

ABSTRACT

Research into the use of drones for human counting and facial recognition is driven by a number of challenges in various fields. These challenges include the efficiency associated with manual counting and recognition in crowded or large areas, the need for effective crowd management during events and in public spaces, and the urgency to quickly determine the number of survivors in disaster scenarios. In addition, the limitations of traditional security measures in real-time identification and verification of authorization, along with the demands for identity verification at regional borders further emphasize the need for automation systems aimed specifically at such matters.

Programs that use drones for human counting and facial recognition can effectively address various challenges. They can assist event organizers in managing crowds during large gatherings, aid search and rescue missions by accurately counting survivors in disaster areas, enhance security and surveillance through real-time tracking of individuals in restricted zones, help with crowd management in public places, speed up border control processes and ensure health and safety compliance in industrial environments. This versatile solution demonstrates the potential to improve efficiency, security and decision-making across multiple sectors.

The results obtained from the test using the system developed by the authors have shown quite satisfactory outcomes. The dataset that is used were trained with the best configuration based on the testing that is done, resulted in a training ratio of 70% train, 15% valid, and 15% test. The optimal hyperparameters were found with a learning rate of 0.0001, batch size of 6, and 250 epochs. The program demonstrated the ability to recognize and count humans, with an average counting accuracy from various altitudes while the drone is in motion at 68.75%, and with the drone in a stationary condition at different altitudes at 69.70%. The average accuracy of the face recognition program with a stationary drone was 66,67%, and for accuracy with a moving drone, it was 74,08%.

Keywords: Abstract, YOLOv7, computer vision, face recognition, human counter, dataset, real-time, technology