

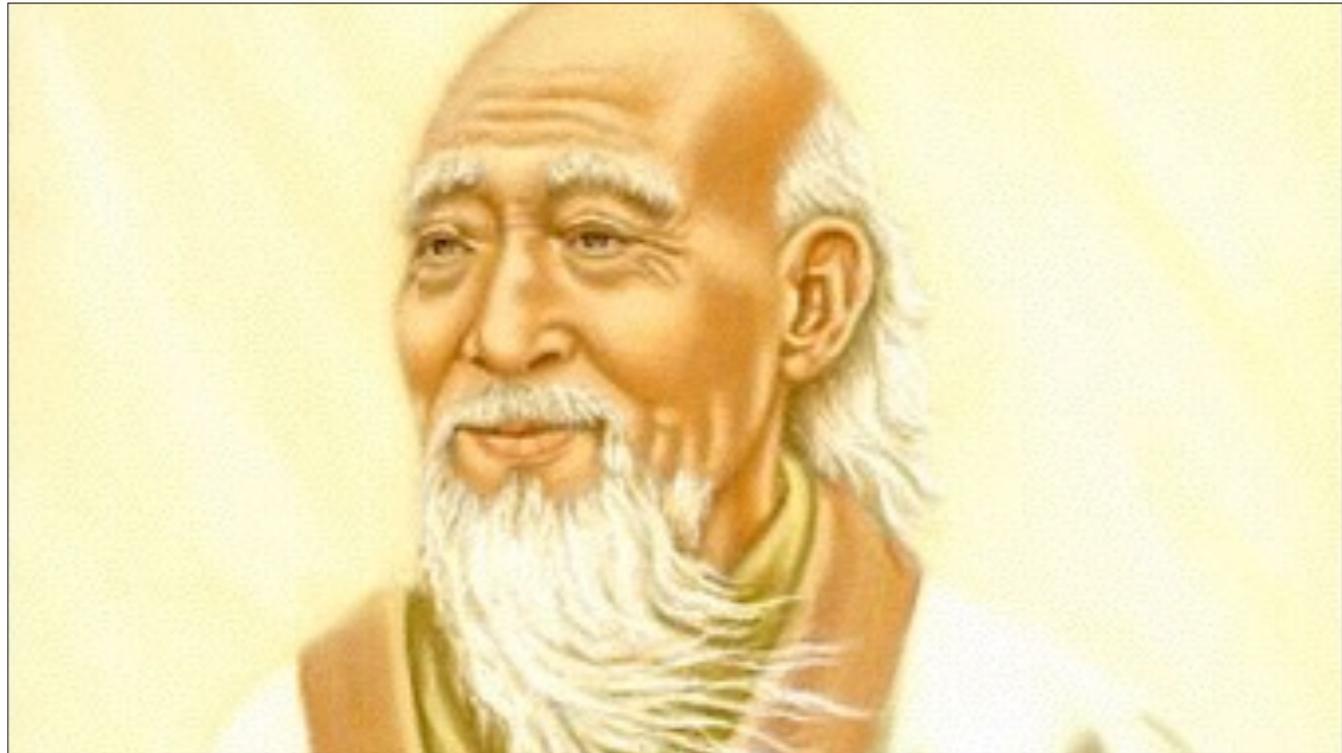


The Big AHA:

How to Future-Proof Your
City/County Against Tomorrow's
Twelve Transformative Trends, Today

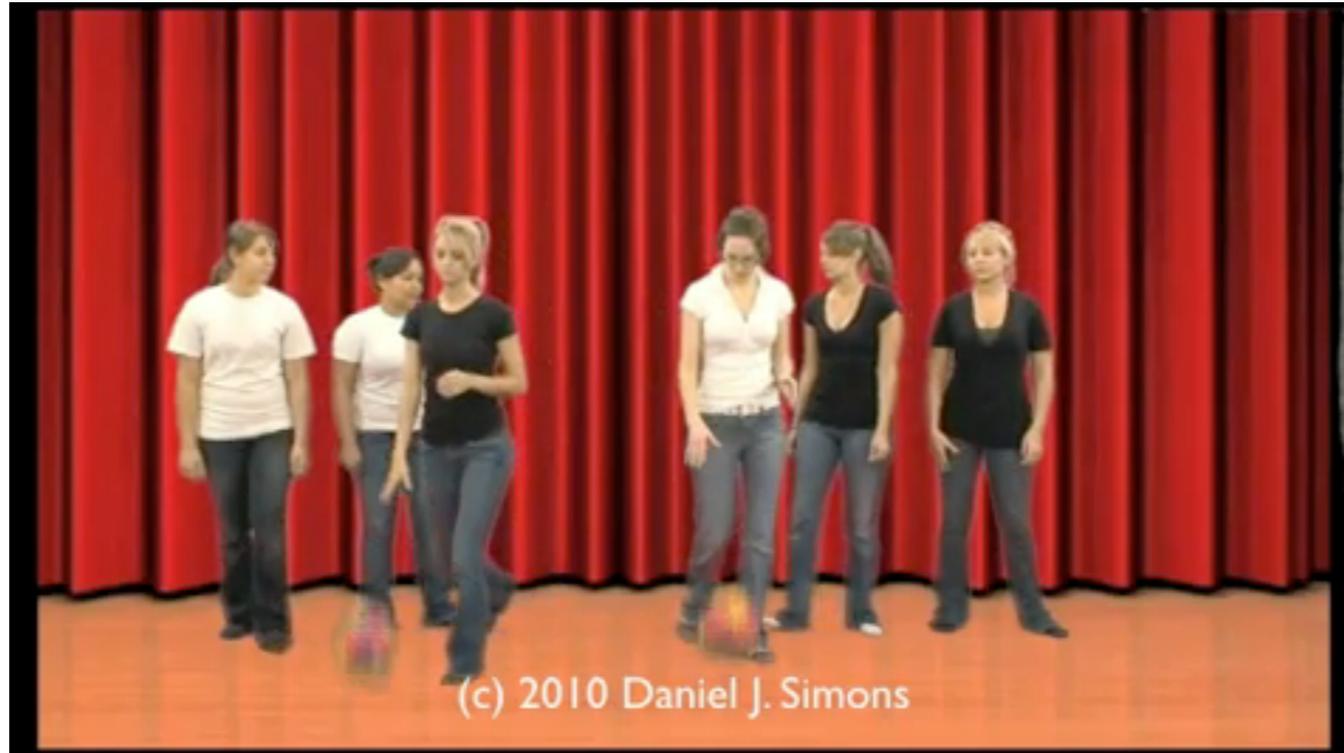
ILCMA 2017 Annual Meeting
Peoria, IL
February 10, 2017





“To attain knowledge, add things everyday;to attain wisdom, subtract things every day”.





(c) 2010 Daniel J. Simons

**Let's rewind and
watch it again**



50 ESSENTIAL STRATEGIES TO
HELP YOUR COMPANY
STAY AHEAD OF
EMERGING
TECHNOLOGIES

JUMP_{THE} **CURVE**

JACK ULDRICH

author of *The Next Big Thing is Really Small* and *Investing in Biotechnology*



Accelerating growth
in **technology.**

Printing press





Exponential growth takes us into “unchartered —and dangerous- waters.” Computer processing power, data storage, bandwidth, sequencing of human genome, advances in biotech, nanotech, robotics, 3d printing, sensor, big data, renewable energy and the sharing economy







The Internet will come to us.

New methods of work?



Trend #1: Augmented reality

Pokemon Go ... only 3 weeks old (faster than Twitter, Netflix)

Augmented Reality could be really big trend

Retailers are experimenting with stores (maybe fewer people will go to stores)

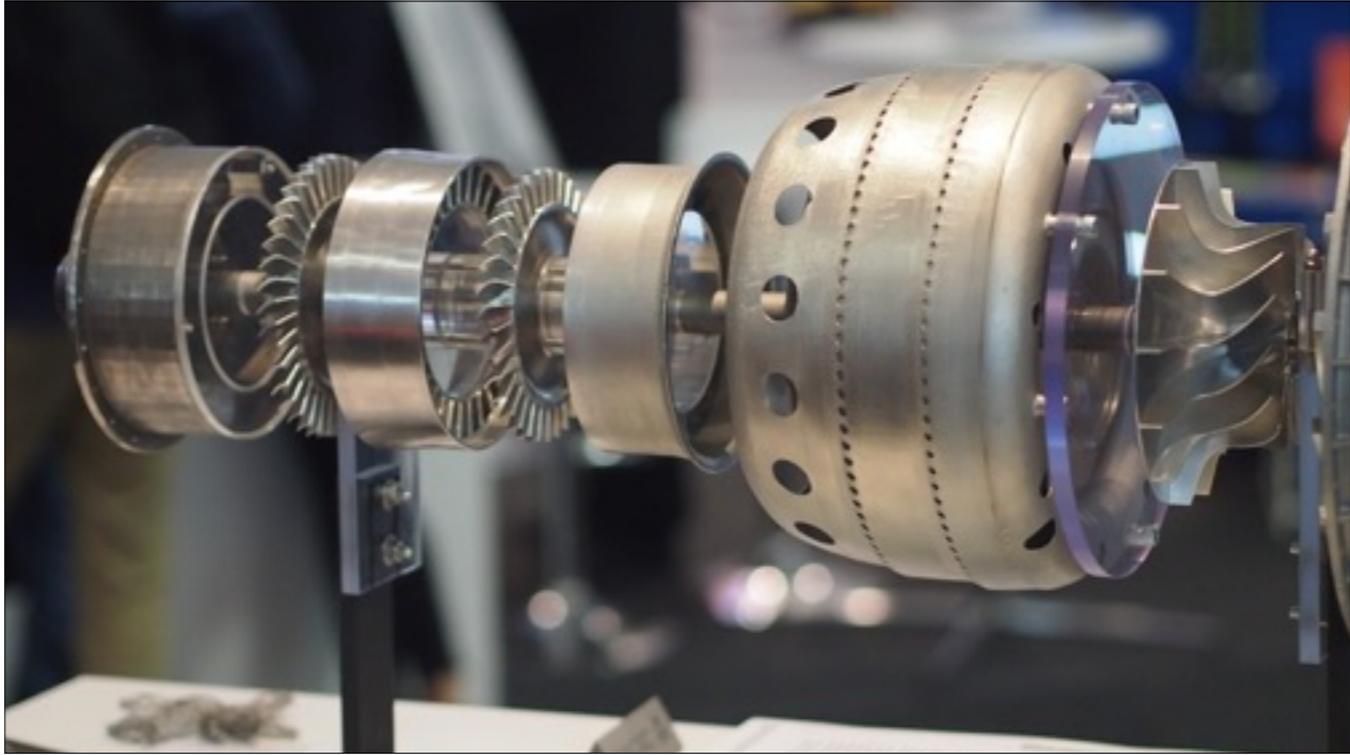


Augmented reality for tourism





Combine, tractor parts?





What next?

Housing in Toronto might go down!

1 Thousand
1 Million
1 Billion
1 Trillion
1 Quadrillion





Wireless: a Thousand times faster



4G ... 1400-fold faster

5G ... 100X faster than 4G (Download movies in second vs minutes) by 2020



Mercy's new \$54 telemedicine center opened in July of 2015.

Will "see" 3 million patients by 2020/



ATT announced first two cities to get 5G ... Austin and Indianapolis



Sep. 20, 2016

Places cheap plastic antenna atop power-line poles

Speeds rivaling 4G LTE and someday 5G

If tests are successful, a cheap way to bring internet service to those who need it. AT&T AirGig

Use cheap plastic antenna to deliver high speed internet service to those who need it.

Use clip

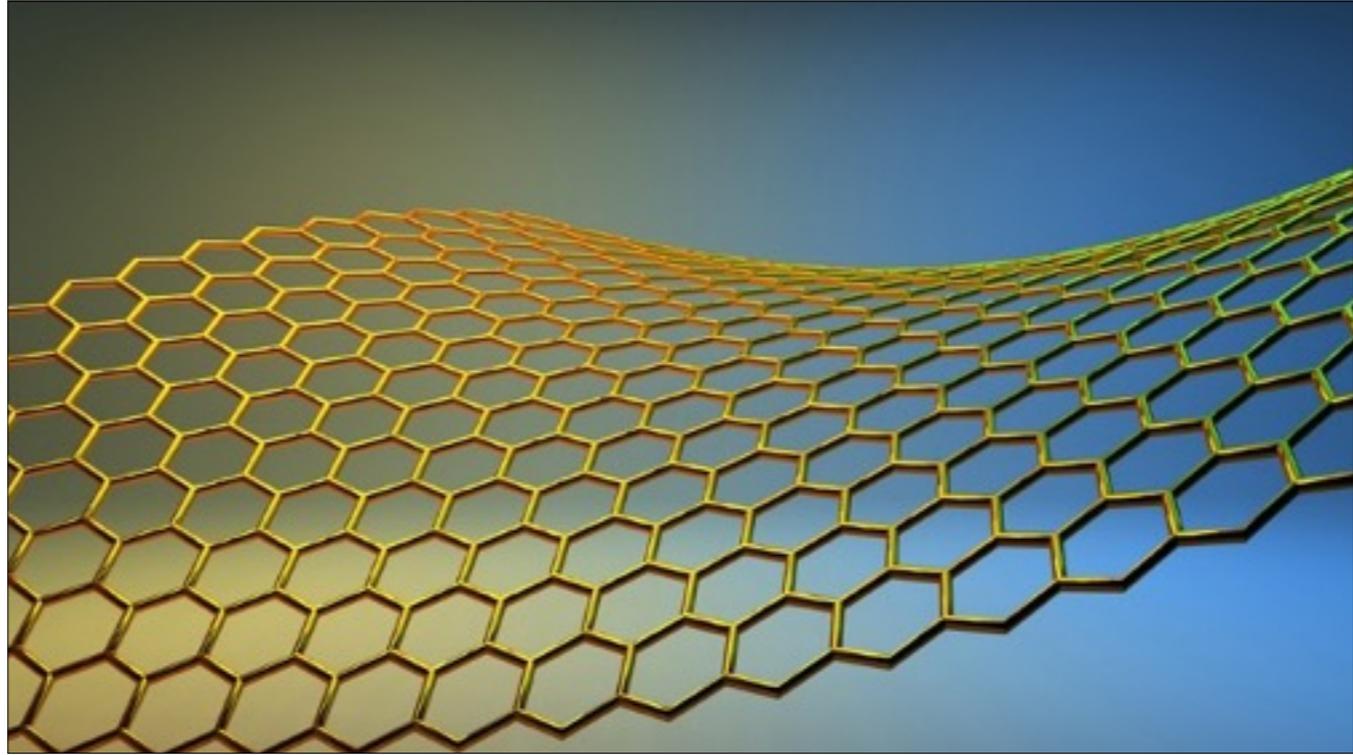


Trend #5: Nanotechnology





University of MN Duluth ... self healing asphalt.







Could a shareable system of electric vehicles (EVs) be used along US 1 in Miami-Dade County to complement current transportation infrastructure? The EV/Infrastructure Alliance thinks it's a possibility.

But to get the infrastructure for an electrified car sharing system, funding and a more rapid permitting process to get charging stations installed are required.

Two years ago Miami-Dade County partnered with the South Florida Regional Planning Council and its Florida Gold Coast Clean Cities Coalition and Florida Power and Light Co. to develop a plan for the deployment of EV infrastructure and use in Miami-Dade, Monroe, Palm Beach and St. Lucie counties. A \$500,000 grant from the US Department of Energy funded the study and planning process.

The Miami-Dade US 1 Clean Transportation Corridor Project, or the US 1 Corridor Project, is just one part of that master plan, which outlines infrastructure projects and requirements for getting Miami-Dade County and others ready for the deployment of plug-in electric vehicles (PEVs).



Trend #5: Robotics

Transform agriculture



SDG&E job description







Self driven cars in Pittsburgh

Sep 14 2016

People may have more discretionary money



Gothenbrg ... 100 cars by 2017



Smart bridges





Cincinnati ... RFID ... "Pay as you throw"

Reduce waste by 17% and increased recycling by 49%



Unlock new revenue

Last year, South Bend became the first city in the world to migrate its sewer system to the cloud, which prevented polluted water from going into the river and saved \$100 million in new pipes. It all started with a local startup called [EmNet](#).

Instead of sending out workers every day to repeatedly peek under manhole covers to check flow, the city has implemented a system of sensors, an algorithm, and a SaaS system that has **saved them over \$100 million dollars in costs**.

In simple terms, CSOnet means that the City of South Bend has a “smart sewer system” which can react in real time to prevent combined sewer overflows.

CSOnet is a technology which monitors and **controls wastewater in real time**, through a network of wireless sensors embedded in municipal sewer systems. This broad network of tiny computers provides 24/7 data on the depth and flow of storm water and sewage in the **500-mile sewer network**, including the 36 combined sewer outfall points within the city, essentially providing **real-time analysis of available inline storage**. In the process, it has helped South Bend avoid millions of dollars in capital expenditures associated with conventional civil engineering upgrades to prevent combined sewer overflows.

Instead of having to tear up streets and install separated storm and sanitary sewer lines throughout the City, **CSOnet recognizes existing capacity in a large header pipe**, called the "interceptor line," which carries water from the different service areas to the wastewater treatment plant. In simple terms, CSOnet means that the City of South Bend has a “smart sewer system” which can react in real time to prevent combined sewer overflows.

Installed "smart" valves with motorized controls and overflow reservoirs at key points in the system are used by CSOnet to redirect flow into the interceptor line, eliminating the risk of more than 250 million gallons of sewage possibly being discharged into the St. Joseph River.

The City of South Bend has invested about \$6 million in CSOnet, including sewer modifications and control valves. "The environmental benefit we have achieved through CSOnet is equivalent to implementing about \$120 million of conventional civil engineering improvements," says Gary Gilot, former City of South Bend Director of the Department of Public Works.





Savings:

Deloitte's HQ in Amsterdam. World's smartest building—houses 2,500 people but only 1,000 offices.

The greenest building in the world

All told, the Edge is packed with some 28,000 sensors.

App knows individuals preference for lighting and heating

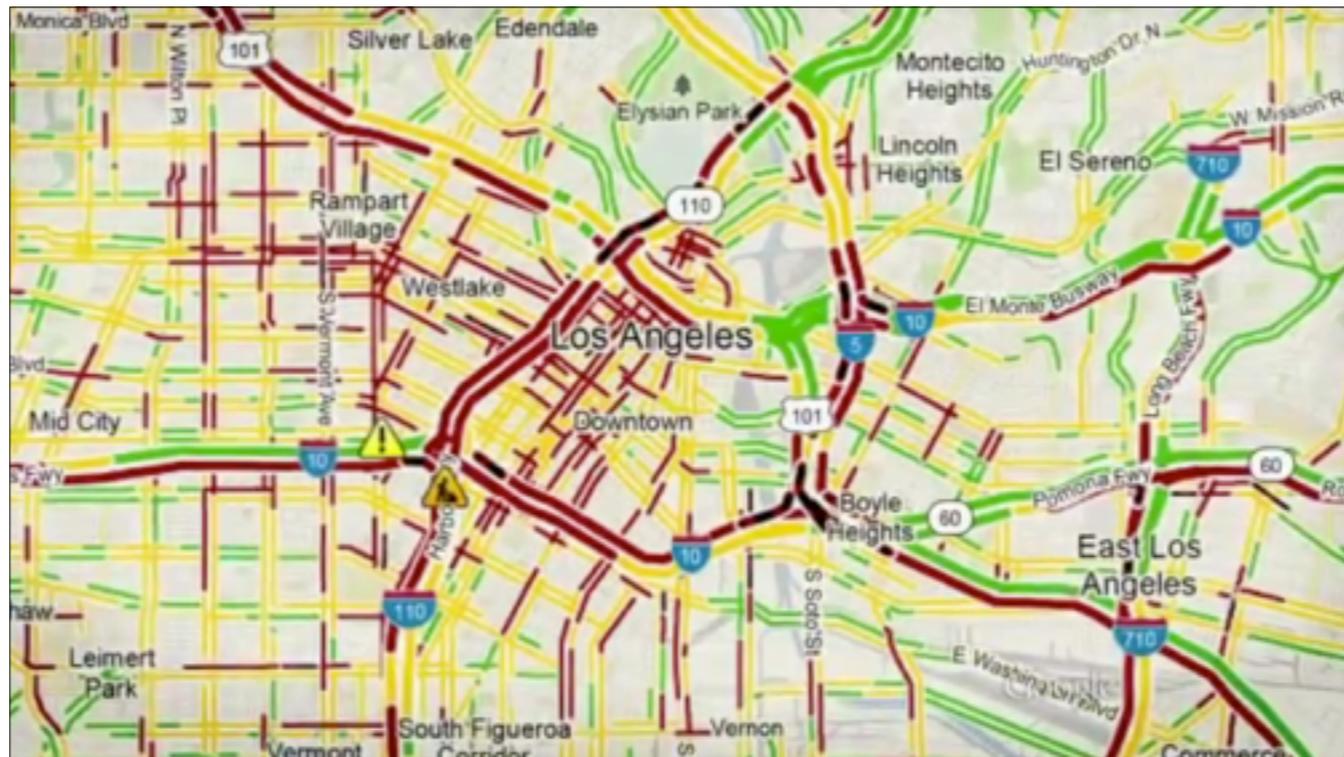
Makes best of humans!

“Hot design” ... 2500 workers but only 1000 desks

“We think we can be the Uber of buildings,” says Coen van Oostrom, chief executive officer of OVG Real Estate, the building's developer. “We connect them, we make them more efficient, and in the end we will actually need fewer buildings in the world.”

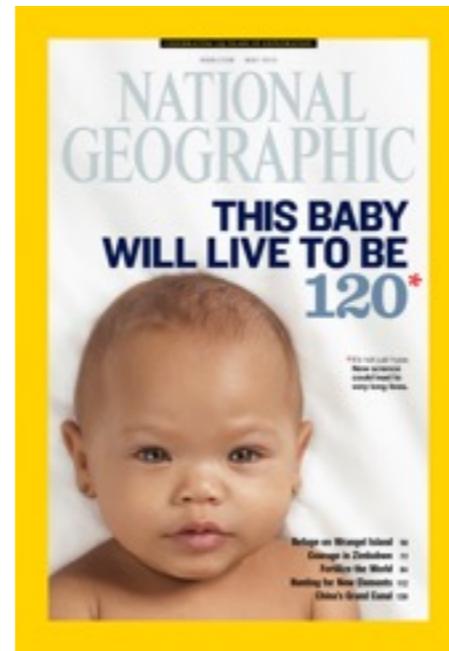


The action: Engage your customer in new and innovative ways ...





Trend #6: Genomics





Trend #7: Artificial Intelligence/computer processing power

IBM Watson ... 80 trillion calculations per second



Bringing artificial intelligence to asphalt compaction



Proper **asphalt compaction** is the key to ensuring the life of roads, and finding new ways to measure that compaction is seen as the key to improving infrastructure construction. To extend the life of the nation's roads, **the U.S. Dept. of Transportation has made "intelligent compaction" a priority.**

Vibratory roller compactors had been outfitted with GPS and multiple sensors to measure ambient conditions, but there was no way to measure the density of the asphalt during compaction.

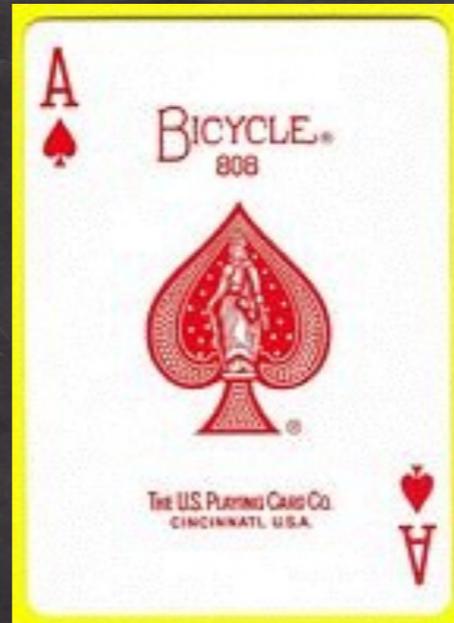
Dr. Sesh Commuri has spent over 13 years working on machine-control systems and artificial intelligence for the compaction process. The result is the Intelligent Asphalt Compaction Analyzer, a neural network-based computer system that can "learn" what proper compaction "feels like" on a tested area of the asphalt. The analyzer uses this information as a guide as the compactor goes over the rest of the road.

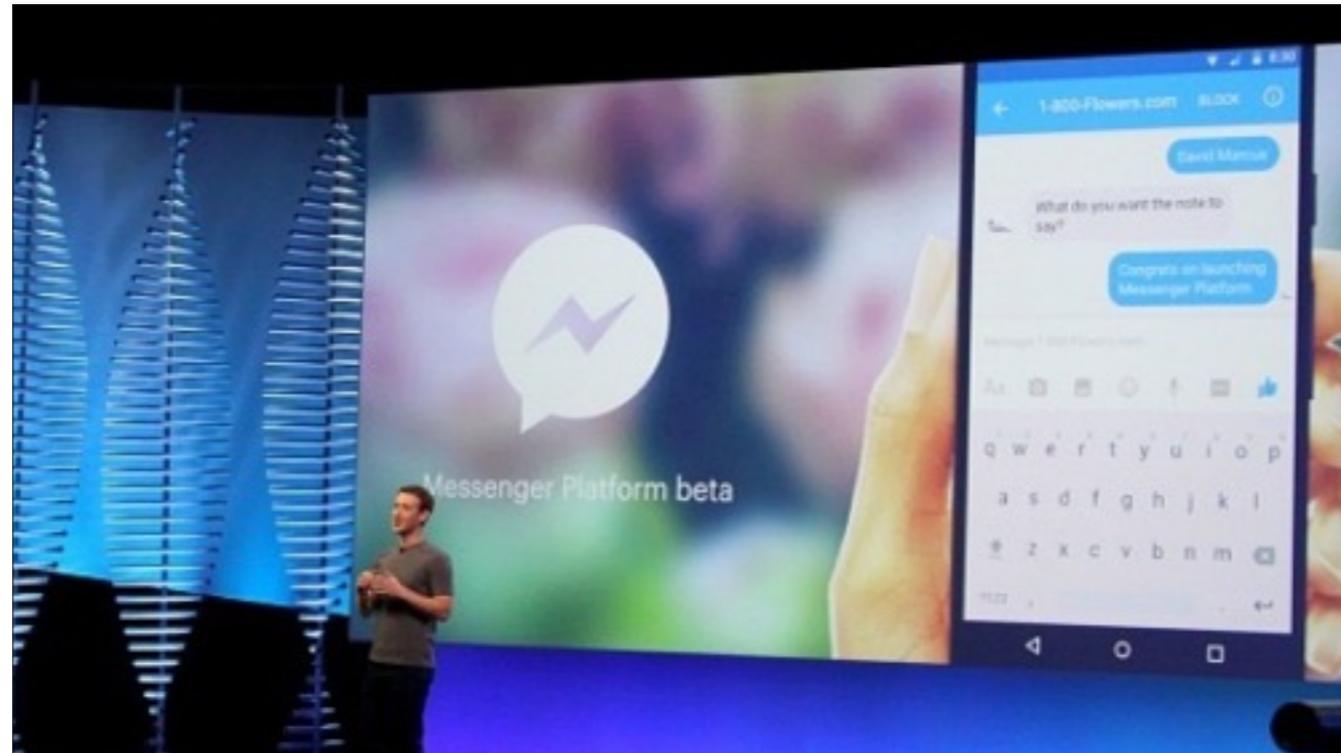
ENR's Top 25 Newsmakers Icon In his work as a professor at the University of Oklahoma, Norman, and working with the Okla. Dept. of Transportation, Commuri has brought cutting-edge artificial-intelligence research to road construction. Now, working with Volvo Construction Equipment, Commuri's technology is found in Density Direct, the first commercially available intelligent compaction system driven by neural networks. Commuri is continuing his work on advancing embedded control systems in his new role as technical director at the Advanced Autonomous Systems Innovation Center at the University of Nevada, Reno. Already, Volvo has begun to sell compactors with the asphalt-compaction machine controls, and a similar system for more intelligent soil compaction is also nearing completion.





Predict who will Tommy John surgery ...





Will “Chatbots” bypass apps and search engines?

A new more conversational way of interacting. The conversation is the platform.

“The next medium people will interact thru.”

Benefits:

1. Nothing to download
2. No new registration required
3. A platform you’re already familiar with.

City enlists SMS chatbots for service delivery

By Stephanie Kanowitz

Jan 20, 2017

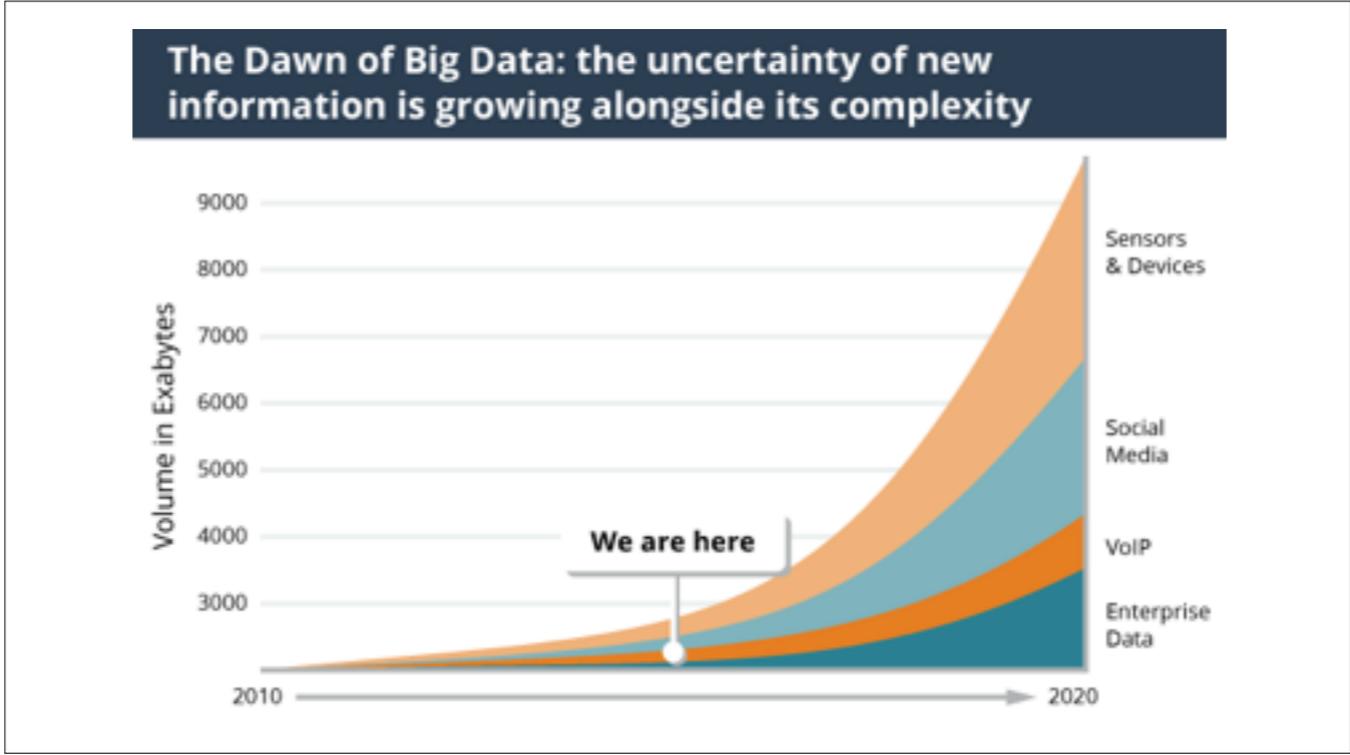


In its effort to improve citizen engagement, the city of **Mesa, Ariz.**, will soon offer interactive texting for some of its services. Residents will be able to send a message via SMS and get answers to about **three dozen frequently asked questions**, as well as check and pay utility bills.

Using Aspect's CXP platform and natural language Interactive Text Response, Mesa is appealing to residents who are comfortable with text-based self service.

"We want to communicate with the public in ways that they're used to communicating," CIO Travis Cutright said. Because we understand that people's time is important to them, we want to get so how "government out to the citizens when they want and how they want it."

When the SMS chatbot goes live in June, city residents will be able to send text messages asking myriad questions, such as **when government offices are open and how much they owe for certain services**, for example. Aspect coded into its system the answers to 30 to 40 frequently asked questions. "If it's easy, we can just respond with a text message, but because SMS has restrictions of 160 characters, there's only so much you can put into that," said Tobias Goebel, director of emerging technologies at Aspect. When a longer response is necessary, the system sends users a short URL that takes them to a disposable optimized website that then redirects to the appropriate website, he said. For instance, someone who wants to pay a bill using a new credit card will be directed to the appropriate web portal. "For those use cases -- rich media display or secure information collection -- we pivot to the disposable app. You can secure that and can be linked to the correct website for the particular need," Goebel said.



Trend #7: Big Data/Data Analytics



Trend #9: Big Data

Amazon Echo can talk to your thermostat.



And it wants to “deliver everything in the world.”

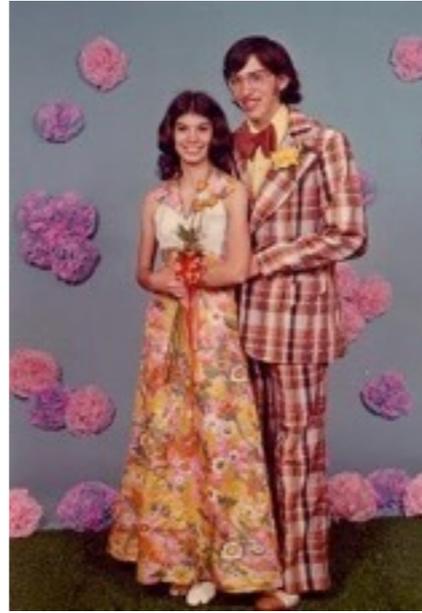


December 5, 2016











Just as yield signs are yellow and black anymore ... either are taxis



Trend #9: Sharing Economy/Collaborative Economy

The network effect/the platform effect



Uber Freight



Uber for office space ...

WeWork takes out a cut-rate lease on a floor or two of an office building, chops it up into smaller parcels and then charges monthly memberships to startups and small companies that want to work cheek-by-jowl with each other.

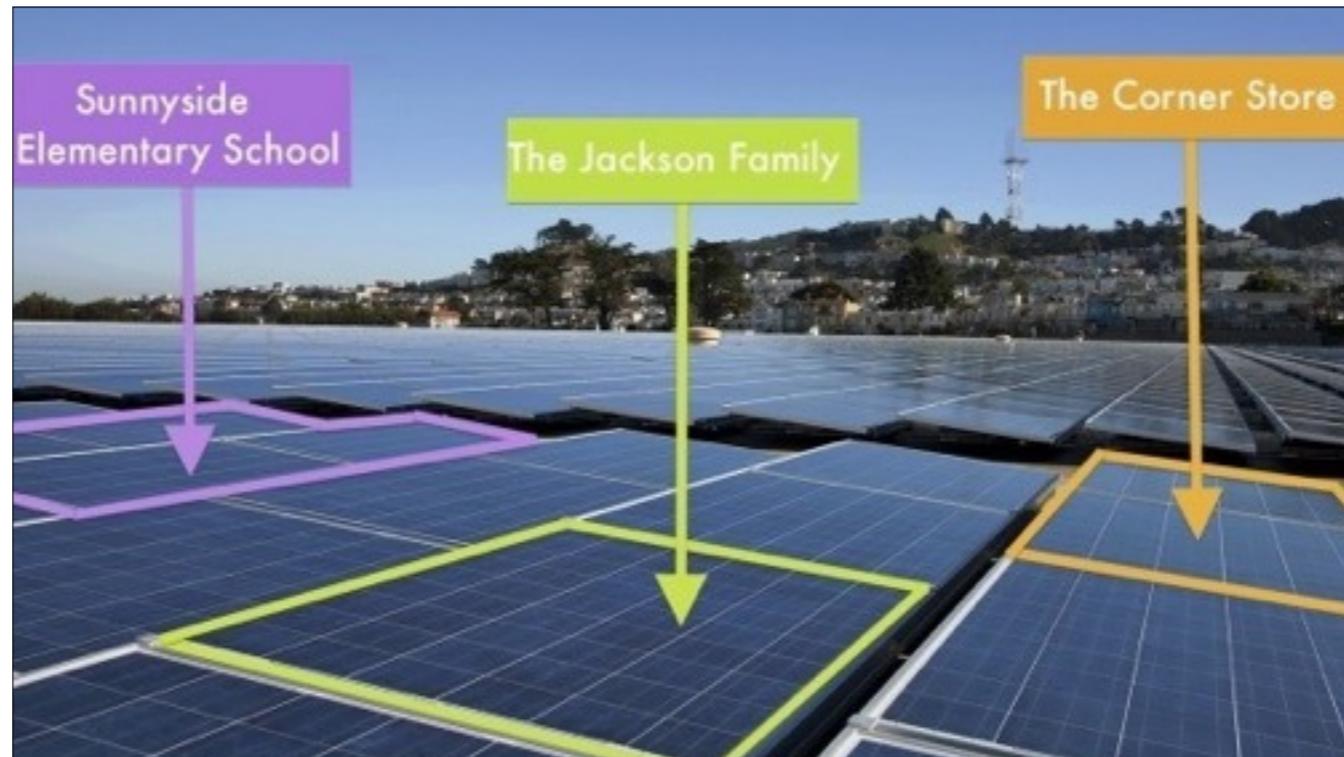
Now WeWork is the fastest-growing lessee of new office space in New York and next year will become the fastest-growing lessee of new space in America as it spreads to cities such as Austin and Chicago, not to mention London, Amsterdam and Tel Aviv.



The average drill is used for 13 minutes ... why not share?

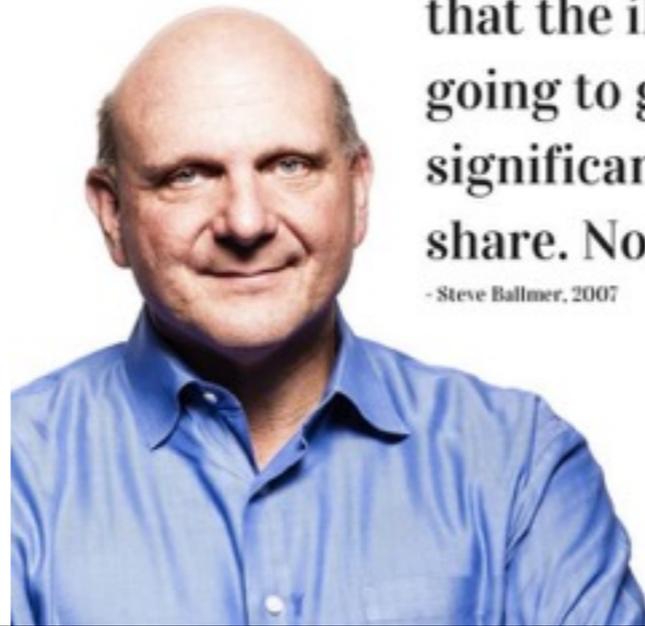
Shared office space?

Shared solar power?









**There's no chance
that the iPhone is
going to get any
significant market
share. No chance.**

- Steve Ballmer, 2007





**World's first anti-ageing drug
could see humans live to 120**



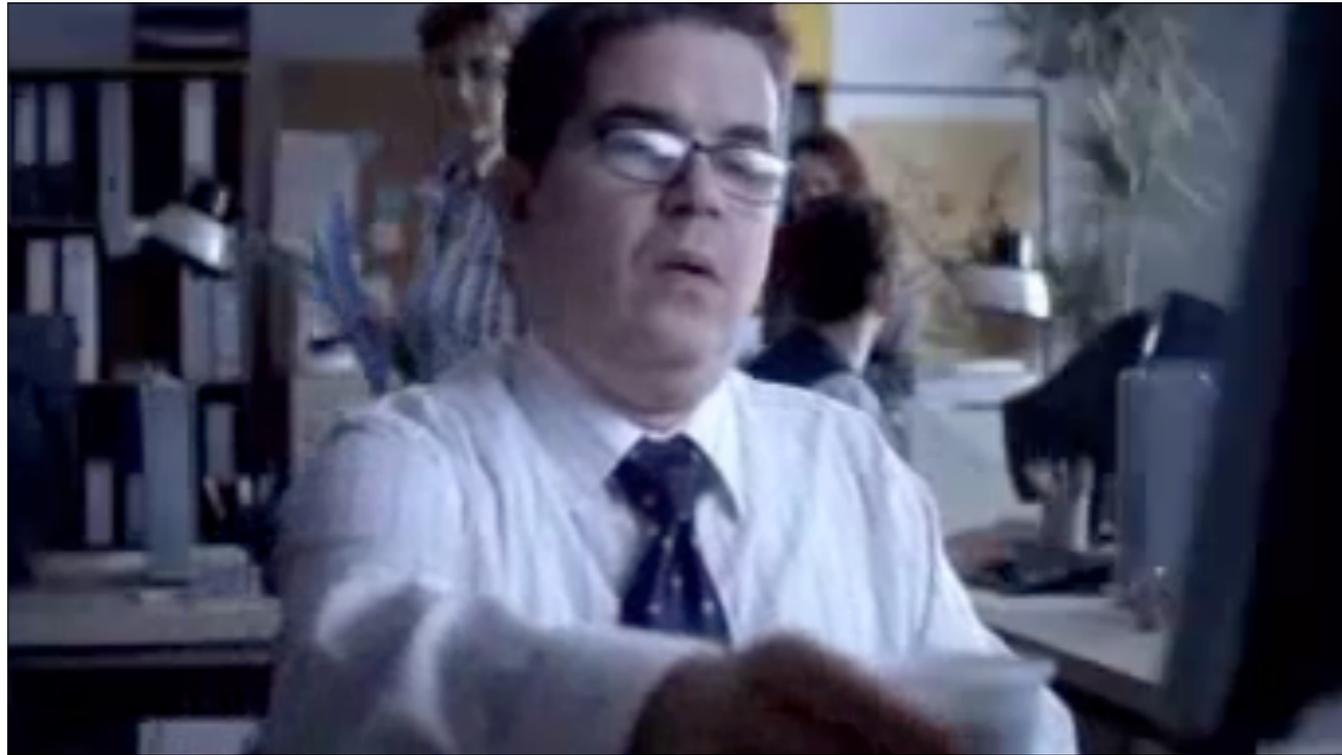
TRUL

Embrace ambiguity



Shakespeare & Co Espresso machine ... printing books

Converging humans and technology



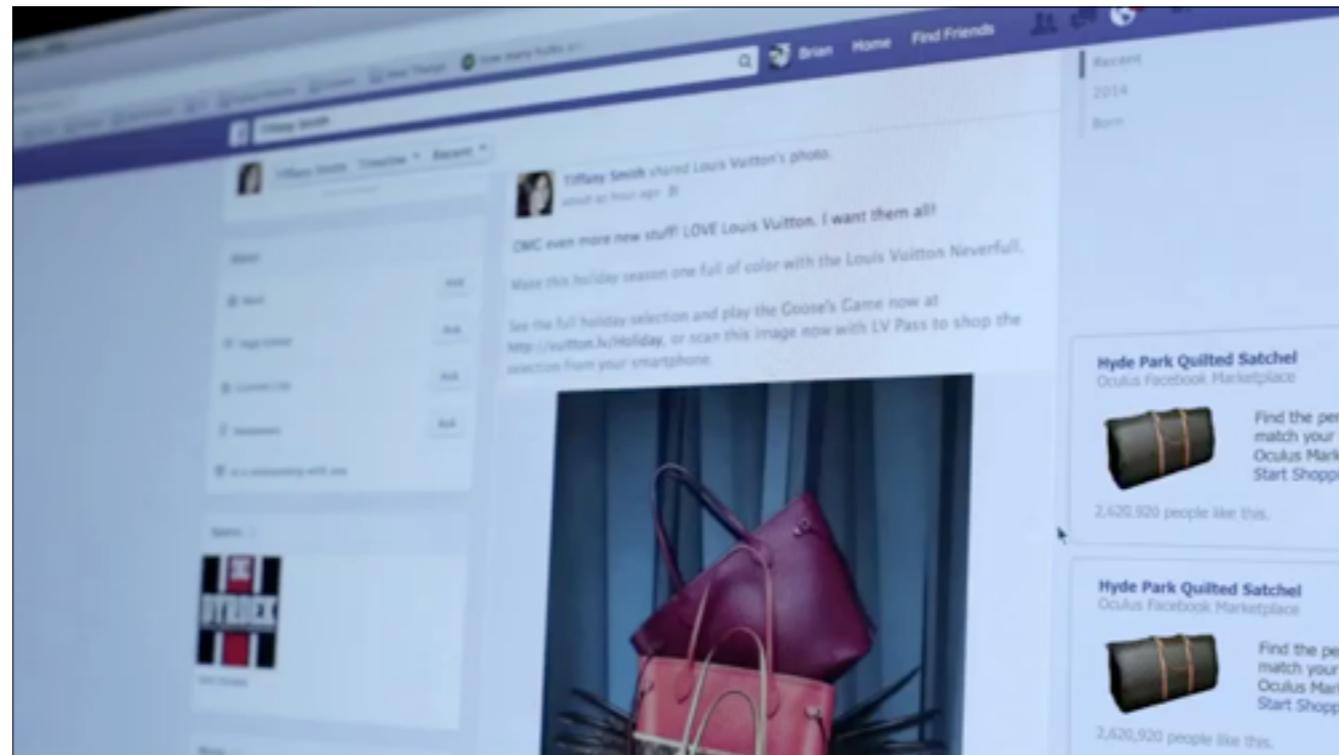
We must have humility when considering new technologies





Trend #2: Virtual Reality

Grandma watching Jurassic Park



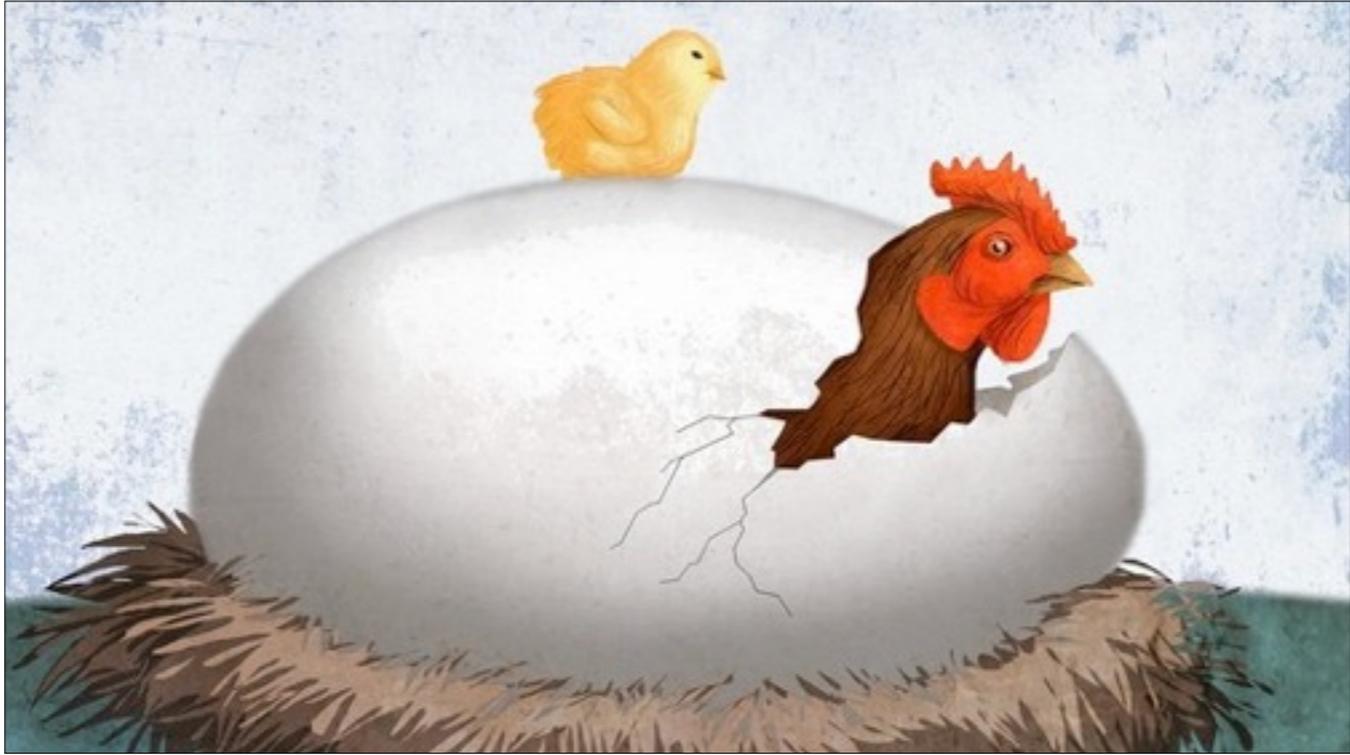
What is the implication for the retail/mall industry?

Could Oculus be used to market properties to 60 million Chinese looking for US properties?

You haven't seen reality until you've seen it in virtual reality.



Mall closure ... giant wave of store closures to hit US





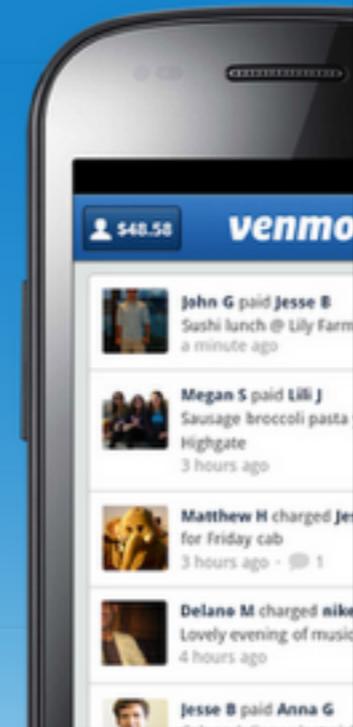
DIFFICULTY: MEDIUM

WHAT IS THE NUMBER OF THE PARKING SPOT
THE CAR IS PARKED IN?



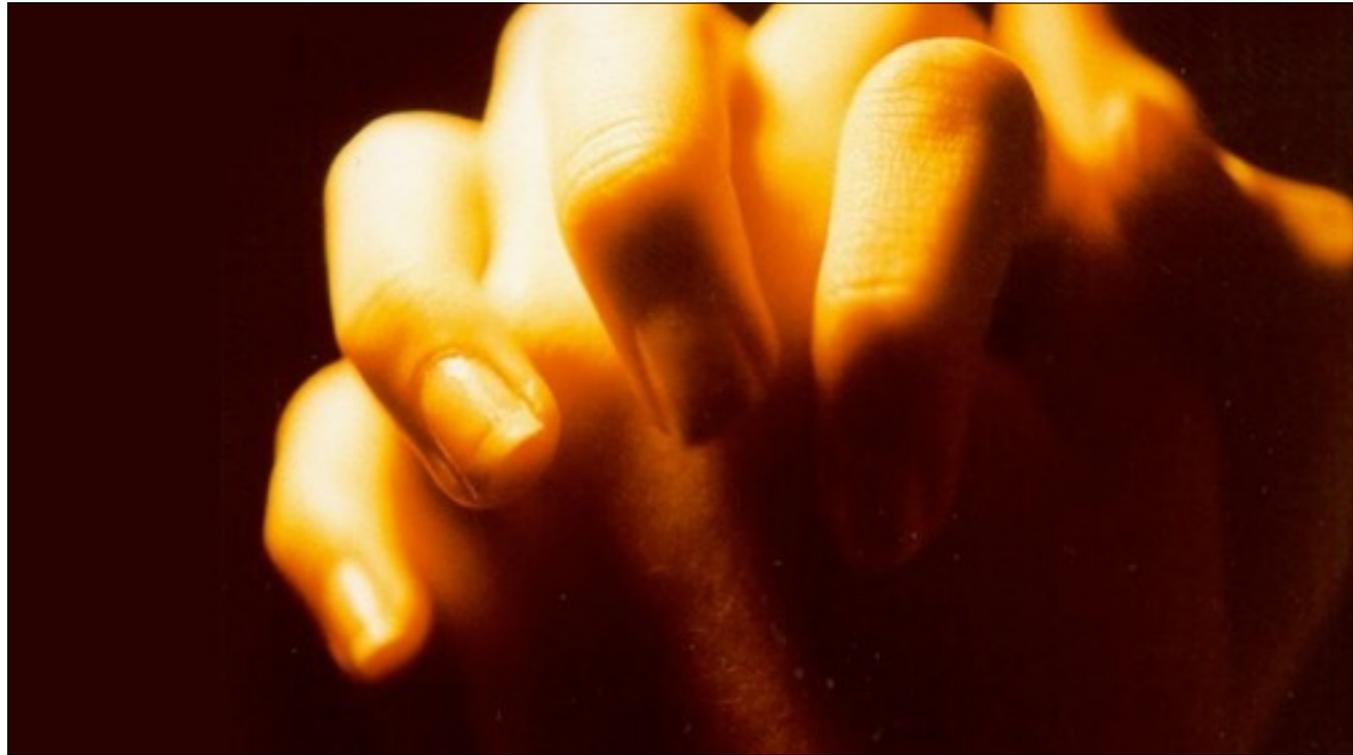
venmo

The easiest way to
pay your friends.





Technology can't do everything ...







“By 2020, smart agents will facilitate 40% of mobile interactions.”





Trend #11: Urban Ag

World's largest indoor vertical farm just opened in Newark, NJ

LED lighting is getting better and can be tailored to grow crops efficiently.

"On average, we're growing in 16 days what otherwise takes 30 days in a field—using 95 percent less water, about 50 percent less fertilizers, zero pesticides, herbicides, fungicides," said David Rosenberg, chief executive and co-founder of AeroFarms.

98% of food arrives in cities by truck!

GETTY/BLOOMBERG

AND IT'S 75 TIMES
MORE PRODUCTIVE
PER SQUARE FOOT
THAN FIELD FARMING

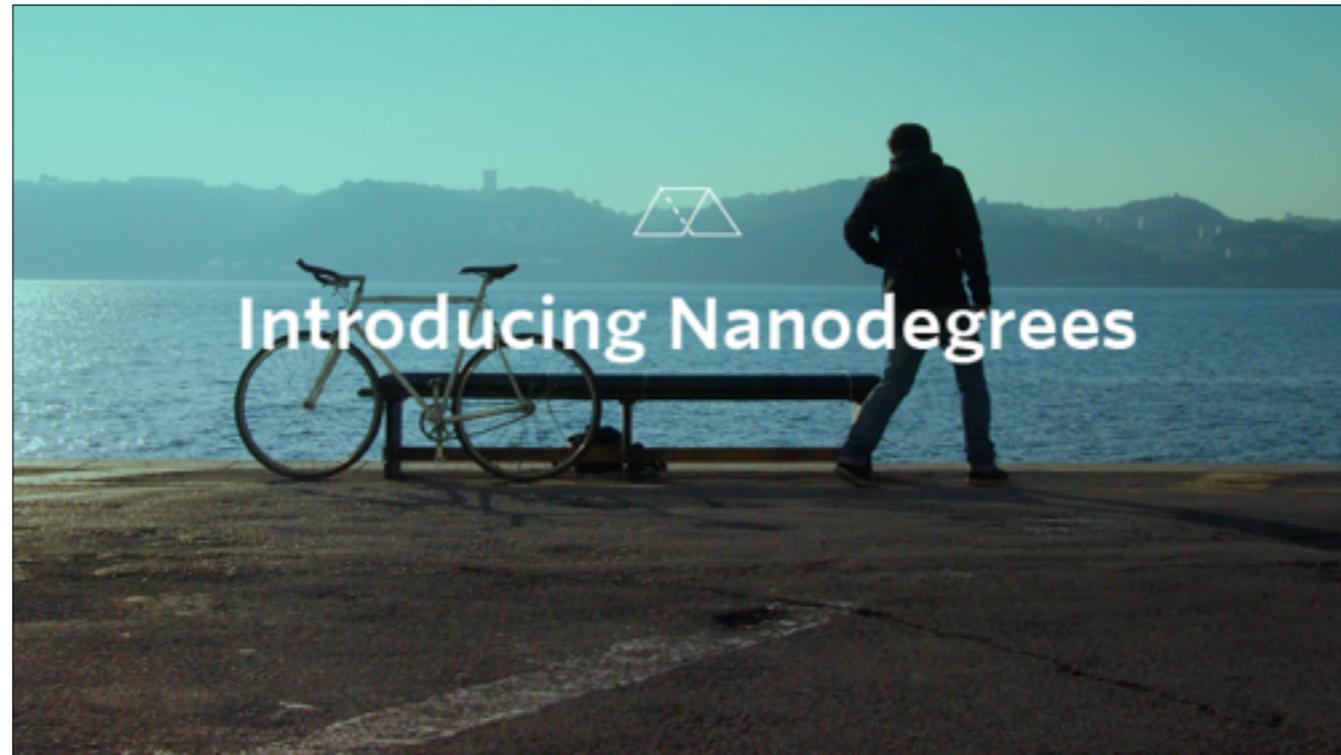
SOURCE: AEROFARMS.COM



Business | Jun 25, 2016

This City Is Home to 820 Urban Farms and Quickly Becoming America's Urban Ag Capital





Trend #11: MOOC--Massive Open Online Courses -- online education

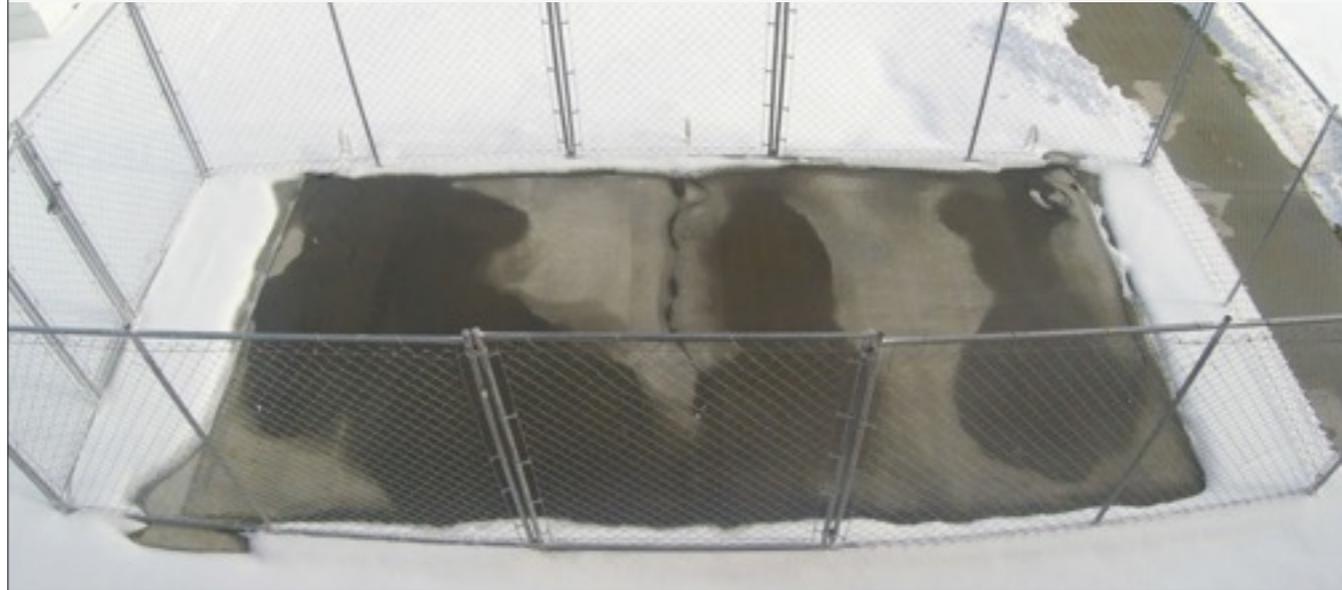
Udacity/EdX, Coursera -- nanodegrees





The Roadways Of the Future Could De-Ice Themselves

A new conductive concrete material could jolt pavement just enough to remove sheets of ice.



University of Nebraska researchers have come up with a new concrete that can clear its own ice and snow. And the solution isn't so high tech at all. All they had to do was add **carbon particles** and steel shavings into the concrete mixture, and **apply some good old-fashioned electric force**.

At about 1/5th of the total mixture, it's enough to melt the snow. And the FAA is keeping a watchful eye on the work of researcher Chris Tuan for possible use on tarmacs. "What they need is the tarmac around the gated areas cleared, because they have so many carts to unload – luggage service, food service, trash service, fuel service – that all need to get into those areas," Tuan said in a press release.

Tuan has been testing out the concrete since 2002 on a bridge near Lincoln, Nebraska. The electric current to clear the bridge costs about \$250 every time, compared to higher costs for snow removal or salt-based deicers, and creates less wear-and-tear on the road. Rather than aiming toward all roads, Tuan is looking toward bridges and other areas that are especially prone to the elements and may need a quick jolt to get itself going. Best yet, the amount of electricity used is just enough to melt the snow, but not enough to harm any bystanders.





Voice translation technology





Think different

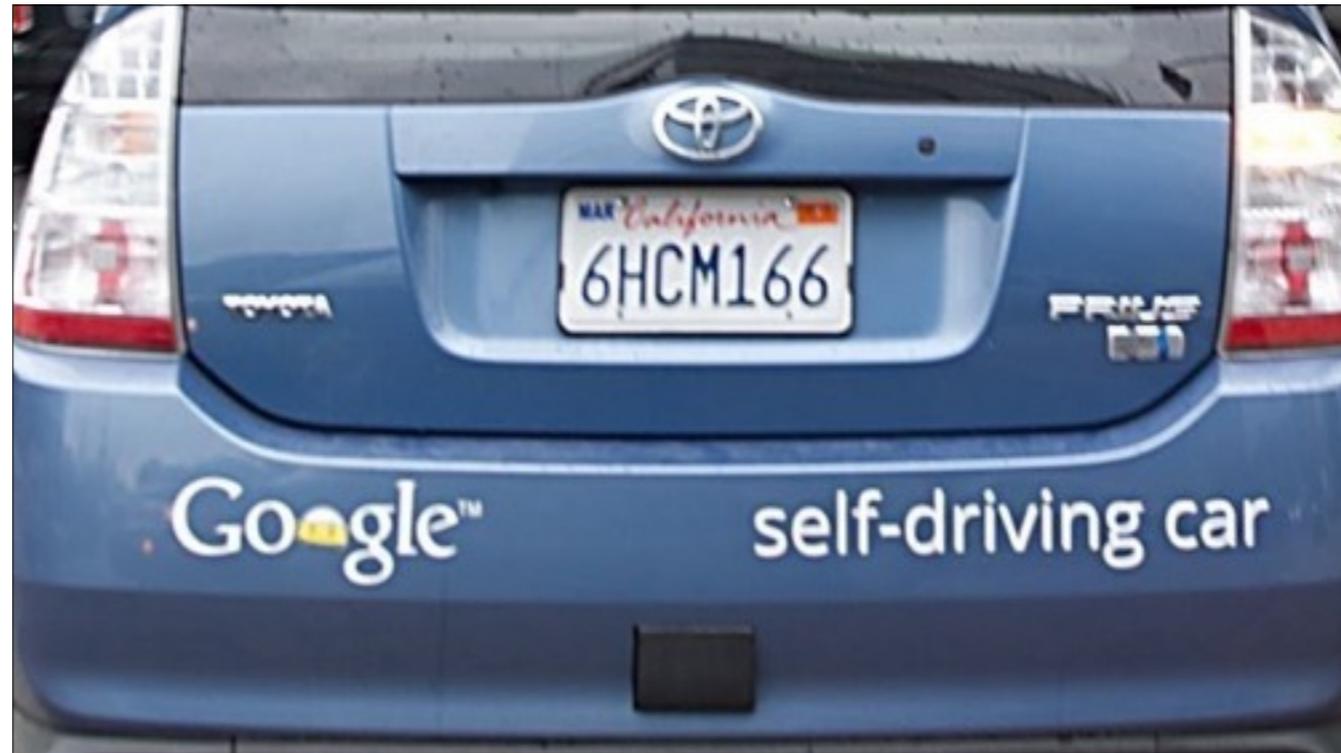


April 15, 2016

Beverly Hills announces plans for autonomous vehicles for public transportation.



Think in Questions



Not ... How will self driving cars impact my city/county

but rather

How do we create a more human-centric city/county with autonomous vehicles.





Trend #10: Renewable energy



Burlington, VT 100 renewable ...

West Texas

GEORGETOWN, TEXAS BUCKS THE OIL TREND

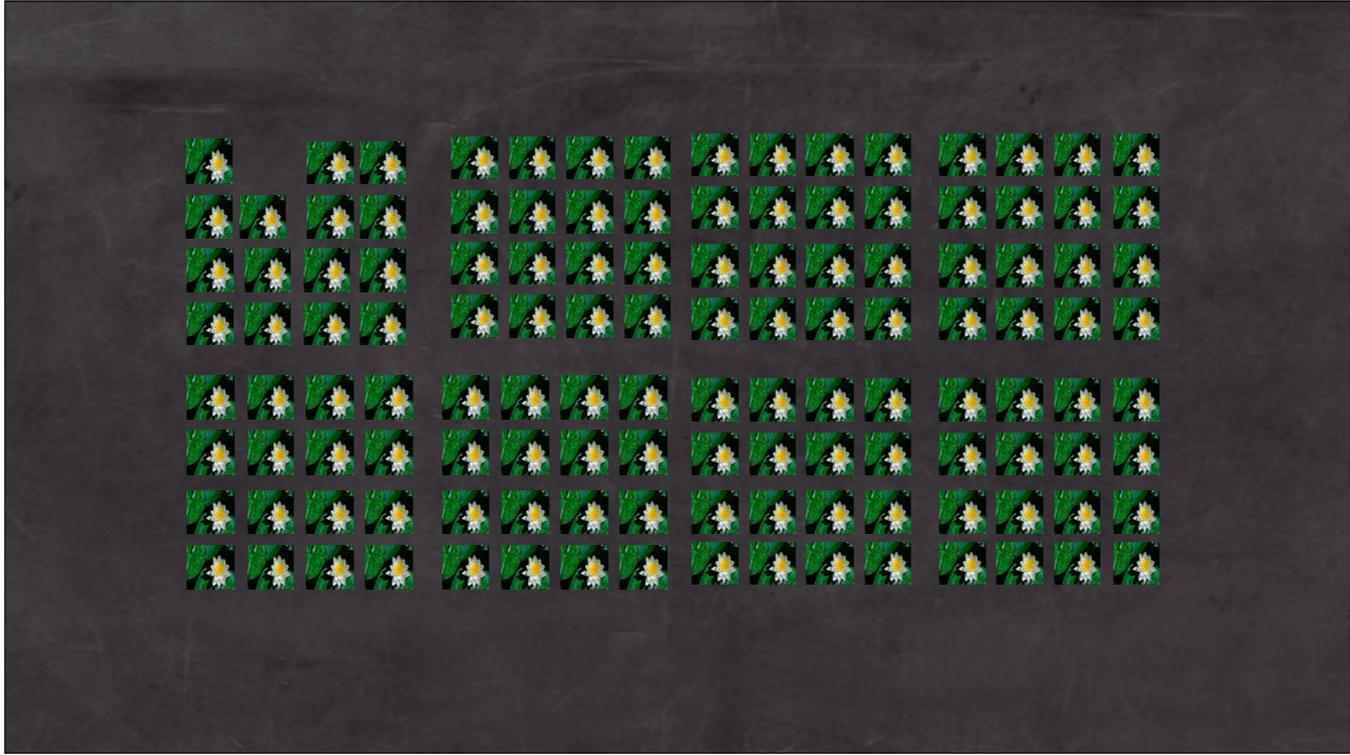


13:52 GMT

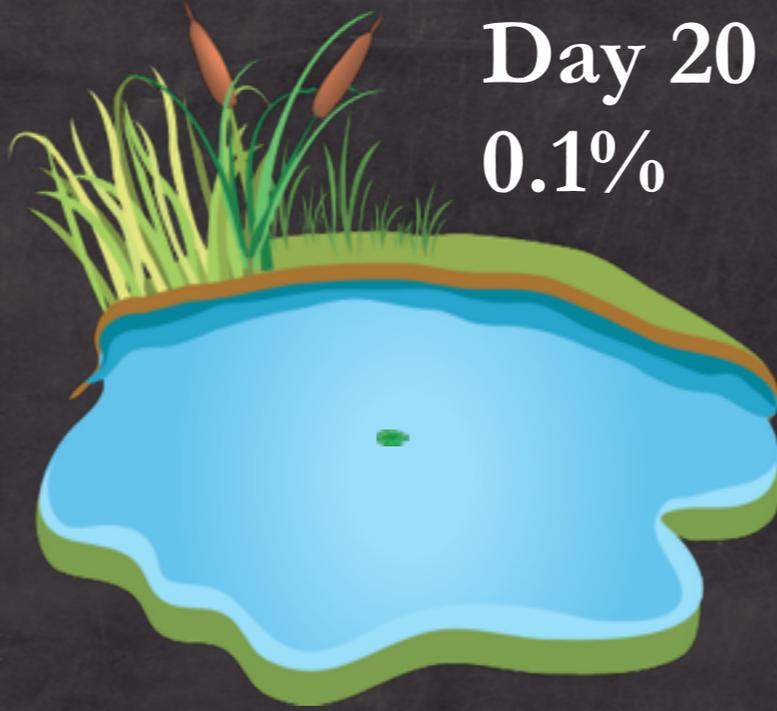








Day 20
0.1%



Day 25
3.2%



Day 29
50%



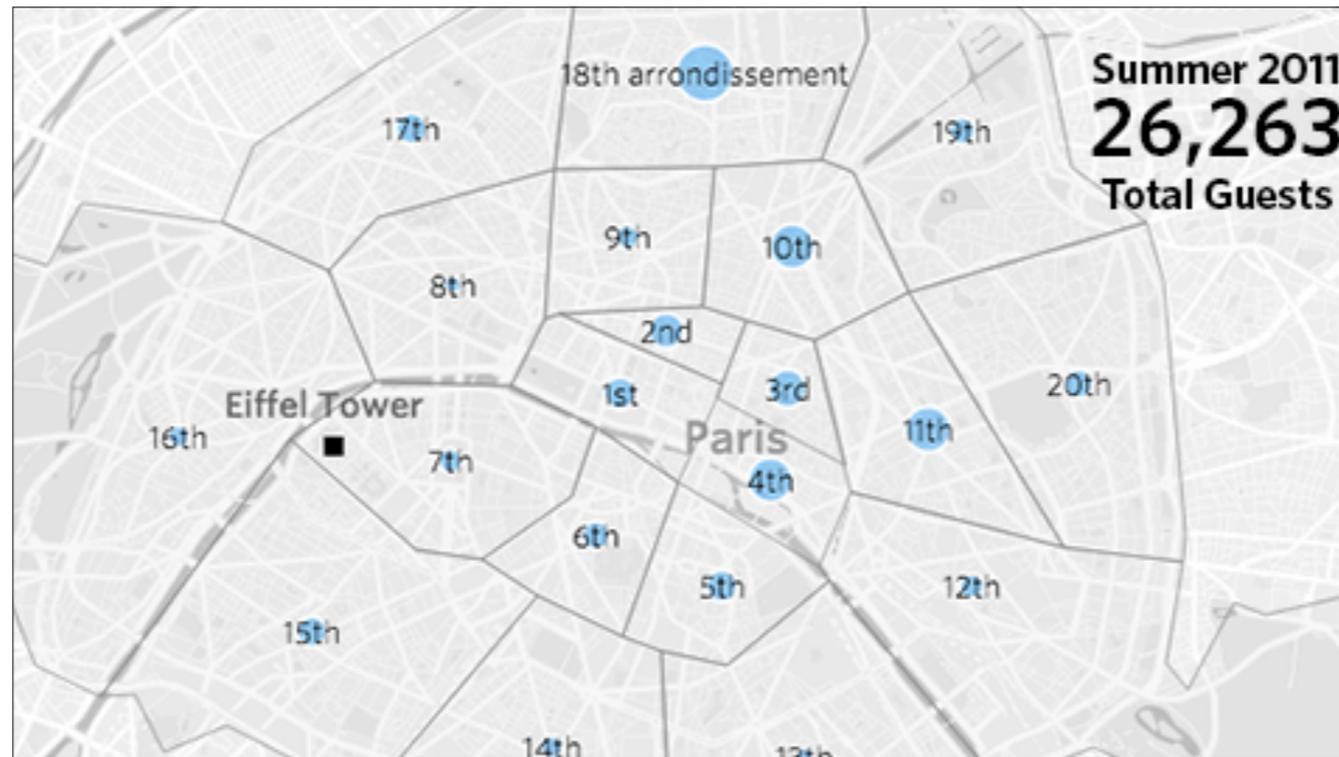
Day 30
100%







Today, some homeless people are using Square to accept mobile donation.



Here is a living, breathing example of the lilly-pad-like exponential growth.

Don't think it can happen to Glendora?

Think again ...



17,000,000





People still crave a human connection — right track with “the human bank”.