

**Automated Disease Detection of Abnormalities in Medical Imaging Using CNN**

**AI4002: CV Project Proposal**

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**Group Members:**

**Ali Iqbal Khan 20K-0141**

**Mujtaba Ahmed 20K-1801**

**Ahmad Azaan Farooqui 20K-1099**

1. **Abstract**

In the realm of medical imaging, the integration of advanced computer vision techniques, particularly Convolutional Neural Networks (CNNs), plays a pivotal role in addressing the growing need for accurate diagnoses amidst the deluge of medical data. Our research endeavors to bridge this gap by pioneering a unified AI system capable of detecting abnormalities in various medical images of X-rays. The significance of our work lies in its potential to transform healthcare delivery. With Convolutional Neural Networks (CNNs) for image analysis, our approach will be poised to revolutionize diagnostic accuracy and expedite healthcare outcomes. Throughout this project, our primary aim will be to create an innovative solution that identifies abnormalities within medical images in a seamless and automated fashion. Our methodology is going to involve the integration of cutting-edge CNNs, meticulously trained on diverse datasets. In conclusion, our research lays the foundation for the project aimed at enhancing the accuracy of medical image analysis. By integrating cutting-edge computer vision techniques, we anticipate significant advancements in the field. This work addresses the complex challenges of the modern healthcare landscape and sets the stage for our future endeavors in AI-driven medical imaging systems.

1. **Introduction**

The integration of artificial intelligence (AI) into medical imaging has demonstrated promising potential in revolutionizing diagnostic processes. Utilizing AI techniques, particularly Convolutional Neural Networks (CNNs), for automated disease detection and medical image classification offers the possibility of enhanced accuracy and efficiency. This project is a pivotal part of our final year academic endeavor, aiming to contribute to the advancement of automated disease detection in medical imaging.

1. **Motivation**

Traditional disease detection in medical imaging is often time-consuming, labor-intensive, and susceptible to human error. The integration of AI, specifically CNNs, offers an exciting opportunity to automate this process, potentially reducing diagnostic time and improving the accuracy of disease detection. By classifying medical images into X-ray, CT scan, or MRI, and subsequently identifying abnormalities using pre-trained CNN models, we can pave the way for more efficient and accurate disease detection.

1. **Problem Statement**

Addressing the urgent need for automated disease detection and in-depth medical imaging analysis through cutting-edge AI techniques is paramount. The current manual methods for analyzing medical imaging often pose challenges in terms of accuracy, speed, and scalability. Integrating CNNs to automatically classify medical imaging and detect abnormalities aims to mitigate these challenges and advance the field of medical diagnostics.

1. **Project Details**

***Data Collection and Preparation***

Utilize existing code and datasets available on platforms like Kaggle to obtain a diverse set of medical imaging data, including X-ray, CT scan, and MRI images.

***Image Classification***

Develop a CNN model to classify the medical images into the categories of X-ray, CT scan, or MRI, and then successfully detecting the disease that it has

***Pre-trained CNN Model Integration***

Incorporate pre-trained CNN models into the project for disease detection and classification.

***Model Evaluation***

Assess the accuracy and effectiveness of the integrated CNN model in accurately classifying diseases based on the medical images.

***Tools***  
Jupyter Notebook and Pycharm

1. **Conclusion**

Automated disease detection in medical imaging using CNNs holds immense promise in revolutionizing healthcare by providing quicker and more accurate diagnoses. This project is driven by the necessity to address the pressing need for efficient and reliable automated disease detection. By classifying medical images and detecting abnormalities using pre-trained CNN models, we aim to contribute to the advancements in AI-powered healthcare solutions. This project forms a crucial component of our final year academic journey, allowing us to make a meaningful impact on the field of medical diagnostics.

**POC (Proof of Concept)**

**Dataset Preparation:**

* Obtain a dataset containing images of X-rays, CT scans, and MRIs, each labeled with their corresponding imaging type and disease.

**Data Preprocessing:**

* Preprocess the dataset to resize the images, normalize pixel values, and split it into training and testing sets.

**CNN Model Development:**

* Build a CNN model capable of classifying both the imaging type and the disease based on the images.
* Train the CNN model using the preprocessed training data.

**Model Evaluation:**

* Evaluate the trained model on the testing dataset to measure its accuracy in classifying imaging types and diseases.

**Classification of a New Image:**

* Use the trained model to classify a new unseen medical image into one of the three imaging types and predict the associated disease.

