Chapter 15
Intelligent Systems in Healthcare Monitoring

Swathi Sree
Koneru Lakshmaiah Education Foundation, India

Kishor Kumar Reddy
Stanley College of Engineering and Technology for Women, India

Srinath Doss
Botho Unversity, Botswana

Avula Mahathi
Stanley College of Engineering and Technology for Women, India

ABSTRACT

Artificial Intelligence (AI) and data analysis in healthcare enhance patient outcomes through improvements in diagnosis and treatment planning. By offering healthcare practitioners real-time guidance, systems to support clinical decisions optimise the delivery of care Healthcare 6.0 relies heavily on intelligent systems capable of advanced problem-solving, pattern recognition, and real-time insights. These systems are made possible by AI and ML. Virtual health assistants, robotic surgery, personalized medicine, and predictive analytics are a few examples of intelligent systems in the healthcare industry. Utilizing AI, these solutions boost patient out-comes, decrease errors, and streamline clinical procedures. Healthcare 6.0's intelligent systems' effects on clinical practice, patient involvement, healthcare economics, and related fields are covered in detail in the sections that follow. Stakeholders will acquire a thorough grasp of the threats, opportunities, and current de-velopments in this revolutionary era of healthcare through in-depth examination

1. INTRODUCTION

Intelligent systems, which are frequently used together with machine learning (ML) and artificial intelligence (AI), have grown above their original definition as simple automation and efficiency tools. These days, they represent a fresh approach to problem-solving, judgment, and flexibility, changing

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markets, economies, and civilizations in the process. The concept of intelligent systems is central to Healthcare 6.0; it is a fusion of modern technologies designed to augment human capabilities, optimize decision-making processes, and unlock insights from massive amounts of healthcare data (Kumar, P,et al.,2023). Unlike their predecessors, which were primarily concerned with digitizing medical records and automating administrative tasks, intelligent systems have the cognitive ability to analyze complex datasets, detect subtle patterns, and generate actionable insights in real time.

Intelligent systems are applied across a wide range of fields in the healthcare industry, from robotic surgery and virtual health assistants to personalized medicine and predictive analytics (Kumar, P.,et al.,2023). These systems sort through massive amounts of data, identify high-risk patients, forecast the course of diseases, and suggest individualized treatment regimens based on each patient's unique requirements. They do this by utilizing AI and ML algorithms. Additionally, they improve clinical workflows, lower diagnostic errors, and improve patient outcomes by providing healthcare providers with user-friendly interfaces, natural language processing skills, and decision support tools.

The potential of intelligent systems to revolutionize healthcare is both thrilling and intimidating as we approach Healthcare 6.0. Although they have the potential to usher in a new era of patient-centered healthcare delivery (Visseren, F. L., et al.,2022), preventive care, and precision medicine, their widespread adoption presents ethical, legal, and societal issues that need to be carefully considered (Basile, L. J., et al.,2023). However, we have the chance to completely transform healthcare as we know it and usher in a period of never-before-seen effectiveness, which is efficiency, and equity by utilizing the potential of intelligent systems. Intelligent systems are AI-driven platforms and apps that can decipher complicated patterns, evaluate enormous volumes of healthcare data, and make well-informed judgments either entirely on their own or with little assistance from humans.

We explore the various uses of intelligent systems in healthcare in more detail in the sections that follow, looking at how they affect patient involvement, clinical practice, healthcare economics, and other areas (A. Kumar, R.et al.,2020). Our goal is to give stakeholders in the healthcare ecosystem a comprehensive understanding of Healthcare 6.0 and its implications by conducting a thorough analysis of current trends, challenges, and future prospects.

Table 1. AI applications in healthcare & AI investment in healthcare (in USD billions)

Year	AI Applications in Healthcare	AI Investment in Healthcare (in USD billions)
2000	Research and experimental AI projects	0.1
2005	Early-stage AI applications in diagnostics	0.2
2010	Initial use of AI in diagnostic imaging	0.5
2012	Expansion into electronic health records (EHR) systems	0.8
2015	AI-based clinical decision support systems	1.2
2017	Growth in AI-driven precision medicine	1.8
2018	Increased adoption of AI in telemedicine	2.3
2020	AI-enabled robotic surgeries	3
2022	AI-powered virtual health assistants	4
2024	Advanced AI applications in drug discovery	5