

## ABSTRACT

Work Safety is a company's responsibility in protecting assets so that the company doesn't suffer from losses. One of the safety pillars is known in Indonesian as the K3 (*Keselamatan dan Kesehatan Kerja*) program but also known as OSH (Occupational Safety and Health). In OSH, one of the safety parameters is equipment, especially in the regulation applied by the Indonesian Ministry of Manpower in 2010 which states the requirements for safety equipment, one of these equipment is a working helmet. One of the threat that may risk work safety is the discipline of hard hat use. Because of that the use of hard hat needs to be monitored to not only to maintain company's OSH value, but also worker's safety.

The research method proposed by the author is to use the object detection method through the camera using Convolutional Neural Network (CNN) with some architecture that supports real-time object detection, namely Faster Region-based CNN and Single Shot Multibox Detector. So that the CNN may be used to detect objects in the form of safety equipment used by someone.

The final result of this research is a safety system displayed through a GUI using CNN architecture with the best precision performance in the Faster R-CNN Inception V2 model which reaches a precision value of 86,841% and the best frame rate performance in the SSD Mobilenet V1 with a value of 10,364 times higher than the Faster R-CNN Inception V2 model. In addition to these two metrics, the calculation of the value of localization precision is carried out using the COCO metric which produces the best value in the Faster R-CNN Inception V2 model with a value of 47,120%.

**Keywords:** Object Detection, Neural Network, dan Safety