Chapter 2
Intelligent Support for Cardiovascular Diagnosis:
The AI–CDSS Approach

Poomari Durga K.
SRMIST, India

ABSTRACT

The AI-CDSS is a powerful tool designed to assist healthcare professionals in making informed and evidence-based decisions in patient care. It leverages artificial intelligence algorithms and data analysis techniques to provide personalized recommendations and insights. This system explores the features and benefits of the AI-CDSS, including patient data analysis, diagnostics and treatment recommendations, drug interaction and adverse event detection, predictive analytics, real-time monitoring and alerts, and continuous learning and improvement. The model also discusses the applications of AI-driven decision-making systems in healthcare, focusing on areas such as cancer diagnosis and treatment, chronic disease management, medication optimization, surgical decision support, infectious disease outbreak management, radiology and medical imaging analysis, mental health support, and clinical trials and research. Additionally, the chapter highlights existing methodologies, such as deep learning models like CNNs and RNNs, that have shown potential in cardiovascular disease prediction.

INTRODUCTION

The AI-CDSS is considered to assist healthcare professionals in making well-informed and evidence-based decisions in patient attention. It utilizes artificial intelligence algorithms and data analysis techniques to provide personalized recommendations and insights.

Features

1. Patient Data Analysis: The AI-CDSS can process and analyses large amounts of patient information, including medical records, lab results, imaging reports, and hereditary information. It can extract relevant information, identify patterns, and detect potential risks or abnormalities.
2. Diagnostics and Treatment Recommendations: Based on the analysis of patient data, the AI-CDSS can generate diagnostic suggestions and treatment recommendations. It can compare the patient's data with a vast database of medical knowledge, clinical guidelines, and research papers to provide the most relevant and up-to-date information.
3. Drug Interaction and Adverse Event Detection: The AI-CDSS can help identify potential drug interactions and adverse events by analysing the patient's medication history and known side effects. It can alert healthcare professionals to potential risks and suggest alternative medications or dosage adjustments.
4. Predictive Analytics: By leveraging machine learning and predictive modelling techniques, the AI-CDSS can forecast disease progression, estimate treatment outcomes, and classify patients at risk of emerging certain conditions. This can aid in early intervention and defensive care strategies.
5. Real-time Monitoring and Alerts: The AI-CDSS can integrate with monitoring devices and electronic health records to provide real-time alerts and notifications. It can detect critical changes in vital signs, lab values, or other health indicators, ensuring timely intervention and reducing the risk of adverse events.
6. Continuous Learning and Improvement: The AI-CDSS can continuously learn from new data, patient outcomes, and feedback from healthcare professionals. It can adapt and update its algorithms to improve accuracy and relevance over time.

Benefits

1. Enhanced Decision-Making: The AI-CDSS provides healthcare professionals with valuable insights, recommendations, and access to a wealth of medical knowledge. It helps improve diagnostic accuracy, treatment selection, and patient outcomes.
2. Time and Cost Efficiency: By automating data analysis and providing instant recommendations, the AI-CDSS saves time for healthcare professionals. It streamlines workflows, reduces errors, and optimizes resource allocation.
3. Improved Patient Safety: The AI-CDSS helps identify potential risks, drug interactions, and adverse events, enhancing patient safety and reducing medical errors.
4. Personalized Care: The AI-CDSS takes into account individual patient data and characteristics, providing personalized recommendations tailored to each patient's specific needs.
5. Research and Population Health Insights: Aggregated and anonymized data from the AI-CDSS can contribute to research efforts, population health management, and the identification of disease trends and patterns.

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