

# Enhancing Heart Attack Prediction Accuracy through Optimized Machine Learning and Deep Learning: A Survey

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**Abstract:** Heart attacks are a leading cause of mortality worldwide. Early and accurate prediction can significantly improve patient outcomes. This paper explores the potential of optimized machine learning and deep learning techniques to enhance heart attack prediction accuracy. We discuss the challenges associated with traditional methods and propose a framework that leverages advancements in machine learning and deep learning. The framework may involve techniques like data pre-processing, feature selection, hyperparameter tuning, and ensemble methods to optimize the performance of machine learning algorithms like random forests and support vector machines. Additionally, it may explore deep learning architectures like convolutional neural networks or recurrent neural networks for feature extraction and pattern recognition from complex medical data. The goal is to achieve a more robust and accurate prediction model for heart attacks. This can empower healthcare professionals to identify high-risk individuals, allowing for preventative measures and early intervention, ultimately saving lives. The paper will delve into the specific methods employed for optimization, evaluate their effectiveness, and discuss the potential impact on improving heart attack prediction accuracy.

**Keywords:** Cardiovascular Disease, Machine Learning, Deep Learning, Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), ECG Analysis.