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TECHNOTRENDS® NEWSLETTER

The biggest ideas that are changing everything

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How Anticipation Can Help Professionals Prepare for Digital Displacement

By Daniel Burrus, CEO of Burrus Research

We've accepted self-checkouts at grocery stores as a natural part of our lives. Even long before that, we've been able to pay at the pump at our local gas station without ever setting foot inside the physical store. Even in the corporate world, there are applications that have made once arduous tasks in high-level careers nearly push-button easy.

These are digital disruptions, and believe it or not, they have been increasing exponentially since long before the dot-com boom or personal mobile devices. From manufacturing to dining and nightlife, autonomous technology and the Internet of Things (IoT) have their digital hands on nearly everything in some capacity, designed exclusively to streamline once human-heavy tasks in an effort to make our lives easier.

> *And if digital disruptions are just going to continue at an exponential rate, is this the end for many careers?*

As a consumer, you may not be concerned. Getting through your weekly grocery shopping a little faster by shopping online and perhaps having an artificially intelligent (AI) robot bring you your groceries one day sounds like a dream!

But for those whose jobs depend on you going into the gas station to pay, checking out with a physical person at the supermarket, or having an actual CPA do your taxes and bookkeeping, digital disruption is playing like a horror film they cannot shut their eyes during.

And if digital disruptions are just going to continue at an exponential rate, is this the end for many careers? Are you feeling as though yours is next, and you're powerless to stop it?

This is a huge misconception creating unnecessary stress in your life; you have way more power than you think, and it is because you have access to an Anticipatory mindset.

This Is a Both/And World

First, take a deep breath, and think about self-checkouts at Walmart or Target for a moment. How long have they been around? For years, right? Self-checkouts were debuting long before autonomous vehicles, smartphones, and Amazon.com were widely accepted. It's been quite a while!

Now, think about this: At your local grocery store, are there still physical cashiers? The answer is a resounding yes, there are! Likewise, think of those self-checkout areas. How many times do you put a product down too quickly on the conveyor belt and cause an error to happen while ringing up your groceries? I know that personally; this happens to me too many times to count and when it does, a human being comes to the rescue, resetting the machine.

In my Anticipatory Leader System, I teach about something I call the Both/And Principle, an abundance mindset where even amid digital disruptions, the "old" way of doing things can be reinvented and intertwined with the new way.

Essentially, there isn't a world where a singular disruption completely erases the old; the old just gets

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TECHNOLOGY NEWS HIGHLIGHTS

The End of Plastic?

Plastics have become some of the most harmful substances on the planet. The promise of recyclability has turned out to be nothing more than a pipe dream, leading not only to litter in our streets and oceans but also the presence of microplastics in our food and water that increase inflammation, neurotoxicity and even the risk of cancer. But new biodegradable materials made from the root structures of mushroom (mycelium) have the potential to replace petroleum-based plastics in packaging, building materials, textiles and more.

Mycelium grows by breaking down waste plant material to create a web of threadlike filaments that can be grown into a wide range of shapes. By controlling temperature, humidity, airflow and carbon dioxide exposure, its properties can be manipulated to create a variety of products, including shipping foam, artificial leather, insulation, edible meatlike products and even transparent sheets that are 10 times stronger than paper. Researchers are also looking at producing mycelium materials that are flame-resistant and waterproof.

The manufacturing process uses 90 percent less energy and produces 90 percent less carbon dioxide than that used to produce plastics. The fungi actually work to capture carbon in the environment. A finished product can be produced in as little as a week, and the material biodegrades in soil in about 45 days. As stricter laws continue to be introduced that prohibit single-use plastics, alternatives such as this will likely experience a huge growth in demand globally.

For information: Ecovative Design LLC, 70 Cohoes Avenue, Suite 103, Green Island, NY 12183; website: https://ecovative-design.com/ or https://mushroompackaging.com/

Iron-Air Batteries

The biggest challenge in transitioning to renewable energy sources like solar and wind has been the ability to store adequate amounts of power to carry through during those periods when the sun and wind are not actively producing. But a new battery technology known as iron-air could finally provide the missing piece that will enable an all-renewable electric grid.

Until now, lithium ion has been the battery of choice for clean-energy storage; however, the technology has several drawbacks. Mining the rare-earth components is harmful to the environment and expensive — lithium ion batteries cost $50 to $80 per kilowatt-hour of storage capacity. They have a useful life of only 3,000 cycles (10 to 15 years) before needing to be replaced and can only supply power over a limited discharge period of 4 hours.

In contrast, the two main ingredients that make up the new batteries are plentiful and relatively inexpensive. Iron-air batteries cost less than $20 per kilowatt-hour of power and last up to 10,000 cycles. More importantly, they can discharge over a period of 150 hours, meaning that they could supply continuous power for more than six days.

Iron-air batteries operate on a principle known as reverse rusting. An anode made of iron pellets and an air-breathing cathode are submerged in a water-based electrolyte. During discharge, air reacts with the iron to form rust, which releases electrons to provide electricity. During recharge, current passes through the cells to remove the rust and once again create iron. The technology is already poised to move into grid-sale power plants with the first demonstration scheduled for 2023 and first deployment to the grid by 2025.

For information: Form Energy, Inc., 30 Dane Street, Somerville, MA 02143; phone: 844-367-6462; email: info@formenergy.com; website: https://formenergy.com/

Urine Test for Cancer

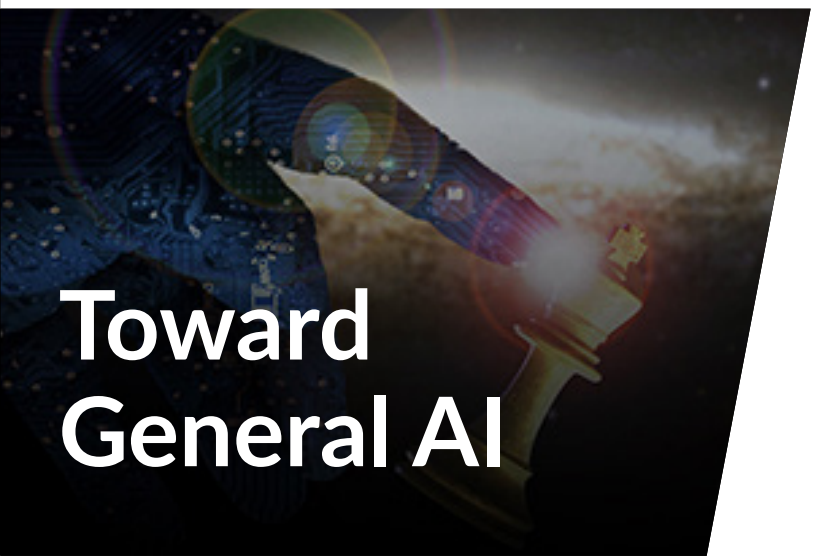
Scientists have developed a diagnostic nanoparticle that can detect cancer cells from virtually anywhere in the body through a urine test. It can also be used in conjunction with traditional imaging to pinpoint the location of tumors, even those that have metastasized.

The injectable microsensors are coated with peptides that react with enzymes produced by cancer cells (known as proteases). This creates a synthetic biomarker that is excreted from the body and may be analyzed in a urine sample. By adding a radioactive tracer, known as copper-64, and a peptide that is attracted to acidic environments (like those created by tumors), the particles are induced

to accumulate at the tumor site, enabling them to be imaged more easily using PET scan techniques.

The researchers envision the particles as a screening alternative to costly imaging procedures. They would also be used to monitor patient response to chemotherapy and radiation and to provide an indicator of potential spread of disease. The cancer-detecting sensors are one in a family of sensors that are engineered to detect specific protease-mediated diseases.

For information: Glympse Bio, 35 Cambridgepark Drive, Suite 100, Cambridge, MA 02140; email: info@glympsebio.com; website: https://glympsebio.com/



Toward General AI

Artificial intelligence (AI) has advanced in recent years to the point where an AI system can master complex games like chess and Go with nothing more than the basic rules. Through a process of trial and error, they use reinforcement learning (RL) to play round after round and ultimately gain enough skill to beat even world-champion programs. The drawback of these systems, however, has been their inability to learn more than one game at a time without repeating the entire RL process.

A newly developed game environment called XLand may be the next step in creating AI agents capable of adapting when presented with new tasks or conditions of play using a process known as deep RL. The dynamically changing environment allows agents to improve their capabilities based on goals of the game currently being played and their relative performance. The inclusion of multiple players even allows agents to build on each other's learning. Although the process starts from scratch, the progression is totally open-ended and virtually unlimited.

As a result of training on approximately 700,000 games in 4,000 worlds with each agent experiencing an estimated 200 billion training steps, the developers have observed a variety of behaviors in XLand agents, including experimentation, use of tools and cooperative behaviors with a trend toward more generally capable tasks.

For information: Deep Mind; website: https://deepmind.com/ or https://deepmind.com/blog/article/generally-capable-agents-emerge-from-open-ended-play

Water from Thin Air

A solar hydropanel that can make, store and dispense clean drinking water could provide a solution to the growing global issues of water insecurity and poor water quality. Known as

SOURCE, the rooftop device consists of two panels that rely solely on solar energy to extract water from ambient air.

Fans push the air through a hygroscopic (water-absorbing) filter where water vapor is trapped, then extracted and collected in a 30-liter reservoir. Minerals (calcium and magnesium) are added to produce high-quality drinking water, which can be piped directly to a tap or dispenser inside the building.

One such system produces between 4 and 10 liters per day — the equivalent of 54,000 plastic bottles over its life span — even in dry climates. Installations can be configured for any size demand from a single-family household to an entire community. A typical two-panel array runs about $4,500 installed.

In addition to providing a stable, independent source of drinking water in drought-stricken areas or locations where water is simply unsafe, systems like this offer benefits for off-grid living and emergency preparedness as well.

For information: SOURCE Global, PBC, 1465 N. Scottsdale Road, #600, Scottsdale, AZ 85257; phone: 855-796-9283; website: https://www.source.co/

Many people don't realize that making chocolate takes a huge toll on the environment. For example, over the last 50 years in Ivory Coast, where one-third of the world's cocoa is grown, more than 80 percent of its rainforest has been cut down to increase cocoa production. Combine that with the fact that the industry has not fulfilled its promises to phase out child labor practices and that climate change is making it harder to grow cocoa in general, and it's easy to see why alternative sources for chocolate are being sought out.

One team of scientists started working on the problem by analyzing the flavor fingerprint of cocoa beans at various stages of processing — from raw to fermented to roasted — in order to understand what gives them their unique flavor. They then did the same with other food manufacturing by-products (such as the residue from pressing sunflower oil) to come up with a combination that can be fermented, roasted and dried in a similar manner.

After multiple tests by a random group of samplers produced good results, the cocoa-less chocolate was evaluated at Fraunhofer, where sensory experts were unable to distinguish it from conventional chocolate. The researchers plan to begin replacing cocoa in mass-market candy while continuing to raise awareness of the need for more sustainable solutions as well as the issues of child slavery within the cocoa industry.

For information: QOA; email: hello@qoacompany.com; website: https://qoacompany.com/

Tesla Bot

Tesla recently announced plans for the Tesla Bot — a lifelike, bipedal humanoid robot that will be designed to perform dangerous, repetitive or just plain boring tasks to make everyday life less of a drudgery.

Considered to be a logical extension of the same technologies that power Tesla's semi-autonomous cars, Tesla Bot will be equipped with similar processors, sensors, batteries and actuators. But instead of a self-driving car, Tesla Bot will look like a human at 5 feet 8 inches (1.73 meters) in height, 125 pounds (57 kilograms) in weight and with a top speed of 5 miles (8 kilometers) per hour.

It's been designed to be somewhat slow and not too powerful so as not to be able to overpower its humans.

Tesla Bot will also utilize artificial intelligence (AI) capabilities like multi-camera video, neural networks and neural net planning that will enable it to perform tasks without requiring explicit training. A prototype is expected to be released in 2022.

For information: Tesla, 3500 Deer Creek Road, Palo Alto, CA 94304; website: https://www.tesla.com/AI

3-D-Printed Wagyu Steak

As far as steak goes, Japanese wagyu is among the most highly prized for taste, texture and tenderness owing to its unique marbling. It's also extremely high-priced at up to $200 per pound, and adult cows sell for more than $30,000. But researchers recently found a way to duplicate this delicacy using a 3-D printing technique that could make it possible to not only enjoy wagyu beef without killing a cow but also to tailor-make cuts of meat that meet individual customer needs and tastes.

Unlike plant-based options, the process uses actual stem cells from wagyu cows. The scientists determined how the various components — muscles, blood vessels and fat — should be structured and then used 3-D bioprinting to form a steak.

Unfortunately, a regulatory framework for products like these does not currently exist, so you won't be able to order 3-D-printed wagyu any time soon. Regardless, the research illustrates that — even when it comes to expensive steaks — it's possible to produce cultured meats that closely resemble the original product in a sustainable way.

For information: Osaka University; website: https://resou.osaka-u.ac.jp/en or https://resou.osaka-u.ac.jp/en/research/2021/20210824_4

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transformed.

The physical need for the task affected by digital disruption still must be completed, and there's a place for humans and machines to coexist.

A machine is not sentient; it hasn't a clue that you made an honest mistake by putting your bag of apples on the conveyor slightly too soon. Therefore, who thinks critically and comes to reset the self-checkout for you? A past checkout worker, of course!

This is the first concept you need to understand as a working professional in any industry: Digital disruptions affect everyone, but that in no way means you will be rendered useless, ever! But while some things certainly fall under my Both/And Principle, what happens when they go a step further?

Remote Grocery Shopping

The coronavirus pandemic kept everyone home throughout the earlier part of 2020. Even though many businesses were deemed "essential" and allowed to stay open, they pivoted and found a way to transform their services to be virtual in a way.

Those same grocery stores with self-checkout lanes as mentioned above responded to global lockdowns in that fashion. Through an app or a store's website, consumers filled a virtual cart with their selections, paid, and then scheduled for pickup or delivery.

The individuals who found this cumbersome and stressful struggled with the process of searching for items online for the most part, not with the idea that they couldn't physically go to the grocery store. However, plenty more individuals have continued to embrace the concept of remote grocery shopping even after mask mandates had been lifted and the world found some semblance of normalcy yet again.

Suppose for a second that everyone embraces the simplicity of virtual grocery shopping just as much as they buy clothing, kitchen utensils, and just about anything else from Amazon, where brick-and-mortar grocery stores merely become storage facilities for groceries to be delivered or picked up from.

What does that do to the cashier whose skill set is in cash handling, customer service, and grocery bagging?

When a certain job or career field within an industry is rendered completely obsolete as a result of an overhaul from transformative consumer behavior rather than a disruption heeded by the company, such as self-checkout stations, does my Both/And Principle still apply?

A Boom in Entrepreneurship

It does, just in a completely different way!

I wrote an article years ago about how we would see professional networking transform as digital disruptions accelerated, due to the fact that so many would be searching for a new opportunity. Of course, this was long before a pandemic transformed our lives.

Now thanks to COVID-19, digital disruptions have accelerated far beyond their original expected trajectory. This has not only made it necessary that networking events, both physical and virtual, are going to increase as individuals search for new opportunities, but also a new wave of entrepreneurship will take hold.

This boom in entrepreneurship will be a direct result of my Anticipatory mindset in professionals identifying the Hard Trends, or future certainties that will happen, in all industries and how to leverage them to their advantage. Virtual grocery shopping

and, really, the virtualization of many other ordinarily in-person activities is most definitely a Hard Trend already disrupting not only the industry but also individual workers in those fields.

Those who look to these Hard Trends now and try to find ways to leverage them in their own industry are blazing an entrepreneurial path. This is because entrepreneurship is possibly the only option they see available to pre-solve the problem of digital displacement that virtualization and automation of previously tactile career fields bring with it.

In doing so, they carve out a new job, either internally at the company they work at or externally in a business they start, staying ahead of the disruption.

Anticipation Prevents Digital Displacement

Having an Anticipatory mindset will set you and your organization ahead of the disruption curve, or in the case of what many employees fear, digital displacement.

Machines will get smarter, but thanks to the reality that we live in a Both/And world, the human element is still there.

Aside from our grocery store example, a more medical and high-profile career field is facing disruption as well: pharmacists. Traditionally, a pharmacist has been underutilized in giving actual medical advice to patients and overutilized in merely filling prescriptions.

We are already starting to see self-checkout-type kiosks that fill prescriptions for you, removing what pharmacists have been largely hired for.

So where does a disrupted pharmacist go from here? They have an MD; they are incredibly useful as a medical professional.

The key is to use anticipation now and treat self-checkouts as the Hard Trend that they have been at grocery stores, at the gas pump, and also in online shopping, where you don't even need to go to the store itself.

We're not going backward, though my Both/And Principle indicates that they can and will both coexist. The generations that grow up completely virtual will someday be astounded to be able to walk in the door of a store, pick out an apple, pay for it, and eat it all in the same day without having to wait by the mailbox for it to arrive.

However, digital disruptions and virtualization are leading the way, causing digital displacement. This means that the brick-and-mortar counterparts must use my Anticipatory Organization Model to reinvent and set a new standard.

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