

**NXTGeUH: INTERNET OF MEDICAL THINGS BASED NEXT
GENERATION UBIQUITOUS REAL-TIME HEALTH
MONITORING SYSTEM**



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ABSTRACT

Background: The biggest challenge in this technologically advanced society is the improvement in the health of aging individuals. The focal cause for significant injuries and early death in senior citizens is due to falling, the possibility to automatically detect falls has increased demand for such devices, the high detection rate is achieved using the wearable sensors, this system has a quiet social and monetary impact on society. So even for the day-to-day activity in the life of aged people an automatically fall detecting systems and vital signs examining system becomes a necessity. We have added one extended idea (which is not in the scope of thesis) in this research by considering current COVID-19 outbreak. As proposed system can monitor vital signs of the patient or individual remotely in real-time without person to person contact. So our health workers, doctors, nurses can easily monitor vital signs of corona positive or infected patient remotely and get updated in real-time. So They may have less chances to get infection from positive one. So it is fact that in this era, IoMT based healthcare systems are highly needed to serve in such bigger outbreak and when country have very less resources in terms of Doctors, nurses, hospitals and medical equipment. As coronavirus keeps on spreading, specialists' doctors and healthcare systems frameworks are confronting a large number of difficulties at all phases of the pandemic

Objective: This research work aims at helping aged people and every other necessary human by monitoring their vital signs and fall prediction. A fall detecting VitalFall gadget which could analyze the measurement in all three orthogonal directions using a triple-axis accelerometer and Vital Signs Parameters (Heartrate, Heartbeat, and Temperature monitoring) for the ancient people with a Next-Generation Ubiquitous Healthcare Monitoring (NXTGeUH) approach with proposed VitaFall wearable device is proposed which is well-timed and gives an effective decision of the fall. The minimum value to define the probability of an old individual's fall is evaluated by calculating the spur and gradient which people make with the parallel plane are with the Vital Signs Parameter, MPU6050 is a Tri-Axial Accelerometer and Tri-Axial Gyroscope Module and collects the accelerations as well as the (angular velocity) angle developed between the aged and the parallel plane of aged people for a VitalFall device in the Internet of Medical Things. A guardian can be notified by sending a text message

via GSM and GPRS module in order that aged can be helped, however, a delay in the time is noticed when comparing the gradient and minimum value to predetermine the state of the old person. It is the era of IoT and ambient intelligence. There a greater number of serious problems in the older populace because of the hasty enlargement of modern society.

Methods: Comparison with Present Algorithms there are various benefits regarding privacy, success rate and design of using an implemented algorithm over the existing algorithms assessed using Kappa analysis, Recall, Precision, Accuracy, and F1-Score. As concluded from the experimental outcomes. **The NXTGeUH proposed system has succeeded to achieve 96.43% Accuracy, 94.06% Precision, 94.62% Recall, 94% F1-Score, when detecting falls.** The proposed advanced algorithm NXTGeUH monitor's the patient's count using proposed VitaFALL device with combining the decision of Fall assessment and Vital signs monitoring.

Keywords: Accelerometer, Gyroscope, Multi-Threshold, Activity of Daily Living(ADLs), Elderly, Fall prediction and detection, Internet of Medical Things(IoMT), NXTGeUH, VitaFALL, Vital signs, Wellness, COVID-19