

tech4u



■ Tokyo University Associate Professor Hiroshi Yokoi displays a robot hand which is able to grip a raw egg and crush an aluminium can. The artificial hand has myoelectrical sensors to measure surface Electromyography (EMG) on the elbow of amputee, to estimate the motion to control the movement of fingers —AFP

Apple plans cheaper, Nano-based phone

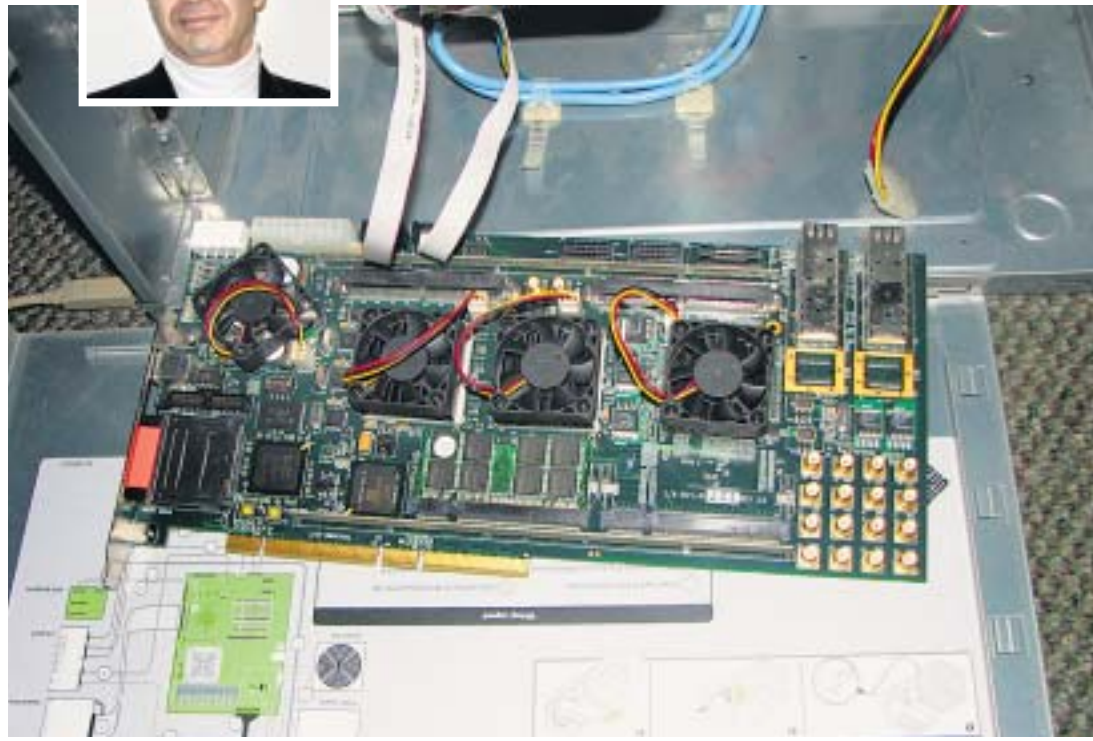
Apple plans to launch a cheaper version of the iPhone in the fourth quarter that could be based on the ultra-slim iPod Nano music player, according to a JP Morgan report. Kevin Chang, a JP Morgan analyst based in Taiwan, cited people in the supply channel he did not name and an application with the U.S Patent and Trademark office for his report dated July 8. Apple filed a patent application document dated July 5 that refers to a multifunctional handheld device with a circular touch pad control, similar to the Nano's scroll wheel. Apple spokeswoman Natalie Kerris declined comment. Chang said a way to follow up the iPhone with a cheaper version would be to convert the Nano into a phone and price it at \$300 or lower.

Video games by Spielberg

Filmmaker Steven Spielberg and video game publisher Electronic Arts Inc. are releasing a few tidbits about their ongoing collaboration to make three video games, but most details — including the game's titles — remain a secret. Code-named "LMNO" and "PQRS," the first two games to come from the exclusive relationship will be previewed at this week's E3 Media & Business Summit, which starts Wednesday in Santa Monica, California. The "LMNO" game is being created for the Sony's PlayStation 3, Microsoft's Xbox 360 and PCs. It will be a "contemporary action adventure" where the player partners with a female character who evolves over time depending on how she interacts with others in the game, said Neil Young, general manager of EA's Los Angeles studio. "PQRS," is being developed for Nintendo's Wi will have gamers wielding the wireless remote to manipulate blocks in various ways.



Professor Uzi Vishkin (inset) connected 64 processors in parallel on a license plate-sized circuit board for building a supercomputer



Coming soon to you, a desktop supercomputer

Dhananjay Khadilkar. Mumbai

Think of a supercomputer and Cray-2, Blue Gene, and Deep Blue instantly come to mind. Now, imagine one of these machines with massive computing power, in a desktop PC size.

Till now, the sheer size of the supercomputer had made it impractical for day-to-day use. But researchers may have found a way to work around that limitation.

Professor Uzi Vishkin, of the University of Maryland Institute for Advanced Computer Studies (UMIACS), has developed a supercomputer that is the size of your desktop PC.

Professor Vishkin and his colleagues at UMIACS have built a prototype that uses a circuit board about the size of a license plate on which are mounted 64 parallel processors. Speaking to DNA, Vishkin said, "Parallel programming makes this single-chip supercomputer run 100 times faster than a desktop PC."

Vishkin is no stranger to supercomputing - at least in theory. In

fact, since 1979, Vishkin was a part of the community that developed a successful mathematical theory of parallel algorithms.

Parallel processing has been used for years to create supercomputers. Vishkin gives a simple analogy to explain the process of parallel programming. "Suppose you hire one person for house cleaning, and it takes five hours for the person to perform each task," he said. "Now imagine that you have 100 cleaning people who can work on your home at the same time. That's the parallel processing method."

However, according to Vishkin, "the biggest challenge is to come up with a software that can manage all the different tasks so that the job is completed in three minutes instead of 300."

Although researchers were familiar with the principle behind developing a desktop supercomputer, a practical machine could not be built because of the limitation of fabrication technology.

However, the exponential rise in the number of transistors that

could be put on a single chip helped Vishkin and his team. "This enabled us to create a supercomputer on a single chip," he said. Vishkin believes that the technology his team has developed represents the future of computing. "Till 2003, the clock rate (the speed of a computer's central processing unit or CPU) had improved at a stunning rate," Vishkin said. "However, from 2004, there has been hardly any improvement in the clock rate and it is not expected to improve much because of issues such as power consumption."

Vishkin said one way to resolve the problem would be to build multi-CPU machines. "I feel our prototype could signal the onset of the next generation of personal computers," he said. So when will the desktop supercomputer become available in commercial form, and what would be its cost? "We are ready to build a commercial grade desktop supercomputer within three years from the moment we get the required funding," Vishkin said. "And it will cost the same as a desktop PC does," he added.

NASA's Mars lander will dig for water

Agencies. Washington

NASA's next Mars mission, Phoenix Mars Lander, will look beneath a frigid arctic landscape for conditions favourable to past or present life, the federal space agency has said.

Instead of roving to hills or craters, Phoenix will claw down into the icy soil of the Red Planet's northern plains.

The robot will investigate whether frozen water near the Martian surface might periodically melt enough to sustain a liveable environment for microbes, NASA officials said at a mission preview news conference on Monday.

To accomplish that and other key goals, Phoenix will carry a set of advanced research tools never before used on Mars. First, however, it must launch from Florida during a three-week period beginning August 3, then survive a risky descent and landing

on Mars next spring.

Researchers evaluating possible landing sites have used observations from Mars orbiters to find the safest places where the mission's goals can be met. The leading candidate site is a broad valley with few boulders at latitude equivalent to northern Alaska.

outer bound

"Our 'follow the water' strategy for exploring Mars has yielded a string of dramatic discoveries in recent years about the history of water on a planet where similarities with Earth were much greater in the past than they are today," said Doug McCuiston, director of the Mars Exploration Programme.

"Phoenix will complement our strategic exploration of Mars by being our first attempt to actually touch and analyse Martian water - water in the form of buried ice," added McCuiston.

One pill cure for addictions

Andrew Bridges. Washington

A single pill appears to hold promise in curbing the urges to both smoke and drink, according to researchers trying to help people overcome addiction by targeting a pleasure centre in the brain.

The drug, called varenicline, is already sold to help smokers kick the habit. New but preliminary research suggests it could gain a second use in helping heavy drinkers quit, too. Much further down the line, the tablets might be considered as a treatment for addictions to everything from gambling to painkillers, researchers said.

Several experts cautioned that there is no such thing as a magic cure-all for addiction and that varenicline and similar drugs may find more immediate use in treating diseases like Alzheimer's and Parkinson's.

Pfizer developed the drug specifically as a stop-smoking aid. Varenicline works by latching onto the same receptors in the brain that nicotine binds to when inhaled in cigarette smoke, an action that leads to the release of dopamine in the brain's pleasure centres. Taking the drug blocks any inhaled nicotine from reinforcing that effect.

A study suggests not just nicotine but alcohol also acts on the same locations in the brain. That means a drug like varenicline, which makes smoking less rewarding, could do the same for drinking. Preliminary work, done in rats, suggests that is the case.



■ Get rid of smoking, drinking —getty

"The biggest thrill is that this drug, which has already proved safe for people trying to stop smoking, is now a potential drug to fight alcohol dependence," said Selena Bartlett, a neuroscientist, who led the study. More often than not, smoking and drinking go together.

The California researchers are now planning the first studies in humans of the drug's effectiveness in curbing alcohol cravings and dependence, Bartlett said.

In the new study, researchers trained rats to drink alcohol and measured the effect of varenicline once the animals became the laboratory equivalent of heavy drinkers. They found the drug curbed their drinking. Even when stopped, the animals resumed drinking but didn't binge.

In latest robotics, new hope for stroke patients

A new robotic device is designed to help stroke patients regain motion in their arms

Amanda Schaffer

Mary O'Regan more or less ignored her left arm for 20 years.

As a sophomore in college, in 1986, she fell off the back of a friend's dirt bike and hit her head on concrete, later suffering a stroke. After intensive medical and physical therapy, she learned to speak and walk again. She went back to school and then to work. (And, as it happened, two of her brothers ended up marrying two of the nurses who had taken care of her.) Still, much of her left side remained numb, and she did not regain use of her left arm.

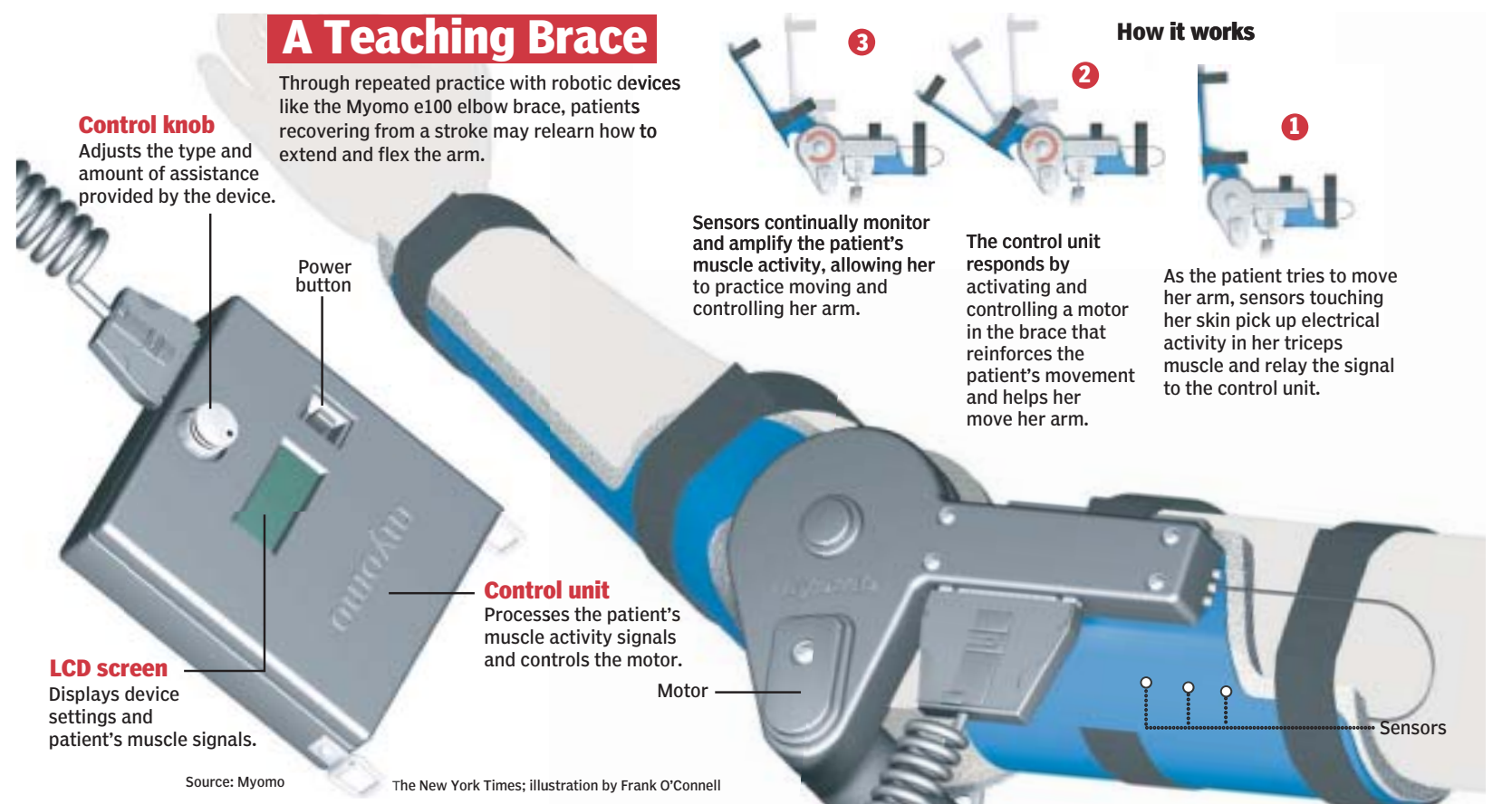
Last year, however, O'Regan, now 40 and living in Westwood, Mass., enrolled in a clinical trial for a new robotic device called the Myomo e100, designed to help stroke patients regain motion in their arms.

The device, worn as an arm brace, works by sensing weak electrical activity in patients' arm muscles and providing just enough assistance that they can complete simple exercises, like lifting boxes or flipping on light switches.

By practicing such tasks, patients may begin to relearn how to extend and flex the arm, rebuilding and strengthening neurological pathways in the process.

"The device is designed to help get patients over a functional hump" so they can start moving the weakened arm again, said John McBean, a mechanical engineer who developed the technology with Kailas Narendran, an electrical engineer and computer scientist. (The two began the project in 2002, in a graduate robotics class at MIT.)

"And the more they are able to use the arm, the more



improvement they begin to see," McBean continued. "So it's a virtuous cycle."

Growing evidence suggests that practicing daily tasks with an impaired limb can help stroke patients recover some function. And robotic devices to help patients with these tasks — whether strapped to the body or free-standing — are proliferating rapidly.

metal support

"This is an area that's exploding," said Hermanto Igo Krebs, a principal research scientist at MIT and one of the first scientists to envision robot-assisted therapy for stroke patients and others with brain injuries and neurological disorders.

"There are now a hundred groups around the world working on this. In five to 10 years, I expect we'll see these kinds of devices in all major clinics and rehab hospitals in the developed world, and even

A Teaching Brace

Through repeated practice with robotic devices like the Myomo e100 elbow brace, patients recovering from a stroke may relearn how to extend and flex the arm.

Control knob
Adjusts the type and amount of assistance provided by the device.

Power button

LCD screen
Displays device settings and patient's muscle signals.

Control unit
Processes the patient's muscle activity signals and controls the motor.

Motor

Sensors continually monitor and amplify the patient's muscle activity, allowing her to practice moving and controlling her arm.

The control unit responds by activating and controlling a motor in the brace that reinforces the patient's movement and helps her move her arm.

As the patient tries to move her arm, sensors touching her skin pick up electrical activity in her triceps muscle and relay the signal to the control unit.

Robotic help

The device, worn as an arm brace, works by sensing weak electrical activity in patients' arm muscles and providing just enough assistance that they can complete simple exercises, like lifting boxes or flipping on light switches. By practicing such tasks, patients may learn to flex the arm

chair to a table.

One time, she was delivering mail at work (she is an administrative assistant at a medical software company) and the envelopes started to slip. "And my left arm shot out to catch them," she recalled. "That hadn't happened in years."

A small study of the Myomo device and associated treatment, conducted with Spaulding Rehabilitation Hospital in Massachusetts and published in April in *The American Journal of Physi-*

cal Medicine and Rehabilitation, found that patients who exercised with the arm brace for 18 hours over about six weeks experienced a 23 percent improvement in upper extremity function.

The device has been approved by the Food and Drug Administration and is expected to reach the market in the next few months.

Further clinical testing with stroke patients is under way at the Braintree Rehabilitation Hospital in Massachusetts.

And a study involving patients with spinal cord injury and traumatic brain injury, including veterans of the Iraq war, is in the planning stages at the James A Haley Veterans' Hospital in Tampa, Florida.

It is not yet clear whether movement therapy using a surface-controlled device like the Myomo brace will benefit these patients, said Dr Irene Estores, a specialist in spinal cord injury and in physical medicine and rehabilitation at that hospital. But in the long run, the device could also prove useful as a "power assist" that patients wear every day.

A renewed ability to flex and extend at the elbow would be especially important to patients who also cannot walk and who may otherwise have to rely on a mouth stick to move their wheelchairs, Estores added.

—NYT News Service

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July 11, 1857



Birth of Alfred Binet

French psychologist. Alfred Binet was born on July 11, 1857.

He was a pioneer in the field of intelligence testing of the normal mind. Unlike other psychologists, he was interested in the workings of the normal mind rather than the pathology of mental illness.

He wanted to find a way to measure the ability to think and reason, apart from education in any particular field.

In 1905, he developed a test called the Binet-Simon intelligence scale in which he had children do tasks such as follow commands, name objects, and put things in order properly. He gave the test to Paris schoolchildren and created a standard based on his data.

Binet published revisions of his intelligence scale in 1908 and 1911, the last appearing just before his untimely death.

From Binet's this work, "IQ" (intelligence quotient), entered the English vocabulary. The IQ is the ratio of "mental age" to chronological age, with 100 being the average.

He died on October 18, 1911.