IOT Based Patient Fall Prediction And Detection System

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ABSTRACT
This Paper states that fall detection and fall prevention systems should require people to wear or to interact with devices. To monitor the system in 24/7 surveillance camera-based systems do not have a monitoring system as no object is attached here the sensors have to be active obstructiveness is varies from system to system as per the sensor used. Some systems need additional gadgets like a wrist band or a belt this has a data collection and robust with a more responsive system. It does not depend on wireless communication. Usually, it means bigger and more obstructive devices. We are tending to develop such a device that can alert and predict patient falls to prevent any injury due to falling.

Keywords-- Falling Detection, IoT based Monitoring, Sensor

INTRODUCTION
The worldwide population of elderly who are more than 65 years old is expected to grow to 1 billion in 2030, and the percentage of individuals aged 20–64 years will become 35% of the population. There are many vital signals like application patients and people wear sensors to detect the emergency condition. A fall is one of the key factors that can lead to injuries and decrease quality of life, at times resulting in the death of elderly persons. People’s rate of falling increases with their age [1]. Falls occur frequently in medical health care centers, hospitals, or houses, with approximately 30% of falls causing injury. Falls in hospitals occur in the rooms of the patients (84%) and during the transfer from one place to another (19%). Majority of falls is due to chairs and beds who falls in a nursing home or hospitals the reason for fall can be aggravated by chronic disease such as Osteoporosis, Delirium, and the aging person is identified by the location of fall, time of fall duration in such an incident it is important to have rescue staff so that the family can be informed about the incident through mobile or wireless network. Microelectron mechanical has different sensors and wireless networks. Wireless sensor networks (WSNs) comprise several tiny and small sensor nodes which are deployed over several applications to monitor the physical environment (e.g., temperature, humidity, vibration, pressure, etc.) physiological parameters are used to monitor the Heart rate, Blood pressure, Fall detection, etc. are the patient vital signs. WSN has played a significant role in medical applications for monitoring elderly patients’ vital signs [2]. The power consumption problem of the proposed fall detection system (FDS) is also addressed. Fall detection is of three types in that the first one is a vision based that is the computer to capture images or videos and is subdivides are GB camera, 3D based method employing several cameras. This system monitors the shape and position of the subjects, which depends on image processing pre-processing and pattern recognition techniques. These are convenient and obstructive for elders and more expensive than the other two types because it needs a camera. Besides, the RGB camera needs to be calibrated to allow a 3D reconstruction of the body, resulting in a time-consuming and computationally intensive procedure.

ORGANIZATION OF REPORT
The report is divided into four chapters. Each chapter is giving brief information about the project. The first chapter is the introduction of the report, it discusses how the ancient patient caretaking changes to high-tech patient fall prediction and detection system and how convenient it is. The second chapter is a literature survey; it discusses the improvement in the system used for patient monitoring. The third chapter gives an overall system overview. It will provide information about the block diagram, circuit diagram, and all components and its proper working [3]. Chapter four is the project’s advantages, future enhancement and conclusion of it as shown in Fig. 1.
**BLOCK DIAGRAM**

**Figure 1**: Block Diagram.

**Arduino UNO**

The Arduino is a processor board with a variety of shields. It is relatively inexpensive (about $25 - $35).

**Accelerometer (ADXL 345)**

An Accelerometer is an electromechanical device used to measure accelerating forces that can be the static force of gravity, vibrations, etc. It is measured in change in velocity or speed divided by time.

**16X2 LCD Display**

The 16*2 LCD has the outline size, VA size and maximum thickness are 80.0*36.0 mm, 66.0*16.0 mm, 13.2 mm respectively. It is optional for + 5.0 V or + 3.0 V power supply. Pin 1, pin 2, or pin 15, pin 16 or A/K are the pins that can drive the LED.

**Impact sensors**

ISR is a polymer thick film (PTF) device which taking out a decrease in resistance with an increase in force applied to the active surface [4]. Whose force sensitivity is optimized for use in human touch control of electronic devices? ISR’s have the same properties as a strain gauge and load cell.

**ESP8266 WIFI chip**

The ESP8266 Wi-Fi chip is a low cost with full TCP/IO stack and microcontroller. It is mostly used for the development of IoT Embedded applications.

**NEO 6M**

Information sheet depicting the financially savvy, superior 6 based NEO-6 arrangement of Gps modules that brings the elite of 6 situating motor to the little NEO structure factor.

**Arduino IDE**

The Arduino IDE consists of a text editor for writing the code, a message area, a text console, a toolbar with buttons for common functions. It associates with the Arduino and Genuino equipment to transfer programs and speak with them.
EXPLANATION

Fall prediction is the main problem that involves complex interactions between physiological, behavioral, and environmental factors [5]. Existing fall location and expectation frameworks principally center around physiological factors, for example, stride, vision, and discernment, and don't address the multifactorial idea of falls.

Likewise, these frameworks need productive UIs and input for forestalling future falls. Ongoing advances in the web of things and portable advances offer adequate open doors for coordinating logical data about patient conduct and condition alongside physiological wellbeing information for anticipating falls.

ALGORITHM

1. If $F < P$, no fall is detection, since the risk to fall is too slow or else a fall process is in progress; a fall event is prediction and the fall protection system should be activated.

2. If $F$ rises and exceeds $D$, it indicates that the body has lost its balance that a fall has happened definitely, so fall is detecting and alarm for rescue is need as shown in Fig. 2.

FALL PREDICTION AND DETECTION ALGORITHM

![Flowchart of Detection Algorithm.]

FUTURE SCOPE

Accuracy of Fall Prediction

Future research should pay particular attention to the design of new techniques, clinical assessments, and algorithms for improving the accuracy of the fall prediction system.

Biomedical Signal Based Fall Prediction

Falls are an exhausting and expensive problem for many patients with Parkinson’s disease (PD). Persons with PD are to be set to do something to fall as people with other neurological conditions.

Environmental Fall Risk Factors

Extrinsic fall risk factors are most often ignored in fall prediction and prevention systems. Hence, we need new technologies to boost patient in their efforts to reduce fall risk due to extrinsic fall risk factor.

Smart Phone Based Fall Detection and Prediction

The assessment of fall detection and prediction approaches has almost exclusively focused on the certainty of the detection algorithm.
USES

1. We can use for physically handicapped peoples.
2. We can use it for children's safety.
3. User Interfaces for Providing Feedback to Clinicians and Patients.
4. With the proliferation of smartphones, fall detection and prediction can be improved by developing user-friendly mobile apps for engaging patients and clinicians in the monitoring process.

CONCLUSION

Fall detectors are essential to prevent fear of falling and their adverse health consequences. These reviews give a classification for fall detector from analysis of studies examines their evolution over time and ultimately find out the problem or issues in a fall detection system.

Camera-based systems do not base on these types of issues. There is a new trend towards the intension fall detector into the smartphone.

REFERENCES


Cite As: