# Chapter 9
# Health Monitoring System for Individuals Using Internet of Things

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## ABSTRACT

*Most of the elderly citizens are either living by themselves or locked up at home when the rest of the family members go to work. Health of the elderly deteriorates gradually with age, but people fail to notice these changes in everyday life. The elderly are at risk of not receiving attention immediately in the case of emergencies. Internet of things can be used to alert family members and health personnel immediately when an abnormality in the elderly person's health is sensed to prevent discovery of illness at an irrecoverable stage. Internet of things can monitor parameters like heart pulse rate, body temperature, body movement, position, and location, and raise an alert to take immediate preventive actions. Making this system portable is one of the most necessary requirements because it will be worn by the user. That introduces various conditions in itself. For instance, the system should not disturb the patient or be heavy.*

## INTRODUCTION

Most of the elderly citizens are either living by themselves or locked up at home when rest of the family

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members go to work. Health of the elderly deteriorate gradually with age, but fail to notice these changes in everyday life. The elderly are at a risk of not being attended immediately in case of emergencies.

Internet of Things can be used to alert the family members and health personnel immediately when an abnormality in their health is sensed to prevent discovery of illness at an irrecoverable stage. It can be used to detect abnormalities in the health condition by monitoring the parameters like heart pulse rate, body temperature, body movement and position, location and raise an alert to take immediate preventive actions. With the help of sensors to sense data, web server to store data and trigger Firebase Cloud Messaging service to push notification to android app on exceeding a certain threshold value, the alert can family and health care service personnel when an abnormality in health is sensed, to avoid worsening of an illness to an irrecoverable stage.

This approach has led to an evolution in the world of medicine. It allows for prognosis of diseases at a much earlier stage using this proactive paradigm compared to the existing retroactive diagnose-and-treat reactive paradigm. It also helps to personalize the treatment options available to meet the specific needs of the person. The early detection of abnormalities in the health condition can help in slowing down the progression of the condition and have everything under control.

This article highlights the opportunities and challenges in utilizing the power of Internet of Things for remote healthcare of elderly and chronic patients.

## OVERVIEW

"Internet of things" refers to the possibility of endowing everyday objects with the ability to identify themselves, communicate with other objects, and possibly compute. The goal of the IoT is to enable a variety of things present in the environment to be connected in order to interact and cooperate "anytime, anyplace, with anything and anyone, ideally using any path or network and any service". So, the Internet is now advancing from a network of computers to a network of things. It is estimated that between 2015 and 2050, the proportion of the world's population over 60 years of age will nearly double from 12% to 22%. The development of health care systems in today's world demands a concerted effort to harness the power of information and communications technologies in order to create more efficient, effective, and secure data sharing [30]. Mobile devices can surpass geographical barriers and deliver remote healthcare services anytime, anywhere. With the help of sensors to sense data, web server to store data and trigger Firebase Cloud Messaging service to push notification to android app on exceeding a certain threshold value, can alert the family and health care service personnel when an abnormality in health is sensed, to avoid worsening of an illness to an irrecoverable stage.

## CHALLENGES

The idea of exploiting technology for this project is limited by the availability of network for reading sensor data, the size of the sensors that might cause uneasiness when worn on the body, the accuracy of sensed data and the accuracy of alerts (not giving alarms for fault positive cases and raising alarms for false negative cases).