Application of Python and OpenCV on industrial cycle time study

Anintaya Khamkanya[1,a], **Suphanath Promteravong**[1,b], and **Sirapop Thongampa**[1,c,*]

[1] Department of Industrial Engineering, Thammasat School of Engineering, Thammasart University, Pathum Thani, Thailand

E-mail: [a]kanintay@engr.tu.ac.th, [b]suphanath.pro@dome.tu.ac.th, [c,*]sirapop.tho@dome.tu.ac.th (Corresponding author)

Abstract. Time study and work study yield a crucial part of productivity measurement and process improvement of a business. Generally, engineers can use some recent technology to help shorten the time in a work study project, such as a digital stopwatch or a mobile application. However, since the cycle time must be collected repetitively to confirm the accuracy and precision of data, the labor cost of the cycle time study process seems to be the largest portion of a work study project cost. Therefore, this project aims to integrate machine vision technology to help reduce human workload in a work study project. Machine vision allows computers to identify objects through digital images or videos. Therefore, the development of the proposed algorithm is expected to help engineers to be able to work remotely and more effectively on a work study project. The project started by designing an assembly process to be used as a test scenario. The proposed artificial intelligence (AI) algorithm was developed using OpenCV with Python. Consequently, the cycle time measured by AI algorithms through videos and by appraisers was compared according to Gauge R&R theory. The comparison results confirm that the cycle time measured by the proposed AI algorithm is indifferent to the cycle time evaluated by appraisers. The outcomes of this project could help reduce engineers' workload in a work study project and help shorten the work study project time.

Keywords: Machine Vision, OpenCV, Process Improvement, Work study.