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Study on Development and Implementation of Safety Inspection Drones with Machine Learning Algorithms to Improve Construction Safety in Sri Lanka

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Most of the construction sites in Sri Lanka work under unsafe conditions due to limited resources. Due to these unsafe conditions, human lives are in danger at times. The construction industry holds a major position in the development process of Sri Lanka, as it significantly contributes, not only for Gross Domestic Product but also for Gross National Product. Unfortunately, the Health and Safety factors have become a secondary concern though the construction industry holds a major portion in the economy of the country. The traditional inspection methods currently practised in the industry seem to be outdated, time-consuming, less efficient, less effective, and increase the workload of safety officers. It is impossible to perform observations in multiple locations at the same time by a single safety officer because some locations in the sites are hard to reach, and there may be blind spots too. This study proposes an automated safety inspection method to increase the safety levels of construction sites. For this, the study reveals a comprehensive experimental discussion on how to blend image processing techniques with unmanned aerial vehicles. Image processing is the technical analysis of images by using complex algorithms, and in this scenario, unmanned aerial vehicles (drones/quadcopters) act as a flexible image providing source that can fly over the construction sites by providing real-time videos for the algorithm to analyse for safety hazards. The study was concluded by achieving two objectives, developing an algorithm with YOLO v3 architecture to detect safety hazards through drones, and measuring the accuracy and reliability of the automated detections.

Keywords: *construction safety, Image processing, unmanned aerial vehicles*