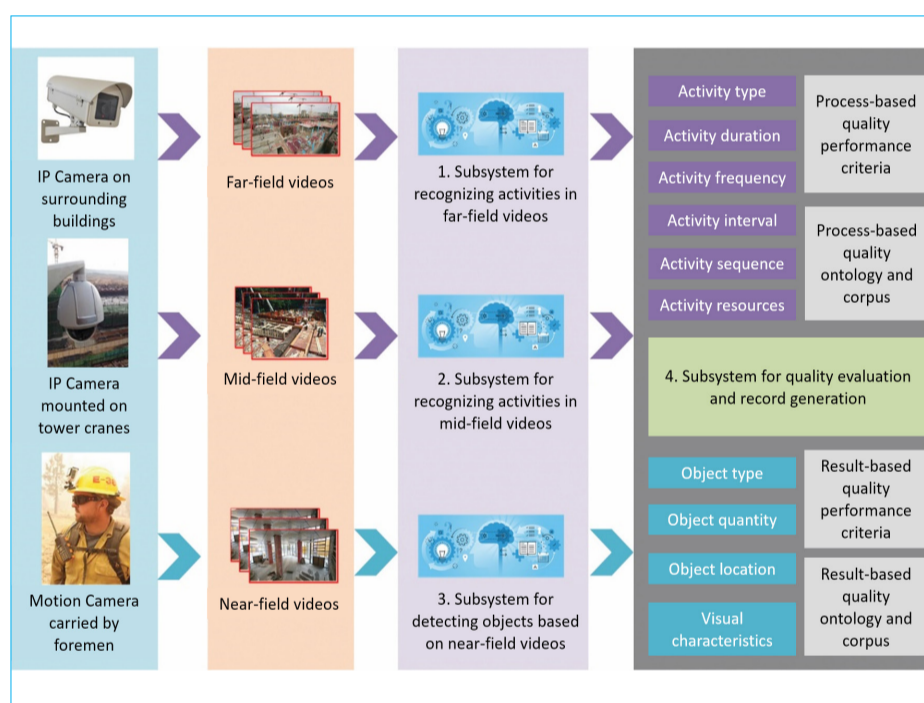


PI: 用於建築業的智能施工品質管理系統

PI: A Smart Construction Quality Management System

利用機器視覺及深度學習技術自動檢測建築工地物件及識別施工活動
Integrating computer vision with machine learning for automated object detection and construction activity recognition

承建商及地盤管理人員需要在施工期間定時進行品質巡檢，這項工作耗時費力，以致管理記錄容易出現缺失或錯誤。另外，現時承建商多採數用多層分判制度來開展建築項目，由於分判商數目眾多，整體品質管理的工作變得更加困難，品質偏差的情況時有出現。為此，理大的研究人員開發了PI智能施工品質管理系統。PI為Project Intelligence和Project Eyes的簡稱，它結合了機器視覺及深度學習技術，透過工地的監控攝像機，自動監察與工程有關的對象，識別工友及施工機械設備的活動，同時判斷施工品質是否有偏差，以及工地是否有危險。此系統能大大提升品質管理、施工生產力及安全表現。



系統架構
System overview

Contractors and site managers need to conduct quality inspections regularly during construction. Such work is time-consuming and labour-intensive, and the resultant quality records are prone to be incomplete or faulty. Besides, contractors nowadays tend to adopt multi-layer subcontracting for construction projects. The presence of multiple subcontractors intensifies the complexity of quality management, and quality deviations may occur under such circumstances. In light of this, researchers from PolyU developed a smart construction quality management system called "PI", an acronym for both "Project Eyes" and "Project Intelligence". Integrating machine vision and deep learning technologies, PI detects construction-related objects and identifies the activities of workers and construction machinery from the videos captured by surveillance cameras on the construction site. It can also determine if there are quality deviations or dangers on the construction site. The PI system can greatly improve the quality management process, construction productivity as well as safety performance.

Principal Investigator

Prof. Heng LI

Department of Building and Real Estate

Contact Details

Institute for Entrepreneurship

Tel: (852) 3400 2929 Fax: (852) 2333 2410 Email: pdadmin@polyu.edu.hk

特色與優點

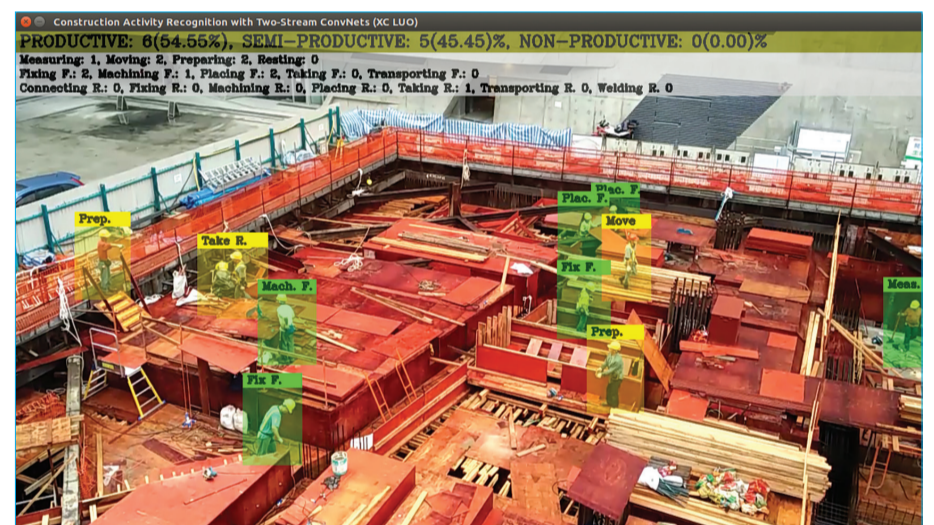
- 利用深度學習與機器視覺技術，自動從圖像識別各種建築資源和施工活動
- 使用現有的工地監控攝像機，無需額外安裝傳感器，不會對他人造成煩擾、不便或騷擾
- 減輕繁瑣的巡檢和人手存檔工作
- 提升施工安全管理
- 低成本，易於採用

應用

任何建築項目的施工品質管理

獎項

第47屆瑞士日內瓦國際發明展 - 金獎 (2019年4月)



識別施工活動
Construction activity recognition

Special Features and Advantages

- Automatically recognises diverse construction resources and construction activities from images employing deep learning and computer vision technologies
- Uses existing surveillance cameras on construction sites; requires no extra sensor; and does not cause annoyance, inconvenience or disturbance for site workers
- Reduces the tedious work of site inspection and manual documentation
- Improves work safety performance
- Incurs low cost and is easy to adopt

Application

Quality control for all kinds of construction projects

Award

Gold Medal - 47th International Exhibition of Inventions of Geneva, Switzerland (Apr 2019)



Access More info via mobile