Skin Disease Detection and Classification Using CNN Algorithm

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***Abstract*—Dermatology's complexity makes it challenging to diagnose accurately using traditional methods. An automated image-based approach utilizing machine learning can improve diagnostic accuracy. The method involves filtering and enhancing skin photographs, extracting features with techniques like Convolutional Neural Networks (CNNs), and using algorithms like SoftMax to classify and generate diagnostic reports. This approach promises greater accuracy and faster results compared to conventional diagnostic methods in dermatology.**

***Index Terms*-Convolutional Neural Network, Diagnosis, Skin Diseases, Accuracy, Sensitivity, Specificity**

I. INTRODUCTION

Skin diseases are widespread and can be severe, requiring medical attention to prevent bodily harm or fatalities. Manual diagnosis by clinicians is common, but it can lead to inadequate treatment due to the complexity of skin disease classification. Accessibility to medical facilities, especially in rural areas or during crises like the COVID-19 pandemic, can hinder timely diagnosis and treatment. Delayed medical attention due to underestimating symptoms or lack of awareness can worsen skin conditions and escalate complications.

II. SYSTEM ANALYSIS

A. Convolutional Neural Network

Convolutional Neural Networks (CNNs) are advanced algorithms used in image analysis, functioning akin to a team of specialized detectives. The input layer receives the image, acting as raw material on a conveyor belt. Convolutional layers, equipped with filters, meticulously scan the image for specific features like shapes and textures. Pooling layers compress the findings, focusing on key details and reducing complexity. Activation layers introduce non-linearity, enabling the CNN to recognize complex relationships between features. Fully connected layers amalgamate information from earlier stages, resembling a final assembly line where the image is classified and assigned probabilities to different categories.

B. Existing System

The existing system for skin disease detection relies heavily on manual diagnosis conducted by dermatologists through visual examination of skin lesions. However, this approach is plagued by subjectivity, time consumption, and variability depending on the expertise of individual practitioners. Manual examination entails inherent risks of human error, limited scalability, and lack of quantitative analysis metrics.

C. Proposed System

In contrast, the proposed system introduces a revolutionary approach using Convolutional Neural Networks (CNNs) to automate skin disease detection and classification. By leveraging AI technology, the system aims to overcome the limitations of manual diagnosis, offering benefits such as accuracy, consistency, and scalability. CNNs can efficiently learn complex patterns from skin lesion images, leading to more reliable diagnostic outcomes compared to human observation.

III. IMPLEMENTATION

The implementation of the proposed system for skin disease detection and classification relies heavily on Python, a versatile platform widely used in research and production systems. Leveraging Python's extensive libraries and packages such as NumPy, Pandas, Matplotlib, Scikit-learn, and Keras, the system facilitates data analysis, machine learning algorithm implementation, and deep learning

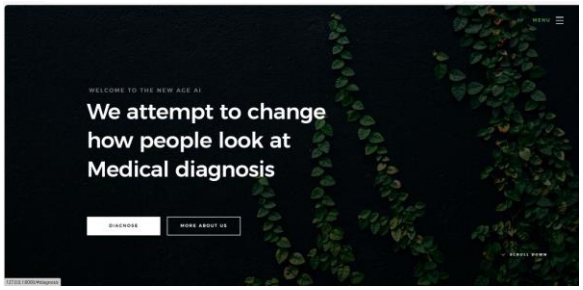
experimentation. Installation steps for deep learning involve defining the problem, preparing data, evaluating algorithms, improving results, and presenting findings. Installation methods include downloading Python individually from python.org or installing the Anaconda distribution, which includes Python and various machine learning packages simultaneously. Anaconda also provides Jupyter Notebook for interactive Python environment, ensuring seamless integration and accessibility for users across different operating systems.

IV. SYSTEM DESIGN

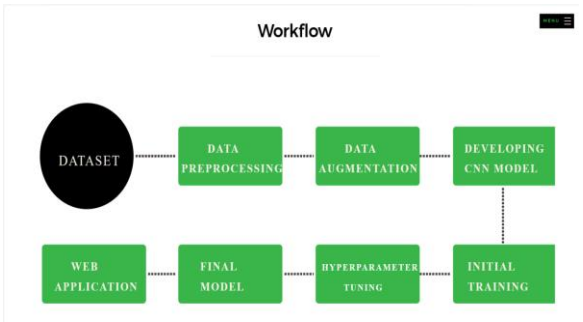
The utilization of UML (Unified Modeling Language) provides a comprehensive framework for designing and visualizing the architecture of software systems. By employing graphical notations, UML facilitates communication, exploration of design options, and validation of architectural decisions. StarUML, a sophisticated software modeler, supports various UML diagrams, aiding agile and concise modeling practices for both professional and educational purposes.

V. OUTPUT SCREENS

A. Project Interface

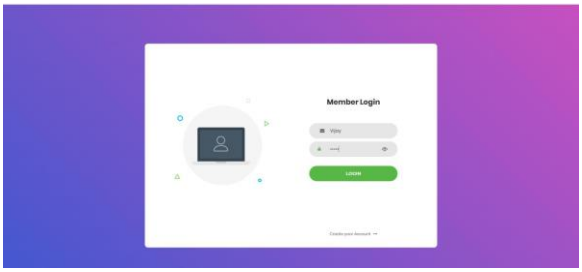


B. Project Workflow

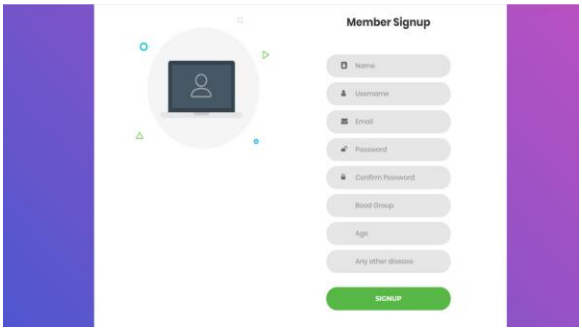


C. Login/Signup Page

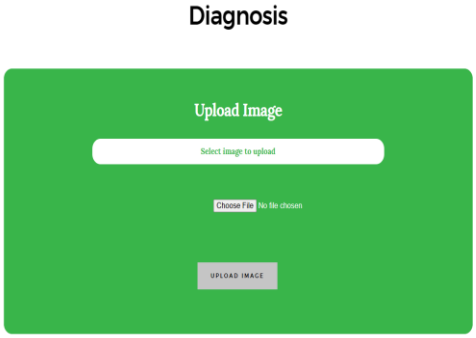
D. Login Page



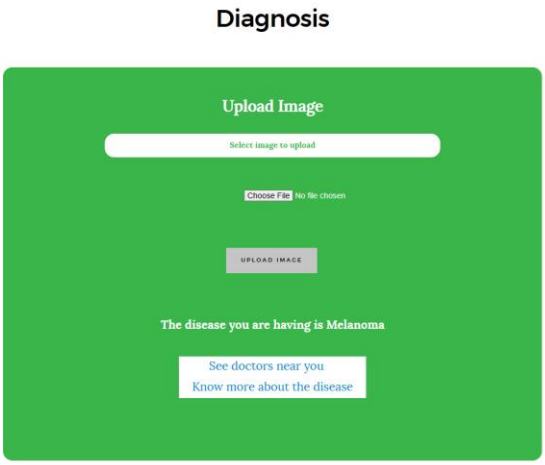
E. Signup Page



F. After login we have to choose image file



G. Choosing an image and click on upload images button to get the result



VI.SOFTWARE REQUIREMENT SPECIFICATIONS

The Software Requirements Specification (SRS) is a comprehensive document outlining the behavior of a software system, including use cases and non-functional requirements. System requirements specify the information necessary for system development, with business, product, and process requirements being key components. Functional requirements define the technical specifications and design parameters, while non-functional requirements focus on constraints and quality attributes. Hardware requirements include a Pentium i5 system with 500 GB hard disk, 15" LED monitor, keyboard, mouse, and 4 GB RAM. Software requirements entail Windows 10 as the operating system, Python 3.7.0 as the coding language, and essential Python packages such as NumPy and Pandas

VI. CONCLUSION

In order to identify diseases, the remarks deep learning and image processing techniques are applied. The system's main benefit is that it streamlines the feature engineering process and reduces work and time. Thus, it is possible to identify and classify skin disorders using CNN. The system may match a specialist's results using advanced computer algorithms and a sizable dataset, raising medical and scientific standards of quality. In this research, a model for forecasting skin disorders was developed using CNN algorithms. Combining characteristics with deep learning has been shown to improve accuracy and be able to predict a far wider range of diseases than earlier models. The model's accuracy might be greatly improved by using a better system, complete with top-notch hardware, sophisticated software, and a sizable dataset. The model is also appropriate for clinical trials since it doesn't involve any invasive measurements. This model might be used in the future as a systematic method for first recognizing skin diseases, reducing time in both treatment and diagnosis.

VII. REFERENCE

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