



## Annual Workplace Safety and Health Conference



### Wearable Technology 2016 Texas Safety Summit

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## The Internet of Things

- A decade ago, **500 million devices** were connected to the Internet
  - Primarily desktop computers
  - Today, **10 to 20 billion** devices are connected:
    - Smartphones
    - Tablets
    - Televisions
    - Thermostats
- In five years, **40 to 50 billion?**
  - **Imagine what will be connected**



CISCO: The Internet of Things How the Next Evolution of the Internet Is Changing Everything, 2011



## Why the proliferation?

- Costs have decreased significantly.
- Sensors
  - Image sensors
  - Early 1990s - \$25
  - End of the decade - **\$5**
- Accelerometers
  - 2007 Single axis of motion - \$7
  - Today Six axis of motion - **\$0.50**

Dubravac, Shawn. "Digital Destiny." P. 68



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## What Is Wearable Technology?

- Sensors
  - Capture data
- Connectivity
  - Feed data to the Internet, server, or other devices
- Platform
  - Analyze data



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## Sensors

Catch data at speeds, quantity, and accuracy not possible for humans.

- Microphone
- Camera
- Global Positioning System (GPS)
- Accelerometer
- Proximity
- Altimeter
- Temperature
- Humidity
- Barometer
- Light
- Chemicals
- Load



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## Big Data

- Analytics
  - To analyze the data and provide meaningful information
- Information modeling
- Actionable intelligence
  - Solutions and action plans
- Can help manage risk and improve worker safety



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## Risks/Issues

- Privacy
  - Lawsuit from employee alleging forced to use tracking application on smartphone
- Regulations
  - Older patchwork of regulations
- Cybersecurity
  - Baby harassed on hacked baby monitor
- Bad data and malfunctioning wearable devices
- If we knew of a potential hazard and did nothing or the wrong thing

<http://www.techweekeurope.co.uk/mobility/lawsuit-tracking-app-168043>



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## Safety Applications

- Driving
  - Speed, braking, circadian rhythms, other smart-car apps
- Industrial Hygiene
  - Air monitoring, noise, temperature, CO, CO2, heat index
- Security/Premises Liability Prevention
  - Parking lot lighting
- Manual Material Handling
  - Weight lifted, pushed, pulled/minute/hour, altitude



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## Wearable examples

### Entertainment

- Smart watch
- Smart glasses
- Virtual reality

### Fitness

- Heart rate
- Skin temperature
- Sock and shoe movement sensors
- Speed
- Distance
- Camera

### Medical

- Hearing aid
- Glucose monitor
- Remote patient monitoring
- Bionics



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## Wearable examples

### Lifestyle

- Smartphone
- Bluetooth
- Smart watch
- Smart glasses

### Gaming

- Gesture-controlled devices
- Augmented reality devices



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## Emerging

- Stop machine when too close
- Hands-free machine operation
- Monitor hazardous environmental conditions
  - Temperature
  - Toxic substances
- Lack of motion in confined space
- Fall protection
- Return to work/light duty restrictions
- Detect overexertion
- **AIG/Human condition**



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## What's Next?

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