I love sticky notes. They are portable, handy and quick. But I wanted them to remind me of my appointments, remember things for me and help me manage my world better.

So, I just made them a little smart.
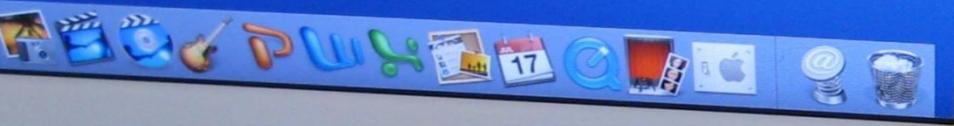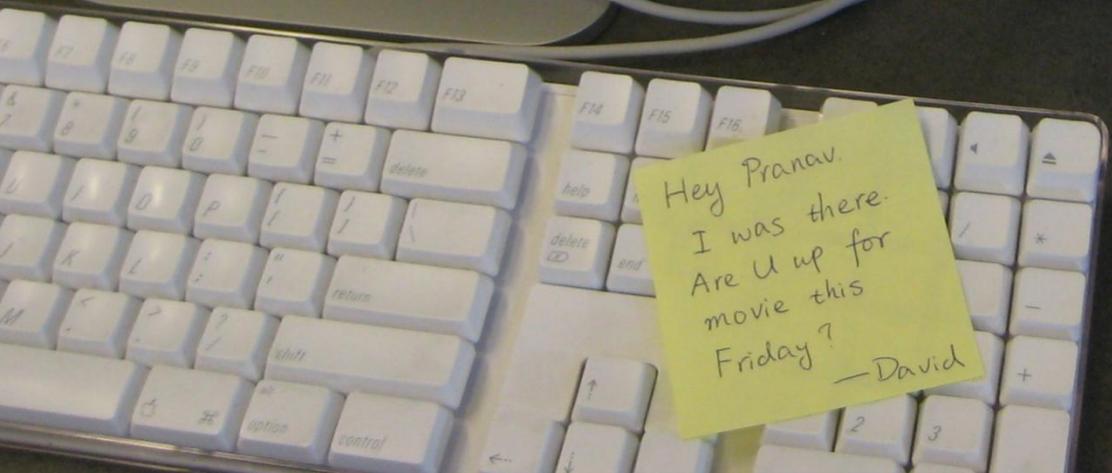
QUiCKiES Intelligent Sticky Notes

Post-it notes that can be searched, located and can send reminders and messages, and help us to seamlessly connect our physical and informational experiences.

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"We live between two realms: our physical environment and cyberspace. Despite our dual citizenship, the absence of seamless couplings between these parallel existences leaves a great divide between the worlds of bits and atoms. At the present, we are torn between these parallel but disjoint spaces."[1]

– *Hiroshi Ishii*

1. Ishii, H. and Ullmer, B., Tangible Bits: Towards Seamless Interfaces between People, Bits and Atoms, in *Proceedings of Conference on Human Factors in Computing Systems CHI '97).*

What are Quickies?

The goal of 'Quickies' is to bring one of the most useful inventions of the 20th century into the digital age: the ubiquitous sticky notes. Sticky (a.k.a. Post-it) notes help us manage our to-do lists, tag our objects and documents and capture short reminders or information that we may need in the near future. Keeping track of these sticky notes is a difficult task in itself. 'Quickies' enrich the experience of using sticky notes by allowing them to be tracked and managed more effectively. Quickies are stickies that have some intelligence and the ability to remind us about the task we ought to perform or to provide us at the right time with the information we captured in the past. The project explores how the use of Artificial Intelligence, Natural Language Processing, RFID and Ink Recognition technologies can make it possible to create intelligent sticky notes that can be searched, located, can send reminders and messages, and more broadly, can help us to seamlessly connect our physical and digital worlds.

What can they do?

Quickies are sticky notes (a.k.a. Post-its) that offer portability, connectivity to the digital information world, smart information organization, ability to be findable (searchable as well as locatable) and ability to send reminders and messages. The following paragraphs present some usage scenarios and examples that demonstrate how 'Quickies' can benefit users.

- Imagine you scribbled a sticky note about an upcoming meeting with a work-colleague; you placed the note on your desktop. Unfortunately, you have overlooked the note, completely forgetting about the meeting and went for lunch with a friend; however your intelligent sticky note reminds you about your meeting appointment via a friendly text message on your mobile phone (Figure 1.)

- You write down a person's name and phone number on a sticky note while talking on the phone. That new contact is automatically entered in your computer address book.

- You create a grocery list or To-Dos on a paper sticky note. This list is automatically synchronized with the task-lists in your mobile phone and computer. Now, your mobile phone has a list of the things you noted down to buy, which comes handy when you are at the grocery store.

- Your mom prefers using physical media rather than mobile phones and computers. She leaves a message for you on a sticky note when leaving for the market. You receive her message as an SMS.

- You use a sticky note to bookmark a section about the 'Platypus Paradox' in Peter Morville's 'Ambient Findability' book. Several weeks later, a discussion about the 'Platypus Paradox' arises and you remember bookmarking Morville's explanation. You can now use Quickies' graphical interface to search for the keywords 'Platypus Paradox'. As the system is keeping track of all your notes in digital form, it shows all the relevant notes you have created in past. The system also helps you locate that note (and so forth the book) in your house.

'Quickies' presents fascinating possibilities of using familiar medium of paper and handwriting as interface to the digital information world. This not only helps bridge our physical and digital realm but also enables the 'Third World' on the other side of the digital divide, which is still disconnected from the benefits of the digital world, to adapt and participate in the information revolution.

Figure 1. (A) Sticky notes at user's desk (B) Example of a reminder sent to user's mobile phone.

How do they work?

Figure 2 presents an explanation of how Quickies work. Physical sticky notes are captured and stored into a computer using commercially available digital-pen hardware, which captures the movement of the pen on the surface of a paper sticky note. The digital-pen hardware uses an ultra-sound wave sensing mechanism. Two stationary sensors receive ultra-sound waves that are emitted by a transmitter placed at the tip of the pen. The device measures the location of the pen tip on the paper using the calculation of receiving-time differences of the signals received by the two
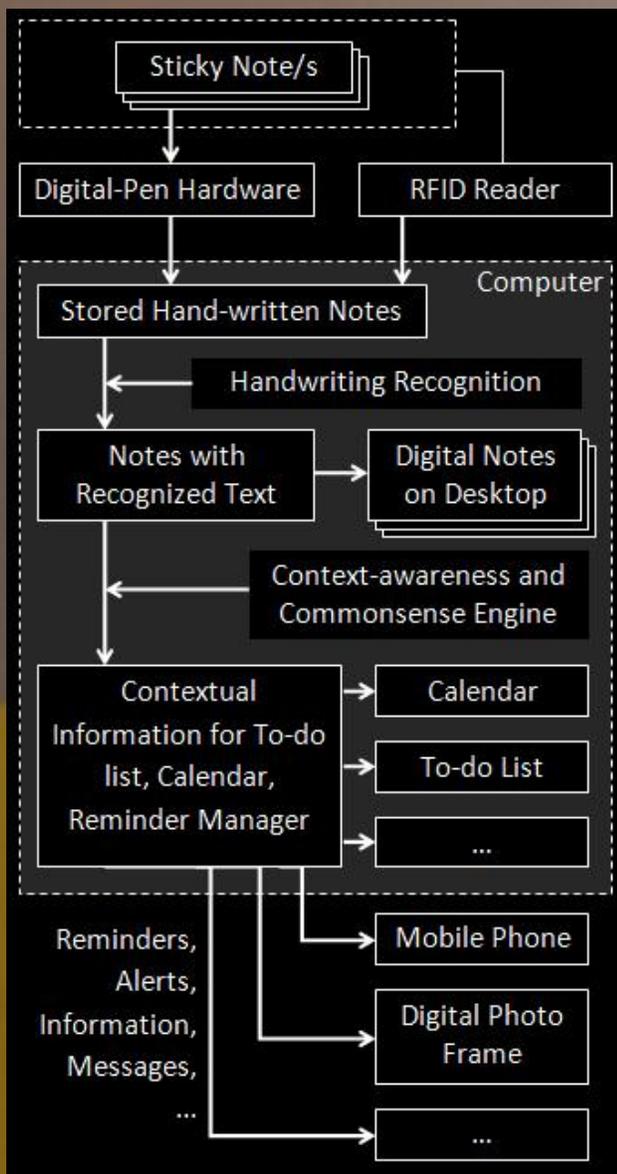

Figure 3. Graphical user interface of the 'Quickies'.
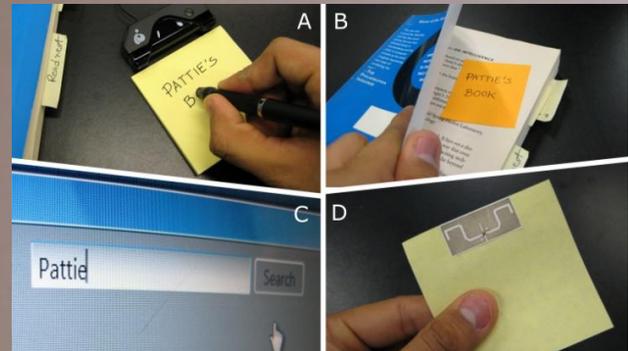
Figure 4. (A) User writes on a sticky note (B) User tags a book with the note (C) User searches notes related to the word 'Pattie'. (D) A sticky note with the RFID tag on back.

stationary receivers. A software program stores the hand-written notes as images/strokes and converts the stored hand-written notes into computer-understandable text using handwriting recognition algorithms. As shown in Figure 3, the system provides a graphical interface to browse or search all of the user's notes. The recognized text is processed using a commonsense knowledge engine that uses ConceptNet, NLP and computational AI techniques. This process provides the note database with contextually rich information and helps the system in categorizing the notes. The system uses its understanding of the user's intentions, content and the context of the notes to provide the user with reminders, alerts, messages and just-in-time information. One of the most interesting features 'Quickies' provide is 'findability'. At the back of each of the Quickies is a unique RFID tag, which makes it possible to locate Quickies in the house or office. Figure 4 presents a graphical scenario of this feature.

'Quickies' enriches the experience of using sticky notes and bridges the gap between the physical and digital worlds, linking hand-written sticky-notes to the mobile phone, digital calendars, task-lists, e-mail and instant messaging clients. By augmenting the familiar and ubiquitous physical sticky-note, 'Quickies' leverages existing patterns of behavior, merging paper-based sticky-note usage with the user's informational experience.

New paradigms always throw new questions, and so do new technologies. Tiny, cheap processors with integrated sensors and wireless communications capability, the remote identification and precise localization of devices, flexible displays based on polymers, miniaturization of computing devices, capacitive multi-touch sensing, and electronic ink - it becomes clear that the technological basis for a strange new world has already been created. On the other hand another interesting opportunity lies in linking information to our everyday objects, effectively attaching this information to them, or augmenting our daily life objects in some sense. Instead of creating more devices to interact with the digital realm, we can communicate directly with our clothes, watches, pens, or furniture. The vision of a future of smart and interacting everyday objects offers a whole range of fascinating possibilities. The foreseeable technological developments can definitely add new quality to everyday objects - these might be able not only to communicate with people and other objects, but also to discover where they are, which other objects are in their vicinity, and what has happened to them in the past.

-Pranav Mistry
18th December, 2007

For more details about the project please visit www.pranavmistry.com/projects/quickies

Related projects by Pranav Mistry

TaPuMa, TellUs and SunFlower are some of other recent research projects that share the theme of connecting the physical and digital world, or more specifically, using physical, everyday objects as interface to the intangible world of information.

TaPuMa is a Tangible Public Map that allows users to use their own belongings, the objects they usually carry with them, to access relevant, just-in-time information and to find the locations of places or people from a public map. TaPuMa is an analogue of the keyword-based search engines using everyday physical objects as keywords or queries.

SunFlower is an electronic flower which can act as a natural sunflower but also as an ambient weather information device.

TellUs is a story telling toolkit for kids which augments objects in the house as characters.

Publications

Below are some of the related recent publications.

P. Mistry, P. Maes. **Intelligent Sticky Notes that can be Searched, Located and can Send Reminders and Messages.** To be appear in the Proceedings of the ACM International Conference on Intelligent User Interfaces (IUI2008). Canary Islands, Spain. 2008.

P. Mistry, T. Kuroki, C. Chang. **TaPuMa: Tangible Public Map for Information Acquirement through the Things We Carry.** To be appear in the Proceedings of the International Conference on Ambient Media and Systems (Amby-sys2008). Quebec City, Canada. 2008.

Project Websites

www.pranavmistry.com/projects/quickiess
www.pranavmistry.com/projects/tapuma

Recommendations

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