

DANIEL BURRUS'

TECHNO TRENDS

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THE BIG IDEAS THAT ARE
CHANGING EVERYTHING

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Who Owns Your Data?

By Daniel Burrus, CEO of Burrus Research

Back in the mid-1980s, I wrote about how GPS would be used to revolutionize our lives. One of my books published back then was called *Advances in Agriculture*, in which I highlighted how GPS would transform agriculture in the 1990s and beyond.

Today those predictions have come true. Thanks to smart tractors from John Deere, as well as harvesters and planters, farmers can use GPS to do much more than plant a straight row of corn. They can also collect data via GPS to determine exactly where in the field they're getting the best and worst yields, foot by foot, right along as they harvest. Therefore, when they plant seeds in the spring, farmers can plug that data into their planters and know exactly where to plant more seeds to get a bigger return, and where to plant fewer seeds because the ground is not as fertile. This enables the farmers to maximize their yields.

All this is great news. And because the data comes from the farmers' equipment and is downloaded onto a memory stick that stays with the farmer, it becomes the farmers' intellectual property. It's their data.

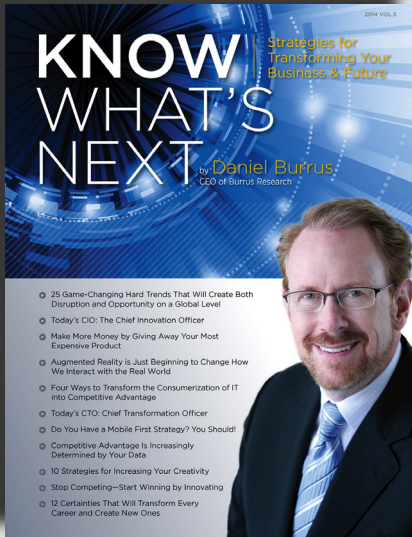
However, recently Monsanto, which is one of the biggest companies in agriculture that provides the seeds for genetically-modified crops, has approached the farmers and made an interesting offer: They want all the farmers' data to go directly from the harvesters and planters to the Monsanto cloud so Monsanto can collect the data on the specifics of each field—what grows well and where. In return, Monsanto will provide the farmers with information on the best ways to work their field as well as the best tools for getting the highest yield and the most profitability.



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TECHNOLOGY NEWS HIGHLIGHTS

Wearable Projector

A new device will be introduced at a conference in April that will allow users to access smartphone content by projecting it on any nearby surface. The technology, known as Ambient Mobile Pervasive Display (AMP-D) is essentially a wearable projector system that hangs around your neck and generates a graphic image in front of you.



When an email, tweet or text is received, the wearer can access it with a swipe of their hand. The message is then projected directly onto their palm. For more public information, the user can have information displayed on the floor. A Kinect-style camera detects the distance to the floor or the user's hand to automatically adjust the focus, and is also used to recognize hand gestures.

In addition to personal messaging, the system will have application for navigation as well as location-aware advertising.

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Dandelion Rubber

Dandelions may soon replace traditional rubber plants as a source of raw materials for tires and other products. With the help of genetic engineering, scientists have succeeded in transforming the weed into an agricultural crop that



can produce an abundance of natural rubber and offers many advantages over tropical and subtropical sources.

As weeds, dandelions are easy to grow just about anywhere, and are nearly infinitely renewable. Because they can be cultivated on land that is not typically suited for food crops, they can be grown in much closer proximity to production facilities, reducing transportation costs as well as environmental impact. The rubber extracted is also less affected by weather than traditional rubber trees.

A pilot facility that will be able to produce the new material in quantity is currently being built in Muenster, Germany and the first prototype tires made using dandelion rubber blends are expected to hit public roads in the next few years.

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Robotic Swarm As A Construction Crew



Harvard engineers recently demonstrated a new concept in building structures using an autonomous swarm of robots. Inspired by the way termites construct complex, functional architectures complete with ventilation and humidity control, they worked to emulate a similar collaborative effort using machines.

The key was to accomplish the task without the need for centralized control (e.g. a supervisor) or individual understanding of the overall plan. By combining swarm intelligence with programmable self-assembly, algorithms were created to incorporate a concept called “stigmergy” in which the communication between robots, and their subsequent action, is based on observation of changes in the environment. In this way, the robotic platform can be kept simpler.

The robots (known as TERMES) are designed to build structures out of foam bricks. In addition to carrying, placing and attaching the blocks, they can build stairs to reach the next level of construction and adapt if an individual robot breaks down. This concept of collective construction could be used to build containment structures in disaster areas, construct defenses in dangerous or remote situations, or even assemble habitats on another planet.

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Cancer Imaging Glasses



Up to 25 percent of breast cancer patients end up requiring a second surgery to remove cells that could not be detected the first time around. But a new wearable technology is being developed that would enable surgeons to distinguish cancer cells from healthy ones, reducing the the need for repeat procedures and the associated pain and anxiety.

The tumor can be visualized by first injecting a contrast agent that targets only the cancerous cells. Under a special light, a video camera sends images to a head-mounted display where the targeted cells glow green. In one published study, it was noted that tumors as small as one millimeter could be detected. Theoretically, the technique would be applicable to any type of cancer.

The pilot testing was performed on mice using a common contrast agent called indocyanine green, however, a new agent is being developed for use with the glasses that will stay in the cancer cells longer.

Security Decoys



It's the biggest nightmare of anyone who uses e-commerce, e-banking, or simply surfs the Internet... criminals decrypting passwords and accessing sensitive information. Now a new encryption system uses a simple, but effective, method to foil would-be hackers at their own game – deception.

Typically, hackers use software programs to generate thousands of “guesses” to passwords or cryptographic keys. A wrong guess sends back garbled information, but a correct one produces a recognizable piece of data, which tells them they’ve unlocked the key.

Known as Honey Encryption, the new approach “fakes out” the software by generating a recognizable (but fake) piece of data every time an attempt is made. In other words, if an attacker tries 10,000 times to access your credit card number, they’ll get 10,000 fake numbers back, with no way of telling whether or not they’re real. The same concept could be applied to password vaults, where unlocking a single password could grant a hacker access to a number of secure locations.

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Wind Power...for Your Phone



The newest development in sustainable power for your mobile devices are micro windmills – tiny little generators only 1.8 millimeters wide and so thin that ten of them can fit on a single grain of rice. In fact, more than 2,000 of them could sit on the surface of an iPhone 4.

The idea is to place the windmills on a wafer or sleeve. When placed in front of a fan or an open window, or just waved in the air, they generate electricity with minimal effort.

They can be mass produced in arrays using a batch process very inexpensively. And because they're made using a nickel alloy instead of brittle microelectromechanical systems (MEMS) they hold up well against the wind.

A Taiwan-based company is already exploring opportunities to commercialize the technology which could have far-reaching applications.

Color-Match 3D Printing



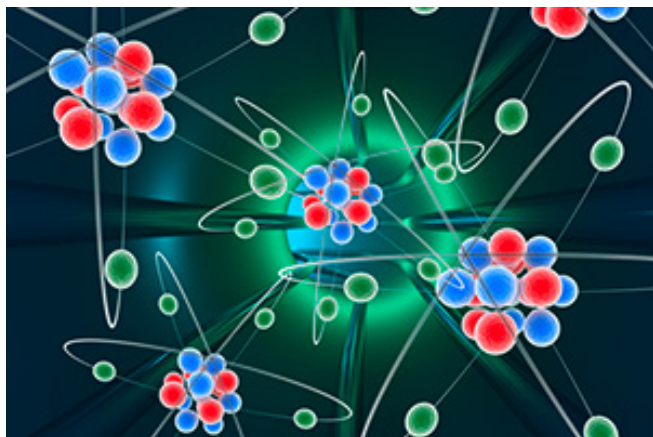
A leading supplier of 3D printers for manufacturing applications recently introduced the Objet500 Connex3 – a multimaterial 3D printer that allows users to change materials and colors on the fly.

Different combinations of base materials can now be selected to provide a virtually unlimited range of flexibilities. Color is controlled using materials similar to an inkjet printer – cyan, magenta and yellow – offering a full array of color options.

The big benefit for manufacturers is that they have more flexibility in using different materials as well as the use of different colors during the development stages of a new product. The system can also eliminate the need to paint individual parts, boosting production efficiencies and reducing the time to market.

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Changing the Rules of Chemistry



Scientists have been hypothesizing that extreme conditions of temperature and pressure might change the way atoms bind together – for example, converting ionic bonds where one atom gives up an electron to another atom, to metallic bonds where electrons flow more freely. But one team of researchers recently discovered that, under high heat and pressure, they could actually create compounds that have never before existed on earth.

They demonstrated this using common table salt (NaCl), which is normally made up of a single sodium atom and a single chlorine atom. However, experiments revealed that the two atoms could bond in ratios of 1-to-3, 3-to-2 and 1-to-7 as well. This not only alters how closely the atoms are arranged, but actually breaks one of the “rules” of chemistry – the octet rule – which states that these elements tend to bond in a way that gives them a complete set of eight electrons in their outer orbits. The new compounds did not always have eight electrons in their outer shell, and in some cases, they formed gemlike structures with totally new properties.

At this point, the researchers haven't yet been able to retain the exotic compounds at normal temperatures and pressures, but the study adds a new dimension to much of what we know about matter and the laws that govern it. Next will be to use supercomputers and high speed analytics to design new compounds using this technique that would have useful and unique properties.

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Who Owns Your Data?

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On the surface, that's a great incentive for the farmers. It makes a lot of sense. But ... who owns the data now? Before going any further, I want to be clear in saying that this example is not about whether Monsanto is doing something good or bad; rather, it is about looking at predictable problems and working together to find solutions before problems begin.

Now here are some big picture questions that would be good for both farmers and Monsanto to discuss and resolve: If Monsanto can get

the majority of farmers to agree to let them collect all harvesting and planting data, wouldn't Monsanto be able to predict the property values of farms better than anyone else? Wouldn't they be able to predict, faster than anyone else, yields and pricing? Wouldn't they have more success in the commodities market, because they would have access to real-time yield information before anyone else? And that opens up another big question: Does data ownership need to be regulated, because in this case it would give Monsanto an unfair advantage in the market? Perhaps regulators need to take a look, analyze this, and solve problems before they happen.



As you can see with this example, it is more important now than any other time in history to look at the future impact of new initiatives and offers, as well as the predictable problems that would result, so we can solve those predictable problems before moving forward.

Of course, this Monsanto scenario is just one example. There are many others—some of which can impact your life. For example, there have been several news reports about how Google Now

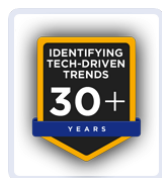
on your smartphone can listen to your television set while you're watching TV. That could allow Google advertisers to identify what you're watching so they can give you more targeted advertising based on your real-time viewing habits.

Similarly, another recent news article stated that when you're playing a video game on a new Xbox, the video camera is on all the time and has the capability to watch you play, watch your emotions, and watch how you react. If a video record of this was created, who owns that video data? Or even bigger, who owns your playtime?

Additionally, many of the new cars today have a type of "black box" in them, along with the dozens of computers that are onboard. That means the black box can know exactly where you are, how fast you're driving, and many other details of your driving habits. Who owns that data? The insurance company? The auto manufacturer? The driver?

As you can see, there's a lot of data being collected, and it's not just by the NSA. It's by an increasing list of companies that are starting to realize they can monitor everything we do and provide personalized services in real-time.

Now is the time to think about it. Who should own your data? This is a vital topic with many predictable problems we need to start solving today, before they wreck havoc on us tomorrow.



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