TRN Research News Roundup

The Latest Technology Research News

December 19, 2005

Silicon gets stretchy

The advent of electronic paper and efforts to embed electronics in nontraditional materials like clothing, is spurring efforts to make flexible circuitry.

The challenge is that, silicon, the mainstay of computer chips, is quite brittle. Some researchers are turning to flexible plastics for a solution, but plastics don't conduct electricity very efficiently. Researchers from the University of Illinois at Urbana-Champaign are looking to solve the problem the other way around -- they have found a way to make flexible circuitry from high-quality silicon.

Source: University of Illinois

These rippled ribbons are made of single-crystal silicon, the stuff of computer chips. The ripples allow the ribbons to stretch and contract.

The method involves making tiny silicon ribbons, stretching a rubber sheet, apply the ribbons to the sheet, then releasing the sheet. When the rubber contracts, the silicon ribbons form regularly-spaced ripples. Subsequent stretching and compressing of the rubber causes the ripples to flatten out or bunch up. The ripples allow the ribbons to stretch without the silicon being strained.

The researchers have made diodes and transistors from the stretchy silicon ribbons; testing showed that the components' electronic properties did not vary when they were stretched or compressed.

The method could be used to build electronic devices on flexible materials like fabric and irregularly shaped objects like toys.

(A Stretchable Form of Single-Crystal Silicon for Electronics on Elastomeric Substrates, *Science*, published online December 15, 2005)

Photos make icons meaningful

Staring at a screenful of identical icons is not the most efficient way to find the file you are looking for.

Researchers from Northwestern University are looking to remedy the problem with a system that automatically generates semanticons -- image-based file icons that are easier to find and remember than ordinary icons.

The system analyzes file names and the contents of files to generate keywords that are then used to query a database of stock photographs. It identifies appropriate photographs, uses the photograph as a template to create simplified cartoon images, and places one or two of the images on an icon template based on file type. A semanticon for a Web page containing a news article about Java software, for example, combines an image of a stack of newspapers with an image of a

Source: Northwestern University

These image-based file icons are generated automatically using information gleaned from the filename and contents.

cup of coffee on a template for HTML file icons.

Source: Northwestern University

These image-based file icons are generated automatically using information gleaned from the filename and contents.

Users recognized semanticons an average of 1.96 seconds faster than ordinary icons and performed a memory game more than 20 percent faster using semanticons than ordinary icons, according to studies by the researchers.

Semanticons could make it easier for users to find and organize files.

The work builds on the concept behind a system developed last year for generating graphical icons based on file names. (See Automatic icons organize files, TRN, September 8/15, 2004)

(Semanticons: Visual Metaphors as File Icons, *Computer Graphics Forum*, September 2005)

Info theory boosts clustering

The emerging field of clustering aims to help scientists analyze mountains of data like genome sequencing, astronomical observations and market behavior by automatically grouping like pieces of data.

Princeton University researchers have taken a fresh approach to the clustering problem using information theory to generalize the process, which removes the need to define ahead of time what makes pieces of data similar to each other.

The method determines how much information each piece of data has in common regardless of the nature of the information, and it boils down to finding the best trade-off between maximizing the apparent relatedness of pieces of data while minimizing the number of bits needed to describe the data.

The method can be used with any kind of data and performs better than previous clustering algorithms, according to the researchers.

(Information-Based Clustering, *Proceedings of the National Academy Of Sciences*, December 20, 2005)

Lasers drive biochips

Pumping and channeling tiny amounts of liquids in biochips is tricky business.

Biochips use microscale channels to transport and combine chemicals and fluids carrying cells and other biological materials; this is useful for biological research, medical diagnostics and drug discovery. Researchers have developed a variety of methods for moving and steering the fluids, including networks of electrodes, and tiny pumps and valves.

Researchers from the University of California at Berkeley and the University of California at San Francisco have devised a simple, low-power fluid transportation technique that involves suffusing a liquid with gold nanoparticles and using a low-power laser to guide the liquid through the channels of a biochip.

Due to the coffee ring effect, the gold nanoparticles concentrate at the outer edges of the liquid, near the boundary between the liquid and the air. The laser heats the nanoparticles, which causes the surrounding liquid to rapidly evaporate. The vapor rapidly cools and condenses in the air, forming droplets on the channel surfaces beyond the boundary of the liquid. As the droplets grow, they combine with the body of the liquid, effectively moving the liquid. Moving the laser beam moves the liquid with it.

The technique promises simple, lower-power biochips.

(Optofluidic Control Using Photothermal Nanoparticles, *Nature Materials*, published online December 18, 2005)

Bits and pieces

A biochip makes tiny amounts of delicate radiological labeling chemicals; a design for combining nanoscale components promises powerful encryption chips; a grid of electrical wires built into walls and ceilings makes it possible to place lights anywhere in a room.

Last Next

Discuss this news roundup or anything else to do with science and technology on the TRN Forum.

TRN needs your help. Please click here for details.

Home Archive Gallery Resources Feeds Offline Publications Glossary
TRN Finder Research Dir. Events Dir. Researchers Bookshelf
Contribute Under Development T-shirts etc. Classifieds
Forum Comments Feedback About TRN
TRN Newswire and Headline Feeds for Web sites