

DANIEL BURRUS'

TECHNO TRENDS

THE BIG IDEAS THAT ARE
CHANGING EVERYTHING

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The Future of Jobs

By Daniel Burrus, CEO of Burrus Research

When it comes to the future of your industry, how secure do you feel, not only in your position, but in your career, your abilities, as a whole? The era in which a professional could go to school for a specific skill or trade, develop his or her acumen and skills, and stick with that skill set to establish and grow a career until retirement has passed. Now, the future of your career doesn't depend on whether employment is available at any given company; it depends on just how employable you are. And this requires constant learning, being proactive in making sure the skills you have fit the market in its current state, as well as its varied demands for employees with up-to-date skill sets.

As the Three Digital Accelerators (bandwidth, processing power, and storage) grow at an exponential pace, new positions are emerging in the tech sector, and traditional jobs are getting tech-related overhauls. This means the skills required to do these jobs are always changing, and it's up to both employees and employers to keep up with these trends.

In an August 2014 Harvard Business Review article, "Employers Aren't Just Whining – The 'Skills Gap' Is Real," journalist James Bessen — citing a report by ManpowerGroup — claims that "many employers might actually have difficulty hiring skilled workers. The critics cite economic evidence to argue that there are no major shortages of skilled workers. But a closer look shows that their evidence is mostly irrelevant. The issue is confusing because the skills required to work with new technologies are hard to measure." These new hard and soft skills, asserts Bessen, are difficult to qualify and quantify, but they're necessary for our developing economy and many would-be professionals lack them.

What does this mean for you? Well, we're living in transformational times, and if your job description isn't already changing, it probably will in the near future. You can't afford to stand still in your career, as many used to

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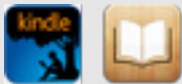


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TECHNOLOGY NEWS HIGHLIGHTS

Early Detection of Dementia

A four-year project involving ten partners from academia and industry is currently underway to develop an integrated system for early diagnosis of dementia. Known as Dem@Care, the goal is to increase accuracy and affordability of detection through the analysis of voice patterns.



Dementia is defined as the loss of memory, cognitive skills and other brain functions beyond what is considered a normal part of the aging process. Currently, diagnosis is generally based on limited clinical observation during short visits to the doctor. This not only makes it difficult to thoroughly assess the patient, but also limits the ability of clinicians to develop effective and individualized preventive strategies.

The new system is based on past research which indicates that certain neurological and mental disorders, as well as diseases like laryngeal cancer, manifest themselves as changes in voice features such as quality, pitch, jitter, continuity, fluency, semantics and richness of vocabulary. Designed to be used in the home, it presents subjects with a series of questions adapted from neuropsychological tests, while a combination of sensors - including a microphone or telephone, accelerometers, video cameras and physiological sensors - records their responses for analysis on IBM's Watson computer.

Experiments have shown the machine learning algorithms to be 85 percent accurate at categorizing patients into one of three groups - normal, mildly impaired, or positive for early dementia. Although it is not a formal diagnosis, the system can help clinicians better manage symptoms and gauge treatment based on behavior patterns. For example, if a patient reveals signs of apathetic behavior, medications and/or activity levels may be adjusted accordingly without requiring an office visit.

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Growing Metal



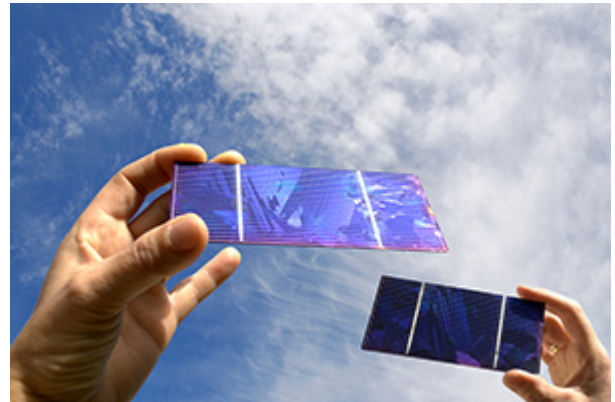
A revolutionary new process has been developed that makes it possible to create high-performance metals using far less energy than traditional methods. Using only electric current, the materials – known as “metal laminates” – are essentially “grown” layer by layer, and are superior to conventionally produced metals in terms of structural, corrosion and temperature performance.

Unlike traditional methods which refine metals using high amounts of heat, the new technology manipulates the interface between layers at a molecular level using electricity. The process starts by placing a mandrel into a tank containing metal ions. When a specific current is applied, particular ions are bound to the mandrel. Adjusting the current allows different ions to be deposited. The result is a layered, nano-laminate structure around the mandrel.

The patented manufacturing process offers better control of material characteristics, allowing a whole new class of applications to emerge, particularly for automotive, construction, oil and gas industries. Some of the new metal laminates have already been used on oil rigs off the coasts of Australia and Africa, and are expected to withstand the corrosive action of the ocean up to eight times longer than conventional materials.

For information: Christina Lomasney, Modumetal, Northlake R&D Center, 1443 North Northlake Way, Seattle, WA 98103; phone: 877-632-4242; fax: 206-770-7338; Web site: www.modumetal.com

Transparent Batteries



Japanese researchers have found a way to bypass the need for solar cells completely by designing a battery that charges itself when exposed to sunlight or other bright light sources.

It all started with the development of a transparent battery about two years ago. Using the same components as a traditional lithium-ion battery, they reduced the thickness of the electrodes to less than 90 nanometers, making them virtually transparent. However, by changing the chemical makeup of the electrolyte used for the negative electrode, these same batteries became self-contained solar power generators, capable of recharging themselves.

The applications for this technology are just about endless. Built into a smartphone display, it could serve as a secondary battery source that harvests energy whenever you're out in the sun. Or it could be used to create self-contained (no wires needed) smart windows for buildings or cars that automatically store the power they need to adjust to changing light levels.

For information: Mitsunobu Sato, Coordination Engineering Laboratory, Kogakuin University, 1-24-2 Nishi-shinjuku, Shinjuku-ku, Tokyo, 163-8677, Japan; phone: +81-3-3340-1211; fax: +81-3-3345-0228; Web site: www.kogakuin.ac.jp/english/

Water-Purifying Paper



A new publication – The Drinkable Book – not only instructs readers on how and why to clean their drinking water; it's actually the means to do so! That's because it's printed on paper which has been infused with bacteria-killing silver nanoparticles capable of killing nearly 100 percent of disease-causing bacteria. A user simply tears out a page, slides it into a slot in the custom filter box supplied with the book, and pours in the water. As soon as the water passes through the filter it is safe to drink. Although the length of time needed is dependent on the turbidity of the water, a single filter will purify up to 26 gallons.

The system requires no chemicals, such as chlorine or iodine, and therefore does not affect taste. But most importantly, it's portable and easy to use, so it can be adopted readily, without the need for massive infrastructure changes.

The ability to treat water at the point-of-use rather than where it is sourced is viewed as an important factor in solving the water crisis in developing countries. In partnership with Water is Life, the paper was transformed into a guidebook that's been translated into local languages in an effort to improve drinking water in these areas. The organization is currently raising funds to produce and distribute the books. The price has not yet been determined, however, they expect to release the first shipments by the end of this year.

For information: Ken Surritte, Water is Life, P.O. Box 661414, Los Angeles, CA 90066; phone: 310-741-9951; Web site: www.waterislife.com/

Roads That Charge Electric Vehicles on the Move

With vehicle technologies advancing at an ever-increasing pace, it's becoming increasingly



clear that simply building more roads isn't likely to meet the demands of 21st century drivers. Thanks to technology, highway planners now have a myriad of options for creating strategic road networks that will improve safety and efficiency while opening up new opportunities for growth.

For example, as part of a program to modernize major roads in the U.K., Highway England is taking full advantage of new technologies that will encourage motorists to explore greener transportation choices. They recently commissioned an 18-month off-road trial to examine the use of dynamic wireless power transfer technologies on motorways and "major-A" roads that will enable charging of electric vehicles (EVs) and hybrids "on-the-move." In addition to reducing fuel costs and preventing EVs from running out of power, the technology presents environmental benefits such as improved air quality and reduced noise. The agency will also be looking at the feasibility of creating a plug-in charging infrastructure with charge points installed at 20 mile intervals.

The trial is part of a government commitment

to provide £500 million over 5 years to improve highways and boost job growth. Pending a successful off-road evaluation the study will be followed by an on-road trial.

For information: Highways England, National Traffic Operations Centre, 3 Ridgeway, Quinton Business Park, Birmingham B32 1AF, United Kingdom; phone: +44-0300-123-5000; email: info@highwaysengland.co.uk; Web site: www.highways.gov.uk/highways-england/ or www.gov.uk/highways

Surveillance Neural Networks

A new consumer surveillance system utilizes neural networks to better identify who or what is approaching your home. So instead of poring over hours of video that was recorded over the course of the entire day, users are presented only with the events that contain potentially significant information.



Unlike currently available surveillance camera systems that create alerts based solely on motion, sound or face recognition, Camio uses artificial intelligence and machine learning to search out specific objects with greater precision. Information from multiple cameras can be compared concurrently to determine whether an event is considered significant. As users review the selected clips, they help the system learn by indicating whether or not a particular clip was important. Eventually the amount of footage to be reviewed can be honed down to about a minute a day, which can be stored on a remote server.

Users can also set up alerts based on an “If This, Then That” (IFTTT) response-triggering service.

For example, the system can be pre-programmed to alert your smartphone whenever a package is delivered. Camio allows a variety of smartphones and tablets to be used as surveillance cameras, and works with some individual cameras as well. Users may stream video for free, but the company charges \$9 per month per camera for recording, playback and storage.

For information: Camio, 20 North San Mateo Drive, Suite 9, San Mateo, CA 94401; phone: 415-766-2299; Web site: www.camio.com/

Ultra Low-Power Wireless

A new wireless communication technique could greatly reduce the power requirements for wearable devices while offering greater security of data. It works by using the human body to transmit magnetic signals between devices and has been shown to achieve the lowest path losses (signal obstructions) of any system demonstrated to date. The most obvious application is for development of a full-body, wireless sensor network for health monitoring.

Most wearable devices currently use electromagnetic radiation (EMR) such as Bluetooth to transmit data, however EMR does not pass easily through the body. As a result, the signals require a power boost, which means shorter battery life. On the other hand, magnetic fields – which are already widely used in magnetic resonance imaging (MRI) and implantable devices – pass readily through human tissue, so a power boost is not needed. The path losses using magnetic field communication are estimated to be 10 million times lower than those associated with EMR. Because the power levels are so low, the researchers claim that there are no significant health risks with magnetic wireless. In addition, using the human body as a communication medium means greater security of medical data. Unlike EMR which is transmitted

through the air and can potentially be intercepted by anyone within 30 feet, a magnetic wireless signal would not be radiated off the body nor transmitted from one person to another.

This method will work with any device that has a circular geometry, which is needed to generate the magnetic field. This includes wristbands, headbands and chest straps, but not patch-type devices or clip-on sensors.

For information: Patrick Mercier, Department of Electrical and Computer Engineering, Jacobs School of Engineering, University of California-San Diego, 9500 Gilman Drive, La-Jolla, CA 92093; phone: 858-534-6237; email: pmercier@ucsd.edu; Web site: www.ucsd.edu or www.jacobsschool.ucsd.edu/wearablesensors/

Robotic Bricklayer

The revolutionary semi-automated mason (or SAM for short) is designed to increase productivity on the job by performing some of the more mundane chores (like large expanses of flat walls) while allowing their human counterparts to handle more intricate and detailed tasks (like squaring up corners and handling aesthetic details).



A variety of sensors measure inclines, angles, velocity and orientation to help the robot know exactly where a brick should be laid. A laser rigged between two poles at opposite ends of the workspace provides an anchor point for SAM, and moves up and down the wall as work progresses. Programmable algorithms give SAM the “smarts” to follow plans and even enable the robot to perform some detail work, such as bumping out selected bricks to create a design or textured surface.

And yes, SAM does increase productivity at the worksite. Whereas a single human mason can lay 300 to 500 bricks per day, SAM can lay 800 to 1200 bricks a day. But there are only three units currently available with a price tag of about \$500,000 each, so unless you have a really big project to tackle, humans are still your best bet.

For information: Construction Robotics, 7385 Willowbrook Road, Victor, NY 14564; phone: 585-742-2004; Web site: www.construction-robotics.com

The Future of Jobs

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in generations past; you can't simply coast along and be complacent in terms of not pursuing more training or a better education tailored to the skills you'll find yourself needing sooner rather than later. Even though most economists, backed by statistics, concur we've made it through the so-called Great Recession, many unemployed or underemployed folks are still having difficulty landing jobs — moreover, even people with jobs who are looking to make a move, whether lateral or upward, are finding it difficult to locate open positions suited to their particular abilities. But thinking the economy is still bleak is somewhat of a misperception: In our ever-shifting economic landscape, factoring in technology that's constantly evolving, many once-common jobs are beginning to disappear, and at the same time new roles are opening up — but companies are, more and more, experiencing difficulty filling these positions.

Even many traditional roles are becoming harder to fill because of a lack of up-to-date skills. According to ManpowerGroup — a multinational HR consulting firm — the 10 most difficult roles to fill are: skilled trade workers (eg. electricians, chefs, butchers, mechanics), sales representatives, mechanical and civil engineers, technicians, drivers, management/executives, accounting or otherwise financial professionals, office support staff, IT staff, and production or machine operations workers. Now, these are relatively common jobs in our economic

landscape; they shouldn't be too difficult to fill. However, most of these jobs call for developed, nuanced skills that can grow in lockstep with our technologically advancing economy. And it's starting to look like many professionals aren't keeping up with the evolving skill demands of their industries.

In addition to these more traditional jobs being difficult to fill, a slew of new roles and professions are offering untapped potential for workers with the right technical know-how. In the tech sector, the ability to negotiate and manipulate data to extract actionable knowledge is quickly becoming invaluable. Freelancer, "the world's largest freelancing, outsourcing and crowdsourcing marketplace," is looking toward our rapidly expanding tech environment; they claim data scientists are in high demand, along with people experience in the eCommerce arena. Some trends they've pointed out include the transition to and increasing dependence on video for social media platforms, and the advent of wearable tech. Anyone skilled in these areas is likely in high demand in this economy.

However, this disconnect between talent, necessary skill, and employment doesn't hinge entirely around employees. Many employers, themselves, are having trouble addressing what's now being viewed as a serious talent shortage. These employers are failing to meet the changing needs of the economy, especially with respect to finding people with technical skills or teaching these skills to new hires. As the needs of our economy develop, employers are having trouble filling positions because many applicants lack requisite hard and soft skills, as well as experience; even when applicants are talented and available, many of them are looking for higher starting salaries than most talent-strapped companies are willing to offer.

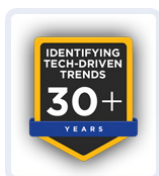
According to the results of a talent shortage survey from ManpowerGroup, 20 percent of employers aren't pursuing strategies to address talent shortages; only 10 percent are adopting new recruiting strategies to find untapped talent; a miniscule five percent are redefining criteria for "teachable" employees and incentivizing prospective talent with added benefits or increased starting salaries; and only a fifth of employers are providing additional technical training to their existing teams.

The solution? ManpowerGroup suggests employers overhaul best practices when it comes to recruiting, like redefining qualifying criteria and conveying the image of their organization as a destination for valued talent with a culture of learning and employee encouragement. Adopting an agile methodology when it comes to pulling talent from nontraditional areas is also tremendously helpful.

For both employees and employers, education is key. Prospective employees need to continuously augment their skill sets and pick up new hard and soft skills in order to remain employable; they can do this, in part, by studying the Hard Trends I've outlined, which will help career-minded individuals predict what sorts of skills they'll need to develop and where opportunity for employment may lie. As for employers facing a talent shortage, they need to develop new recruiting methods and be willing to provide necessary additional training to new hires. From both sides, it's clear that the most important aspect of this talent and employment shortage is the pursuit of modernized knowledge.

So, what are you doing to stay ahead of the curve in your industry? How are you growing your career by being anticipatory? Just how employable are you, given the transformational changes we have been and will continue to experience?

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