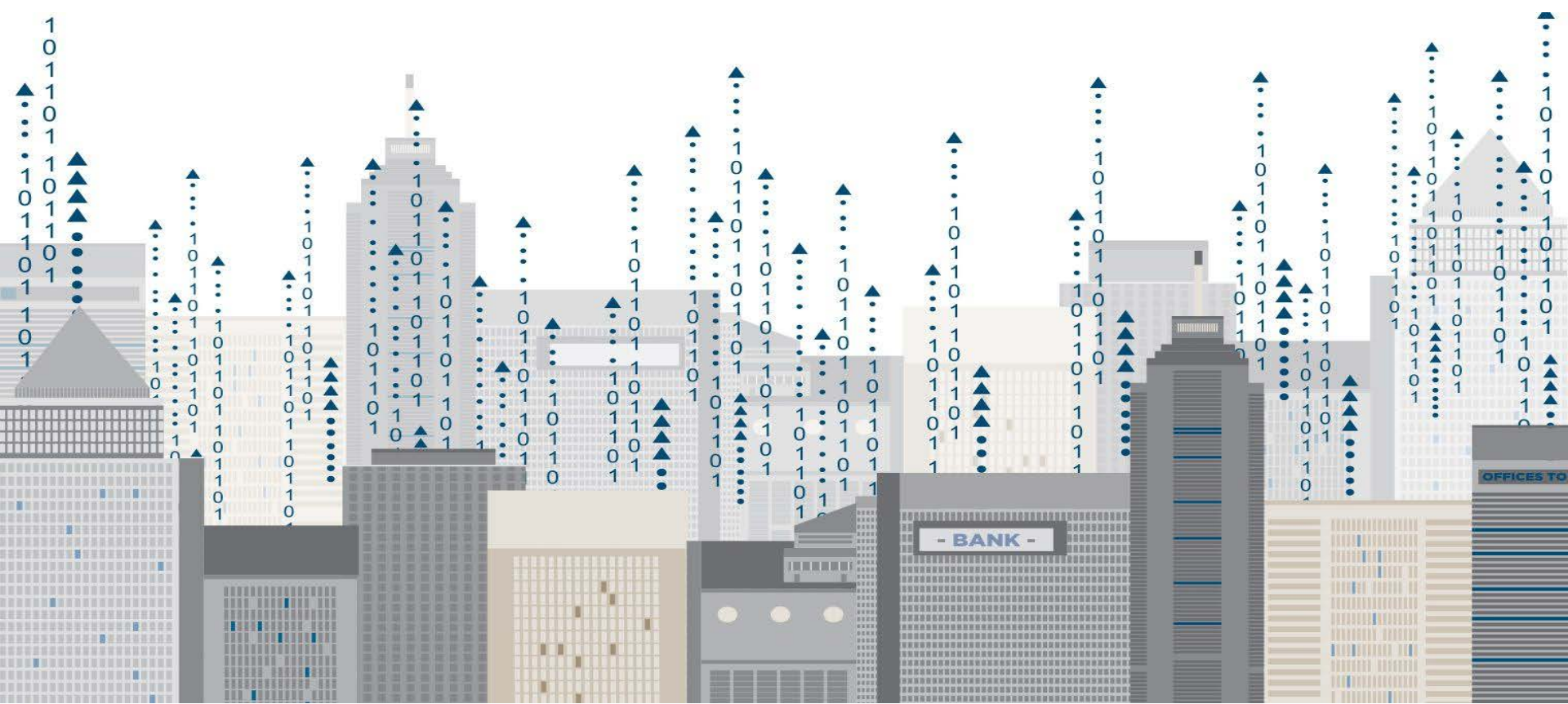# BIG DATA ANALYTICS

S Y M P O S I U M

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Big Data
What it Means For Business
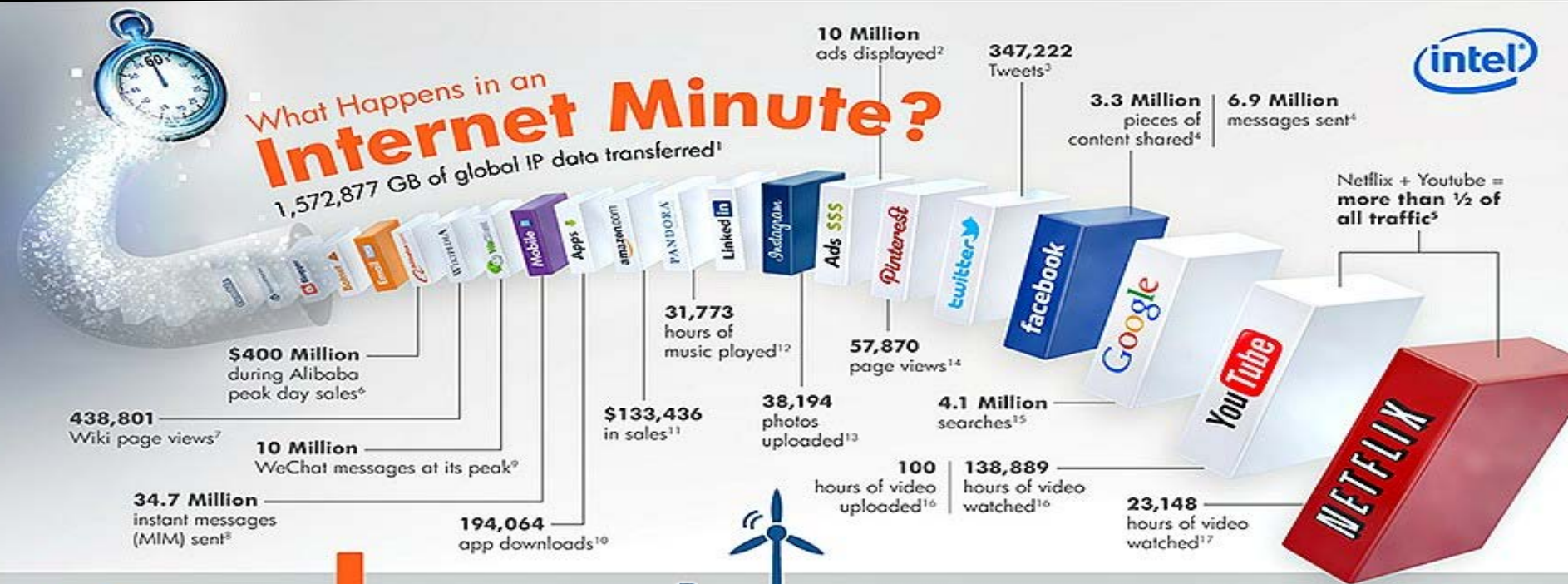
Dr. Bob Porter
Executive Director
UCF Executive Development Center

Technology: The Big Data Enabler

The Future of Marketing…Based on Your Data?

Google Providing Select Retailers Unprecedented Access to Consumers' Personal Habits

Move over, NSA – Google has its eyes on you … and potentially hundreds of millions of online consumers.

Google has partnered with Axecom Corp., DataTrax Holdings Inc., and Intel Corp. to create a system that collects consumers' physical and Internet related activities. This includes more than what they purchase – it collects data on what consumers view online and don't purchase.

The new system also tracks consumers' physical behavior, including biometric data such as pupil dilation, eye movement, heart rate, blood pressure, etc. It then shares this data with participating partners for a small fee, which allows partners to dynamically adjust the marketing, pricing, inventory and product information displayed to consumers in real time, both online and at brick-and-mortar locations.

Google described this system, called the Consumer Purchase DNA, as the next generation of technology for predicting and motivating consumer buying habits.

More than 500,000 consumers were tracked during the past six months in pilot programs that targeted industries including legal, accounting, banking, education and retail. Through creating complete consumer purchasing models, Google reported an additional $10 million in new revenue (an extra $20 per person) as a result of this new technology.

Many of the consumers were not aware that they were being tracked in this way, as this new technology is not yet regulated by privacy laws.

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What is Big Data?

Big Data is the cultural, technological, and scholarly phenomenon that rests on the interplay of:

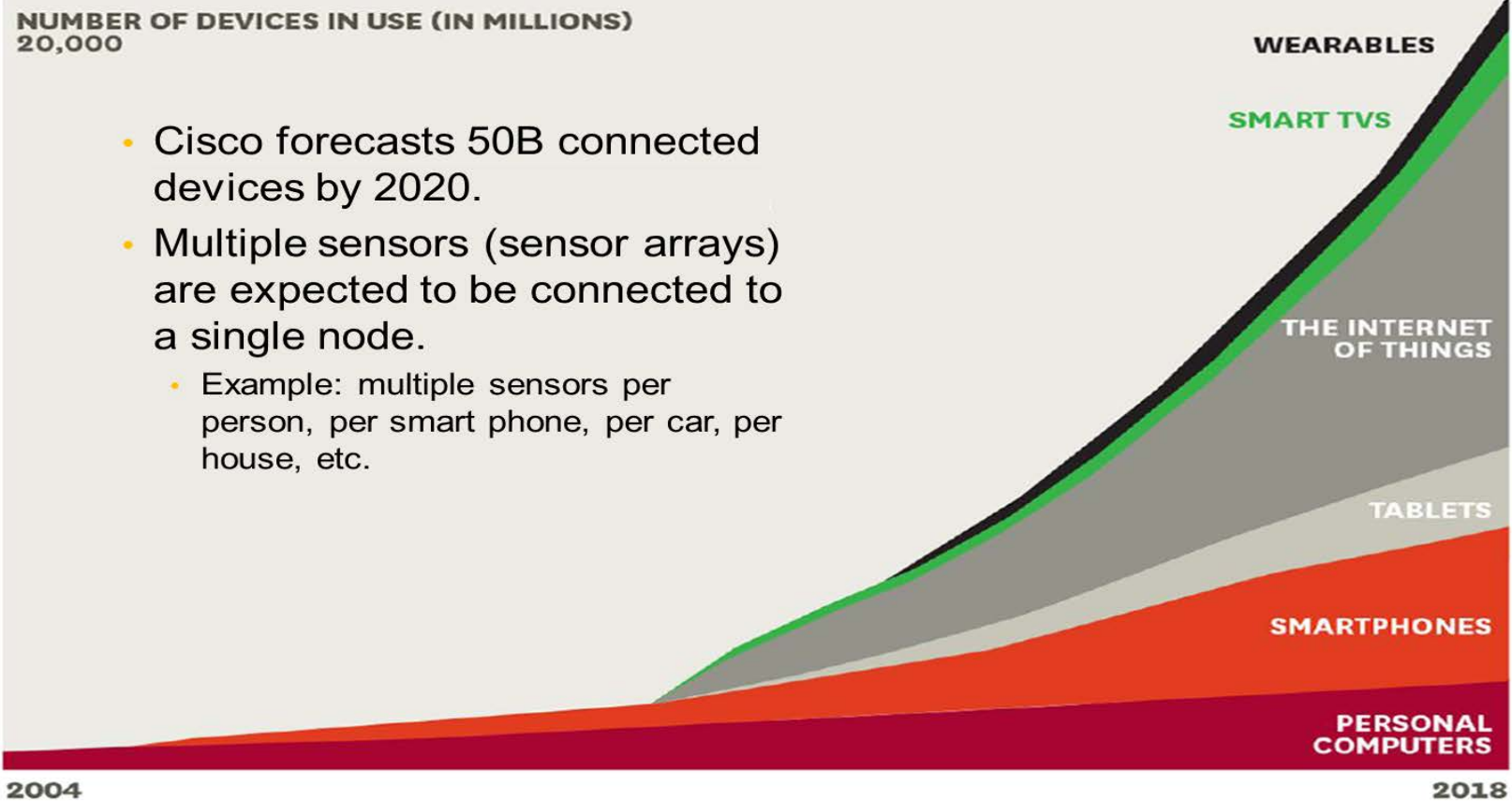**Technology**: gather, analyze, link, and compare large data sets

Analysis: identify patterns in order to make economic, social, technical, and legal claims

Mythology: the belief that large data sets offer a higher form of intelligence and knowledge

Boyd & Crawford, 2012

When Did it Become "Big Data?"

**NUMBER OF DEVICES IN USE (IN MILLIONS)**
20,000

- Cisco forecasts 50B connected devices by 2020.
- Multiple sensors (sensor arrays) are expected to be connected to a single node.
  - Example: multiple sensors per person, per smart phone, per car, per house, etc.

WEARABLES

SMART TVS

THE INTERNET OF THINGS

TABLETS

SMARTPHONES

PERSONAL COMPUTERS

2004   2018

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The Scale of Big Data

- Thirty-five zettabytes of data will have been created by 2020
  - A zettabyte = 1 trillion gigabytes
- That's enough data to fill a stack of DVD's…that reaches halfway to MARS.
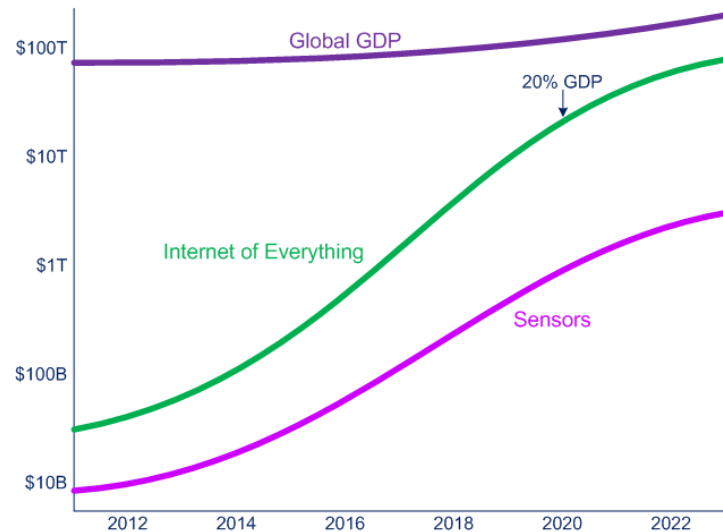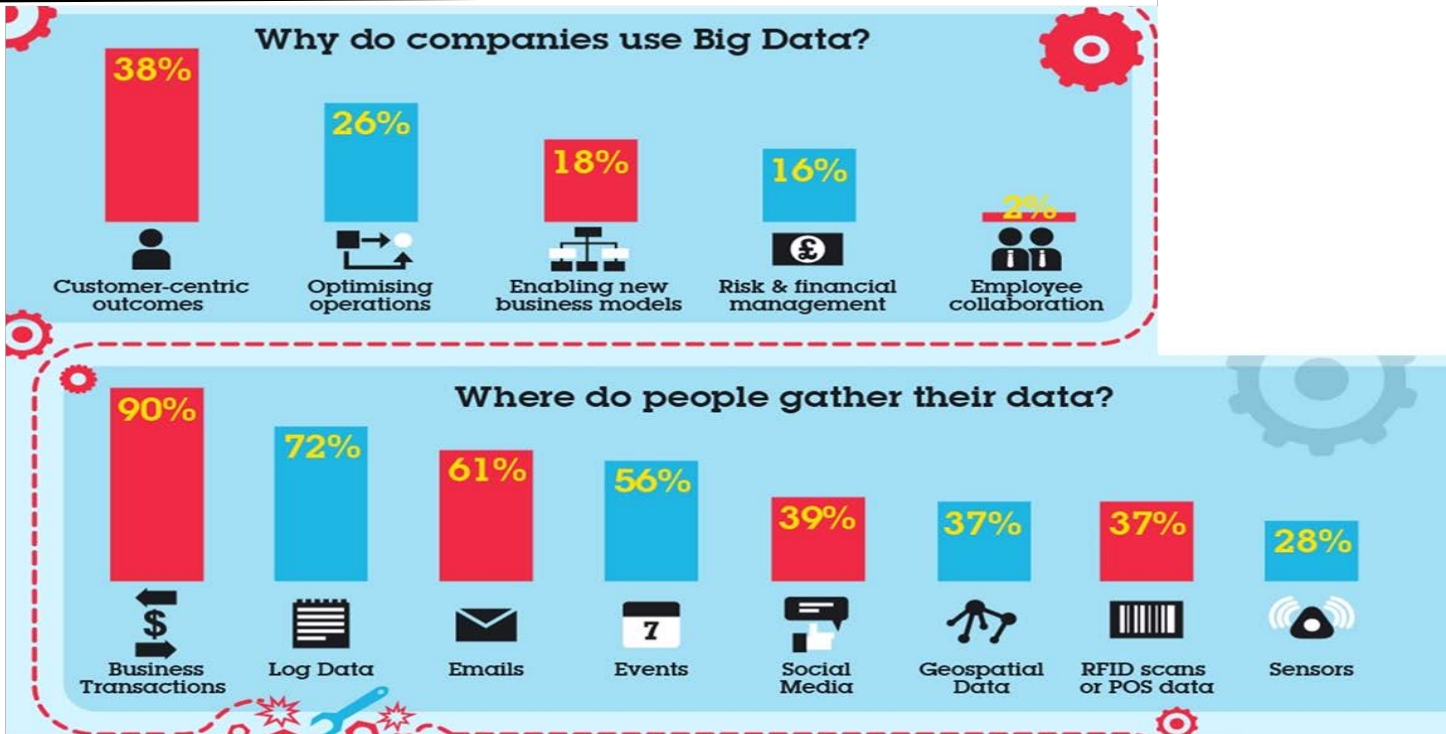
Key Findings from Deloitte Report

- **Analytics has arrived** – already a competitive resource
- **Better decision making** – on key strategic initiatives
- **Marketing and customers** – highest investment in analytics
- **Structure is a challenge** – coordination and alignment
- **Key barriers exist** – data management and access to talent
- **The best is yet to come** – technology sophistication

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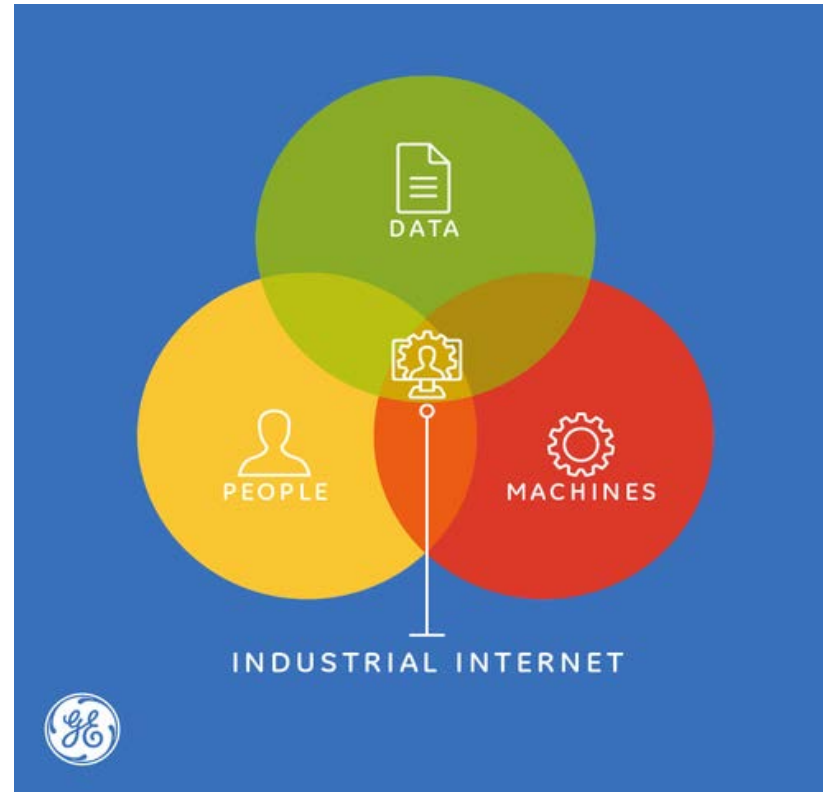# IBM: How Data Is Used in Business
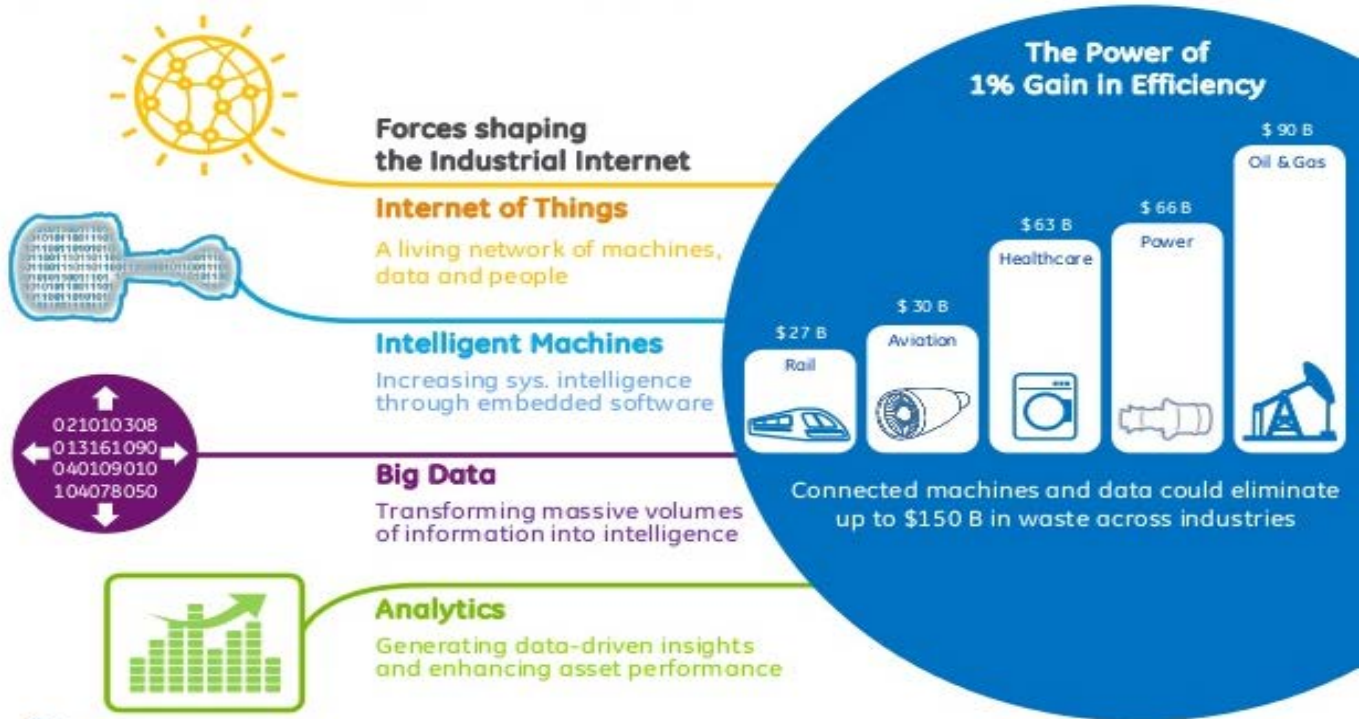
IBM: How Big Data Transforms Your Business

General Electric: The Emergence of the Industrial Internet

General Electric: Forces Shaping The Industrial Internet

There are now enough reasons for us to prove beyond all doubt that what we've always done, based on intuition, isn't the best way to go.

— Director of planning and analysis for a global medical services company

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Data Command Center at SpaceX

They track: Status and progress of Space launches and overall mission status.

Data Command Center at Lockheed Martin

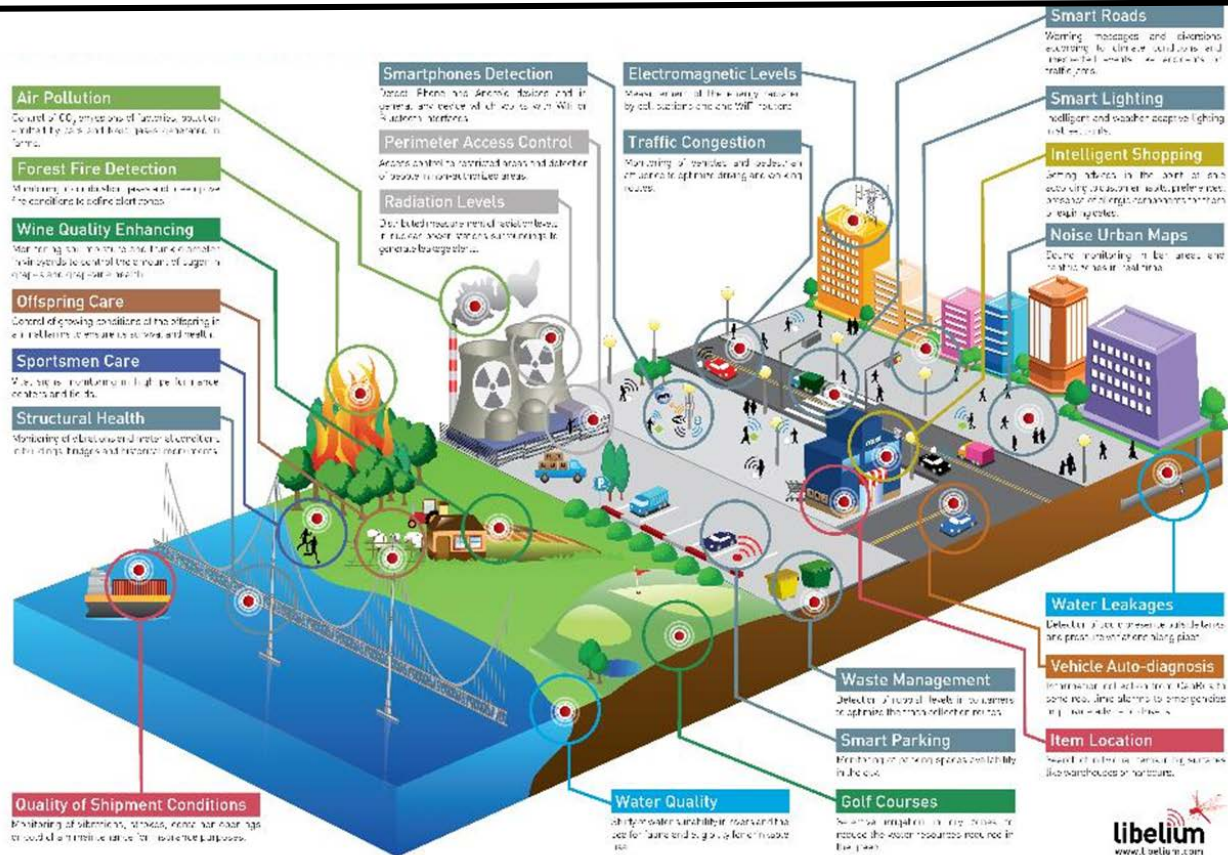They track: Objects in space to help maneuver spacecraft and track orbital technology.

Data Command Center at Johns Hopkins

They track: Bed availability, operating room efficiency, patient status and staffing.

The Internet of Things:
An Explosion of Connected Possibility

Your Smartphone – a Big Data Driver

- **Light sensors**
- **Proximity sensors**
- **Camera sensors**
- **Microphones (ultrasound) sensors**
- **Touch sensors**
- **Position (GPS, WiFi, Cellular, Bluetooth) sensors**
- **Accelerometer sensors**
- **Magnetometer sensors**
- **Gyroscope sensors**
- **Pressure sensors**
- **Temperature sensors**
- **Humidity sensors**

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Your Smartphone Goes To Med School…Locally

EKG monitor from AliveCor
http://www.alivecor.com/home

EKG monitor from Quardio
https://www.getqardio.com/qardiocore/

Preventice 's smart bandage constantly tracks cardiac ECG and rhythm monitoring
http://www.preventice.com/bodyguardian/howitworks/

Uchek (MIT) detects 25 diseases, such as diabetes, urinary tract infections, pre-clampsia, glucose, proteins, ketones, and more.
http://www.medgadget.com/2013/08/smartphone-based-urine-analysis-interview-with-ucheks-

Fraunhofer's glucose, lactate and cholesterol sensors, pulse oximeter, and a fluorescence sensor for detecting biomarkers
http://www.fit.fraunhofer.de/en/presse/13-09-12.html

Smart Sensor Project – BRIDGE - Osceola

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UCF Graduate Degrees = Big Data Opportunities
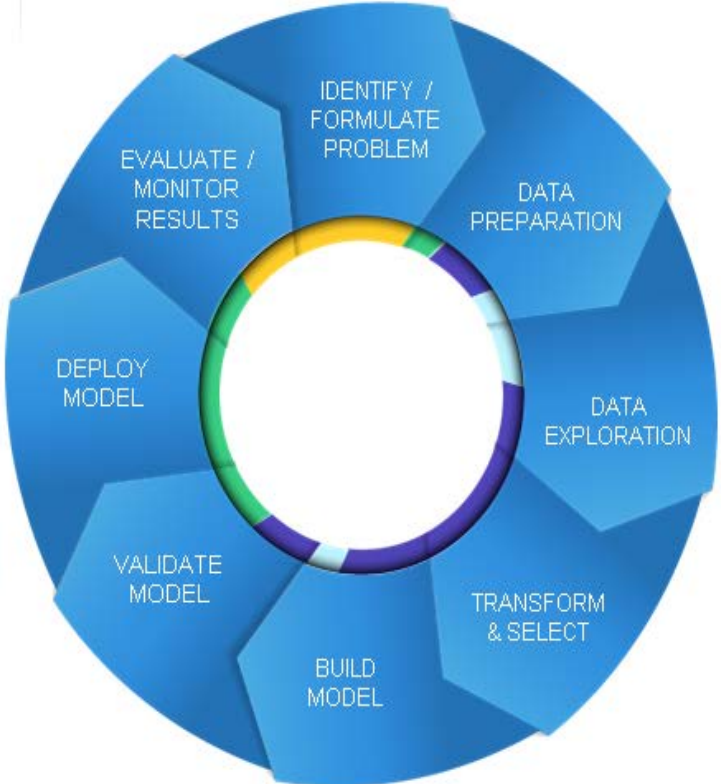
Program Comparison

College of Sciences	College of Engineering	College of Business
• The Data Mining track in the Statistical Computing MS program focuses on data mining and its **application to business, social, and health problems.** • The program is particularly suited for individuals who have completed an **undergraduate program in mathematics, statistics, economics, business, or other related fields**, and wish to pursue a career in data mining. • Data miners are statisticians who analyze **massive data sets to uncover trends and associations**, and make theoretically sound decisions on, for example, business, social, and health subjects. • **Data miners have one of the most coveted jobs**, as the demand for them far exceeds the existing number of qualified persons in the area. • Currently, the work force in the data mining industry consists mainly of individuals trained with post college education. To date, very few university degree programs exist for **training students for such a large and growing industry** in the United States.	• The Master of Science in Data Analytics program provides students with the ability to **develop algorithms and computer programs** for discovery of information from large amounts of data. This includes the **architecture of programs, as well as technical details of algorithm development.** • Students are expected to be able to **write and maintain novel computer programs** that make efficient use of cutting-edge computer technology. • Students in this non-thesis program receive a broad background in the areas of **parallel programming, machine learning, data mining, and network science** while specializing in particular areas of data analytics practice. • Students successfully completing this program will have exhibited breadth as well as depth of capability involving **discovery of knowledge from "big data."**	• The 30-hour, ten course curriculum introduces students to the main quantitative methods and software tools of business analytics, a subfield of data science; namely, those used in **numerical, optimization, simulation, and statistical methods.** • Designed for those interested in using **quantitative methods to uncover economic relationships, to construct predictive models, and to communicate business intelligence**, the curriculum provides students with the knowledge necessary in making informed business decisions. Specifically, students will learn how to acquire, organize, manage, and analyze data. • In addition to gaining experience with **software tools commonly used in industry (such as UNIX, SQLite, Python, and R),** students will also be instructed in using commercial software (such as SAS) to train, validate, and test empirical models. • Through a combination of **case studies, hands-on lectures, and group projects,** students will gain valuable experience in using quantitative methods to solve business problems. • The program culminates in an **applied field project** that uses these methods and tools to solve a non-trivial business problem.

To Find Out More About UCF Big Data Programs

College of Sciences	College of Engineering	College of Business
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The Best is Yet to Come

Closing Slide