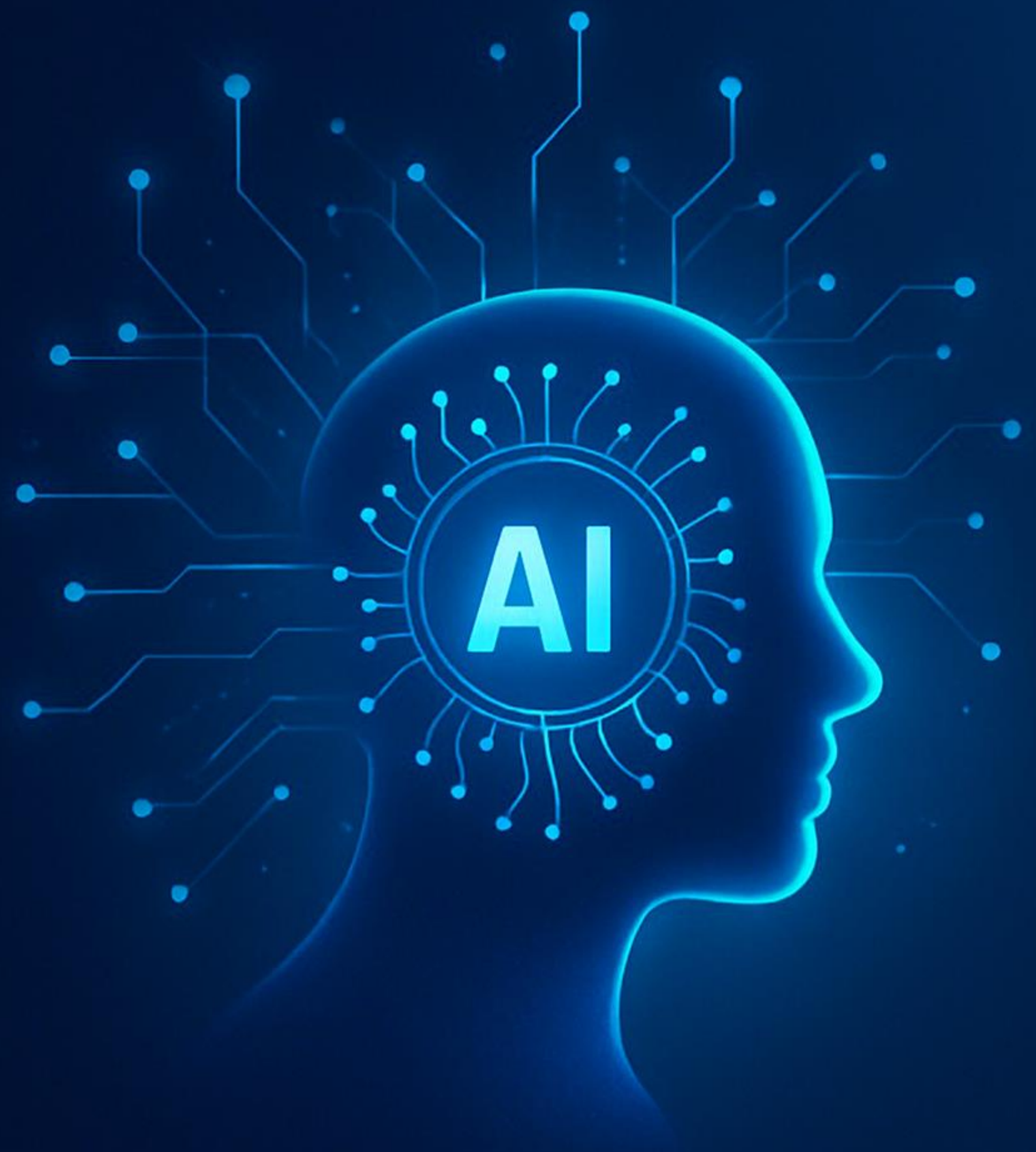


AI in HealthcareMedical Imaging, Diagnostics & Personalized Medicine

BY

Group-4

CONTENTS

01

Introduction

Overview

Machine learning (ML) and deep learning (DL) are leading approaches in intelligent healthcare applications.

Focus on disease predictions, drug discovery, and medical image analysis.

Recent Advancements

Healthcare + AI: Quick Overview

Goals and Benefits

AI assists clinicians with data (images, lab results, EHR, genetics) for earlier detection, accurate diagnosis, and tailored treatments.

Key areasMedical Imaging, Diagnostics, and Personalized Medicine.

Benefitsspeed, consistency, and insights at scale across healthcare systems.

AI augments clinicians, improves quality and efficiency, and supports decision- making.

02

Medical Imaging — What & Why

Applications and Benefits

Computer Vision Applications

Applies computer vision to X- rays, CT, MRI, ultrasound, and pathology slides.

Detects patterns too subtle for the human eye; flags suspicious regions for review.

Helps with triage—highlighting urgent cases first to reduce time- to- treatment.

Supports screening programs (e.g., breast, lung) with consistent second reads.

Real-World Examples & Next Steps

Current Implementations

Imaging triage for stroke/bleeds; AI assist for mammography and lung nodule follow- up.
Behold.aiUses AI to help radiologists diagnose disease with radiology scans.
Prediction of Alzheimer's disease: RSNA suggests AI can predict Alzheimer's years earlier by identifying metabolic brain changes.
EHR- based early- warning scores for sepsis and heart failure decompensation.
Tumor profiling to select targeted therapies; pharmacogenomic dosing recommendations.

Next Steps

Start small (pilot), measure outcomes, train staff, expand responsibly.

Medical Imaging — How It Helps

Lesion Detection & Segmentation

Outlines tumors, measures size and growth.

Quantification

Counts nodules, tracks change over time for objective follow- up.

Workflow Improvements

Pre- sorts studies, auto- fills measurements, and reduces repetitive tasks.

Quality Control

Flags poor image quality or missing views before the patient leaves.

03

Diagnostics — Beyond Images

NLP for Clinical Notes

Summarization and Safety

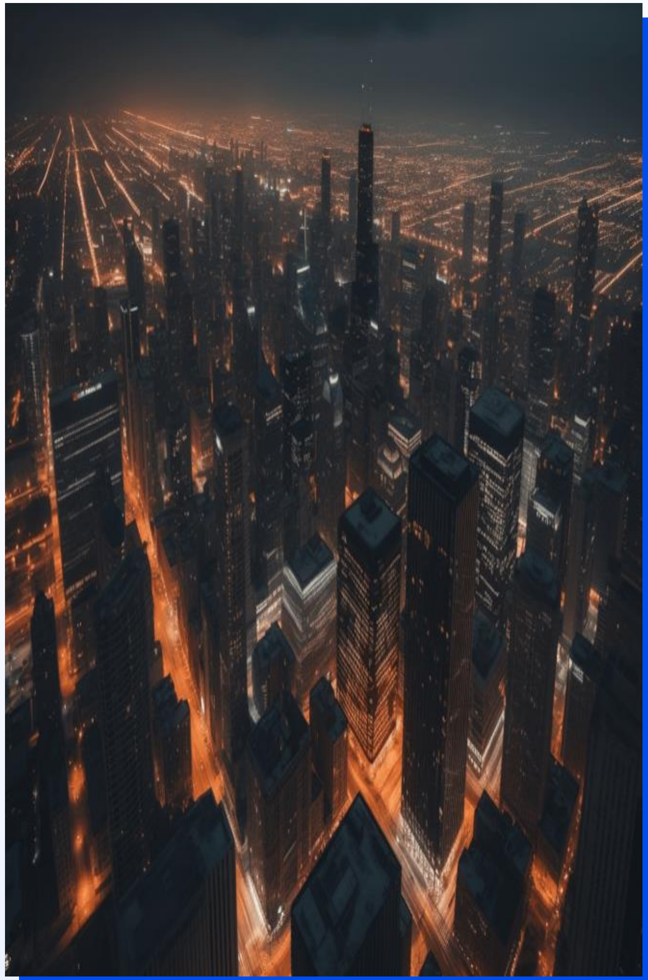
Summarizes histories, pulls problems/meds/allergies into a clean view.

Detects potential adverse interactions or dosing errors.

04

Personalized Medicine — Tailored Care

Genomics and Clinical Data



01. **Predictive Analysis**

Uses genomics + clinical data to predict disease risk and therapy response.

Oncology and Pharmacogenomics

Targeted Treatments

Matches tumor mutations to targeted drugs or immunotherapies.

Suggests drug/dose choices based on a person's metabolism.

05

Benefits, Risks, and Good Practice

Benefits

Efficiency and Quality

Faster reads, fewer missed findings, consistent quality, and more time with patients.

Risks

Potential Issues

Bias, over- reliance, privacy and security concerns, and lack of explainability.

Good Practice

Implementation Guidelines

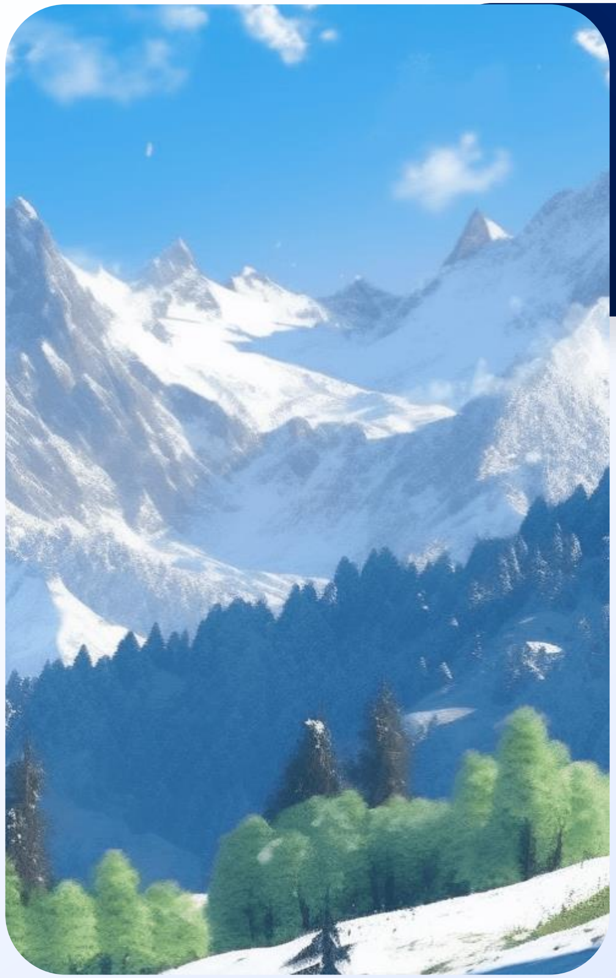
Human- in- the- loop, diverse training data, and clear audit trails.

Complianceprotect PHI, validate models clinically, and monitor performance over time.

06

Why Deep Learning Fits Medical Imaging

Advantages of Deep Learning



Handling Image Data

Handles large, unstructured image data and learns features automatically.

CNNs capture fine details—shapes, textures, edges—boosting detection and diagnostic accuracy.

Performance improves as more labeled data arrives, increasing prediction accuracy.

YOUR LOGO

07

Why Traditional Machine Learning Falls Short

Limitations of Traditional ML

Feature Engineering

Relies on hand- crafted features and domain expertise, which may miss complex image patterns.

Struggles with high- dimensional parameters and spatial hierarchies common in medical images.

Typically delivers lower diagnostic accuracy compared to modern deep learning approaches.

08

Conclusion

Summary

Deep Learning Superiority

01

Deep learning—especially CNNs—best fits medical imaging because it learns rich, subtle image features automatically and scales its accuracy with more data.

02

Traditional ML struggles with complexity and spatial hierarchies, leading to lower diagnostic performance.

03

A human- in- the- loop deep learning workflow with strong data governance provides the most accurate, consistent, and clinically useful outcomes.

09

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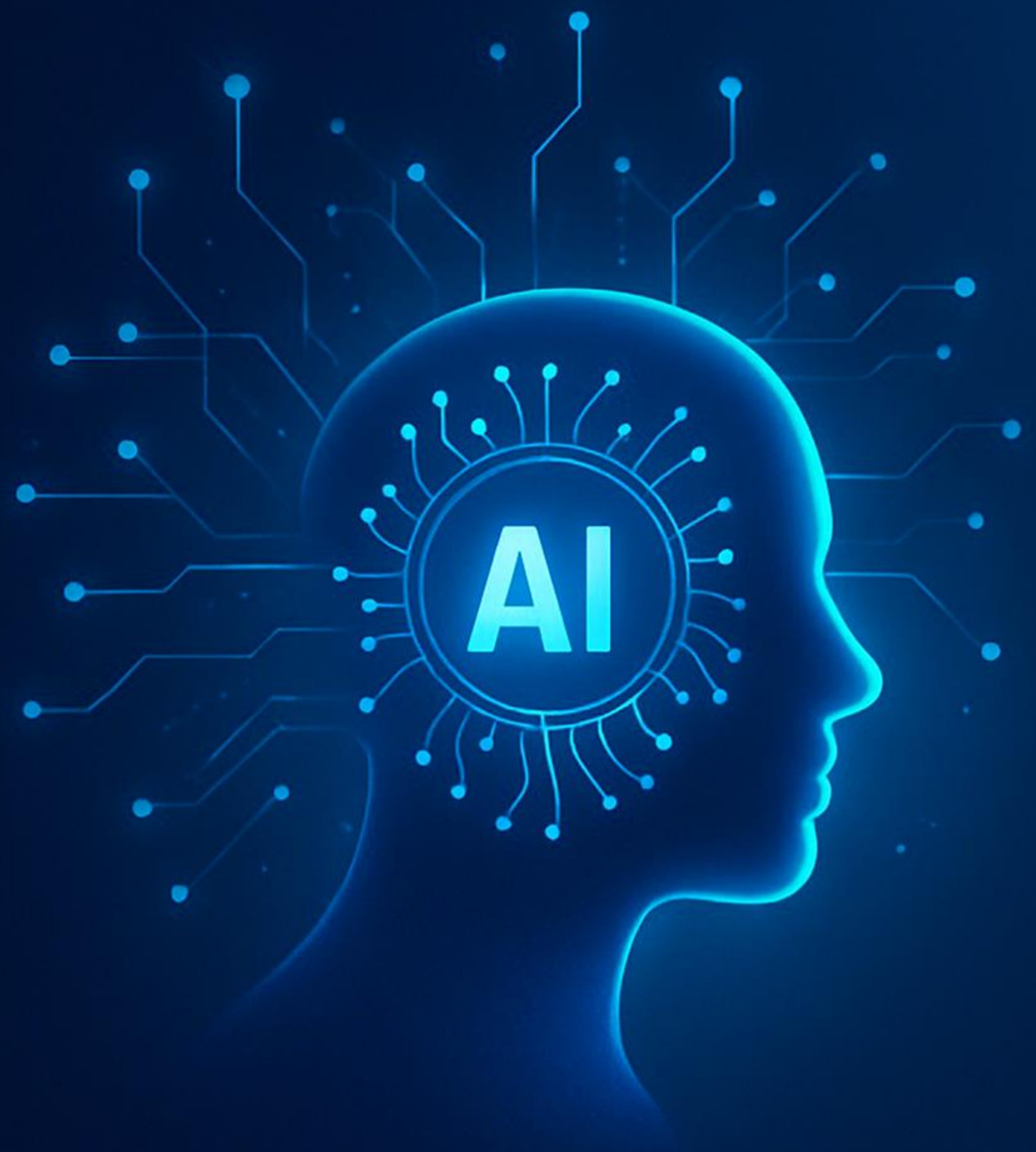

Thanks