PRESIDENCY UNIVERSITY
Private University Estd. in Karnataka State by Act No. 41 of 2013
Itgalpura, Rajankunte, Yelahanka, Bengaluru – 560064

AUTOMATIC HEALTH MONITORING SYSTEM BASED ON LIVER CANCER ANALYSIS

A PROJECT REPORT

Submitted by

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IN

COMPUTER SCIENCE AND ENGINEERING

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PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

BONAFIDE CERTIFICATE

Certified that this report "Automatic Health Monitoring System Based On Liver Cancer Analysis " is a bonafide work of "Bindu Shree P (20221CSE0520), Amrutha S (20221CSE0509), Anushree S (20221CSE0512)", who have successfully carried out the project work and submitted the report for partial fulfilment of the requirements for the award of the degree of BACHELOR OF TECHNOLOGY in COMPUTER SCIENCE AND ENGINEERING during 2025-26.

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DECLARATION

We the students of final year B.Tech in COMPUTER SCIENCE AND ENGINEERING, at Presidency University, Bengaluru, named Bindu Shree P, Amrutha S , Anushree S, hereby declare that the project work titled "Automatic Health Monitoring System Based On Liver cancer Analysis " has been independently carried out by us and submitted in partial fulfillment for the award of the degree of B.Tech in COMPUTER SCIENCE ENGINEERING during the academic year of 2025-26. Further, the matter embodied in the project has not been submitted previously by anybody for the award of any Degree or Diploma to any other institution.

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Abstract

Liver cancer is one of the top causes of cancer-related deaths around the world. Early detection is vital for effective treatment and better survival rates. Traditional diagnostic methods can take a lot of time, cost too much, and often rely on expert interpretation. To tackle these issues, this project suggests an Automatic Health Monitoring System focused on Liver Cancer Analysis. It uses machine learning and deep learning techniques to help with timely diagnosis and monitoring.

The system takes advantage of medical datasets, which include imaging and clinical data. It applies algorithms like Convolutional Neural Networks (CNNs) for extracting features from images, XG Boost for classifying structured data, and text analysis techniques for processing clinical records. Additionally, the system includes real-time monitoring dashboards and visualization tools to track patient health indicators. These tools provide doctors with clear insights.

The goal is to improve diagnostic accuracy, decrease false positives, and assist with personalized treatment planning. By combining automated analysis with ongoing health monitoring, this project aims to create smart, scalable, patient-focused healthcare solutions for liver cancer detection and management.

The system preprocesses CT images through normalization, resizing, and augmentation before feeding them into a CNN model that automatically learns spatial and texture-based features associated with tumor presence. These deep feature vectors are then classified using XG Boost, leveraging its strong regularization and decision-tree-based learning to reduce overfitting and improve generalization, especially with limited medical datasets. Experimental results demonstrate that the hybrid **CNN-XG Boost model achieves 95.6% accuracy**, outperforming standalone CNN and XG Boost models in precision, recall, and F1-score.The combination of deep feature learning and gradient-boosted classification enhances diagnostic reliability and reduces false negatives—critical for early detection and timely clinical intervention. This work highlights the potential of hybrid AI models to support radiologists, improve diagnostic consistency, and serve as a scalable foundation for future applications in medical imaging and automated health monitoring.

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