ABSTRACT

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IMPLEMENTATION OF MACHINE LEARNING FOR PERSONAL PROTECTIVE EQUIPMENT DETECTION USING CONVOLUTIONAL NEURAL NETWORK

Keywords: CNN, computer vision, construction site, machine learning, object detection, safety.

Safety in construction is very important as the industry is prone to dangerous situations. Some of the factors that cause accidents on construction sites are personal protective equipment not provided to workers, workers not using the provided personal protective equipment and lack of adequate safety training for workers. Construction accidents sometimes occur because workers do not use the safety equipment provided. The frequency of accidents can be reduced if entities can observe workers continuously to immediately identify when safety equipment is not being used properly. Machine learning, part of the field of artificial intelligence (AI), is a technology that is widely researched and used for problem solving. The purpose of this research is to create a system that can detect whether workers use personal protective equipment or not, using machine learning and computer vision technology. This research applies an applied research approach, using the Convolutional Neural Networks (CNN) method which is commonly used in object detection using Machine Learning and Computer Vision. The process of convolutional Neural Networks (CNN) in modeling personal protective equipment detection objects is that CNN can automatically extract important features from images. This process involves convolution and repeated pooling to find visual patterns such as edges, lines, textures, and other features that are useful for distinguishing objects. The results produced an average precision value of 0.82 or 82%, an average recall value of 0.77 or 77%, and an F1 score of 0.79 or 79%. Overall, the results show that the object detection model has a high level of accuracy in detecting personal protective equipment and to improve detection accuracy, diversity is needed in the dataset in terms of object type, background, pose, distance, orientation, and lighting conditions.

Bibliography (1995 – 2023)