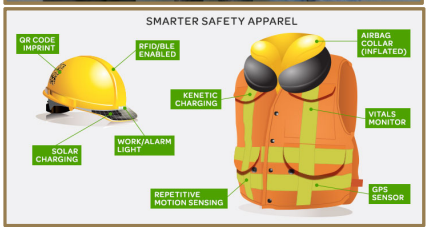
Saving Lives & Reducing Injuries in Construction with Innovative Wearable Technologies



Dr. Teizer with Human Conditions Team

Human Condition is applying their previously developed biometric sensing technology to tackle OSHA's Focus Four Construction Hazards using Intel's New Edison Platform.

"Construction is a tough and dangerous job with constant pressure due to deadlines and weather. There is no reason safety and efficiency can not coexist on a modern job site, and we are excited to be developing these important tools that can save lives."

New York, NY, 2/1/2014, http://www.prweb.com/releases/human-condition/construction/prweb11522839.htm

Construction job site injuries account for 19.6% of all U.S. work related fatalities and injuries. This includes falls, electrocution, repetitive stress, and temperature related injuries. Human Condition, a New York City based innovation think and do tank, wants to change this.

Global construction is expected to grow 70% by 2025 according to Global Construction Perspectives and Oxford Economics. With this growth comes a need to focus on job site safety and efficiency. While construction technologies have had to adapt to increasingly complex building demands of architects and modern design, construction safety technology has lagged behind. As one of the most dangerous occupations, this needs to be addressed swiftly.

The team started by looking to address the OSHA's Focus Four Hazards: falls, struck, electrocution, and caught-in or between. These areas were the basis for designing the next generation of construction safety clothing. Focusing on two existing pieces of safety gear, they designed a new smart hard hat and a safety vest that can be used on a modern job site.

"Construction safety and health is about to see a transformative change over the next few years due to innovative solutions and applications in wearable technology. The technology has finally caught up so that it can provide the solutions our research has shown to be needed in the construction industry. Collecting data on workforce movements and behavior can allow us to identify safety and health related patterns and intervene. Our research has shown that bad work layout is often to blame for injuries or fatalities. We have to consider that workers want to be empowered and involved in hazard detection, control, feedback, and decision making."

Dr. Jochen Teizer, Director of RAPIDS Construction Safety and Technology Laboratory

According to a blind survey the Human Condition Institute conducted in 2013 both workers and managers responded favorably to taking active roles in wearing technology that would promote job site safety. They also looked at the ecosystem of modern job sites and applied biometric and location-based sensor technology to the rethinking of safety clothing for construction workers.

"We predict that this technology will revolutionize the way contractors view their sites, crews, and bottom lines. When safety, cost, and efficiency are not viewed as mutually exclusive we have succeeded."

Peter E. Raymond, Human Condition CEO.

The key to this technology is low-cost wearable computers that do not interfere and can be powered by the motion of the worker. With Intel's announcement of Edison, an SD card sized computer that integrates a miniature computer with wireless radios, these products can be more easily brought to market.

The "enhanced" reflector vest has both GPS as well as RTLS location capabilities, airbag fall protection system, and vital stat monitor. The hard hat detects biometric signals coupled with force detection to detect and report an impact or a fall. It can also report when it is not being worn in a specified area of a job site. An integrated LED work light and safety beacon has been implemented to help with visual alerting of a hazard and enable visual identification of a worker who may be in a compromised location. The smart safety clothing connects to a cloud-based processing and a mobile dashboard interface to indicate: vitals, body temperature, repetitive motion (which can possibly lead to injuries), and location. The sensor embedded outerwear provides real time, to the minute data.

Integrated with building information modeling software (BIM), it can provide a 5-dimensional view of a construction project. Time, space, climate, materials and workers are all able to be tracked and used for predictions and modeling. Utilizing this streaming data on site can increase worker safety by analyzing information such as: hoist use, task-orientated location monitoring, proximity to site specific hazards and heavy machinery on the move, specific body functions to predict injuries, and climate impact on the workers and job site.

The real time data allows a supervisor/engineer to communicate with employees if they enter or are about to enter a potential hazard zone and to also view whether or not they are in the correct zones and performing the assigned tasks. Utilizing the biometric information provided by an automated solution, employers are capable of monitoring and correcting job site behavior. On-the-job injuries can potentially cause major costs and construction delays. Maintaining job site efficiency and safety is important as labor productivity is crucial to monitor if a project is going to be completed on schedule and within budget.

For more information concerning this research topic or the RAPIDS laboratory, please contact:
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