

DESIGN AND DEVELOPMENT OF ELDERCARE SELF ACCIDENT DETECTION SYSTEM BY MACHINE LEARNING

(Machine Learning Approach)

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Abstract :

With the development of new technology there are very new search research were done all over the world , in this paper I am discussing for the old age medical condition people that how we can help them with the modern technology .From few last years with the introduction of advance technology in the health care sector there is lot of eldercare systems are invent. is paper is summaries various human activities and action of old age people which can leads to danger for the patient life .

This article discusses visual machine learning models designed to detect human falls accidentally using by python algorithm methods. These patterns develop by aim to differentiate falls from activities of daily living (ADL) such as walking, standing, moving, lying down, sitting, and bending over. This article aims to analyze the performance of these machine learning algorithms for human fall detection.

The goal of the project is to use this system in public health, such as intensive care units, hospitals, and metal shelters. e. In real time, the system advises and warns people in the vicinity of the elderly through alarm clocks and other notification methods. Various machine learning algorithms were tested on the train data set, and the best algorithm was used to train the visual data. The model was then compared to a standard behavioral database, compared to unknown real-time visual data, and predicted human conditions.

IndexTerm - : Fall; action, Machine Learning; visual , Public health ,human fall-in-progress; real-time detection; fall prevention; machine learning; classification; ensemble-in-time; inflatable body airbag, Deep learning.

1 . INTRODUCTION :

The human collapse fall is a considered as he very common but unfair event for the patients or any other old age human because it can be harm to his life also. Actually older people fall percentage is more high and gradually increases with the increase in age and his medical condition. According to Work progress Administration (WPA America) 2017 report there will be up to 1.4billion population with the age more than 60 by 2030 also by 2050 the predicted growth of such human is from 962 million to 2.1billion with respect to year 2017 (Uddin et al., 2018) .WHO 2008 report says there will approximately 20% to 35% people ages comes more than 65 once a every year and 32% to 42% people more than 70 age. Actually the over age people is not a problem for humanity but we need to develop the life saving technology for the old age people so that we can give him better life and service when they are tired physically .The old age home ,metal hospital, hospital ICUs and even in for home we need the system to watch on such elder people automatically for any unfair and accidental falling and this is our main Moto to develop the such action detection techniques .

The main motive of the project to rescue the people with their rescue time period . Because we see in our daily life there are lot of cases that senior citizens are fall in bathroom kitchen ,hospital etc and they remain in that condition for long time and this is very dangerous even may life threatening to human .in lot of case we hear that the doctor was saying that the patients may alive if you was take him to me earlier.

2 . CLASSIFICATION OF FALL DETECTION TECHNOLOGIES

The main objective of fall detection or unusual activity detection system is to differentiate and classify the action with the actually serious fall and other fall like action so that the output is correct and action taken by monitor person . Discrimination between a fall and an daily life activity is not an easy task because actions like lying on a floor , sitting on a floor from a standing position are very

resemble like falling action . That's why in order to developed the very efficient and accurate system we need to train the data set of daily activity and falling activity . This type of data may collected by different way like pressure sensors, infrared sensor, floor vibration sensor, microphones and cameras etc and collected data will be in the form of acceleration signals, pressure signals, audio, or videos. Then this signals are processed and passed to the classifier system which differentiate weather the activity done is falling ,collapse action or daily life activity.

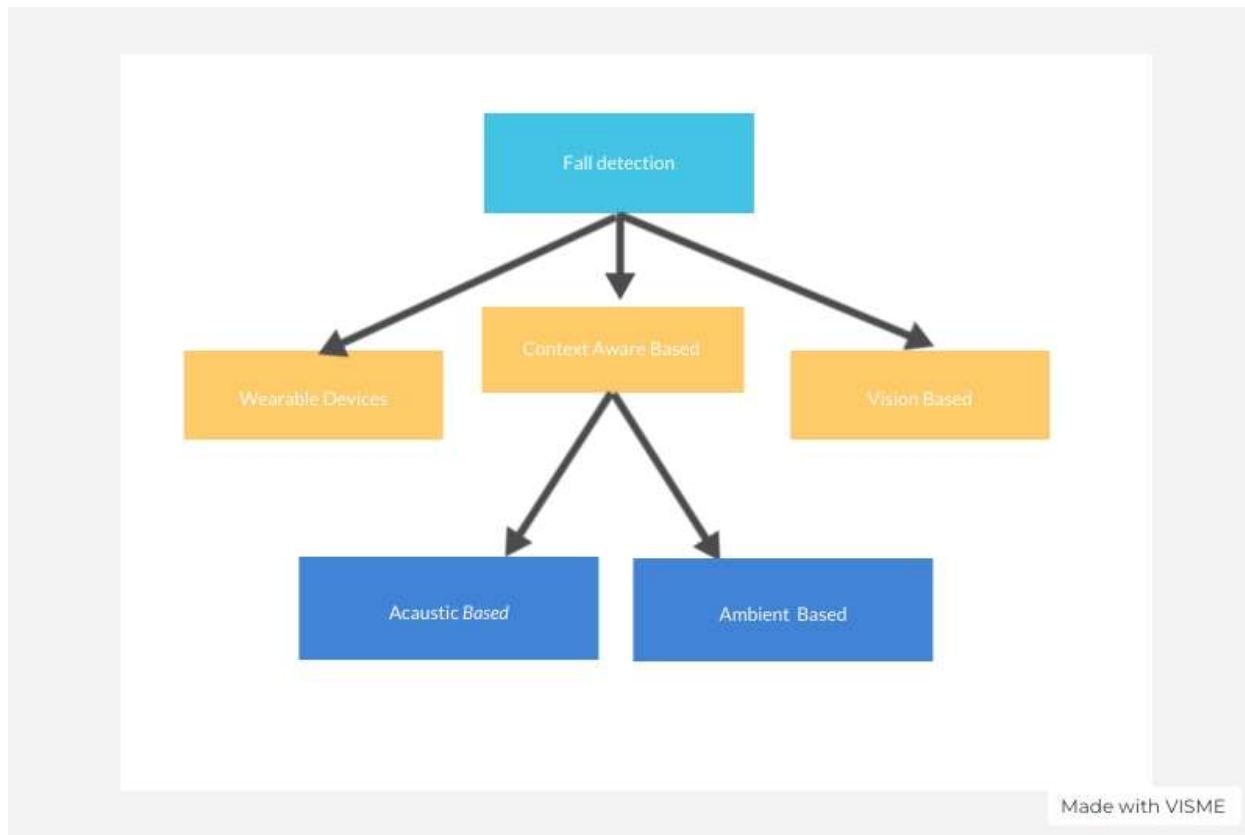


Figure 1. Classification of fall detection methods

2.1 Wearable Device based Fall Detection Systems

As the name suggest the device is wearable either on wrist or wear as belt according to designer developments may be under or top of the person cloth according to Nizam et al., 2016. These device is gadgets of variety of sensors like tilt meter, motion sensor, gyroscopes, accelerometers, oscilloscopes, liquid level sensor, horizon sensor to detect a fall. This system is looks good but some conditions are there that the device carry with the person all the time hence the freedom are there for the elder person to move anywhere but on the other hand (Doukas et al., 2007; Chen et al., 2010). but in real life the elder person may forget to wear it or forget to change exhaust battery or to charge the battery .May feel uncomfortable to wear it all the time that condition saying that we need the contact less fall detection system.

2.2 Context-aware Fall Detection Systems

basically this type of detection uses ambience and acoustic sensors such as pressure sensors, floor sensors, infrared sensors, and microphones. and this sensors are use to collect the data for further processing and all the data fed to the pc for analysis where the algorithm decides the weather the action was fall or the daily life Action according to presets threshold value from standard database. Also machine learning algorithm may use to decide the ambient base activity and acoustic based activity

2.3 Vision based Fall Detection Systems

The vision based activity detection is based on visual frames in a video, for this we thoroughly refer to all the research papers in ScienceDirect, IEEE Explorer and available sensors databases.

Most of the research and databases show in a similar manner for the visual detection system but with different detection algorithms and sensors. All the databases focus on the artificial view action detection for the last five years and this technique has the scope to develop the new perfect error-free system.

The review therefore focuses entirely on fall detection using artificial vision. All the vision-based methods use classical normal video cameras (Cucchiara et al., 2007; Fu et al., 2008) or depth video cameras (ShojaeiHashemi et al., 2018) to track human movements in real time, and algorithms in the background are as follows: Run it on a dedicated PC to figure out a person's posture. As soon as the algorithm detects a falling posture, an alarm is generated to call for emergency. Only one of these systems can be installed to monitor more than one person at a time. Compared to the previously mentioned systems, it is more convenient to use and independent of the environment. Also, a single video can gather more information than other sensors installed in the environment. Another advantage of these systems is their versatility and reliability. That is, it can be used for previously installed surveillance and security cameras (Liu et al., 2010). With the advent of deep learning, computer vision has improved many tasks such as object detection and recognition, image classification and segmentation. Researchers are now beginning to use these deep learning concepts in many areas of vision-based applications, such as developing powerful and intelligent vision-based fall detection systems (Feng et al., 2014; Jokanovic et al., 2016c; Shojaei Hashemi et al., 2018).

3. PROPOSED SYSTEM

To do the system more accurate the database needs to gather videos associated with falling patterns. Once the data is gathered we need to monitor the falling frames and divide them into fall and non-falling postures. With the help of falling frames it becomes easy to identify the real view of falling of a person by comparing the real-time or dataset falling video with the frames we classified.

3.1 Activities For Recognition

Usual activities which were identified as constant postures

- Working at Computer (working PC).
- Standing Up, Walking and Going up/down stairs.
- Standing.
- Walking
- Going Up/Down Stairs (stairs)
- Clapping
- Jumping
- Running
- Seating
- Bending

The false positive in the "walking between falls" categories were generated from video in the second set of video and were generated by the carpet made by the autumn of the subject. After the restored theme in autumn, the carpet has begun to surround the static object detection system, and ultimately the autumn began to slowly. The autumn event corresponds to the autumn event indicated by the autumn event as incorrectly detected. This case was correctly detected in autumn and generated the wrong case of the fall restoration when the subject remains on the floor. This was caused by the fact that the topic has obtained the location that generated data that generated data similar to the situation. Although all seat events were correctly detected in the same way, three of them have caused a short fall detection incident. However, all these crash events were correctly rejected by the notification delay system marked as transition from unstable state. Short-term falls were caused by sitting positions with similar data characteristics to certain types of falls.

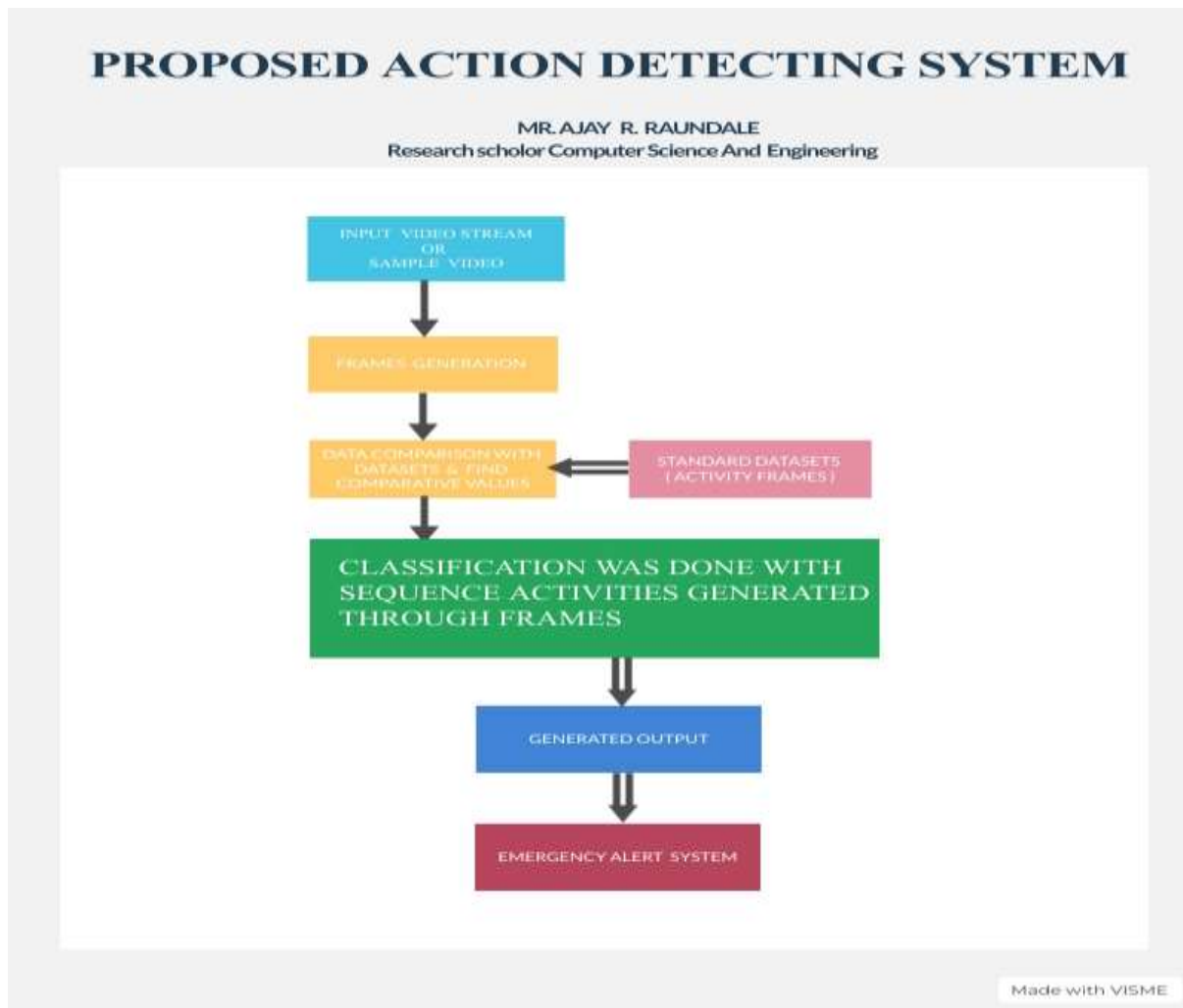


Fig.1. Depicting the flow of Proposed system for self fall detection

- Input data signals from dataset or real time camera
- Pre processing of input data to generate frames through segmentation
- Feature are extracted for specific activity
- Models for specific activity was created
- The generated values were compared with an ideal value and fall detection or not were justified.

3.2 Usable Python Libraries

- *OpenCv : Application Mainly For Video Analysis
- *Scikit image : Python Library For Image Processing
- *NumPy : Numerical Python
- *MatPlot : Visualization Python Library
- *TKinter : Various Development For Graphical User Interfaces GUI

Summary And Conclusions

In this short review paper we give the all possible short holistic approach for fall detection system which include the data transmission, collection, management and security applications. In particular, the survey approaches the individual sensors and devices for the detection also software based programming with deferent methodology may adapted and i aimed to give all possible understanding or working ,technique, arrangement for each method used for fall detection.

According to me I draw the fallowing conclusion regarding the paper and research

There are lot of work done in past 6 year on the fall detection system and all the existing system mainly on data analytics aspect and not give much attention to the deep learning and iot platform in order to build full stable plat form for single system .To spread the such healthcare system in real world market there is need to do more effort so that we can able to develop the more robust ,stable, secure and trustable system which easily allowed real-time procession with gaining of trust of old age people. And why we think only about apply this system on older people only ,the similarly system can be used in mobile crowd for emergency fall for any people so that we can think to install sane system in railway station , courts, roads, malls, cinema theater etc.

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