Research on convolutional neural networks and their application in counting the number of people entering and leaving a hospital

Vu Van Giang

Abstract: This study investigates the application of Convolutional Neural Networks (CNNs) to the problem of counting people entering and exiting a hospital. Accurate people counting in healthcare settings is critical for resource allocation, security, and infection control, yet it remains challenging due to occlusions, variable lighting, and complex crowd dynamics. We propose a deep learning framework based on a customized CNN architecture designed for real-time video analysis. The model processes surveillance footage to detect and track individuals, distinguishing between entry and exit events. A dataset of annotated hospital entrance videos was collected and used for training and evaluation. Experimental results demonstrate that the proposed CNN-based system achieves high accuracy and robustness, outperforming traditional computer vision methods. The system effectively handles dense crowds and partial occlusions, providing reliable bidirectional counts. This research confirms the viability of CNNs for practical crowd monitoring in medical environments, offering a scalable solution for improving hospital operational efficiency and safety management.

Keywords: CNN, people counting, hospital, deep learning