FALL DETECTION USING YOLOv5

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ABSTRACT

The number of persons above the age of 60 years is fast growing, especially in India. India as the second most populous country in the world has 104 million people at or over the age of 60, constituting above 7.53% of total population. The problems faced by this segment of the population are numerous owing to the social and cultural changes that are taking place within the Indian society. The major area of concern is the health of the elderly with multiple medical and psychological problems. Elderly falls have been a concern for many years, but it has become an increasingly important issue in recent decades, particularly as the global population has aged.

With the increasing number of older adults, the risk of falls and their consequences has become a major public health concern. According to the World Health Organization (WHO), falls are the second leading cause of accidental or unintentional injury deaths worldwide, and around 37.3 million falls that are severe enough to require medical attention occur each year. Falls are the leading cause of injury-related deaths among people aged 65 and above. The product developed is focused on this problem.

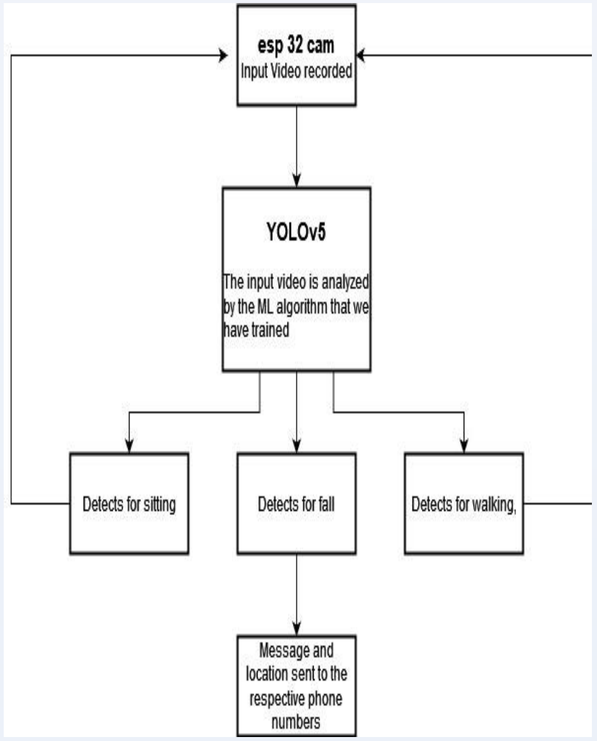
OBJECTIVES

- Prompt medical attention: One of the main outcomes of fall detection systems is that they can alert caregivers or emergency services when a fall occurs. This can help ensure that the elderly person receives prompt medical attention, reducing the risk of serious injury or complications.
- Increased independence: Fall detection systems can help elderly individuals maintain their independence and live in their own homes for longer, as they provide an added layer of safety and security.
- Improved quality of life: Knowing that there is a system in place to detect falls and respond quickly can help reduce anxiety and improve overall quality of life for both the elderly person and their caregivers.
- Reduced healthcare costs: The cost of fall-related injuries can be significant, and fall detection systems may help reduce healthcare costs associated with falls by preventing more serious injuries and hospitalizations.
- Valuable data for healthcare professionals: Fall detection systems can provide valuable data to healthcare professionals, enabling them to better understand and prevent falls in the elderly population.
- Peace of mind: The use of fall detection systems can provide peace of mind to both the elderly person and their caregivers, reducing anxiety and improving overall well-being.

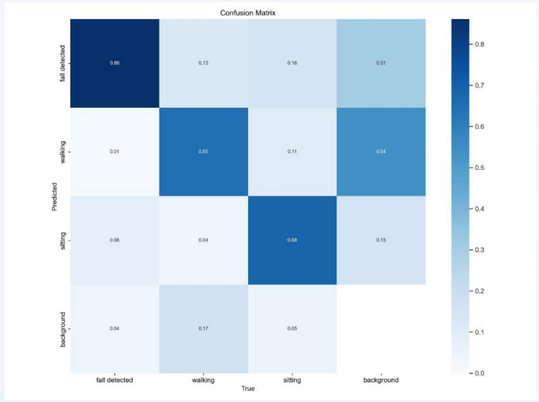
METHODS

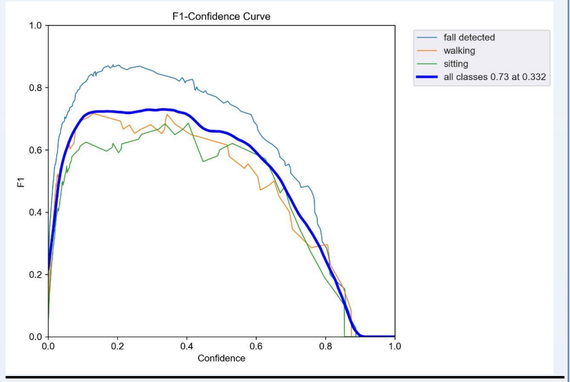
The esp32 camera is placed inside a portable box which is made from a 3D-printer. The box has a handle and can be placed anywhere at our desired location. The esp32 camera will record the video in a continuous manner and feed to the YOLOv5s algorithm. The YOLOv5s algorithm will analyse the live feed that is received from the camera and based on that it will detect falling, walking, and sitting.

If walking or sitting is detected then the video input is analysed further and no further action is taken. If falling is detected in the livestream then a message “Fall Detected” and the location is sent to the concerned users.



RESULTS





CONCLUSIONS

For the elderly, fall detection systems can be an invaluable aid in assisting in the prevention of severe accidents and complications from falls. When a fall is detected, these systems usually use sensors, wearable technology, or cameras to send a warning to a carer or emergency services.

Depending on the particular system and how it is used, different fall detection systems perform differently. While some systems may be prone to false alerts or may not be sensitive enough to detect all falls, others may have high accuracy rates and can reliably detect falls.

In general, fall detection systems can offer an extra layer of security and peace of mind for elderly people and those who care for them.

FUTURE WORK

Fall detection systems have the potential to improve the safety and quality of life for elderly individuals and those with mobility impairments. Here are some potential areas of future work in fall detection systems:

- Improving accuracy: Future research could focus on refining algorithms and integrating new sensor technologies to enhance the accuracy of fall detection systems.
- Integration with health monitoring: Fall detection systems could be integrated with other health monitoring systems to provide a more comprehensive view of an individual's health.
- Privacy and data security: Future research could focus on developing secure data storage and transmission methods, as well as strategies for managing data access and use.
- User-friendly interface: To ensure widespread adoption, fall detection systems need to be easy to use and integrate seamlessly into users' daily lives.

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