

# Optimized Machine Learning Methodologies with Applications to Medical Diagnosis.

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## Abstract:

Machine learning is a branch of Artificial Intelligence (AI) cite (IBM Cloud Education, 3 June 2020). Computer science uses data and algorithms to imitate how humans learn and improve their accuracy. As of the last couple of decades, technological advances in storage and processing power have empowered some innovative products based on machine learning, such as image processing and self-driving cars, as others. As for a sub-field of machine learning, a neural network is a system of hardware and software patterned after operating neurons in the human brain. Neural networks, also called Artificial Neural Networks, are a variety of deep learning technology, which also falls under the umbrella of artificial intelligence, or AI. This work presents some practical applications of machine learning, which are based on real-world data, along with the diagnosis and classification analysis of pediatric pneumonia using chest X-ray images and breast cancer classification data using Machine Learning (ML) algorithms, such as commonly used Logistic Regression, along with Convolutional Neural Network (CNN) and Random Forest (RF). We compare the ML algorithms' predictive ability to breast cancer and pneumonia and expand its classification via Graph Neural Networks (GNN) to optimize ML methodologies, Monte Carlo Tree Search will be also implemented. Graph neural network allows us to find the improved configuration of various machine learning algorithms.