Chapter 8
An Intelligent IoT-Based Health Monitoring System for Tribal People

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ABSTRACT

Healthcare monitoring has grown drastically in the world. People are provided with modern treatments and continuous monitoring of physiological changes in their body. Many technologies are merged into the medial field to bring in this revolution. Many solutions are provided and are commonly used in hospitals and by patients. An IoT-based intelligent healthcare monitoring system provides a continuous health monitoring for tribal people. The system collects data from a patient and loads it into the cloud storage. The doctors have the privilege to view the patients' data and suggest the prescriptions or send an alert message in case of any emergency. A prototype model is developed and tested. This system helps to provide a healthcare solution for tribal community.

INTRODUCTION

The internet of things is the collection of smart devices embedded in everyday objects capable to send and receive data over internet that enable machine-to-machine and machine-to-human interaction possible. It is forecasted that around 50 billion devices or objects will be linked over internet within the year 2020. Internet of things (IoT) has been widely used in various field of development in recent times. IoT has marked its footprints in almost all fields and hence there is a shift in research in all the fields to integrate concepts of IoT, ambient intelligence and autonomous control. This basically provides a dynamic and interactive environment. In some applications machine learning algorithms are integrated with IoT devices to make IoT objects closer to reality.

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Among these fields, health care is a domain where IoT has gained potential benefits in monitoring patients. IoT has come long way in healthcare space (Amna, 2015 & Cecilia, 2014 & Clifton, 2014 & Devashri, 2015 & Dunsmuir, 2014). The implementation of IoT within healthcare led to advancement in technology in patient monitoring and analyze to data to improve patient outcome. This tremendously reduces the risks of healthcare professionals. IoT had helped to place every detail of the patient into perspective to make decisions in favour of the patients. Nowadays patient information is stored in cloud. This allows in real time monitoring of patients to track the severity of disease and perform preventive measures. IoT have offered services such as health monitoring systems, wearables, mobile apps to render services such as diagnostics, post-surgery monitoring, complement therapies, etc. Such type of data collection in health monitoring provides better diagnosis by health professionals and reduces human errors in medical field. Though IoT had proved to provide many benefits in the field of healthcare, it also comes with downside. The amount of data collected from the patient is very large and it is very difficult to manage for healthcare facilities IT departments. Also, there is a threat in providing security for the data when shared between devices.

India, the subcontinent is a developing nation in the world. Each and every sector is drastically growing competing with rest of the world. Many developments and researches are carried out in each and every sector. One such sector is health sector. India has a second largest population with 1.37 billion residents in the world and is expected to unseat China as the world's most populated country in the next couple of decades. India's current yearly growth rate is 1.08%.

Tribal peoples constitute 8.6 percent of India's total population, about 104 million people according to the 2011 census (68 million people according to the 1991 census). This is the largest population of the tribal people in the world. The tribal population mainly dwells in the states of Madhya Pradesh, Maharashtra, Orissa, Gujarat, Rajasthan, Jharkhand, Chhattisgarh, Andhra Pradesh, West Bengal, and Karnataka. Other few states where 15.3% of tribal people are settled are Assam, Meghalaya, Nagaland, Jammu & Kashmir, Tripura, Mizoram, Bihar, Manipur, Arunachal Pradesh, and Tamil Nadu. The tribal population in India is minimum and left ignored in many aspects.

In Tamil Nadu, tribal people account for 1.03 percent of the total population. There are 36 different tribes, present in almost all the districts, across 2860 villages located in 63 blocks of the state. They are predominantly in rural areas, and of these, around 5 lakhs live in 13 districts. The tribal population is sometimes isolated and government beneficiary plans are not reaching the meager population. In recent days, many problems like lack of electricity, mode of communication, health issues, habitat etc. are faced by the tribal population.

Mostly tribal areas are present near forest borders and hence facilities are not available. Though healthcare sector had brought in much advancement, the problems faced by tribal people in using those healthcare resources are

- Tribal people are financially very poor.
- Lack of awareness about healthcare innovations.
- Minimum health facilities available in tribal living places or manpower is not available in health centers
- Tribal people are commonly affected by sickle cell anaemia, tuberculosis etc.
- Many tribal villages are remotely located which are away from hospitals/remote health centers.
- Inadequate monitoring of reach of healthcare facilities to tribal people.
- Inaccessibility of free government services for healthcare