

DEVELOPMENT OF DATA ACQUISITION SYSTEMS FOR REMOTE PATIENT MONITORING

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ABSTRACT:

The development of data acquisition systems for remote patient monitoring has emerged as a vital innovation in healthcare, offering real-time insights into patient health while reducing the need for frequent hospital visits. These systems enable the continuous collection, transmission, and analysis of patient data, such as heart rate, blood pressure, oxygen levels, and glucose levels, from remote locations. This enhances the quality of care, particularly for patients with chronic conditions, elderly individuals, and those in rural areas with limited access to healthcare facilities.

The integration of sensors, IoT devices, and wireless communication technologies, such as Bluetooth and cellular networks, forms the foundation of these systems. Coupled with cloud computing, this data is processed and analyzed in real time, allowing healthcare professionals to make informed decisions and intervene promptly when necessary. Artificial intelligence and machine learning algorithms further enhance the system's capabilities by enabling predictive analytics, which can foresee potential health risks before they manifest.

Challenges in the development of such systems include ensuring data accuracy, maintaining patient privacy, and optimizing the systems for energy efficiency and long-term use. Additionally, the need for seamless interoperability with existing healthcare systems and compliance with regulatory standards remains critical.

This research explores the latest advancements in data acquisition technologies, the architecture of remote patient monitoring systems, and the future potential of integrating AI-driven solutions for personalized healthcare delivery. The study also addresses the technical and ethical challenges inherent in remote healthcare technology.

KEYWORDS: *Data Acquisition Systems, Remote Patient Monitoring, Healthcare Technology, Iot Devices, Real-Time Data Analysis, Chronic Disease Management, Artificial Intelligence, Machine Learning, Patient Privacy, Healthcare Interoperability, Predictive Analytics, Cloud Computing, Wireless Communication, Telemedicine, Health Data Security*

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