

Fall Detection at Night

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Q1) *What is the problem that you will be investigating? Why is it interesting?*

Ans:

- 1) Security of homes of important people, security of important places such as military bases as well as secret safe-houses and hideouts is important for national security.
- 2) When armed forces are at continuous vigil at such places, especially during night times, when activity in the surrounding as well as visibility of the environment is relatively low, enemy can strike the personnel in silence and stealth.
- 3) Hence, there is a need to monitor whether the armed forces guarding the place, have encountered an irrecoverable fall from such strikes of the enemy, and take subsequent measures.

Q2) *What reading will you examine to provide context and background?*

Ans:

1. Development of Human Fall Detection System using Joint Height, Joint Velocity and Joint Position from Depth Maps
Fall detection in the proposed system is accomplished using both the velocity of head, the distance from head to floor and position of other joints. The system will confirm a fall if the subject remains on the floor without any movement for 5 seconds and then a fall alarm will be generated. In such cases the changes of distance from head to floor possess similar pattern except the time it takes. For velocity calculation, joint coordinates are extracted from every consecutive frames.
The experimental results showed that the algorithm used on the system can accurately distinguish fall movements from other daily activities with an average accuracy of 96.55%. The system was also able to gain a sensitivity of 100% with a specificity of 95%. The proposed system was able to distinguish all fall movements.
2. Classification of Human Fall from Activities of Daily Life using Joint Measurements
This Paper uses Kinect for capturing depth images at a frame rate of 30 FPS, with Microsoft SDK v1.7. The methodology applied in this system uses, the floor plane equation and the joint coordinates from the skeleton data generated by the Kinect runtime. These data are then used to compute the velocity & acceleration of the body, the distance between the head to floor plane and the position of the other joints to identify an unintentional fall movement from other activities of daily life. It uses the Kinect infrared sensor.
In this paper a human fall detection system using depth images generated by the Kinect infrared sensor. The experimental results show that the algorithm used on the

system can accurately distinguish fall movements from other daily activities with an average accuracy of 94.43%.

3. Human Fall Detection from Depth Images Using Position and Velocity of Subject

The fall detection algorithm in the proposed system uses depth information from Microsoft Kinect Sensor to compute velocity and position of the subject. These data from each consecutive frames are used to compute the velocity of the body to identify any abnormal activity continuously within the view of the Sensor.

Q3) **What data will you use?**

Ans:

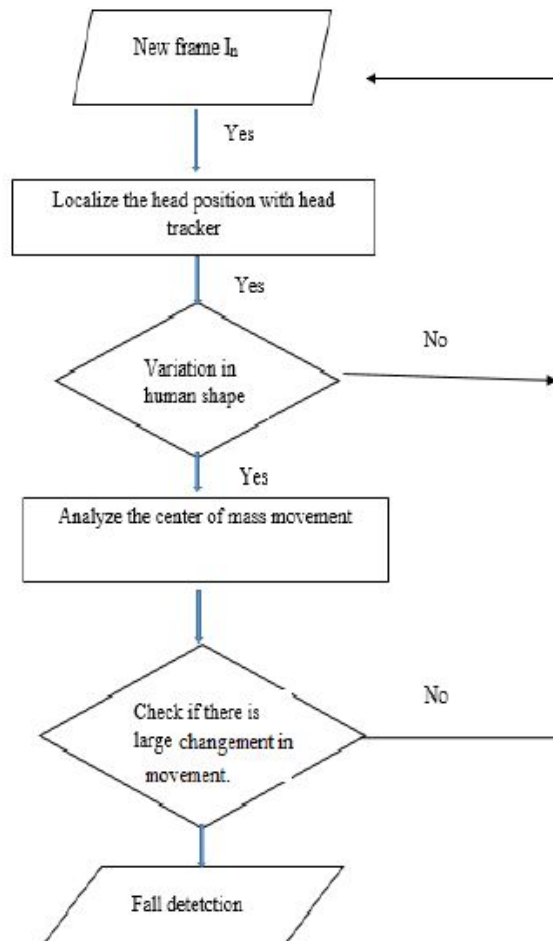
Based on the referred papers:

- 1) Self prepared dataset
- 2) SDUFall dataset
- 3) UR Fall dataset
- 4) OpenCV Library
- 5) Morphological operator erosion and dilation

Q4) **What method are you proposing?**

Ans:

Following is an existing implementation, we would try improvising it if needed:



Q5) How will you evaluate your results?

Ans:

We will use the above datasets, split it into training and testig, and cross-validate the results by testing real-time using the actual camera setup. The experimentation result would look as follows:

