

# DoctorAI: Revolutionizing Diagnosis

Integrating AI and Chatbot Technologies in Healthcare

**Supervised by DEPI and CLS**

Presenter



# Our Dedicated Team Members

Meet the experts driving DoctorAI's innovation



## Menna Tallah – Chatbot Developer

Menna specializes in designing and implementing **chatbot** systems that assist in early **disease detection**.



## Adel Mahmoud – AI Developer

Adel focuses on developing **AI** algorithms that enhance the capabilities of our health detection systems.



## Yousef Alaa – AI Developer

Omar contributes to the **AI** model training and optimization for better diagnostic accuracy.



## Mostafa Abdo – AI Developer, Full Stack Developer, MLOps Engineer

Mostafa integrates **AI** solutions with full stack development and manages **MLOps** for deployment.



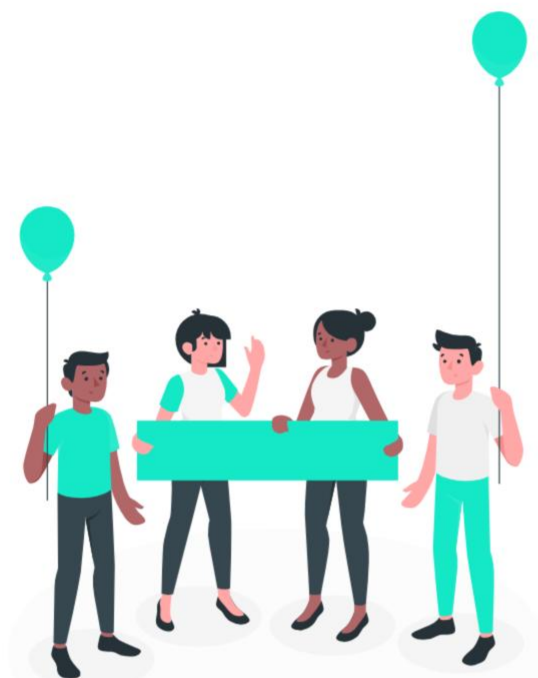
## Mohamed Osama – AI Developer

Mohamed works on crafting robust **AI** solutions aimed at early detection of diseases.



## Mohamed Ahmed Tolba – AI Developer

Mohamed focuses on research and development within our **AI** frameworks for optimal performance.



EARLY DETECTION

# AI for Early Disease Detection

Leveraging AI and chatbot technology for timely medical diagnosis and treatment.



CLS | Learning Solutions

# Innovative AI for Early Disease Detection

Leveraging AI and chatbots for prompt disease diagnosis and patient interaction



## Deep learning models for diagnosis

Employing multiple **deep learning models** to enhance **disease diagnosis** across a variety of medical conditions, ensuring accuracy and efficiency.



## Medical chatbot for patients

Integrating a **medical chatbot** to facilitate initial patient interactions, providing timely responses and guidance for further steps.



## Comprehensive disease classification

Capabilities for **disease classification** including critical conditions such as **brain tumors, pneumonia, anemia,** and various types of **cancers**.



## Focus on early detection

The project emphasizes **early detection** of diseases, which is crucial for timely intervention and improved patient outcomes.

# Innovative Chatbot for Health

Enhancing early disease detection through user interaction and AI technology.



## User interaction before uploads

This module is designed to interact with users **before** they upload any medical images, ensuring that necessary information is gathered upfront.



## Advanced AI architecture

Utilizes **LSTM** with **seq2seq** and **attention** architecture to effectively understand user **symptoms**, allowing for accurate assessments.



## Real-time interaction capability

Integrated with **FastAPI**, this chatbot enables real-time interaction, providing immediate responses and support to users.



# AI in Brain Tumor Detection

Utilizing AI for accurate CT scan analysis and early detection



## Classifies CT scans accurately

The model distinguishes between **Tumor** and **No Tumor** in CT scans, enhancing diagnostic precision.



## Preprocessing for optimal results

Involves **resizing** and **normalization** of images to improve the performance of the detection model.



## CNN model ensures high accuracy

Employs a **CNN-based model** that achieves a high level of **accuracy**, making it reliable for clinical use.



# AI-Powered Pneumonia Detection

Utilizing AI technology for accurate pneumonia diagnosis through chest X-rays



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## Detects pneumonia via X-ray images

This method leverages **chest X-ray** images to accurately identify cases of **pneumonia**, enhancing early diagnosis.

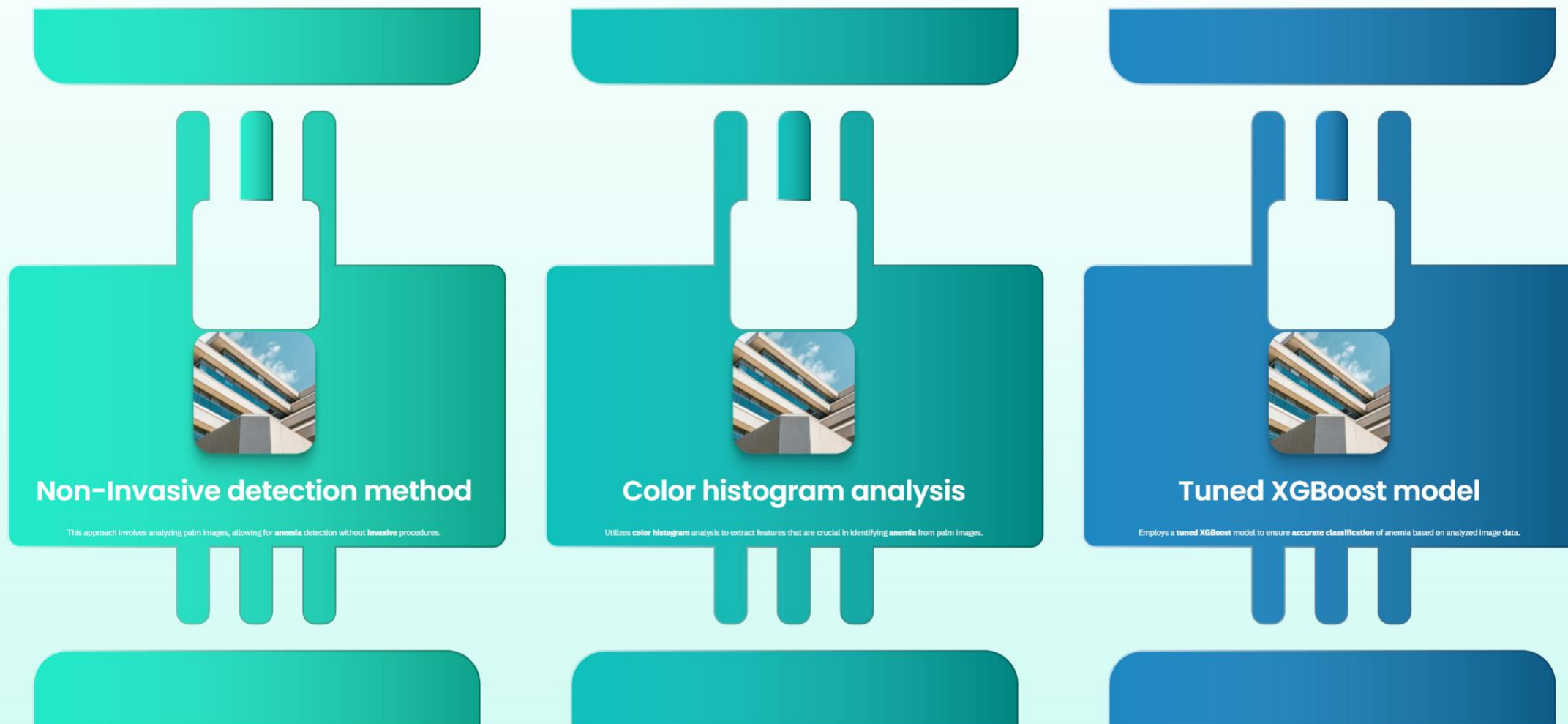
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## Uses deep CNN model

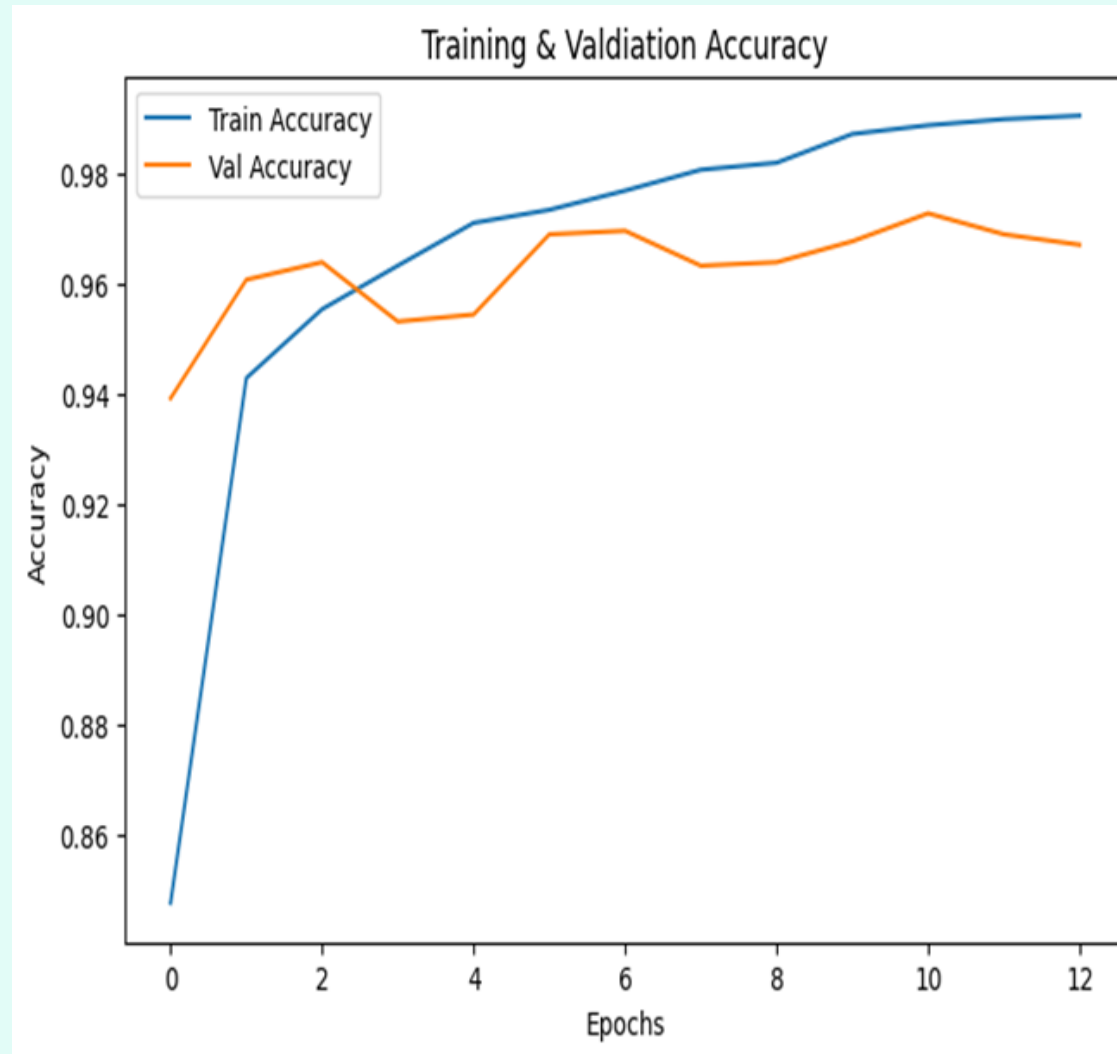
Employing a **deep CNN model** optimizes performance, ensuring high accuracy in detecting **pneumonia** from X-ray images.

# Non-Invasive Anemia Detection Method

Leveraging AI for early disease identification through palm image analysis







# AI Classification of Lung and Colon Cancer

Utilizing CNN for Accurate Histopathological Image Analysis

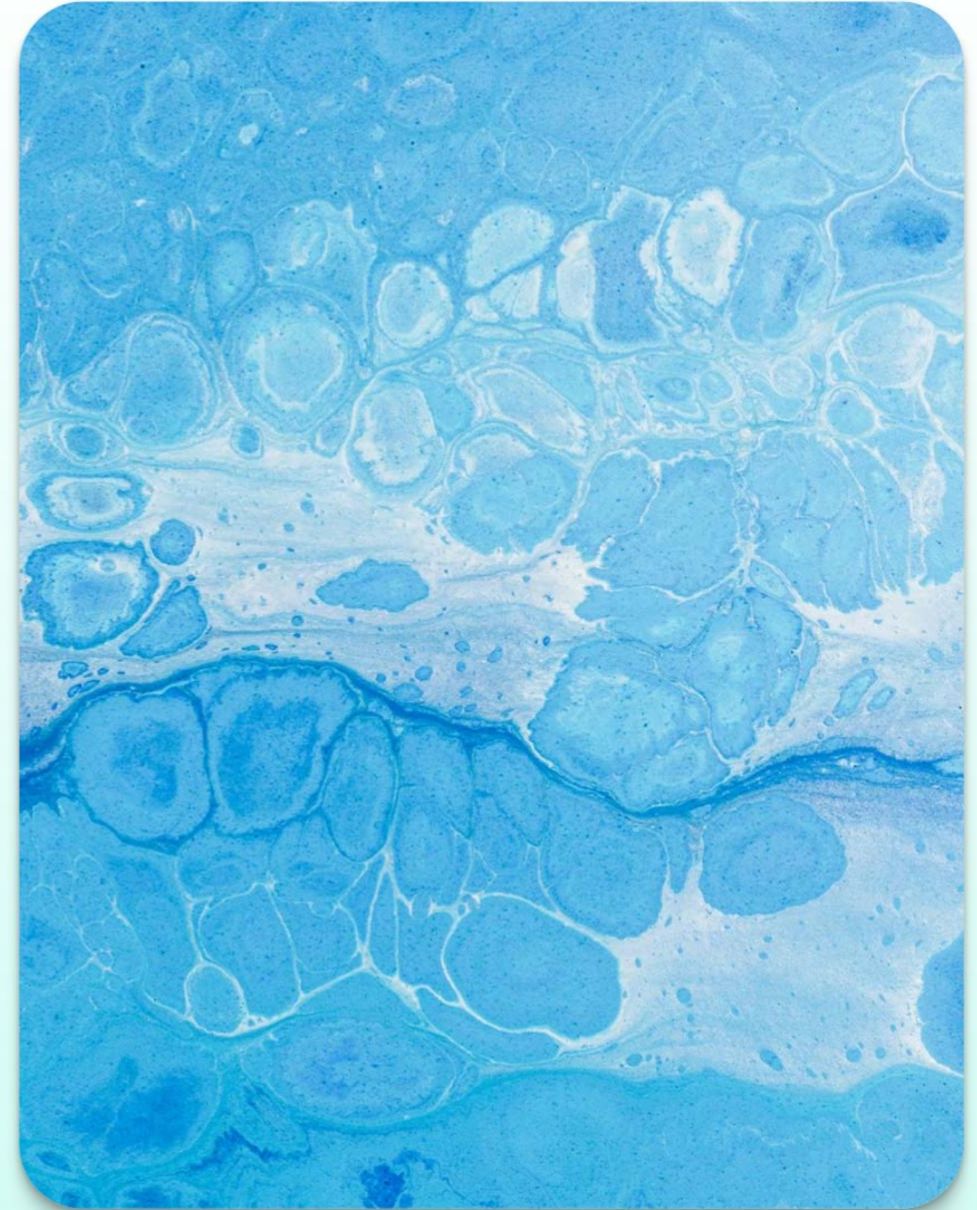
## Classifies histopathology images

The model categorizes images into four distinct classes: **Lung Adenocarcinoma**, **Lung Squamous**, **Colon Adenocarcinoma**, and **Colon Benign** lesions, aiding in precise diagnosis.

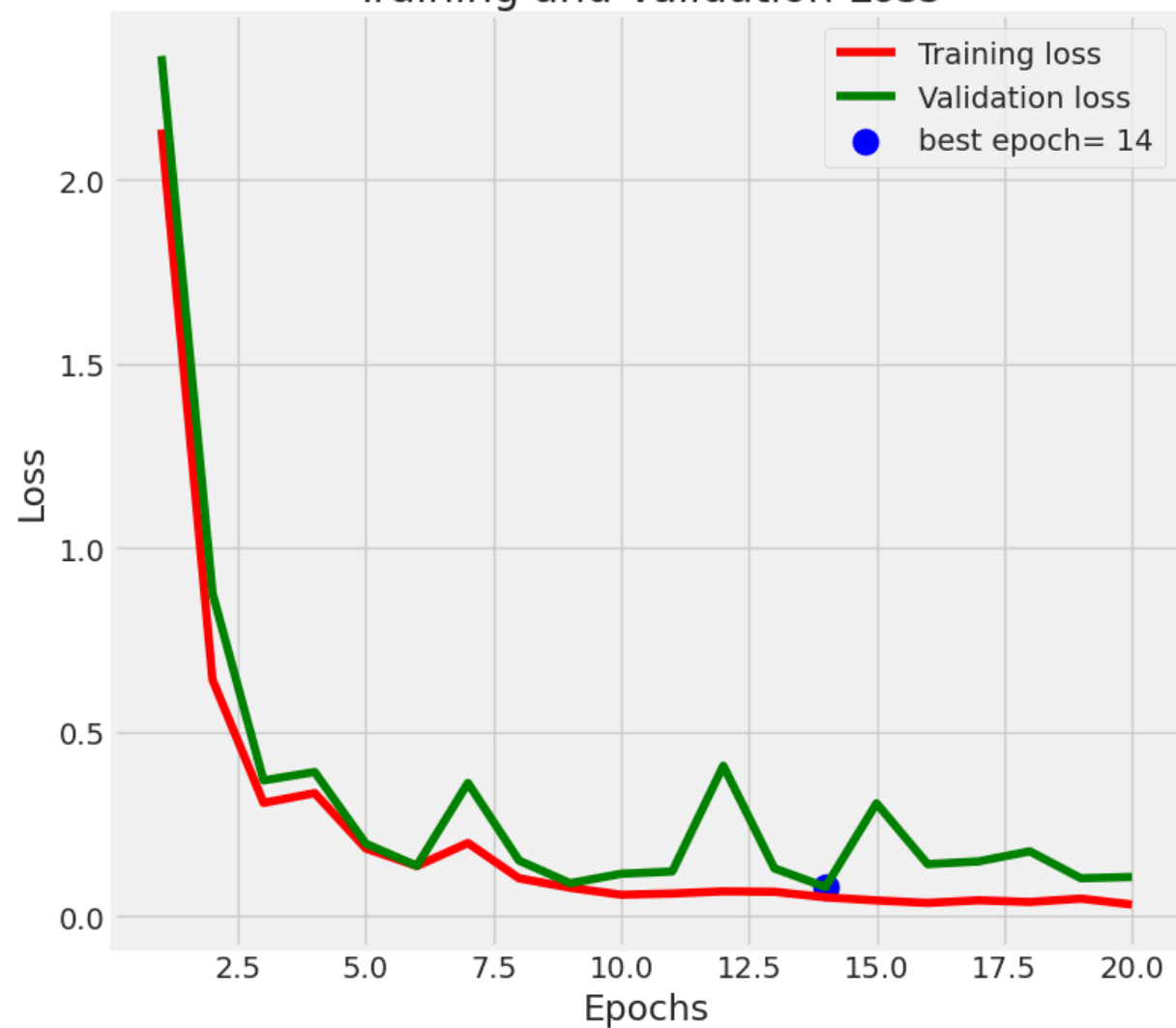


## Trained using CNN model

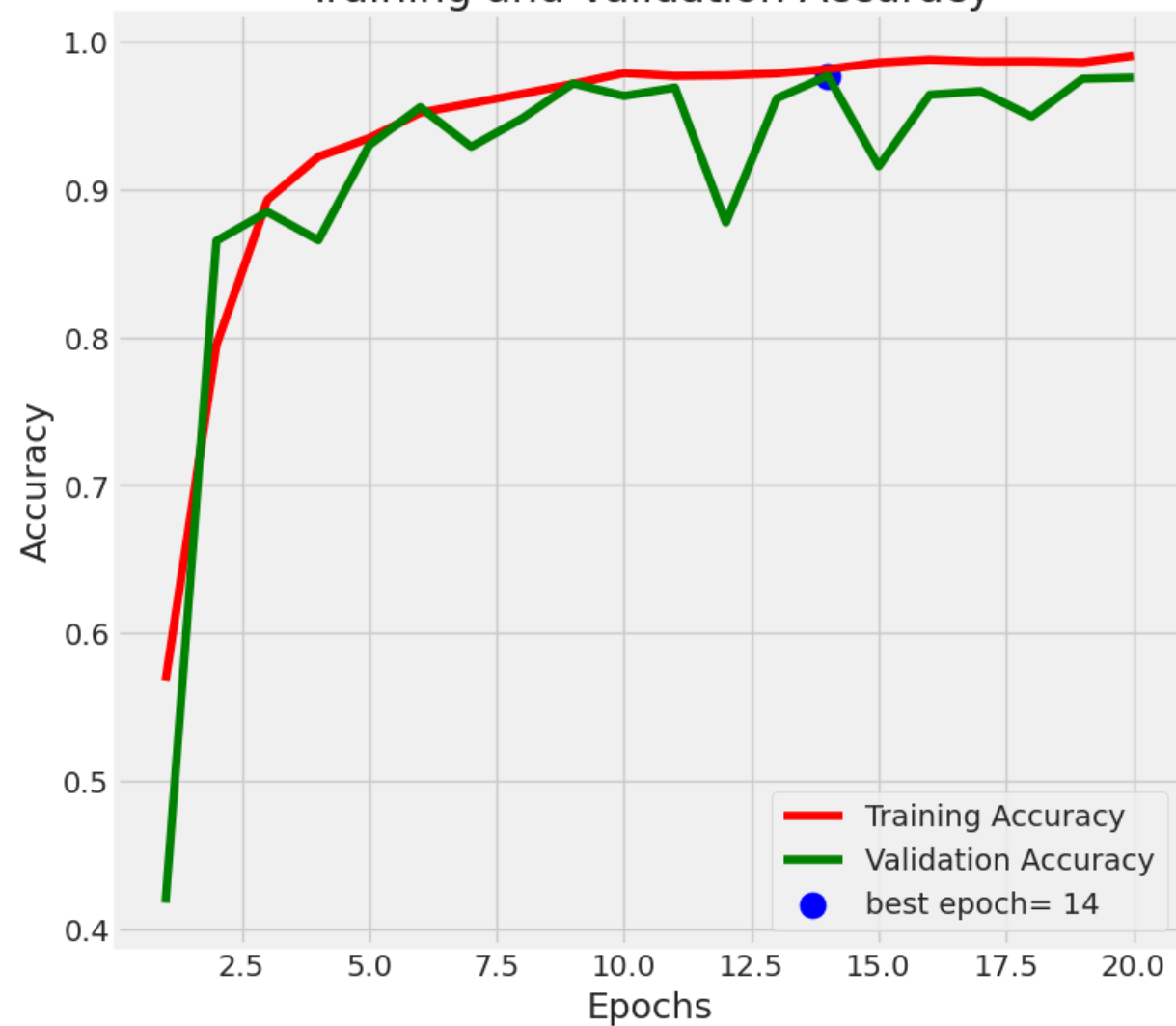
This classification system is trained on extensive datasets of histopathological images employing a **Convolutional Neural Network (CNN)**, enhancing the accuracy of disease detection.



### Training and Validation Loss



### Training and Validation Accuracy



# AI in Skin Cancer Detection

Utilizing AI for early skin cancer identification and diagnosis



## Input: Dermoscopy Images

Dermoscopy images serve as the primary input for AI systems, enabling accurate assessment of skin lesions.



## Output Classifications

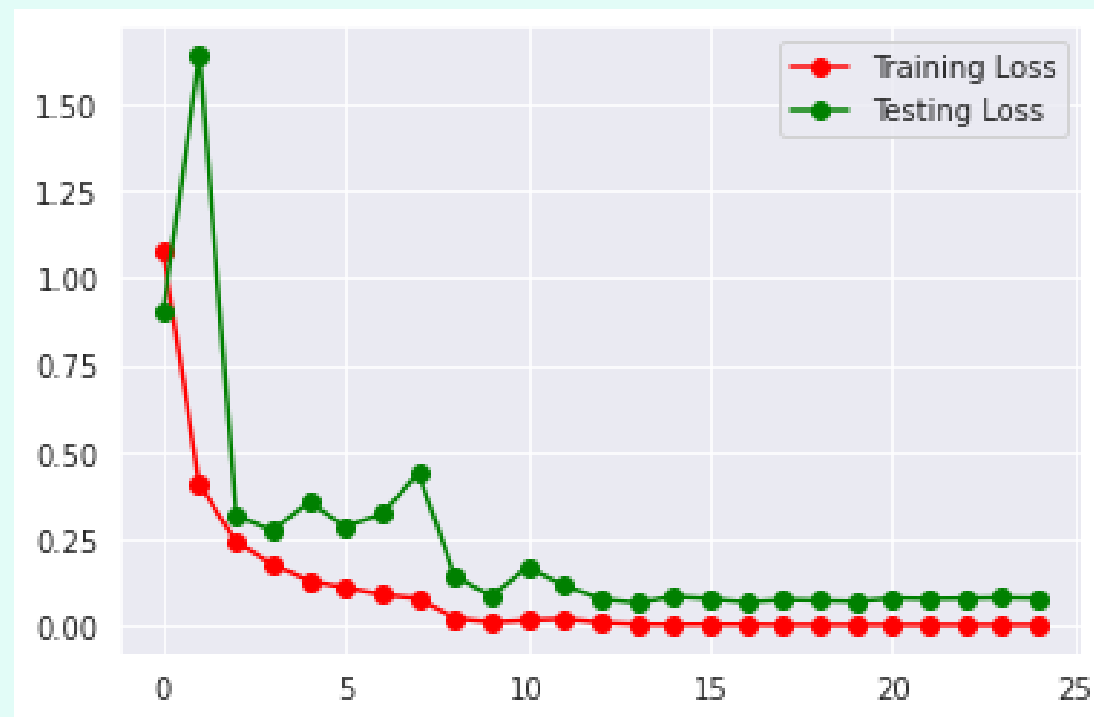
The AI system classifies images into categories such as **melanoma** and **benign keratosis-like lesions**, aiding diagnosis.



## Data Augmentation Techniques

To combat **overfitting**, data augmentation techniques are employed, enhancing model robustness by diversifying training data.







# Innovative Monkeypox Detection Methods

Utilizing AI for rapid detection of Monkeypox outbreaks



## Binary classification system

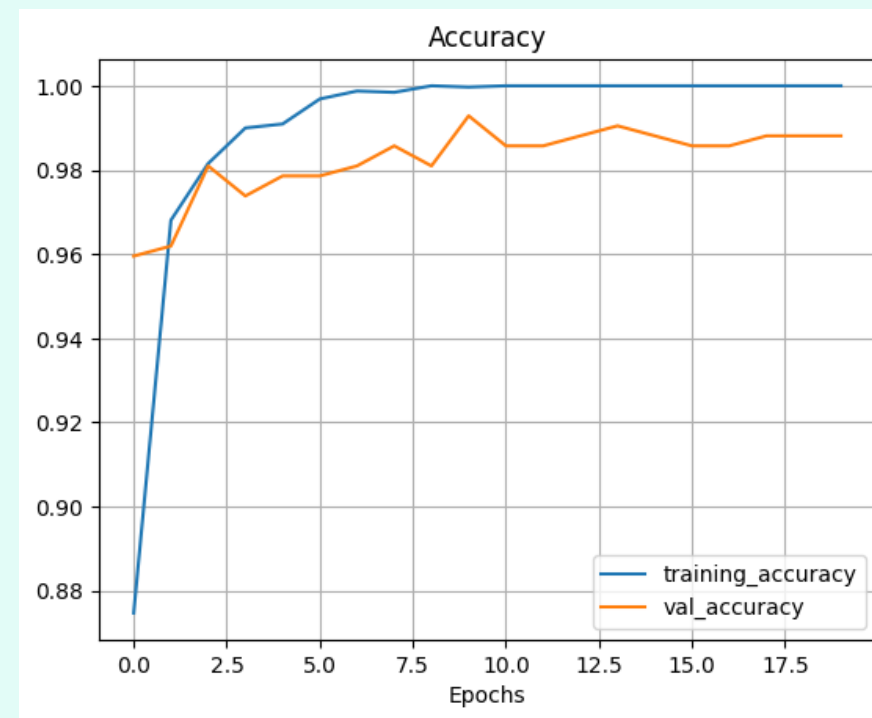
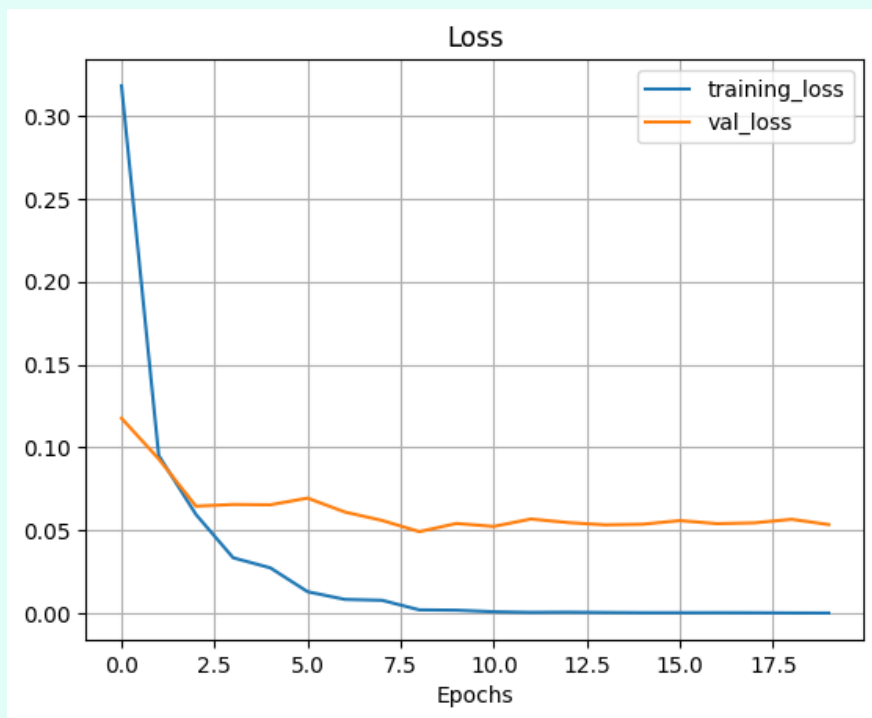
A **machine learning** approach designed to differentiate between **Monkeypox** and **Non-Monkeypox** cases, enhancing diagnostic accuracy.



## Custom CNN for speed

Implementation of a **custom Convolutional Neural Network (CNN)** allows for **fast detection** in outbreak scenarios, enabling swift public health responses.





# Classification of Bone Fractures

Utilizing AI for improved fracture diagnosis in medical imaging



## Fracture detection in X-rays

This process involves utilizing AI to accurately detect **bone fractures** within **X-ray images**, enhancing diagnostic capabilities.



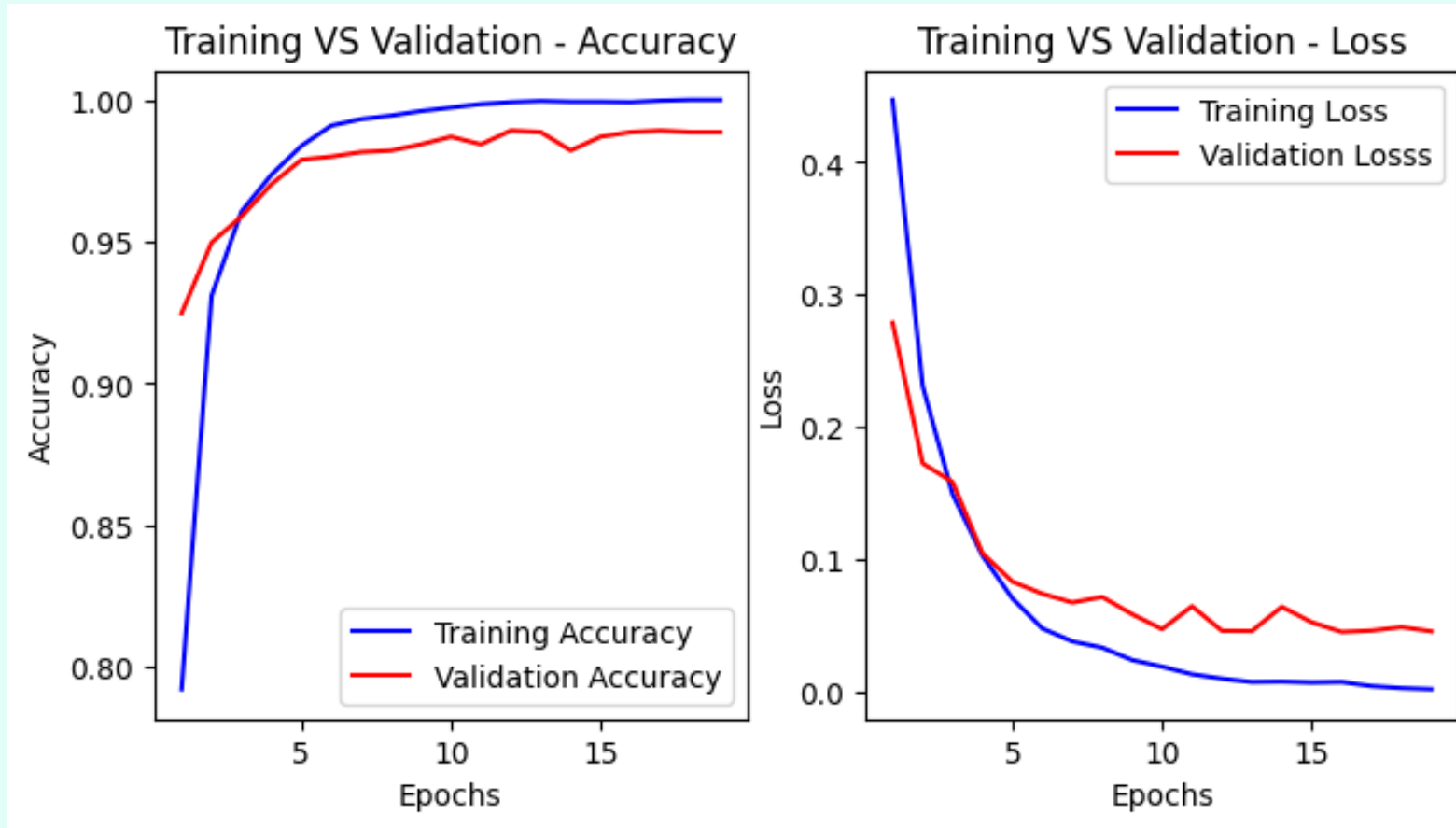
## CNN model application

A **Convolutional Neural Network (CNN)** model is employed, which is trained to identify various fracture types through deep learning techniques.



## Contrast enhancement technique

By applying **contrast enhancement**, the model improves the visibility of fractures, leading to more precise diagnoses and treatment plans.



# Comprehensive Deployment Overview

Exploring the development of a robust web application



## Full web application creation

A **complete** web application designed from **start to finish** to enhance **user experience**.



## Modern frontend with React

The **frontend** utilizes **React** to provide a **modern** and **dynamic** interface for users.



## FastAPI backend performance

The **backend** is developed using **FastAPI**, ensuring **high-speed** performance and **efficiency** in processing requests.

# Key Challenges in Early Disease Detection

Understanding obstacles in AI and chatbot technology for healthcare



## Limited and imbalanced datasets.

Difficulties arise from having insufficient or skewed data that can affect model training and accuracy.



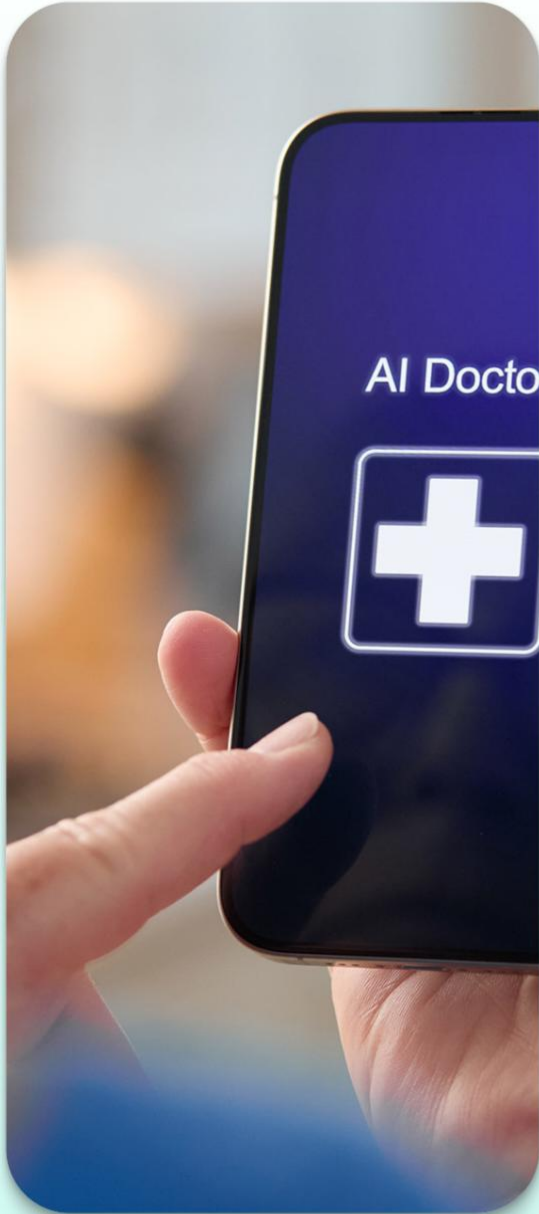
## Specialized preprocessing per disease.

Each disease may require unique preprocessing techniques to ensure that the AI model can effectively learn relevant patterns.



## Preventing overfitting in small datasets.

When datasets are small, there is a high risk of the model learning noise instead of the underlying trend, leading to poor generalization.



# AI-Driven Early Disease Detection

Harnessing AI and chatbots for healthcare advancements

This system combines advanced **AI models** with a **chatbot** interface, enhancing user interaction and data processing.  
**Integration of AI models and chatbot**

By reducing the **diagnostic workload** in healthcare, this solution allows professionals to focus on critical patient care rather than repetitive tasks.  
**Lightening the diagnostic load**



## Accelerating disease detection

The technology enables **fast** and **early disease detection**, leading to timely interventions and better health outcomes.





QUESTIONS & ANSWERS

# Engaging Q & A Session

Open floor for questions and discussions

