Online Teaching and Learning from "Tracing" Real-time Daily Site Operations: Development of the Platform of Automated Surveillance Network Cameras at Building and Civil Engineering Project Site - To understand more about Safety and Productivity

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Abstract:

Construction industry is regarded as one of the most dangerous place around the world due to its sophisticated working sequence and complicated working environment. The Hong Kong government and most construction companies have put more emphasis on construction safety, but still the number of fatality and accident remain high. Throughout the whole construction process, the contractors and inspectors are obligated to develop and implement an integrated, inclusive safety management system. Surprise checks, regular safety training and safety audit or review are some of the key elements included in the safety system. These ensure proper working procedures or safety precautions are carried out.

The traditional ways used in Hong Kong to perform safety training are reading the words, charts or figure on paper, safety training lecture, videotapes and taking online classes. These types of training provide lack of realism in mock drills. Construction students/practitioners/workers are difficult to apply the knowledge from notes or video in real situation when they really facing the hazards. Moreover, these traditional training methods do not provide a good evaluation of effectiveness. Hence, a brand-new training is needed in construction industry.

In this TDG project, a new real-time platform of application of automated surveillance network cameras will be developed. The study aims to create and design a real-time monitoring system named TRACE, to facilitate the monitoring of workers in construction site and ensure all workers are well-equipped with PPE, minimize illegal actions or unauthorized people entered and record the license of vehicle entered. This system trained with Deep Learning Method and able to detect worker without PPE and send warning to both the worker and safety officers in real-time, aiming to develop an innovative monitoring system to improve the safety and health of workers and working conditions, thus enhance the productivity.

TRACE can be used for online teaching and learning! As mentioned as above, it is not easy to achieve on-site or in-plant safety training to our students (Industrial/ Construction) as there are uncontrollable and unpredictable hazards. Tools or equipment are also too costly for safety training. Visualization is a far better tool that solves the issue of understanding and analyzing hazards. This new training tool can enhance the works safety habits and hence contributes a safety and health-working environment. The

proposed project will focus on creating a new real-time platform. Through the monitoring of real-time environments and experience different scenarios, by using AI Cameras, it helps the students (the future practitioners/ trainer) to understand, simulate and remember the safety precautions, inspections, rules, standards, regulations and other follow-up actions (e.g. proper ergonomics by posture detection!), etc.