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The biggest ideas that are changing everything

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Using Mobile Apps to Transform Business Processes

By Daniel Burrus, CEO of Burrus Research

As our need for just-in-time information flourishes, our reliance on traditional technological processes has been decreasing significantly. The shift from personal computers to mobile devices that has been occurring for the last decade has picked up now more than ever.

It is difficult to determine if or when desktop or even traditional laptop computers will be a thing of the past; however, there is no doubt that smart mobile devices are here to stay. Our reliance on these tiny, ingenious pieces of technology is overwhelming, but for good measure. It is hard to argue how much time and energy is saved through the use of a tablet or smartphone, which allow users to access multimedia information and much more anywhere with the click of a button.

With increased use of mobile devices, inevitably came the expansion of new types of tasks that could be carried out using these devices.

Smartphones have the capability to answer nearly every need of its users, from providing detailed directions to and from any location around the globe to having access to a supercomputer in the cloud twenty-four hours a day, seven days a week. These are notions that we often take for granted as the opportunities provided by mobile devices have become so tightly wound into our everyday lives.

Of course the information that we seek is not freely floating on our tablets and smartphones. Mobile applications are the key to the success of the widespread use of mobile devices, as they provide a gateway to anything and everything that a consumer may need. Whether you are looking for a weather forecast, the highest rated coffee shop in your area, a movie, or how the stock market is doing today, an app is where you will likely find it.

> ***To date, there have been over one hundred billion apps downloaded.***

At just over one hundred billion, the number of apps downloads across the world to date is astonishing. This staggering number is predicted to double in 2017, bringing the applications run by users to over two hundred and fifty billion, worldwide.

Although mobile applications are commonplace nowadays, most consumers tend to think of apps as only being used for personal use. We understand that there is an app for our favorite social media site, the automated card game app we play while waiting around in the doctor's office, and the app that holds all of our photos.

But in what other ways can applications be exploited?

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TECHNOLOGY NEWS HIGHLIGHTS

Blood Test for Alzheimer's

A new blood test that leverages a person's immune response to detect Alzheimer's disease (AD) in its early stages has been demonstrated to predict whether a patient suffering from Mild Cognitive Impairment (MCI) will eventually develop AD with an accuracy rate of 87 percent.

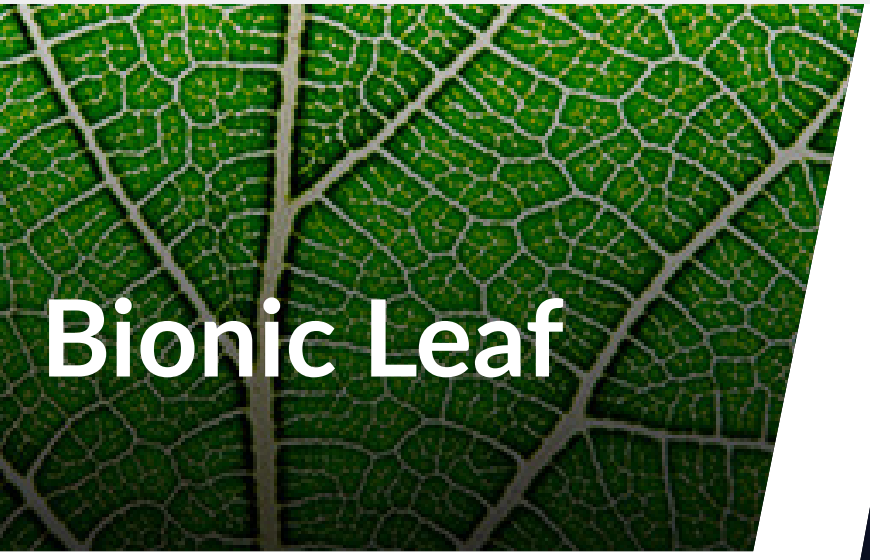
Samples from 236 subjects were analyzed using microarrays containing 9,486 individual human proteins as "bait" to attract blood-borne autoantibodies.

The results identified 50 biomarkers capable of detecting early AD pathology, which were then tested against healthy age- and gender-matched control subjects. The results showed that the 50 biomarkers selected were 100 percent accurate in distinguishing MCI due to AD.

The test was also disease-specific, distinguishing between AD, Parkinson's disease, multiple sclerosis and early-stage breast cancer with nearly 100 percent accuracy.

While MCI is considered to be indicative of early-stage AD, about 40 percent of cases are caused by other factors, including vascular disease, drug side effects and depression, so the ability to differentiate between AD and other causes is extremely beneficial. The ability to stage AD earlier may allow patients to delay its progression through lifestyle changes, begin treatment sooner and plan earlier for future care needs.

For information: Robert Nagele, Ph. D., Rowan University, School of Osteopathic Medicine, One Medical Center Drive, Stratford, NJ 08084; phone: 856-566-6083; email: nagelero@rowan.edu; Web site: http://www.rowan.edu/som/index.php



Bionic Leaf

Harvard scientists have developed a new hybrid microbial/artificial leaf system that is capable of converting sunlight and water into liquid biofuels – a breakthrough that could not only eliminate the need for fossil fuels, but also provide a storage mechanism for large-scale distributed deployment of solar energy.

Although earlier versions of the artificial leaf, which use sunlight to split water into oxygen and hydrogen, have been reported, this latest development combines that concept with a bio-engineered bacterium known as Ralstonia eutropha which goes a step further, converting the hydrogen and carbon dioxide into isoproponal and other usable fusel alcohols.

The system can convert solar energy to biomass with an efficiency of 10 percent, far exceeding the fastest growing plants, which operate at only about 1 percent efficiency. In addition, solar-to-fuel yields have been demonstrated to be about 6.7 percent.

In principle, the platform could be adapted to make other carbon-based molecules as well. In fact, it's already been used to create PHB, a precursor to bioplastics.

For information: Robert Nagele, Ph. D., Rowan University, School of Osteopathic Medicine, One Medical Center Drive, Stratford, NJ 08084; phone: 856-566-6083; email: nagelero@rowan.edu; Web site: http://www.rowan.edu/som/index.php

Atomic Data Storage

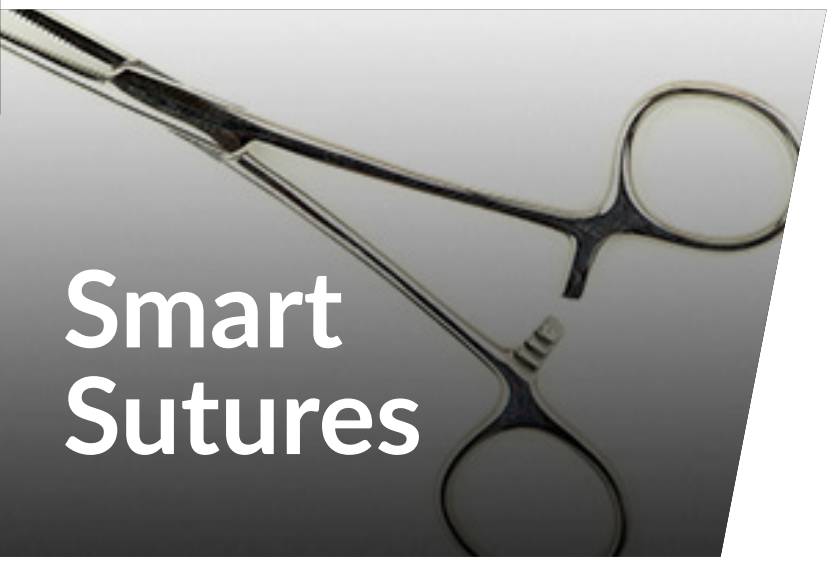
Researchers have been experimenting with the concept of storing data at the atomic level for decades. As early as 1959, physicist Richard Feynman suggested that atoms could be manipulated to form letters, and three decades later, scientists did just that, writing the letters "IBM" by precisely positioning 35 xenon atoms on a sheet of nickel. The problem was that, in order to keep them from vibrating off the "page," they had to be cooled to -269 degrees Celsius (just four degrees above absolute zero).

Recently, a team of Dutch scientists made huge strides by storing an entire paragraph of data at temperatures of only -196 degrees Celsius. They accomplished it by covering a sheet of copper with a lattice of chlorine atoms, then used pairs of atoms and spaces within the lattice to create a binary code.

The lattice structure provided more stability than individual atoms, and the code could be written and rewritten by sliding the atoms back and forth within the pairs.

Eight bits were used to create a byte, and a total of 1,016 atomic bytes were built. At an information density of about 78 trillion bits per square centimeter the new atomic storage has hundreds of times more capacity than current storage mediums, but read/write speed is still excruciatingly slow at 1-2 minutes per 64 bits! Regardless, it's an impressive illustration of what's possible with today's technology!

For information: Sander Otte, Delft University of Technology, Quantum Nanoscience, Building 22, Room F390, Lorentzweg 1, 2628 CJ Delft, The Netherlands; phone: +31-15-27-88998; email: a.f.otte@tudelft.nl; Web site: http://www.tudelft.nl/en/



Smart Sutures

A new twist on implantable sensors could provide more detailed information on the biological processes in the body than skin-mounted sensors would ever be capable of detecting. The approach involves using specially treated sutures to measure a variety of chemical and mechanical properties so that doctors can continuously monitor a patient's physical and biochemical status unobtrusively.

For example, sensors for measuring electrical signals in a muscle could be created by coating a fiber with conductive ink. Physical strain – a useful parameter for monitoring wound healing – could be assessed by embedding a stretchy thread with silicone and carbon nanotubes to make a piezoelectric fiber. And threads could be coated with a variety of compounds to make them sensitive to acidity, electrolyte concentrations or other chemical dynamics. They can even be made to exploit a property of thread known as "wicking," which allows liquid to travel along the fibers via capillary action, to siphon small amounts of interstitial fluid that surrounds tissues and cells.

Human clinical trials have not yet commenced; however, one area of interest is to use the sutures for monitoring wound healing in diabetics, where the ability to diagnose and treat problems early could reduce the possibility of losing a limb.

For information: Sameer Sonkusale, Tufts University, School of Engineering, 105 Anderson Hall, 200 College Avenue, Medford, MA 02155, phone: 617-627-5113; fax: 617-627-3819; email: Sameer@ece.tufts.edu; Web site: http://engineering.tufts.edu/

Lithium-Oxygen Battery

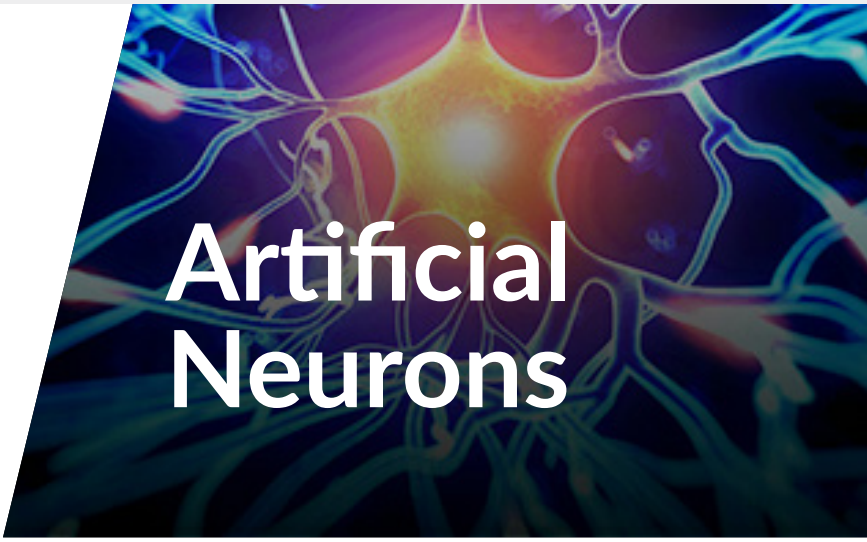
Since the 1970s, engineers have been working on improving lithium-ion batteries using a concept known as a lithium-air battery. Although it's been theorized that such a battery could quadruple the energy density of current

lithium technology, in practice they have been plagued with problems including contamination from water vapor and carbon dioxide. Even prototypes running on pure oxygen proved to be inefficient because the process requires large amounts of energy (up to 30 percent of the electricity input) to change the oxygen from a gas to a solid and back again.

However, a new design was recently tested that uses oxygen which is hermetically sealed inside the battery itself in a chemical form known as lithium superoxide (LiO2). The superoxide is embedded in a matrix made of cobalt oxide that is bathed in a liquid electrolyte. The superoxide, which is highly unstable, surrenders some of its oxygen molecules to form either lithium peroxide (Li2O2) or lithium oxide (Li2O). These chemical reactions are what drive electrons to create current, which can be used to power a variety of devices from cell phones to electric vehicles. When connected to a power supply, the process simply works in reverse to recharge the system.

The fact that the oxygen is always in a solid state throughout the discharge/charge process is an important aspect of the design. Instead of using 30 percent of the input power to recharge, the new battery uses only 8 percent. And battery life is also prolonged, as tests have shown that only about 2 percent of its capacity is lost even after as many as 130 charge/discharge cycles. The developers hope to take the design from prototype to product within a year.

For information: Ju Li, Massachusetts Institute of Technology, Department of Nuclear Science and Engineering, 77 Massachusetts Avenue, Cambridge, MA 02139; phone: 617-253-0166; fax: 617-258-8863; email: liju@mit.edu; Web site: www.mit.edu



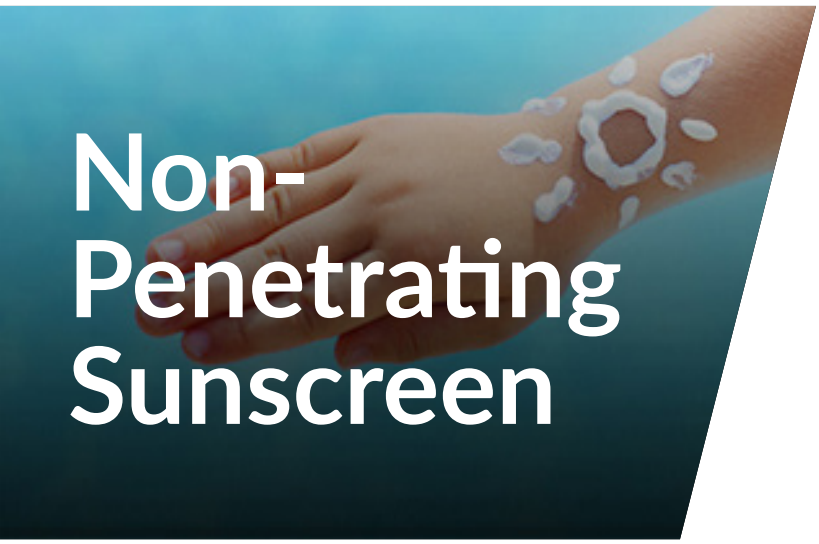
Artificial Neurons

People sometimes tend to think of computers and brains as being analogous. The truth is, they operate very differently, and each has its advantages. Computers, for example, are excellent at performing precise tasks, over and over, at very high processing speeds. The human brain, on the other hand, takes more time to perform computational tasks, but excels at making sense of uncertainty and vagueness that is common in real world applications. It's for this reason that the developing branch of artificial intelligence (AI) known as "deep learning" is seeking ways to mimic how brains – and more specifically, neurons – work to deal with the unpredictability of the natural world.

Researchers recently got one step closer by building a working, artificial version of a neuron. Neurons typically work in unison with other neurons, sending jolts of energy only when they receive a sufficient number of inputs from other neurons. This type of behavior was simulated by placing a tiny bead of phase-change material known as germanium antimony telluride between two electrodes. It starts out lacking any regular atomic structure and, as such, possesses poor electrical conductivity. However, as it is exposed to pulses of electricity, small portions heat up and rearrange themselves to form crystals with much better conductivity properties. Eventually, the bead becomes fully conductive, passing current from electrode to electrode in a fashion similar to the way a neuron would fire.

This design is similar to real neurons in another way – it's unpredictable. Fluctuations within the system imply that any given input will not necessarily produce the same result, since the crystallization processes can vary from cycle to cycle. The next step is to link the artificial neurons into networks and attach them to sensors to test their performance with regard to tasks like speech or facial recognition.

For information: Evangelos Eleftheriou, IBM Research, Saumerstrasse 4, Ch-8803 Ruschlikon, Switzerland; phone: +41-44-724-8111; Web site: http://www.research.ibm.com/index.shtml



Non-Penetrating Sunscreen

While sunscreens may be effective at protecting skin from damaging UV rays, they aren't without risks and concerns. Research has suggested that when the active ingredients in sunscreen absorb UV light, it triggers a chemical change that generates molecules known as reactive oxygen species (ROS). Furthermore, if the agent penetrates the skin, it could cause the very type of cellular damage that leads to skin cancer. Other non-penetrating solutions are available that use large molecule, inorganic compounds like titanium oxide, but they are opaque, making them unpopular for aesthetic reasons.

But a new type of sunscreen has been developed that stays on the skin without being absorbed into it. The commonly used UV-absorbing chemical – padimate 0 – is coated with a biodegradable nanopolymer. The nanoparticles are large enough that they don't penetrate the skin surface. They're also sticky enough that they'll stay out of hair follicles. The result is a transparent sunscreen that isn't absorbed, won't wash off with water and can only be removed by wiping with a towel. In addition, because it stays on the skin surface, the new sunscreen requires a smaller amount of active ingredient to be effective.

A small-scale study on human subjects will be conducted to establish the SPF. It is hoped that minimizing the risk of exposure to potentially harmful chemicals will encourage more people to use sunscreen in the future.

For information: Michael Girardi, MYSM School of Medicine, P. O. Box 208059, New Haven, CT 06520-8059; phone: 203-785-4094; email: michael.girardi@yale.edu; Web site: www.yale.edu

Biofoam Water Purifier

Worldwide, it has been estimated that four out of ten people suffer from a lack of clean drinking water. The health consequences can be serious, forcing them to obtain water from contaminated sources that can spread diseases like cholera, typhoid fever and salmonella. But now, an inexpensive and extremely

lightweight, bi-layered biofoam has been developed that can purify and desalinate water using sunlight.

The foam itself is a nanoscale cellulose fiber network that's produced by bacteria. As the first layer is being formed, graphene oxide flakes are added to increase light and heat absorption. At a certain point, the graphene oxide is removed to produce a pristine nanocellulose layer. The interface between the two layers is extremely robust, and the process is highly scalable.

When suspended on top of water, the pristine cellulose layer acts as an extremely effective sponge, drawing water to the top layer, where solar heat causes it to evaporate and re-condense rapidly. The fresh water is then easily collected from the top of the sheet.

The cellulose sheets can be produced very inexpensively on a massive scale, making it a viable solution for water purification and desalination in the poorest areas of the world. As long as there is ample sunlight, dirty water can be turned into clean, fresh water without the need for expensive purification facilities.

For information: Srikanth Singamaneni, Washington University, Campus Box 1099, One Brookings Drive, St. Louis, MO 63130; phone: 314-935-5407; email: singamaneni@wustl.edu; Web site: https://wustl.edu/

Using Mobile Apps to Transform Business Processes

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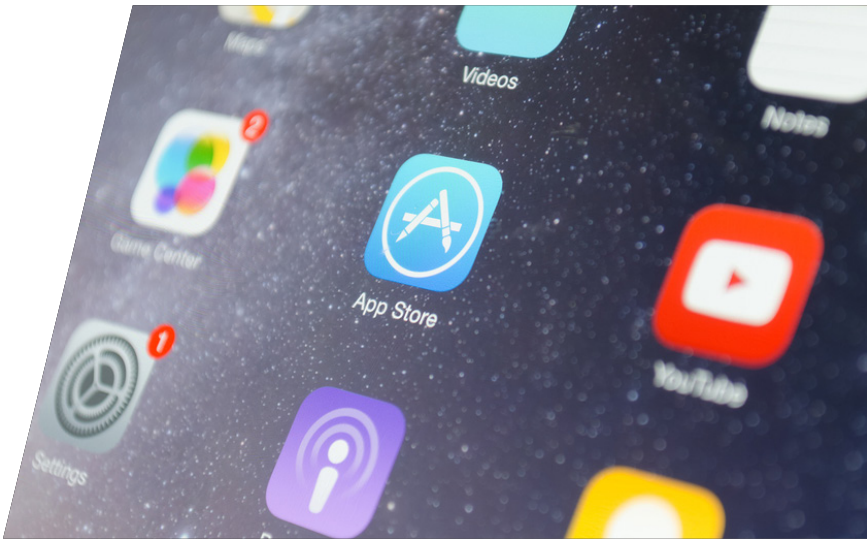
In a consumer-driven world, who else might benefit from the untapped potential of mobile apps?

The answer is businesses.

I have seen nearly all businesses large and small begin to understand the potential that creating an app for customers has. Retailers can now provide customers with the ability to shop online, find deals and savings, and browse their inventory while on the go. Likewise, transportation services have created apps that help users navigate through train routes and bus times, while providing pricing and travel tips.

Financial institutions allow their clients to check statements and ask questions whenever and wherever they find themselves in need. These applications all benefit both the consumer and the organization itself, though they are not the only type of mobile business apps that are on the rise.



Mobile applications for business processes are becoming more and more prominent when it comes to how businesses run day to day. Applications that are created specifically with the operational side of an organization in mind have picked up in popularity, tremendously.

The benefits of employing an app to be used

on a smartphone or tablet for the purpose of transforming business processes are many, and begin with the reason we tend to use apps in the first place: convenience.

Just like all mobile apps, applications for business processes allow businesses to become more efficient. Instead of hand writing notes on data or inventory while out of the office, which must be later entered into the system, an application that allows data to be entered on the spot by typing or talking completely removes a lengthy step in the process.

By engaging in these simple apps, many have found that time can be better spent visiting clients and prospective customers, providing some convenience in an otherwise tedious operation.

Another way that a mobile app might be applicable for a business's internal use is when it allows for mobile sales to be made. For deals that close quickly or unexpectedly, organizations can have contracts ready to be signed electronically no matter where a meeting may have taken them.

Presentations and data can be displayed at a moment's notice whenever they may be needed most. Information, like notes and data, on previous deals made with a customer can be easily accessed while heading to meet with the client.

Mobile apps can be created to streamline processes including supply chain, purchasing, distribution, or maintenance so that a business can run as productively as possible. With information on demand, in one accessible place that can be reached easily using a mobile device by those who need it most, organizations tend to increase productivity as well as find areas that need further improvement. Having one comprehensive, competent mobile system can reduce cost inefficiencies while increasing revenue.

Additionally, communication and collaboration are improved through mobile apps for business processes, as employees can begin to more clearly understand roles and discuss discrepancies highlighted by the application. Employees at every level instantaneously become more productive, as time is saved by the assistance that mobile applications including electronic assistants like Apple's Siri provide.

These applications can be purchased and modified by organizations, or designed to fit the unique needs of a business. By creating a mobile app tailored to a business, the organization gains a competitive edge by having access to something unattainable by competitors. There are dozens of businesses that specialize in creating mobile apps to fit the unique needs of their customers, and this represents yet another market on the rise.

The ways in which mobile applications can be used is seemingly endless, and right now mobile apps for business processes represent a growing Hard Trend that no business should turn its back on.

These innovative applications result in an efficient internal process that will only continue to provide success for users. For businesses looking to become more productive and effective long term, I suggest asking yourself: How can we use mobility to transform every business process? My guess is your answers will amaze you.

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