AI-Powered Medical Diagnosis System: Boosting Accuracy with Multi-Modal Imaging and Edge Computing

Rakesh Kumar Vishram, Vinay Kumar Pant, and Pravesh Kumar Bansal

[1] Computer Science and Engineering, University of Engineering and Management, Jaipur, India
rakeshvishram12@gmail.com
[2] Dept. of Computer Science, Moradabad Institute of Technology, Moradabad, UP, India
pantvinay02@gmail.com
[3] Computer Science and Engineering, University of Engineering and Management, Jaipur, India
praveshk.bansal@uem.edu.in

Abstract. What if diagnosing diseases from X-rays or CT scans was as quick as a snap? We're almost there! This paper presents an AI system that makes this happen, checking medical images to find issues like COVID-19 or tumors with great accuracy. It runs on the NVIDIA Jetson Nano, bringing fast diagnosis right to the clinic without needing the internet. Our process—think of it as a smooth workflow—cleans up images, analyzes them with deep learning, and shows doctors clear results. We tested it on the NIH Chest X-ray Dataset, getting 93% sensitivity for pneumonia, and it's built to keep improving and work well in hospitals. This isn't just tech—it's a way to make healthcare better for everyone, everywhere.
Keywords: Medical Imaging, Artificial Intelligence, Multi-Modality, Edge Computing, Deep Learning, Healthcare Integration

1 Introduction

Imagine a busy hospital where doctors are swamped with X-rays and CT scans, trying to spot tiny signs of illness. It's tiring work—staring at screens for hours, guessing at shadows, and hoping they don't miss anything. Doctors I've spoken to say it feels like finding a needle in a haystack, but the stakes are super high. That's why we started this project—to create a tool that helps doctors work faster and smarter.

Medical imaging is key for diagnosis. X-rays give a quick look at your lungs, while CT scans show a detailed 3D view inside your body. But doing this by hand takes time, and even experts can disagree [8]. AI has been a big help—tools like Aidoc or Google's DeepMind [7] are amazing—but they often focus on one thing, like brain scans, and need a strong internet connection, which isn't always available.