

DANIEL BURRUS'

TECHNO TRENDS

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THE BIG IDEAS THAT ARE
CHANGING EVERYTHING

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Ultra-Intelligent Electronic Agents Will Shape the Future

By Daniel Burrus, CEO of Burrus Research

Ever since our first digital search we've all spent increasing amounts of time on the web looking for the information we need. Since most of us are in a hurry, we've used various search sites and mega portals over the years, from early players like AOL and Excite to today's leaders such as Google and Bing. You know the process: You enter a keyword or phrase to find what you are looking for, and then you manually scan the results, which are sometimes staggering in length, looking for what you really want. The good news is that the web has provided us with a world of information at our fingertips. The bad news is that the world of information we have access to is getting bigger by the day. As a result, we are all spending way too much time looking for the information we really want.

Help is On the Way!

We are now on the brink of having access to a powerful new tool that will do much of the search and sorting work for us, with far more intelligence and personalization than we have had in the past. Very soon you will find yourself using, on a daily basis, an emerging new technology called an ultra-intelligent electronic agent. Actually, the first generation of intelligent agents was launched by Apple when the iPhone 4S was launched...and her name is Siri.

Siri, what Apple calls their intelligent personal assistant, was very different from the Google app (that was available at the time) on your smart phone where you would ask for directions or a restaurant and it provided written search results. While Google search was intelligent and worked very well, Siri provided you with an actual agent to interact with. Siri has a woman's voice; it has a personality; it can even give you some humor.

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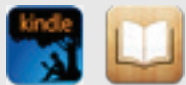
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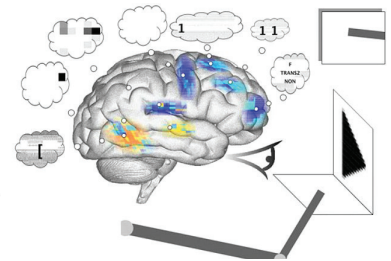


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TECHNOLOGY NEWS HIGHLIGHTS

Simulated Brain

Canadian neuroscientists recently made a huge breakthrough in simulating the biological function of the brain. The model, known as Spaun (Semantic Pointer Architecture Unified Network), bridges the "brain-behavior gap" with 2.5 million computer-generated neurons. By simulating the actual voltages and currents observed in living neurons, Spaun can mimic the cognitive activity that occurs in the prefrontal cortex, basal ganglia, thalamus and other parts of the human brain.



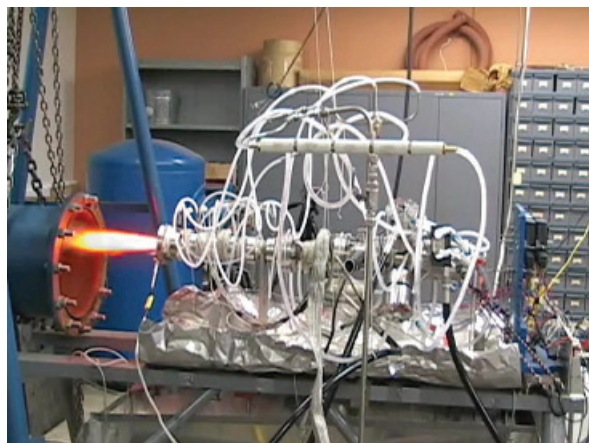
A simulated eye gives Spaun the ability to recognize numbers and objects, and a mechanical arm enables it to write and draw. It's capable of shifting from one task to another, such as memorizing a list, learning a new pattern, or figuring out the best answer to a question. It has even passed some basic functions of an IQ test. Although it is nowhere near as complex as a real brain, Spaun captures how different components of the brain interact and describes key facets of perception, cognition and behavior in ways that other models have not.

For information: Chris Eliasmith, University of Waterloo, Centre for Theoretical Neuroscience, PAS Building, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1; phone: 519-888-4567 ext. 32449; fax: 519-746-3097; email: celiasmith@uwaterloo.ca; Web site: <http://uwaterloo.ca> or <http://ctn.uwaterloo.ca>

Detonation Engine

Military researchers are working on a new type of engine that could save hundreds of millions of dollars in fuel costs annually. Designed to replace jet engines and gas turbines, detonation engines basically offer a more efficient way to produce the high levels of air compression that are needed to power the large generators.

In contrast to conventional combustion engines, which burn fuel continuously, the new technology produces a series of pulsed



detonations. However, that creates a new challenge – finding materials that can withstand the higher pressure levels generated by the explosions, which can be up to ten times greater than traditional combustion engines. On the other hand, the payoffs are big – reducing fuel consumption by up to 25 percent.

For information: Kazhikathra Kailasanath, Naval Research Laboratory, Laboratory for Computational Physics, 4555 Overlook Avenue SW, Washington, DC 20375; phone: 202-767-2402; email: kailas@lcp.nrl.navy.mil; Web site: www.nrl.navy.mil

Mannequins Watching You

If you feel as though you're being watched while you shop... you are...but not necessarily by those overhead



security cameras we've all come to recognize. The latest twist on shopper surveillance is mannequins with built-in cameras in their eye sockets. And these spy dummies do more than record video.

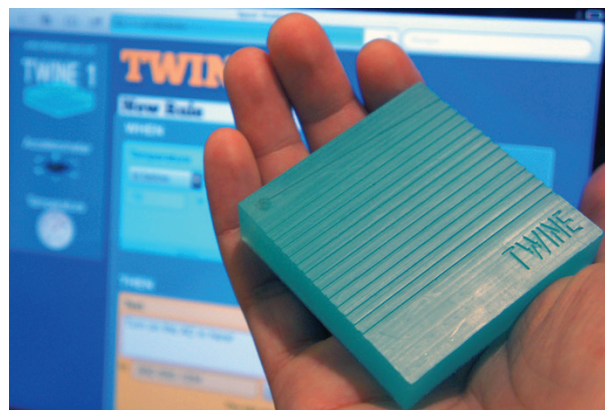
In addition to documenting numbers of people at specific times of the day, EyeSee mannequins are capable of analyzing facial features to record a shopper's gender, race and approximate age, providing sophisticated statistical demographic data for more targeted marketing

strategies. The next generation will likely include microphones in their ears to eavesdrop on what customers are saying. The company also has plans to provide screens that will prompt passing shoppers about products that match their personal preferences, based on the data collected.

The new spy mannequins are currently being used in the United States and Europe.

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Home Automation Made Easy



A new Web-connected smart device is designed to make remote home monitoring and automation “easier than programming a VCR.” With no buttons, few connectors, and a rubbery elastomer enclosure, Twine is about the least intimidating piece of electronics you're likely to find. And it comes with just two instructions: “Place this side up” and Go to Twinesetup.com.”

From there, a dashboard in your Web browser walks you through setup using Twine's internal WiFi and a simple set of rules. You can also select from a variety of ways to communicate with the device remotely including email, text, and Twitter.

Built-in temperature and orientation sensors are standard, but magnetic switches and moisture sensors are also available, so you can tell (for example) whether the air conditioning is working, if the front door was opened or when it's time to water the garden. Retail price for a basic system is around \$125.

For information: John Kestner, Supermechanical, LLC, 902 East 5th Street #106, Austin, TX 78702; phone: 512-814-7186; email: connect@supermechanical.com; Web site: www.supermechanical.com

Pacemaker Cells from a Virus



The rhythm of a beating heart is controlled by a cluster of cells – known as the sinoatrial node – which act as a natural pacemaker. When these cells are damaged by disease or injury, an electronic pacemaker can restore a normal rhythm and prevent cardiac arrest, but the potential for mechanical complications still leaves a patient at risk.

Recently, a team of researchers discovered that regular heart cells could be converted into pacemaker cells using a gene known as Tbx18. This gene is activated in the embryo when the sinoatrial node is developing. By inserting it into a virus and then injecting the virus into the fully grown heart tissue of guinea pigs, the heart began to beat in rhythm with the newly formed pacemaker cells. In addition, the infected cells, which had taken on a tapered shape distinctive of pacemaker cells, retained that shape

even after the Tbx18 was no longer present, indicating that the procedure could provide a lasting solution for damaged sinoatrial cells. Human trials are on the near horizon.

For information: Eduardo Marban, Cedars-Sinai Heart Institute, 8700 Beverly Blvd., Los Angeles, CA 90048; phone: 310-423-7557; fax: 310-423-7637; email: marbane@cshs.org; Web site: www.cedars-sinai.edu

3D Printing On-Demand

Staples stores in the Netherlands and Belgium will begin offering 3D printing services early this year. Known as “Staples Easy 3D” the new service will allow customers to take advantage of rapid-prototyping – for customized parts, prototypes, and architectural or medical models, for example – without the expense of investing in a printer of their own.



Staples will be using the Mcor IRIS printer which is capable of over a million colors with 5760 x 1440 x 508 dpi resolution. The printer cuts standard paper to form layers 0.1mm thick, and then glues them together to produce a model that's nearly as hard as wood. Expect more companies to offer remote 3D printing services.

For information: Mcor Technologies, Unit 1, IDA Business Park, Ardee Road, Dunleer, Co. Louth, Ireland; phone: +363-41-686-2800; Web site: mcor technologies.com

T-Ray Scanner

Engineers at Caltech have developed a small, inexpensive silicon chip that can generate terahertz (THz) waves – a form of high frequency

electromagnetic radiation that can penetrate objects without the damaging effects that X-rays and micro-waves can produce.



THz waves operate at frequencies 300 times the speed of traditional CMOS chips (between microwaves and far-infrared), and can be used to penetrate packaging, render images, detect chemical fingerprints of drugs or explosives and even locate tumors in the body. However, existing THz scanners require multiple lasers and lenses, making them bulky and expensive to produce. The ability to incorporate the microchips into low-cost circuitry for handheld devices could enable a broad range of new applications for terahertz waves, including security, medicine, communications and gaming.

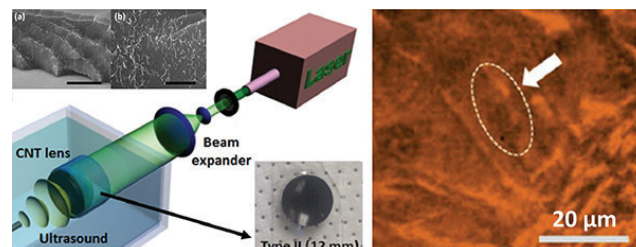
For information: Ali Hajmiri, California Institute of Technology, Engineering and Applied Science, 302 Moore Laboratory, MC 136-93, Pasadena, CA 91125; phone: 626-395-2312; email: hajmiri@caltech.edu; Web site: www.caltech.edu

Precision Ultrasound

Targeted ultrasound is widely used for a variety of medical applications, but the relatively large focal area (typically on the order of a centimeter or more) makes it difficult to focus the beam precisely. Recently, researchers found a way to fine-tune the accuracy by nearly 100 times taking the target range down to an area as small as 75 by 400 microns (thousandths of a millimeter).

Instead of starting with sound, the new method uses a

6-millimeter optoacoustic lens coated with carbon nanotubes to convert laser light into high-frequency sound waves. As the nanotubes absorb the light, they warm up, transferring heat to a second layer – a rubbery synthetic material called polydimethylsiloxane – which expands as it



absorbs heat and amplifies the signal through rapid thermal expansion. The resultant sound waves are at a frequency 10,000 times higher than humans can hear.

The highly-focused sound waves are capable of blasting a 150-micron hole in a kidney stone. With this kind of precision, ultrasound could someday be used to clear cholesterol deposits from clogged vessels or target specific clumps of cancer cells.

For information: L. Jay Guo, University of Michigan, Macromolecular Science and Engineering, 2304 EECS Building, 1301 Beal Avenue, Ann Arbor, MI 48109; phone: 734-647-7718; fax: 734-763-9324; email: guo@eecs.umich.edu; Web site: www.umich.edu or www.eecs.umich.edu

Ultra-Intelligent Electronic Agents

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Essentially, it's an audio avatar. And if we look to the future a little further out, it's obvious that soon we'll be able to see Siri's face (or visual representation) on a smart phone, tablet, computer, or even TV screen. Of course, Siri was just the beginning. In no time at all we saw a Google version for Android phones, and as you already know, there are many others including IBM's Watson. So what makes Siri an ultra-intelligent electronic agent versus a text-based search engine? Siri (as well as its competitors) are linked to a super-computer in the cloud that can tap

into all of the world's databases and news feeds. It has access to increasing amounts of information coming from everywhere. This is about machines talking to machines and sensors, all communicating through the internet. In addition, it's connected to our personal computing devices with access, granted by you, to your calendar, contacts, and more. All the data goes to a super-computer that feeds into our ultra-intelligent agent, which can then give us the actionable knowledge that's pertinent to us.

Why You Need to Take Notice

Most people don't realize the impact an ultra-intelligent agent will have, much less how it will transform companies the world over. Think about it...If you have an ultra-intelligent agent that can give you exactly the information you want, do you need to take the time to personally go to a website to get it? Did you do a traditional search? Did you issue the request for information, analyze the information, or even physically place the order for a product or service? The answer to all of these questions is "no." The agent did the search, gathered the information, issued the request, and in some cases even analyzed the results and placed the order.

This is something powerful and disruptive, and it's not an "if" or a "maybe." We can see already with Siri and some of the Siri competitors how this technology is taking hold. And because of bandwidth, storage, and processing power growing exponentially, we'll see more advanced versions of the ultra-intelligent electronic agent coming onboard very quickly.

When you know what's going to happen before it happens, you have the upper hand. Therefore, you have to start looking at how you can both control and use this technology in your company rather than waiting for your competitors to use it, which puts you in the position of having to play catch-up.

Sell and Connect Better

Ultra-intelligent electronic agents provide a new level of

competitive advantage to organizations because they help create a level of electronic advice and trust between your company and your customers. Even though the world is more and more technological, relationships are increasingly more and more important. Trust is still something that either earns your business or loses your business depending on whether your customers trust you. Business—all business—is still about trust and relationships.

You could expand upon this trust by offering your customers a plug-in to their ultra-intelligent electronic agent. Basically you're making your company's information a part of your customer's intelligent agent so your company is always top of mind for them.

For example, your financial planner may offer an agent plug-in module to help you manage your investments. Your child's school might offer a plug-in giving you information about your child's progress. And your bank might offer a plug-in to help maintain your account balances and other financial information. The list of possible plug-ins is endless. Essentially, you'll build your agent based on the relationships of the different companies and organizations you work with and have a trusting relationship with.

Currently, Siri and its competitors represent a general, early intelligent agent, which means it's intelligent, but not that intelligent. In the near future, though, it will get a lot more intelligent.

Not only will it get more intelligent, but it will also get more personalized. For example, let's say you and I both have iPhones and we both use AT&T as our carrier. Even though we have the same phone, I can bet you \$1,000 that my phone is still much different than your phone, and I'd win. Why? Because I have hundreds of thousands of apps to choose from. So it's not an iPhone; it's a myPhone customized by me to serve me best. The same is true for other smart phones and tablets.

In that same way, we're going to create a customized ultra-intelligent agent by adding little components to it from the most trusted providers. That's why business needs to wake up to this and take part—you want your company's plug-in a part of every customer's intelligent agent.

Additionally, we'll have B to B intelligent agents. Now it's not just about interacting with customers. It's also about selling to businesses that service or sell to other businesses, to suppliers, to distributors, etc. Various levels of this selling, servicing, and advising will be done using intelligent agents to save us time; therefore, you have to decide how you'll build the intelligence of your agent that's helping you.

Work Smarter

In addition to helping your customers, your company's ultra-intelligent electronic agent will be able to help your employees work smarter. Chances are you have many employees who don't always have access to a computer screen but still need information. This could pertain to employees who are on the road, such as salespeople, as well as those in the field, such as repair and maintenance people or engineers. These people can pull out their smart phone or tablet and ask their intelligent agent for detailed information.

For example, suppose you have a maintenance person fixing an air conditioner. He can pull out his smart phone and ask his agent, "Do I have this part in my truck?" And the agent can reply, "No, you don't have that part in your truck." He can then ask, "Well, do we have it back at the shop?" As he asks and gets his answers, he's still working and doing maintenance, essentially multiplying his time.

Instead of having to go their laptop back in the truck or type in search terms on their smart phone, employees simply ask a question and have access to all of the information they need, including diagrams and videos for just-in-time training.

These ultra-intelligent electronic agents are the way to help employees do more with less.

So determine how your company can use its ultra-intelligent electronic agent in the various functions. Just like mobility is driving a transformation of almost every business process—including purchasing, logistics, supply chain, etc.—we can do the same with an ultra-intelligent electronic agent.

The Future of Google, Search, and Your Company

In the future, will anyone want to do a manual search or surf the web when their electronic agent can simply do the work for them? To help answer that question, it is important to remember a guiding principle I have shared over the years: To see the future, think both/and. Some people will want to surf the web and do manual searches while others will never take on that task again. It is easy to predict that the number of people going to a search site will diminish greatly because of the increasing value of our time.

So does that mean that companies who offer only text-based search are out of business? Not if they have expanded their vision of what they are and how they serve customers. In fact, Google, Yahoo, Bing, and other search companies are already in the process of becoming key players in the development of ultra-intelligent agents. Why? Because, if they don't do it, someone else will.

The same can be said for your company. You want to be the first in your industry to offer customers an ultra-intelligent electronic agent plug-in. Remember, offering an ultra-intelligent electronic agent is not something that is here today, gone tomorrow. It's something that is already here today...it just hasn't been fully applied to business yet. If you don't act first, someone else in your industry will. Plan your future now.



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