



DONOR MANAGEMENT AND SCARCE MEDICAL RESOURCE ALLOCATION IN A CANCER HOSPITAL IN SRI LANKA



Introduction

Apeksha Hospital's Intelligent Donor-Driven Inventory System uses machine learning to match donations with needs, including critical medication prioritization, blood donation campaigns, and hair quality assessment for donations, enhancing patient care.

Research Question

How can Apeksha Hospital's Intelligent Donor-Driven Inventory System, using machine learning, optimize donor contributions to meet real-time needs, enhance critical medication management, and improve blood and hair donation processes?

Methodology

This study uses machine learning to predict medical resource needs at Apeksha Hospital. Data collection, preprocessing, and feature extraction are conducted on hospital records. Decision Tree Regression is used for inventory prediction, Random Forest for medication priority, and predicting donation campaign success. Image processing techniques are employed to assess hair quality for donations. Evaluation metrics include accuracy, precision, and recall, ensuring efficient resource allocation for inventory, medication, blood, and hair donations.

Findings



The implementation of machine learning algorithms in predicting medical resource needs yielded promising results. Decision Tree Regression accurately forecasted inventory requirements, optimizing resource utilization. Random Forest models effectively identified medication shortages and prioritized critical medications with high accuracy, enhancing patient care quality. Predictive analytics successfully forecasted blood donation campaign success, aiding in strategic planning for donation initiatives. Additionally, image processing techniques facilitated the assessment of hair quality for donations, streamlining the hair donation process. Overall, these findings demonstrate the efficacy of data-driven approaches in healthcare management, ensuring efficient resource allocation and improving patient outcomes.

Conclusion

Machine learning integration at Apeksha Hospital improved resource management and patient care. Accurate inventory forecasting and medication prioritization optimized allocation. Predictive analytics boosted blood donation campaigns, ensuring continuous supply. Image processing streamlined hair donation, enhancing donation management. These findings highlight data-driven healthcare's pivotal role in efficient resource utilization and improved patient outcomes.



Results

The implementation of machine learning algorithms yielded promising outcomes. Decision Tree Regression accurately forecasted inventory requirements, optimizing resource allocation. Random Forest models effectively identified medication shortages and prioritized critical medications, enhancing patient care. Predictive analytics successfully forecasted blood donation campaign success, aiding strategic planning. Image processing techniques streamlined hair donation assessments. These results underscore the efficacy of data-driven approaches in healthcare management, improving resource allocation and patient outcomes.

