actually function using paper as a central medium?

What motivates the work?

- Paper is already heavily used in prototyping, enabling it to be actually interactive and functional could be of substantial interest for well-established prototyping practices
- The lightweight nature of paper may offer the possibility of a new class of simple but highly customized interface devices that are created quickly on demand for small tasks

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

- Paper is lightweight, inexpensive, and easily modified, recyclable, ubiquitous, passive, unobtrusive

What is the target application domain of the work?

- Prototyping

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

- Augmenting RFID tags that can be easily affixed to sheets of paper in the form of adhesive-backed stickers to increase their usefulness as input sensors
- New techniques to enable continuous tracking of tag velocity, motion, magnitude, and relative direction of motion towards and away from the reader
- New RF features that can support real-time multi-class gesture classification including hand-waving over the tag, light finger touch, whole-hand cover, swipe touch, and no touch
- Enable the following UI primitives: paper knobs, sliders, pop-ups

How are the proposed extensions implemented?

- Custom tag fabrication: Use of a half-antenna design with a sticker RFID IC
- Signal detection: Use channel parameters reported by the RFID reader, such as Received Signal Strength Indicator (RSSI), RF Phase, and Read Rate, which represent a unique signature of the RF environment of each individual tag to enable tag motion tracking, as well as on-tag and free air gesture recognition

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

- Presented method enables creation of lightweight, simple, and recycling paper interfaces
- Contribution primarily technical