ABSTRACT

Industrial safety is a critical concern in today's world. Despite various efforts to reduce fatalities in industrial projects, the enhancement of Personal Protective Equipment (PPE) continues to be a priority to prevent accidents. However, there are often instances where workers intentionally or unintentionally neglect to use PPE. Consequently, it becomes a paramount responsibility for Personal Protective Equipment (PPE) inspectors to ensure optimal safety for the personnel involved in the project. In response to this challenge, the principal aim of this research was to devise a machine vision system proficient in identifying Personal Protective Equipment (PPE) including helmets, masks, and vests. The research design involved creating a system that could identify PPE in various conditions, thereby enhancing safety measures. The research methodology encompassed the generation of a novel dataset, comprising 2260 images along with their respective annotations from the three classes. These images were selected with a consideration for variations in factors such as background, gestures, angles, distances, and the presence of multiple classes. The main achievement of this study is the development of a computer vision system proficient in the effective detection of Personal Protective Equipment (PPE). The findings indicate that the system, utilizing YOLOv8, attained a mean Average Precision (mAP) of 87%. The system functions at a CPU speed of 98ms. In summation, this study offers a substantial contribution to the domain of industrial safety by advocating for the efficient utilization of PPE through sophisticated computer vision applications. This could potentially lead to a reduction in workplace accidents, thereby ensuring a safer working environment for all

Keywords: YOLOv8, object detection, personal protective equipment