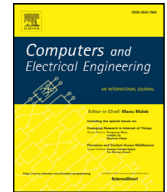




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Secure user authentication scheme for wireless healthcare sensor networks[☆]

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ABSTRACT

Recently, countries worldwide have actively developed approaches to improve the quality of healthcare and reduce healthcare costs. One of these approaches involves replacing human labor with wireless information transmission. On the basis of the wireless sensor networks employed for medical monitoring in hospitals and healthcare institutions, this paper proposes a user authentication scheme and data transmission mechanism that facilitates security and privacy protection, enable medical personnel to instantly monitor the health conditions of care receivers, and provide care receivers with prompt and comprehensive medical care. Using both smart cards and passwords, our scheme grants only legal medical personnel access to patient information such as body temperature, heart rate, and blood pressure. In addition, a secure cryptosystem was applied for establishing a data transmission mechanism. Furthermore, this scheme can resist common attacks, such as impersonation, replay, online or offline password guessing, and stolen-verifier attacks.

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1. Introduction

1.1. Research motive

For improving healthcare and medical technology, the ranking of the most common diseases in Taiwan has changed to chronic and degenerative diseases being the most common. A low average income among younger adults, high price levels, increasing stress in daily living, late marriage, decreasing birth rate, and the increasing national average life expectancy have all contributed to the increase in the aging population in Taiwan. The population aging of Taiwan and Japan is the most severe in Asia, and medical expenditure in these countries continues to increase. Emerging aging societies, changes in the living habits of people, and improvement in medical technology have caused mortality from chronic and degenerative diseases, such as diabetes, cardiovascular diseases, and dementia, to gradually outnumber mortality from infectious diseases in the global population. Consequently, demands for medical assistance have increased continually. Moreover, multigenerational extended families have gradually been outnumbered by nuclear families, in which the family population is decreasing continually. When the younger leave family for work, the older who require long-term care are forced to live solitarily. Subsequently, the needs for medical care of older people have increased substantially, causing a consequent increase in healthcare demands and rapid development of hospitals.

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