How Wearables, IoT, and Cognitive can Improve employees safety

Nir Mashkif

Manager, Wearable and IoT Solutions,
IBM Research

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Person Centric IoT

We expect computers to

- Interact with us in new ways
- Engage us everywhere at the right time, in the right way and with the right content
- Understand us and automatically help in a way that is seamless

We have many roles

Employee

Consumer

Student

Citizen

Patient

Parent

The way enterprises engage with people is changing

Transforming Professions

Field worker safety

Emergency response

Customer service

Smart conference

Smart care

Field worker effectiveness

Engaging Customers

Payments

Wellness

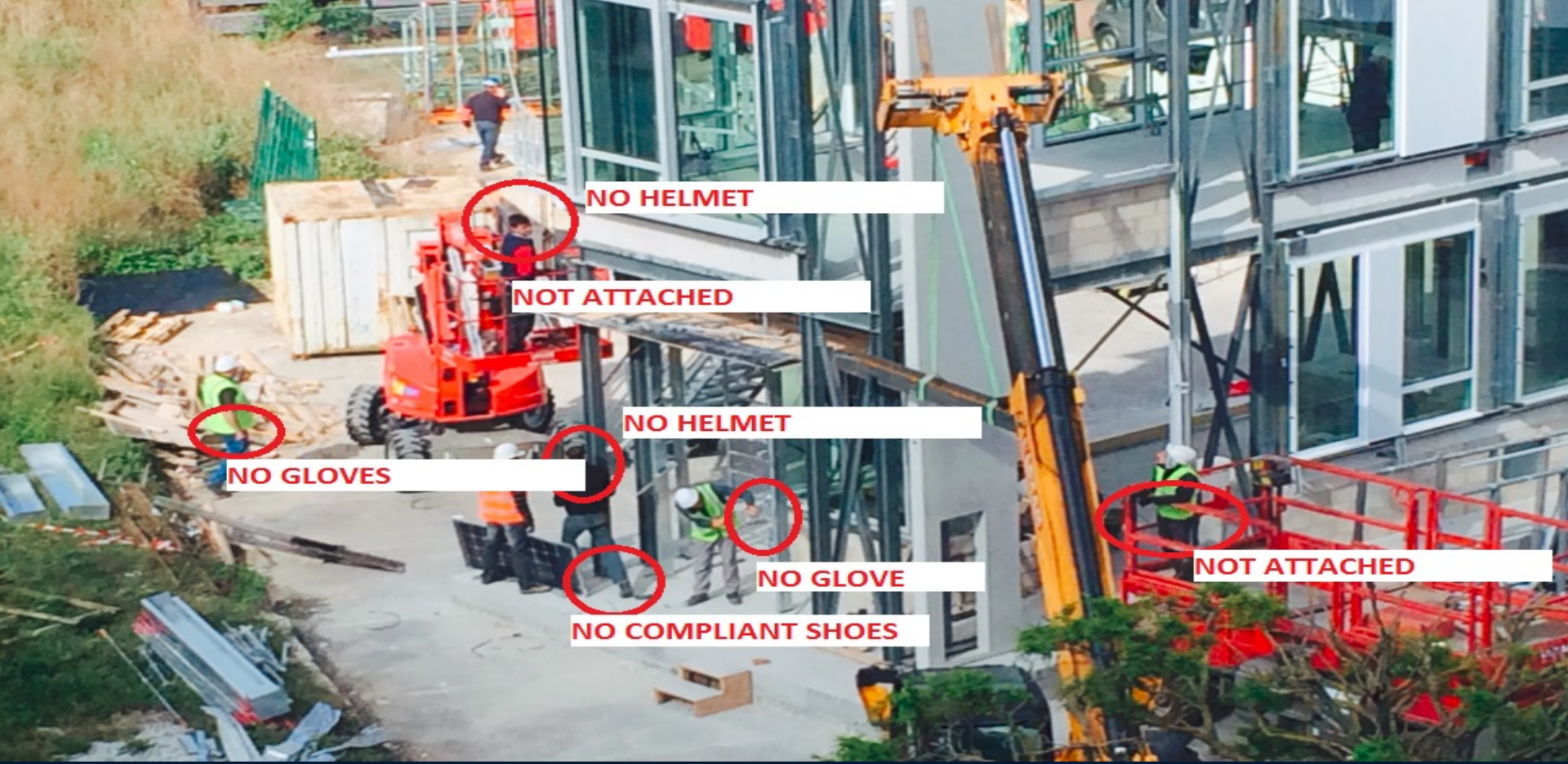
Amusement parks

Customer loyalty

Pay as you live insurance

Healthcare

Can you make sure your employees are protected at all time ?



NOT REALLY and not without IoT

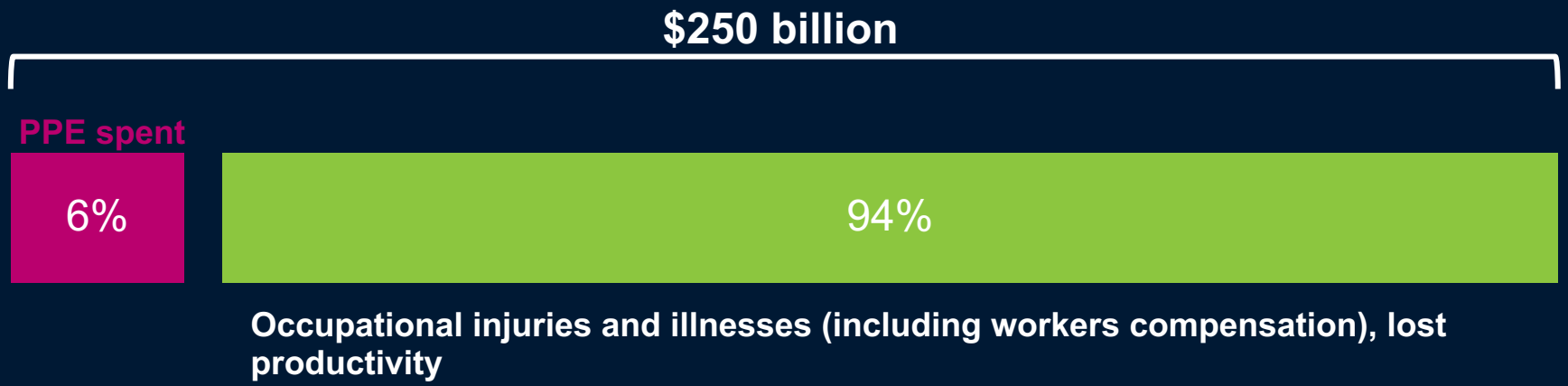
Over 4,500 Lives lost on the Job in the US every year

More then 27 millions working days lost

Worker Safety Is In top of mind of every CEO

US business lost $250 billion per year in safety related costs

But spent only 6% on protective equipment and systems



Source: Occupational Safety and Health Administration (OSHA)

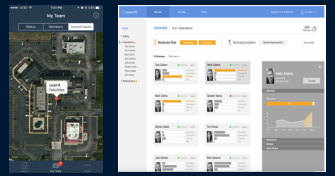
IBM Employee Wellness and Safety Solution As Your Employees' Guardian Angel

Hazards Detection

- Excessive lifting, pushing, carrying
- Fatigue
- Alertness
- Dehydration
- Fall / Injury
- Use of safety equip

Alert Employee

Inform Emergency Center / Supervisor



Broadcast message

IBM Employee Safety– Shields

- Shields are the key executable building blocks in the Solution
- Each shield reflects a single safety concerns in the application
- It is a form of an “intelligent rule” (Safelet-Condition-Action):

Hazard Detection

Check conditions

Expedite Response/Alerts

Different forms of analytics (a.k.a) employed over input data: simple threshold function, statistical, or even a ML model. Could depend on any combination of sensors data and other shield’s output.

Verifying conditions such as: location, time, identity, or any other contextual property that need to be checked prior to the invocation of the shield’s action part.

The action part of a shield. May reflect either form of preventive, detective, or predictive acts.

But where should the various shields execute?
(a) Cloud, (b) On edge/phone device, (c) Depending on circumstances?

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Example: “Overexertion Detection” shield:

Detect “overexertion detected” hazard if heart-rate > AVG(heart-rate(now-10,now)±3σ

Check: (location == @work) && (08:00 < now < 18:30)

send push notification to Employee.supervisor.phone-number

But where should the various shields execute?
(a) Cloud, (b) On edge/phone device, (c) Depending on circumstances?

IBM Employee Safety Benefits

IBM Employee Safety helps companies protect themselves and their employees from the financial loss and human cost of workplace injuries.

Real-time analytics

- Prevent workplace accidents and injuries before they happen
  - Validate compliance to safety guidelines and regulation
  - Predictive alerts to employees and supervisors
- Expedite emergency response in case of accidents
  - Notifying emergency response and near-by employees

Off-line analytics

- Identify the “near-misses” and almost accidents
- Continuously improve safety guidelines and regulations via learning
  - Employee personalization

North Star BlueScope Steel and IBM are using Watson IoT technology and wearable devices to protect workers in extreme environments

Goal
Identify potentially problematic conditions by collecting data from various, continually monitoring sensors

Alerts provide personalized safety guidelines to individual employees

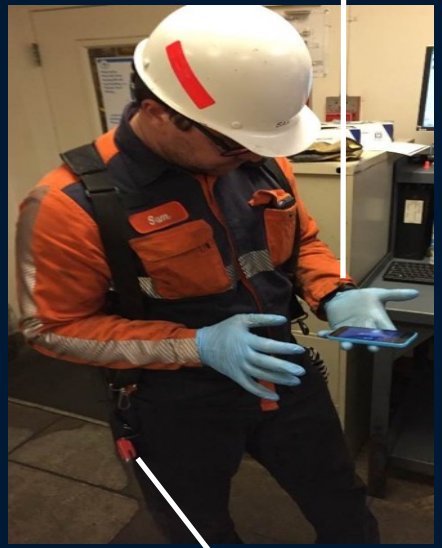
Heat Stress and Overexertion Protection

OSHA Heat Index and Risk Levels

Metrication of Template:HeatTable

Relative Humidity (%)	temperature (°C)															
	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
40	27	28	29	30	31	32	34	35	37	39	41	43	46	48	51	54	57
45	27	28	29	30	32	33	35	37	39	41	43	46	49	51	54	57	
50	27	28	30	31	33	34	36	38	41	43	46	49	52	55	58		
55	28	29	30	32	34	36	38	40	43	46	48	52	55	59			
60	28	29	31	33	35	37	40	42	45	48	51	55	59				
65	28	30	32	34	36	39	41	44	48	51	55	59					
70	29	31	33	35	38	40	43	47	50	54	58						
75	29	31	34	36	39	42	46	49	53	58							
80	30	32	35	38	41	44	48	52	57								
85	30	33	36	39	43	47	51	55									
90	31	34	37	41	45	49	54										
95	31	35	38	42	47	51	57										
100	32	36	40	44	49	54											

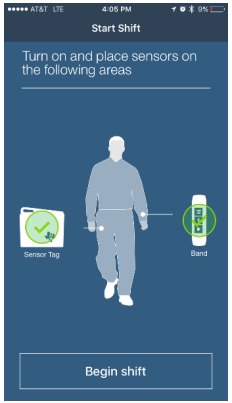
HR, movement, body temperature

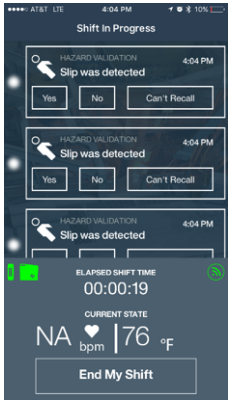


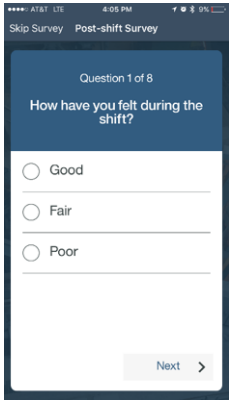
Temp, Humidity

IBM Employee Safety Apps and Dashboards

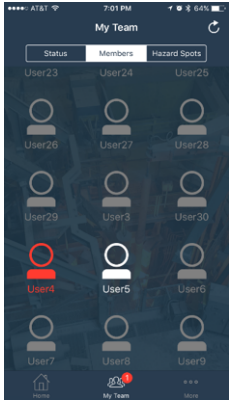
Worker App

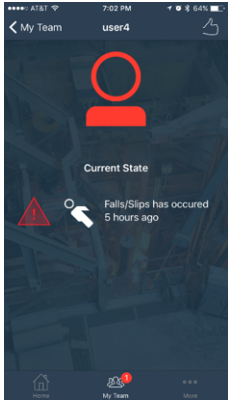


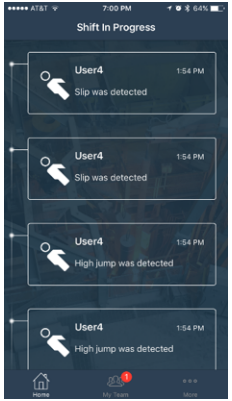




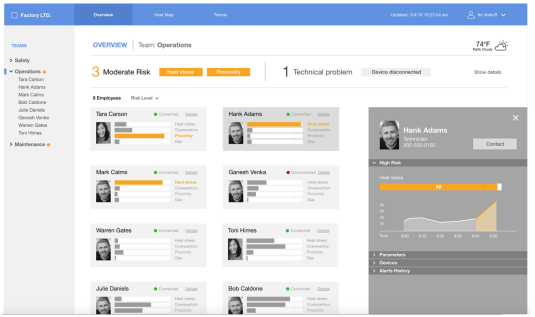
Supervisor App



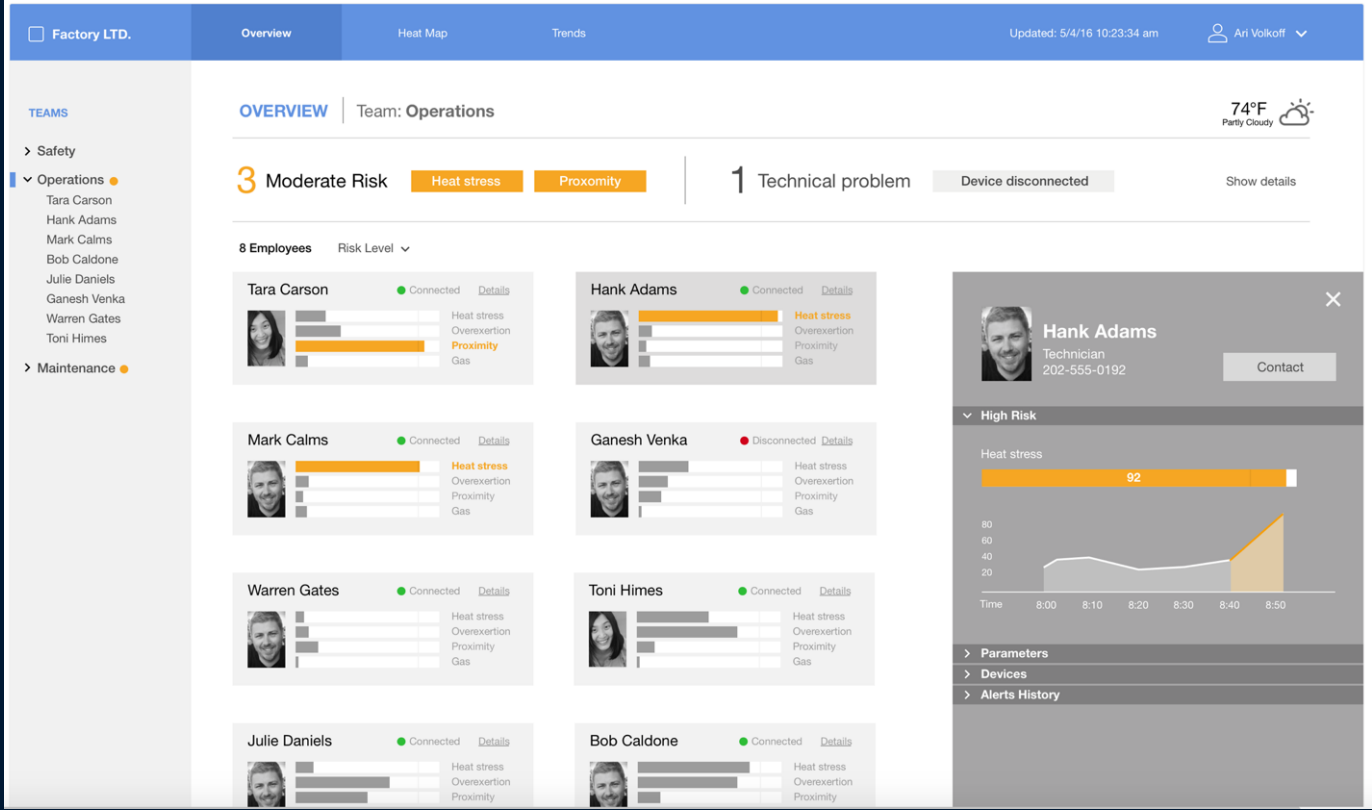




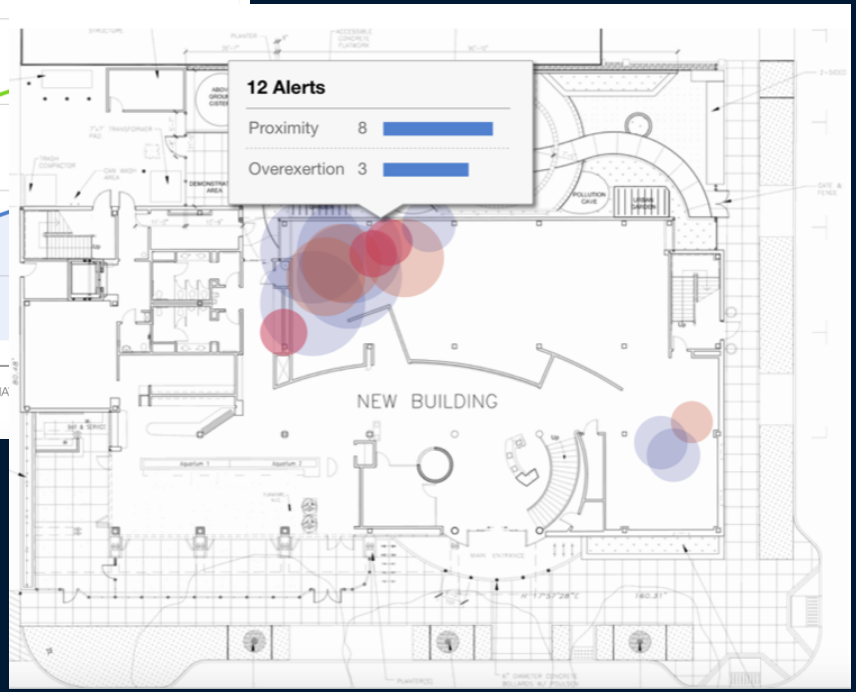
Dashboard



Monitor Employees Risk



Safety Analytics



Pilot Results

Heat Stress: **34**

Overexertion: **18**

3 **Heat stress incidents were reported during the pilot by people not using solution**

Breaking Ground in Other Industries

Warehouse safety

Oil and gas

Energy and utility

For more information

Press release

- http://www-03.ibm.com/press/us/en/pressrelease/49994.wss

Blogs

- https://www.ibm.com/blogs/research/2016/01/putting-wearables-to-work-for-improved-safety/
- https://www.ibm.com/blogs/internet-of-things/worker-safety-and-wearables/

Demo

- https://www.youtube.com/watch?v=wJbAKeLGzrs