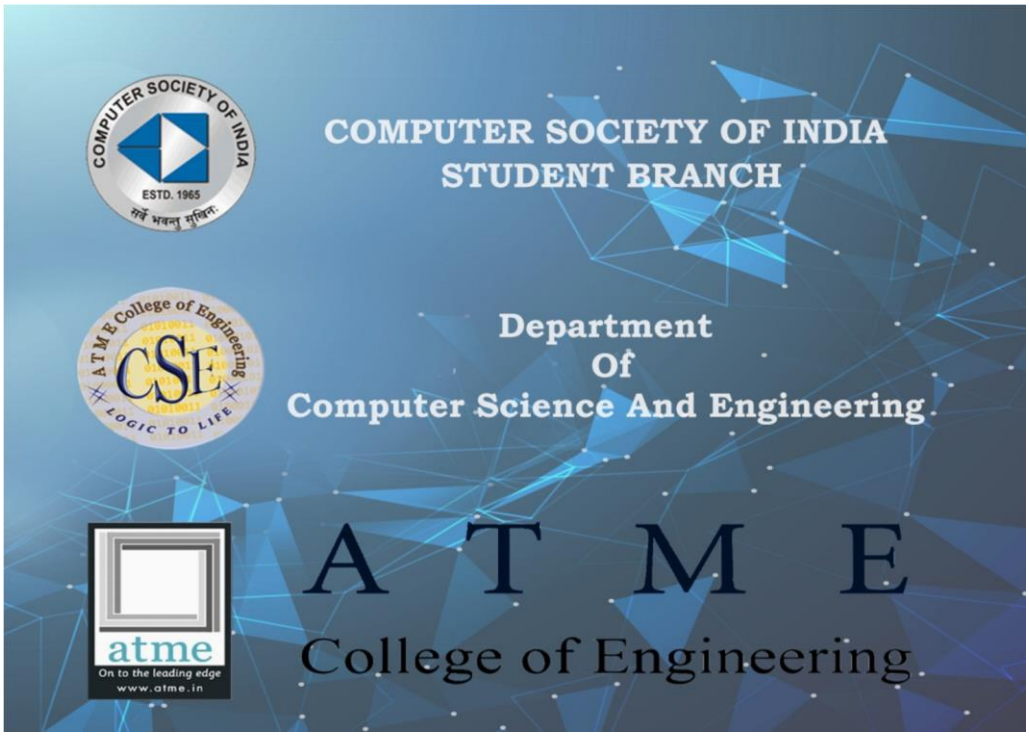


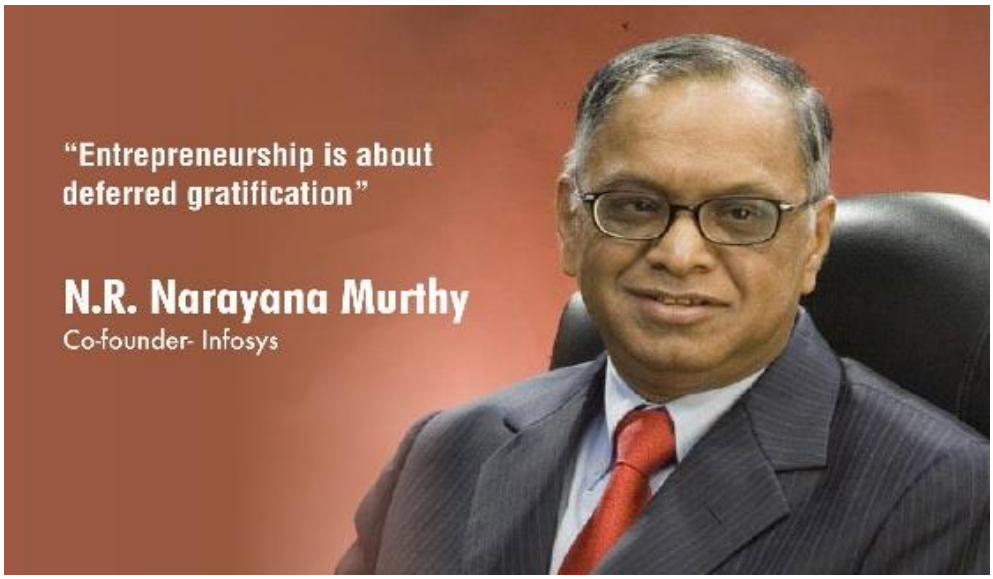
Tech Bits

CSI Newsletter

Volume 4
Issue 1
09th November 2019

In This Issue

N.R. Narayana Murthy



Nagavara Ramarao Narayana Murthy *(born 20 August, 1946) is an Indian IT industrialist and the co-founder of* ***Infosys****. Before starting Infosys, Murthy worked with* ***Indian Institute of Management, Ahmedabad*** *as chief systems programmer and Patni Computer Systems in Pune (Maharashtra). He started Infosys in 1981 and served as its CEO from 1981 to 2002 and as chairman from 2002 to 2011. In 2011, he stepped down from the board and became chairman Emeritus. On 1 June 2013, Murthy was appointed as Additional Director and Executive Chairman of the board for a period of five years.*

Murthy has been listed among the 12 greatest entrepreneurs of our time by Fortune magazine. He has been described as the "father of the Indian IT sector" by Time magazine due to his contribution to outsourcing in India. Murthy has also been honoured with the ***Padma-Vibhushan*** *and* ***Padma-Shri*** *awards.*

CSI Timeline 2019-2020

The Department of Computer Science and Engineering under Computer society of India Division one and Computer Society of India Student Branch had organized Intra Collegiate event called 'Technovanza' which Hunt on Net and Technical quiz on 11th May 2019. The Newsletter Volume 3 Issue 2 was released on this day by Dr. Manjunath S S, Professor & Head, Department of CSE, Professor Dr. Puttegowda D, Mrs. Sneha N P, Assistant professor, Department of CSE and Mr. Charan Bharadwaj ,Chairman

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Student articles on recent trends in Technology

Find articles on IoT, Quantum Supremacy, Image recovery and Block-Chain submitted by our beloved CSI - SB members.

CSI Timeline 2019-20

Technical Quiz 2019

The Computer Science and Engineering Department under Computer Society of India Division-1 and Computer Society of India Student Branch had organized a Intra Collegiate Technical event 'Technovanza' on 11th May 2019 where many of the students from final, pre-final and second year showed true spirit, immense interest and actively participated. The Newsletter Tech Bits Volume 3, Issue 2 for the year 2019 was released on this day.

The Event was inaugurated by Dr. Manjunath S S, Head of the Department, and Professor, Dr. Puttegowda D. The CSI-SB Newsletter "TECH BITS" Volume 3, Issue 2 was released on this occassion by Dr. Manjunath S S, Head of the Department, and Professor Dr. Puttegowda D. Mrs.Sneha N P,CSI-SB Counsellor, Mr. Charan Bharadwaj, Chairman; CSI-SB also were present on the Dias. The Technical Quiz had about 40 teams and was organized in three rounds i.e., Written, Rapid Fire and Buzzer Round. The Round 1 consisted of 30 questions and out of which Top 15 teams were selected. Round 2 consisted of 20 questions out of which Top 5 teams were selected for the final round. The Round 3 consisted of 15 questions and out of 5 teams top 3 were selected and rewarded with cash prize.

The Winners were rewarded with attractive cash prizes by Dr. Manjunath S S, Head, Dept of CSE. First prize was awarded to Sachin S and Pramod N of 6 'B' with cash prize of Rs 1000. The team winning second prize-Chandana N G and Abhishek R of 4'A' were awarded with cash prize of Rs 600. The team winning third prize was Niranjan Gowda M S and Manoj M of 6th semester awarded with cash prize of Rs 400.

Hunt on Net 2019

The Computer Science and Engineering Department under CSI Student Branch Banner had organized an Intra collegiate event Hunt On Net on 11th May 2019 where about 20 teams participated from second and third years. The event was conducted in CS Dept Labs. The Hunt on Net was organised in two rounds.

The event was based on Google search where the questions were framed based on level of difficulty with the rounds. The

questions were made such that it were interlinked deep inside which was a tough competition between all the participants.

The Round 1 consisted of 10 questions and out of which Top qualifying teams with score of above 4 teams were selected.

The Round 2 consisted of 10 questions and those who cleared with highest score were considered as the winners.

The winners of the hunt on net event were Syeda Masiha Tabassum and Chandana of 6 'B' and 4 'B' respectively and the runners were Canny cushallapa N J and Bharath of 4 'A'.

Gallery

CSI Crew

HOD Addressing the gathering

Technical Quiz event

Hunt on Net event

Indian Origin CEOs Who Rule the World

1. Sundar Pichai

Sundar Pichai, is an Indian American business executive. He is an engineer and the chief executive officer of Google LLC.
Age: 47

2. George Kurian

George Kurian is the CEO and president of storage and data management company NetApp. He was vice president and general manager of Application Networking and Switching Technology Group at Cisco Systems.
Age: 52

3. Satya Nadella

Satya Narayana Nadella is an engineer and Indian American business executive. He is the chief executive officer of Microsoft. He led a giant round of layoffs and flattened the organization, getting rid of middle managers.
Age: 52

4. Nikesh Arora

Nikesh Arora is an Indian businessman who served as a former Google executive. He later served as the president for SoftBank Group. Arora took on the role of CEO and chairman at Palo Alto Networks.
Age: 51

5. Shantanu Narayen

Shantanu Narayen is an Indian American business executive, and the chairman and CEO of Adobe Inc. He was honored with India's civilian honor Padma Shri in 2019.
Age: 56

6. Sanjay Jha

Sanjay Kumar Jha was the former CEO of GlobalFoundries and former chairman and chief executive officer of Motorola Mobility. Prior to that he was the chief operating officer of Qualcomm.
Age: 52

7. Sanjay Mehrotra

Sanjay Mehrotra is an Indian-American Businessman and executive who is current chief executive of Micron Technology. Previously, he co-founded SanDisk where he served as President and CEO.
Age: 61

8. Francisco D'Souza

Francisco D'Souza is an Indian American entrepreneur and businessman, who is the former CEO and Vice Chairman of Cognizant: a Fortune 200 global professional services company: co-founded the NASDAQ-100 company in 1994.
Age: 51

9. Rajeev Suri

Rajeev Suri is an Indian–Singaporean business executive and the CEO of Nokia. Before the current assignment in May 2016, he was the CEO of Nokia Solutions and Networks from 2015 and held various positions in Nokia since 1995.
Age: 52

Google achieves Quantum Supremacy

By

Affan Zaidi B, 5th sem

Google's Sycamore chip is kept cool inside their quantum cryostat.

Google just took a quantum leap in computer science technology. Scientists at Google on Wednesday, 23-10-2019 declared, via a paper in the journal Nature, that they'd done something extraordinary. In building a quantum computer that solved an incredibly hard problem in 200 seconds — a problem the world's fastest supercomputer-Summit would take 10,000 years to solve — they'd achieved "quantum supremacy." That is: Google's quantum computer did something that no conventional computer could reasonably do.

Using the company's state-of-the-art quantum computer, called Sycamore a team of researchers led by John Martinis, an experimental physicist at the University of California, Santa Barbara, wrote in their study published on Wednesday.

Quantum computers take advantage of the whacky physics of quantum mechanics to solve problems that would be extremely difficult, if not impossible, for classical, semiconductor-based computers to solve.

Ordinary computers perform calculations using "bits" of information, which, like on-and-off switches, can exist in only two states: either 1 or 0. Quantum computers use quantum bits, or "qubits," which can exist as both 1 and 0 simultaneously. This bizarre consequence of quantum mechanics is called a superposition state and is the key to the quantum computer's advantage over classical computers.

Some researchers at IBM contest the "supremacy" claim, saying that a traditional supercomputer could solve the problem in 2.5 days with a few hardware and software modifications, not 10,000 years. Still, 200 seconds is a lot quicker than 2.5 days. If the quantum computer isn't supreme, it's still extremely impressive because it's so small and so efficient.

"They got one little chip in the quantum computer and the supercomputer is covering a basketball court," Preskill says.

"It looks like Google has given us the first experimental evidence that quantum speed-up is achievable in a real-world system," says Michelle Simmons, a quantum physicist at the University of New South Wales in Sydney, Australia.

The task Google set for its quantum computer is "a bit of a weird one", says Christopher Monroe, a physicist at the University of Maryland in College Park. Google physicists first crafted the problem in 2016, and it was designed to be extremely difficult for an ordinary computer to solve.

The team challenged its computer, known as Sycamore, to describe the likelihood of different outcomes from a quantum version of a random-number generator. They do this by running a circuit that passes 53 qubits through a series of random operations. This generates a 53-digit string of 1s and 0s — with a total of 253 possible combinations (only 53 qubits were used because one of Sycamore's 54 was broken). The process is so complex that the outcome is impossible to calculate from first principles, and is therefore effectively random.

But owing to interference between qubits, some strings of numbers are more likely to occur than others. This is similar to rolling a loaded die — it still produces a random number, even though some outcomes are more likely than others.

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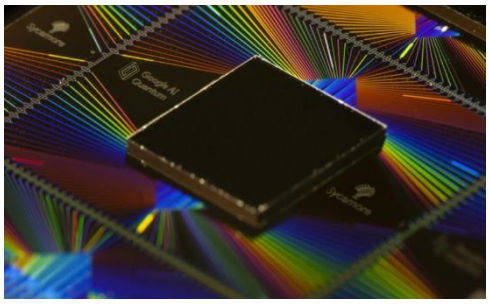


The quantum chip Sycamore

Verifying the solution was a further challenge. To do that, the team compared the results with those from simulations of smaller and simpler versions of the circuits, which were done by classical computers — including the Summit supercomputer at Oak Ridge National Laboratory in Tennessee. Extrapolating from these examples, the Google team estimates that simulating the full circuit would take 10,000 years even on a computer with one million processing units (equivalent to around 100,000 desktop computers).

Sycamore took just 3 minutes and 20 seconds.

Navigating the Path to a Seamless IoT Future

By

Akshay Kumar K, 7th sem

Whether you trace the beginning of the Internet of Things (IoT) to ARPANET in 1969 or John Romkey's toaster that turned on and off over the Internet at the October 1989 INTEROP conference or the coining of the Internet of Things term by Kevin Ashton in 1999, it's clear that here in 2019, the IoT industry has progressed far beyond its early promise.

The new IoT trends, technologies and channels are driving tremendous excitement. Everyone wants in on the game. We're officially neck deep in the hype phase of IoT. But the evolution of IoT also points to a looming problem: all these diverse sources for IoT solutions are competing to become the center of the IoT universe. Differentiating themselves from one another means settling into distinct silos. And silos are the enemy of IoT adoption. After all, the user expectation is that IoT is one single, interconnected and all-encompassing experience with every connected device connected to every other connected device. It's not an unreasonable expectation, given the promises made about seamless IoT operations.

The Gap Between Integrated Solutions and a Single Internet of Things

Let's take a look at what's happening in the consumer IoT world. For example, service providers are investing heavily to offer consumers more integrated and turnkey smart home solutions.

Beyond the communications domain, what about support for the protocols controlling device identification and discovery, data transmission and device management?

Which multi-layer frameworks should any particular turnkey smart home solution support if any? These considerations don't even touch on how to handle technologies and protocols that have yet to be invented and launched to the marketplace. Clearly, there's a pretty wide chasm separating the dream of a seamless, interconnected IoT and the reality of today's silos and incompatibilities.

How an Agnostic, Platform-Based Approach Can Help

One way that IoT could achieve that seamless interconnectivity is through universal agreement on a single set of standards that every manufacturer, service provider and retailer would adhere to. Given the inherent fragmentation and competitiveness in IoT, that's an essentially impossible goal. Instead, the path to a seamless IoT future lies at the IoT platform level. Imagine a comprehensive IoT platform traversing the entire IoT ecosystem, one that supports not only all the currently important standards and protocols but also commits to incorporating future technologies as they arise. Such a comprehensive platform would handle the fundamental, horizontal IoT functionality that all connected solutions require, such as security, connectivity, data capture, privacy, firmware updates and device onboarding and management.

Connecting to the IoT platform means that any company designing, manufacturing, delivering, managing or maintaining connected solutions could focus on differentiating their own offerings, rather than on agonizing over protocol, chipset and compatibility decisions that will inevitably fail to result in a comprehensive, seamless connected experience for users.

Fortunately, IoT platforms are already here and ready to help organizations across the chasm to seamless IoT.

Wireless transmitter

One of the greatest strengths of the neurotrophic electrode is its wireless capability, because without transdermal wiring, the risk of infection is significantly reduced. As neural signals are collected by the electrodes, they travel up the gold wires and through the cranium, where they are passed on to the bioamplifiers (usually implemented by differential amplifiers). The amplified signals are sent through a switch to a transmitter, where they are converted to FM signals and broadcast with an antenna. The amplifiers and the transmitters are powered by a 1 MHZ induction signal that is rectified and filtered. The antenna, amplifiers, analog switches, and FM transmitters are all contained in a standard surface amount printed circuit board that sits just under scalps. . The whole ensemble is coated in protective gels, Parylene, Elvex, and Silastic, to make it biocompatible and to protect the electronics from fluids.

Data acquisition system

On the outside of the patient's scalp rests the corresponding induction coil and an antenna that sends the FM signal to the receiver. These devices are temporarily held in place with a water-soluble paste. The receiver demodulates the signal and sends it to the computer for spike sorting and data recording.

Recovering “lost dimensions” of images and video

By

Ashish Prabhu M, 7th sem

Source: Rob Matheson | MIT News Office

MIT researchers have developed a model that recovers valuable data lost from images and video that have been “collapsed” into lower dimensions.

The model could be used to recreate video from motion-blurred images, or from new types of cameras that capture a person’s movement around corners but only as vague one-dimensional lines. While more testing is needed, the researchers think this approach could someday could be used to convert 2D medical images into more informative — but more expensive — 3D body scans, which could benefit medical imaging in poorer nations.

“In all these cases, the visual data has one dimension — in time or space — that’s completely lost,” says Guha Balakrishnan, a postdoc in Computer Science and Artificial Intelligence Laboratory (CSAIL) and first author on a paper describing the model. “If we recover that lost dimension, it can have a lot of important applications.”

Captured visual data often collapses data of multiple dimensions of time and space into one or two dimensions, called “projections.” X-rays, for example, collapse three-dimensional data about anatomical structures into a flat image. Or, consider a long-exposure shot of stars moving across the sky: The stars, whose position is changing over time, appear as blurred streaks in the still shot.

Likewise, “corner cameras” recently invented at MIT, detect moving people around corners. These could be useful for, say, firefighters finding people in burning buildings. But the cameras aren’t exactly user-friendly. Currently they only produce projections that resemble blurry, squiggly lines, corresponding to a person’s trajectory and speed.

The researchers invented a “visual deprojection” model that uses a neural network to “learn” patterns that match low-dimensional projections to their original high-dimensional images and videos. Given new projections, the model uses what it’s learned to recreate all the original data from a projection.In experiments, the model synthesized accurate video frames showing people walking, by extracting information from single, one-dimensional lines similar to those produced by corner cameras. The model also recovered video frames from single, motion-blurred projections of digits moving around a screen, from the popular Moving MNIST dataset.

Digital cameras capturing long-exposure shots, for instance, will basically aggregate photons over a period of time on each pixel. In capturing an object’s movement over time, the camera will take the average value of the movement-capturing pixels. Then, it applies those average values to corresponding heights and widths of a still image, which creates the signature blurry streaks of the object’s trajectory. By calculating some variations in pixel intensity, the movement can theoretically be recreated.

As the researchers realized, that problem is relevant in many areas: X-rays, for instance, capture height, width, and depth information of anatomical structures, but they use a similar pixel-averaging technique to collapse depth into a 2D image. Corner cameras — invented in 2017 by Freeman, Durand, and other researchers — capture reflected light signals around a hidden scene that carry two-dimensional information about a person’s distance from walls and objects. The researchers built a general model, based on a convolutional neural network (CNN) — a machine-learning model that’s become a powerhouse for image-processing tasks — that captures clues about any lost dimension in averaged pixels.

In training, the researchers fed the CNN thousands of pairs of projections and their high-dimensional sources, called “signals.” The CNN learns pixel patterns in the projections that match those in the signals. Powering the CNN is a framework called a “variational autoencoder,” which evaluates how well the CNN outputs match its inputs across some statistical probability. From that, the model learns a “space” of all possible signals that could have produced a given projection. This creates, in essence, a type of blueprint for how to go from a projection to all possible matching signals.

When shown previously unseen projections, the model notes the pixel patterns and follows the blueprints to all possible signals that could have produced that projection. Then, it synthesizes new images that combine all data from the projection and all data from the signal. This recreates the high-dimensional signal.

“It’s almost like magic that we’re able to recover this detail,” Balakrishnan says.

The researchers didn’t test their model on medical images. But they are now collaborating with Cornell University colleagues to recover 3D anatomical information from 2D medical images, such as X-rays, with no added costs — which can enable more detailed medical imaging in poorer nations. Doctors mostly prefer 3D scans, such as those captured with CT scans, because they contain far more useful medical information. But CT scans are generally difficult and expensive to acquire.

“If we can convert X-rays to CT scans, that would be somewhat game-changing,” Balakrishnan says. “You could just take an X-ray and push it through our algorithm and see all the lost information.

Blind People Can See Through Tongue Using Brain Port

By
USHA M.T, 5th sem

Source: Wikipedia

For all the wonderful uses of technology, none is more wonderful than when it can be used to improve the lives of the handicapped. A device called the Brain Port is a sixth sense for the blind, translating images from a video camera to electrical impulses that are transmitted via the tongue to the brain of a blind person.

The Brain Port is the strangest gadget for the blind of them all, translating visual images into electrical impulses, sent to a plate that rests on the tongue.
The technique, called echolocation, uses reflected sound to help subjects "see" their surroundings by measuring the distance, size, and density of the objects around them, it is reported. Interestingly, the blind subjects are intensively using the camera zoom on the current Brain Port vision device, even if it was not included in our original natural design.

The Wicab Brain Port is a device that takes information gathered by the sensors in a pair of glasses and sends them to a "lollipop" electrode array that sits on your tongue. Visual data are collected through a small digital video camera about 1.5 centimetres in diameter that sits in the centre of a pair of sunglasses worn by the user. Wicab Brain Port is a device that takes information gathered by a small digital camera in a pair of glasses and sends it to a "lollipop" electrode array that sits on your tongue. The device was designed to help people who are blind or who have extremely low vision. The camera in the glasses transmits the light information to a small base unit the size of a cell phone, an article at Scientific American explains. The base unit converts the light information into electrical impulses; this replaces the function of the retina. The retina is the surface at the back of the eye that encodes light into nerve impulses and transmits them to the brain. The base unit then sends that information into a set of 400 microelectrodes arranged on a lollipop-like paddle that you place on your tongue. The microelectrodes stimulate the nerves on the surface of your tongue. Although it seems incredible, the user's brain actually learns to interpret the tongue sensations as a kind of visual image. After all, your brain cannot "see" - it can only interpret the nerve impulses from your eyes and then create a picture that helps you move through a room, or find nearby objects.

The Brain Port device has been developed specifically for people with visual impairments. The basic premise of this device is in creating tactile images on the tongue, and thus enabling the patient to ‘feel’ the images. The input for this device comes from visual information gathered by a user-adjustable head-mounted camera. The processed information is sent to the Brain Port base unit, which converts it into electrical patterns projected on to the tongue. The resulting image is perceived as stimulation. also exist possibilities for easy assembly

The challenge of rechecking vision

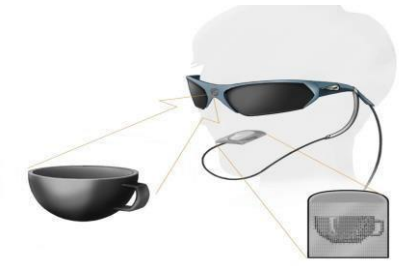
Wicab is working with the University of Pittsburgh Medical Center's UPMC Eye Center for further testing on BrainPort. Optometrist Amy Nau will test it, along with other artificial devices such as retinal and cortical implant chips, in order to develop criteria for monitoring the progress of artificial sight.

"We can't just throw up an eye chart. We have to take a step back and describe the rudimentary precepts that

these people are getting," Nau says. "The images are in black and white, pixilated. How do you recheck vision?" Nau is particularly interested in the BrainPort because it is non-invasive, unlike implants.

The key to the device may be its utilization of the tongue, which seems to be an ideal organ for sensing electrical current. Saliva there functions as a good conductor, Seiple said. Also it might help that the tongue's nerve fibers are densely packaged and that these fibers are closer to the tongue's surface relative to other touch organs. (The surfaces of fingers, for example, are covered with a layer of dead cells called stratum corneum.)

"Many people who have acquired blindness are desperate to get their vision back," Nau says. Although sensory substitution techniques cannot fully restore sight, they do provide the information necessary for spatial orientation. Along with the blind, the BrainPort could help people with visual defects such as glaucoma, which leads to the loss of peripheral vision, and macular degeneration, which degrades sight at the center of the visual field.



Gallery






Editorial Board