

ABSTRACT

The development of an advanced age care monitoring system utilizing webcams and YOLOv7 algorithm is crucial in addressing the challenges faced by the elderly population. The lack of supervision over the elderly can lead to increased safety and health risks, especially concerning memory-related diseases commonly experienced by the elderly. Physical and mental weaknesses among the elderly can also hinder their ability to carry out daily activities independently, necessitating an innovative solution that enables more effective monitoring of their conditions.

The proposed solution in this research is the development of a system capable of detecting elderly family members. The system can discern whether a person is elderly or not, detect specific elderly activities, particularly during meal times, and identify hazardous situations such as falls. The system employs the YOLOv7 algorithm as an object detector to recognize the elderly and family members, monitoring behaviors like walking, standing, or sitting. Additionally, the system is adept at identifying potential hazards like falls and monitoring mealtime activities. In case of detected meal activities or falls, the system promptly sends real-time notifications through the Telegram application to caregivers or responsible family members. It also generates sound notifications through speakers for the elderly.

The results of the testing demonstrate that the developed system exhibits satisfactory accuracy in detecting objects and elderly behaviors. The YOLOv7 algorithm successfully recognizes the elderly with an accuracy of 94% and detects daily activities with good reliability. The fall detection feature for the elderly achieves a success rate of 90,55%, while meal activity detection reaches 62,33%. Furthermore, the family member recognition feature achieves a success rate of 96.26%. The testing also confirms the system's ability to send timely and responsive notifications when the elderly are detected to have fallen or during meal activities, and it also delivers voice notifications when family members or visitors are detected. Consequently, the development of this monitoring system has the potential to enhance elderly care and improve the quality of life for the elderly, providing valuable support for stakeholders in addressing the challenges of advanced age care.

Keywords: Monitoring system, YOLOv7 algorithm, elderly detection, Family member recognition, Fall detection, Real-time notifications