

# UbiSketch: Ubiquitous Real Time Sketch-Based Communication

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## UbiSketch

### A mixed paper/digital infrastructure

- Leverage affordances of pens, paper, and mobile phones
- Platform for developing novel applications supporting lightweight visual communication
- Potential to support novel interactions for quick, easy, sharing of paper-based information in networked environments

### Mobile phones are shifting social practices

- Mobile devices are becoming central communication tools
- Networked mobile applications are shifting practices for communication and group awareness
- Interaction is limited by small screens, keypads

### Pens and paper are ubiquitous

- Paper is inexpensive, portable, flexible, high-resolution
- Pens commonly carried, used to annotate paper documents
- Digital pens can digitize paper-based input

### Sketch-based communication

A communication practice that involves sharing visual content created by hand with a stylus on a surface.



UbiSketch examples

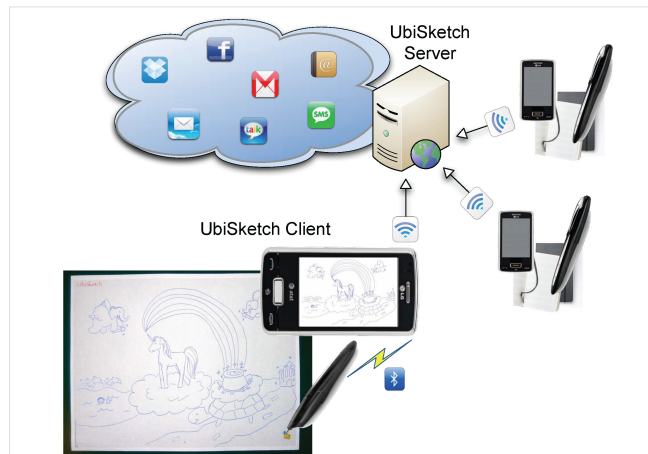
#### Why?

- Express feelings, relieve boredom (aids memory and focus)
- Externalize ideas for sharing, discussing, revising
- Quick, timely, inexpensive, disposable, show hand-writing

#### How?

- **Paper:** Quick, natural, but hard to search, store, edit, transmit
- **Digital:** Easy to search, store, edit, transmit, but feels different
- **Mixed:** Exploit combined affordances of paper and digital

## System Overview



Anoto digital pens capture paper-based interaction and stream data to Bluetooth-enabled mobile phones. The phones forward data to a server, which publishes sketches to digital services on the Internet.

## Study Setup



We observed users' experiences with a working prototype and conducted an evaluation of the system's UI. We created SketchBook, an application that uploads paper-based sketches directly to Facebook.

## Observations

### Sketching experiences

#### Procedure

Initial interview, sketching task, observation of Facebook interactions, follow-up interview



UbiSketch examples

#### Results

- Sketching felt natural with digital pen and paper UI
- Publishing sketches was easy, fun, led to social interaction
- Positive responses eased users' initial hesitation

### Feedback on user interface

#### Procedure

Feedback on paper UIs, description of ideal interface



Paper user interfaces

#### Results

- Sketching area should be maximized
- Digitized sketch should capture detail of original
- Paper UI should be portable, simple, easy, primary interface
- Phone UI should provide feedback, optional interaction

### Future directions

- Field study to understand sketch-based communication
- Revised user interface design
- Extensions: gesture-based interaction, re-print and append (collaboration), visualization (location, speed, force)