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CNN BASED SKIN DISEASE DETECTIONSYSTEM USING CNN ALGORITHM

Shreyash Thorat[*1], Udaysinh Rode[*2], Samiksha Gedam[*3], Prof. Pragati Deole[*4]

[*1,2,3]Computer Engineering, Smt. Kashibai Navale College Of Engineering Vadgaon BK, Pune, India.

[*4]Guide, Computer Engineering Dept Smt. Kashibai Navale College Of Engineering Vadgaon BK Pune, India.

ABSTRACT

Skin disease prediction and identification have long been difficult and crucial tasks for medical practitioners. Numerous clinics and skin care specialists charge outrageous prices for their services. The prevalence of skin conditions is widespread throughout our nation at the same time. The majority of skincare professionals currently use time-consuming traditional methods to detect diseases, which may take a long period. Skin diseases have become important issues in recent years due to a variety of environmental, socioeconomic, and dietary variables. This essay compares and contrasts various skin illnesses with regard to both cosmetics and common skin problems. A review of several publications is conducted based on the technologies employed, the accuracy of the results, the ethical behavior, the number of diseases identified, the datasets, etc.

I. INTRODUCTION

The most critical health issue on the planet is skin infection. One of the challenging ranges to predict is human skin. There are various kinds of skin conditions. A few are chronic conditions, while others are allergic. Accurately distinguishing and treating a skin issue is a time-consuming process. Diverse illnesses have different indications. The areas of cosmetology focus on the skin, hair, and nails. Every individual on the planet stresses about how they see and feel at some point. The symptoms and seriousness of skin disorders can change significantly. They might be either permanent or transitory, unpleasant or not. There is no age gather that is more vulnerable to skin conditions. Skin illnesses impact individuals of all ages, including newborn children and the elderly, in one way or another.

Modern society is experiencing an increase in technical breakthroughs that are most beneficial for improving our quality of life. Recent years have seen a significant increase in the use of electronic medical records and diagnostic imaging, combined with machine learning algorithms finding considerable success in image identification jobs. The authors of the research also emphasize that deep learning techniques, particularly convolutional networks, have rapidly become the methodology of choice for medical picture analysis.

II. LITERATURE SURVEY

The present study strongly recommends a conceivable relationship between F1F0-ATP synthase, Inapt, and keratinocyte separation. It also gives modern bits of knowledge into the component by which energy metabolism possibly regulates.

Skin illness may inspire psychosocial comorbidities, and psychosocial stresses may evoke skin infection; a perfect spiral of cause and effect. Skin cancer, the most common human malignancy1–3, is fundamentally analyzed visually, starting with an initial clinical screening and taken after potentially by dermoscopic analysis, a biopsy and histopathological examination.

we display a facial picture examination system, Deep Gestalt, utilizing computer vision and deep learning calculations, that evaluates similarities to hundreds of syndromes. Deep Gestalt outperformed clinicians in three starting tests, two with the objective of recognizing subjects with a target disorder from other disorders, and one of separating different genetic subtypes in Noonan syndrome.

The first case represents the recognizable proof of the most common cancers, the second represents the recognizable proof of the deadliest skin cancer. The CNN accomplishes execution on standard with all tested experts across both assignments, illustrating an artificial intelligence capable of classifying skin cancer with a level of competence comparable to dermatologists.

In this paper, authors applied deep neural network algorithm to classify dermoscopic pictures of four common skin maladies and chronicled promising comes about. Based on the comes about, we advance summarized the

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determination/ classification scenarios, which reflect the significance of combining the endeavors of both human skill and computer calculations in dermatologic diagnoses.

Three skin conditions, parasitic skin maladies, other skin and subcutaneous illnesses, and acne were in the beat 10 most prevalent illnesses worldwide in 2010, and eight fell into the best 50; these extra five skin issues were pruritus, dermatitis, impetigo, scabies, and molluscumcontagiosum.

III. PROPOSED SYSTEM

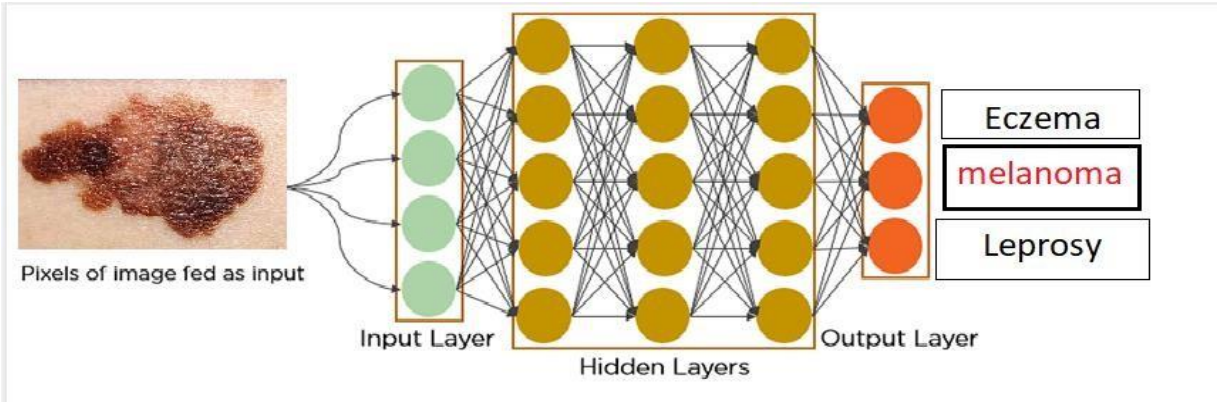
Skin diseases are a prevalent and diverse category of medical conditions that affect millions of individuals globally. Timely diagnosis and access to information about the causes and precautions related to these conditions are crucial for effective treatment and prevention. However, the current healthcare infrastructure faces several challenges in this regard, including limited access to dermatologists, delayed diagnoses, and a lack of comprehensive information for patients. This project aims to address these challenges by developing a skin disease detection system capable of accurately identifying skin conditions from images and providing detailed information on the causes and precautions associated with each disease.

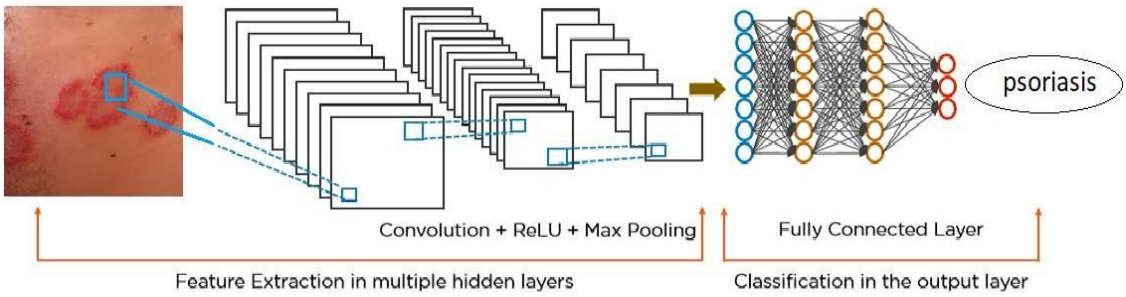
Skin issues not only harm physical health but also induce mental issues, particularly for patients whose faces have been harmed or indeed distorted. Using smart applications, most of the individuals are able to get helpful clinical pictures of their confront skin condition.

To build and implement skin disease detection using machine learning framework.

IV. METHODOLOGY

CNN Algorithm





Convolution Layer: - Convolution is the first layer to extract features from an input image (image). Convolution preserves the relationship between pixels by learning image features using small squares of input data. Convolution of an image with different filters can perform operations such as edge detection, blur and sharpen by applying filters i.e. identity filter, edge detection, sharpen, box blur and Gaussian blur filter.

Pooling Layer: - Pooling layers would reduce the number of parameters when the images are too large. Spatial pooling also called subsampling or down sampling which reduces the dimensionality of each map but retains important information.

Fully Connected Layer: - In this layer Feature map matrix will be converted as vector (x1, x2, x3, …).With the fully connected layers, we combined these features together to create a model.

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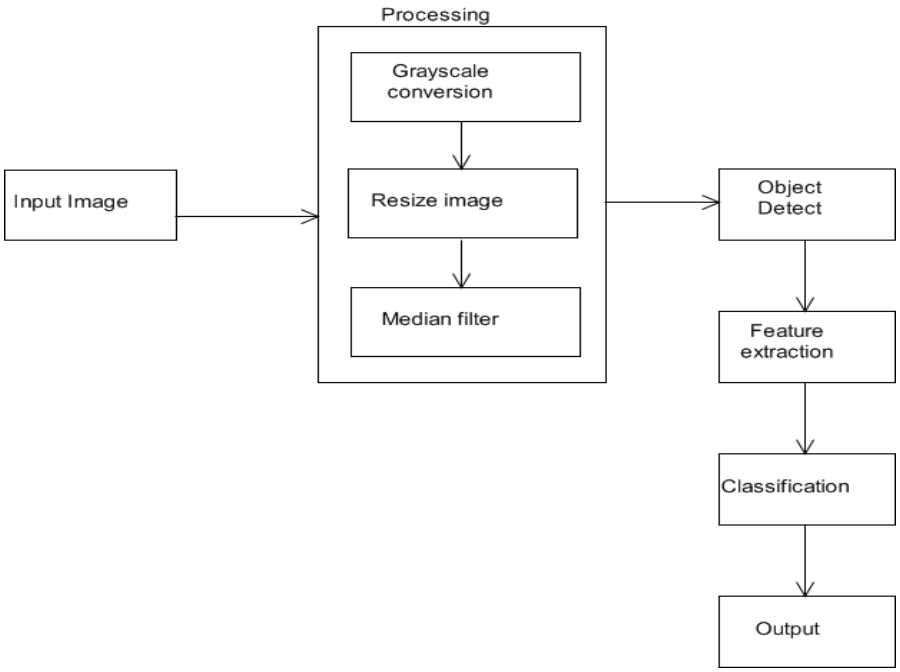
SoftMax Classifier: -Finally, we have an activation function such as SoftMax or sigmoid to classify theoutputs.

V. ARCHITECTURE OVERVIEW



1. **Input Image:** It involves uploading a skin image that the system will then analyse to identify the presence of any skin conditions.
2. **Grayscale Conversion:** Grayscale conversion is the process of transforming a color image into a grayscale (black and white) image, where each pixel's intensity value represents the varying shades of Gray. This conversion is commonly used in image processing to simplify images and reduce the amount of data required for storage and processing, while retaining essential details.
3. **Resize Image:** In skin disease detection using image processing, image resizing is a crucial preprocessing step. It standardizes images for consistency, enhances computation efficiency, and enables focused feature extraction, ensuring compatibility with detection models and improving overall analysis accuracy.
4. **Median Filter:** A median filter is a common image processing technique used to reduce noise and enhance image quality. It works by replacing each pixel in an image with the median value of neighboring pixels within a specified window or kernel. This helps in removing outliers or "salt and pepper" noise, resulting in a smoother and cleaner image while preserving edges and fine details.
5. **Object Detection:** Object detection is a computer vision task that identifies and locates objects in images.
6. **Feature Extraction:** It involves selecting and transforming relevant data or attributes from a larger dataset to reduce dimensionality while retaining essential information. Feature extraction is used to simplify data for further processing and analysis.
7. **Classification:** It involves categorizing data into distinct classes or categories based on its attributes. It is used to predict the class labels of new, unseen data based on patterns and knowledge learned from a training dataset.
8. **Output:** It gives the disease name with precautions, causes and suggestion of doctors.

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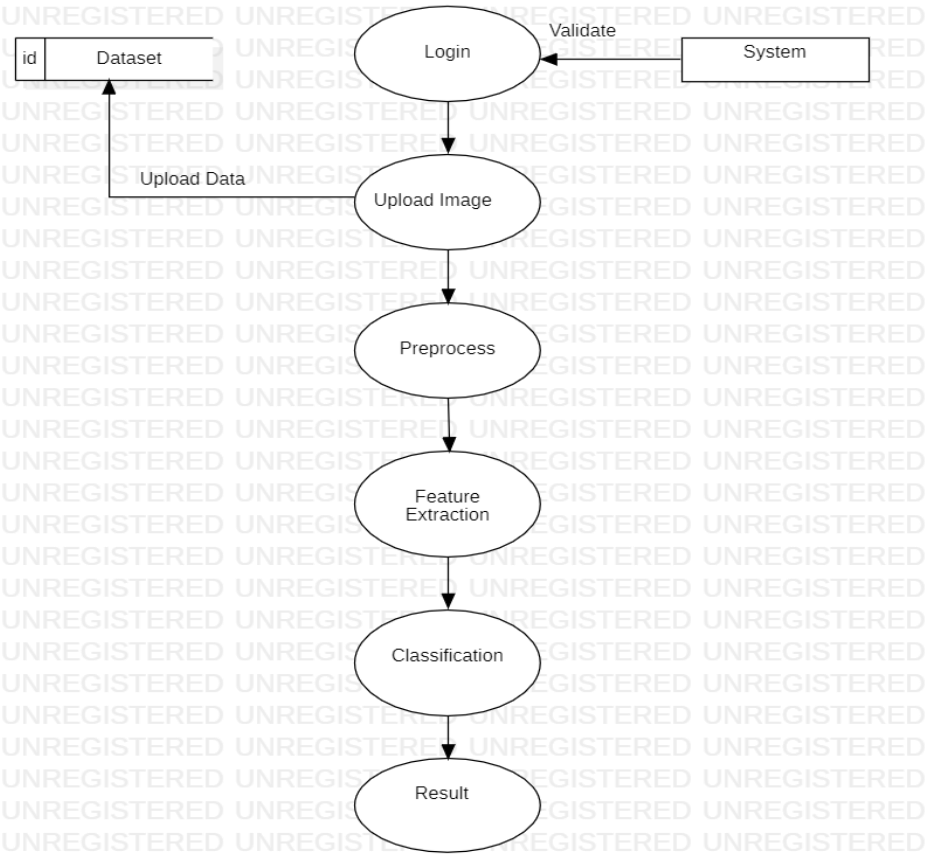
DATA FLOW DIAGRAM



Login Page: The process begins when a user accesses the system and navigates to the login page. Here, the user provides their credentials (username and password) to authenticate themselves and gain access to the system.

Authentication Process: Once the user submits their credentials, the system verifies them against the stored database of registered users. If the credentials are valid, the user is granted access to the system; otherwise, access is denied, and an error message is displayed.

Navigation to predict page: Upon successful authentication, the user can select the predict option from navbar, where they can upload an image for skin disease analysis.

Image Upload: The user selects an image containing a skin lesion from their local device and uploads it to the system for analysis. The uploaded image is then transmitted to the backend for further processing.

Image Processing: Upon receiving the uploaded image, the system processes it to extract relevant features using image processing techniques. This may involve tasks such as resizing, noise reduction, and enhancement to prepare the image for analysis.

Feature Extraction: After preprocessing, the system extracts feature from the uploaded image. These features may include color, texture, shape, and other characteristics relevant to skin disease classification. Feature extraction techniques such as convolutional neural networks (CNNs) or feature descriptors are employed for this purpose.

Classification: Once the features are extracted, the system utilizes a trained machine learning model or deep learning algorithm to classify the image based on the extracted features. The model predicts the presence or absence of skin diseases and assigns a corresponding class label to the image.

Result Generation: The classification result is generated based on the prediction made by the model. The system displays the predicted skin disease along with relevant information such as confidence score or probability of correctness.

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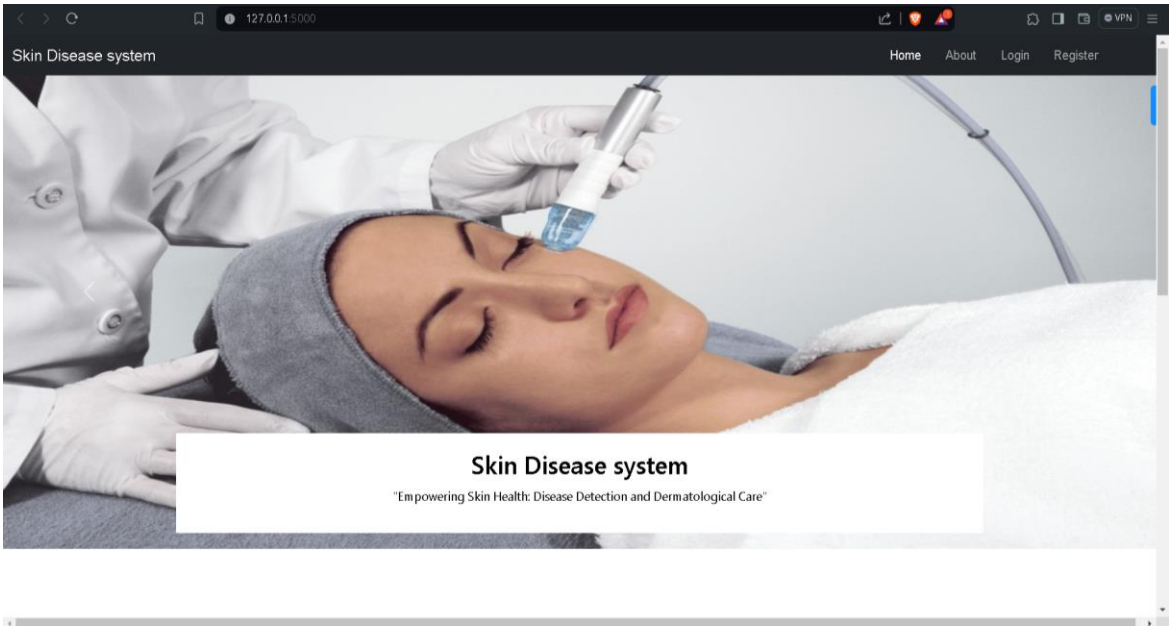
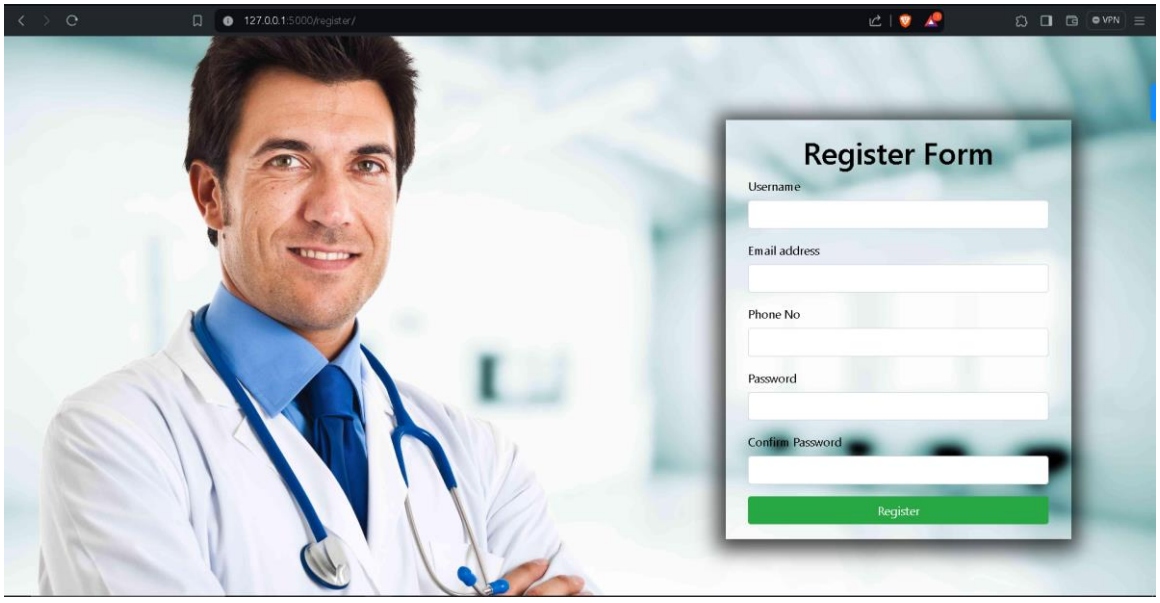
Project Screenshots



After opening the System, we will see a navbar which contains the options Home, About, Login, Register. By clicking Register option, it will redirect to Register page.



In Registration form, all fields are mandatory. User needs to fill all the fields then only the user will get registered in the system. After completing registration, system automatically redirects to Login page.

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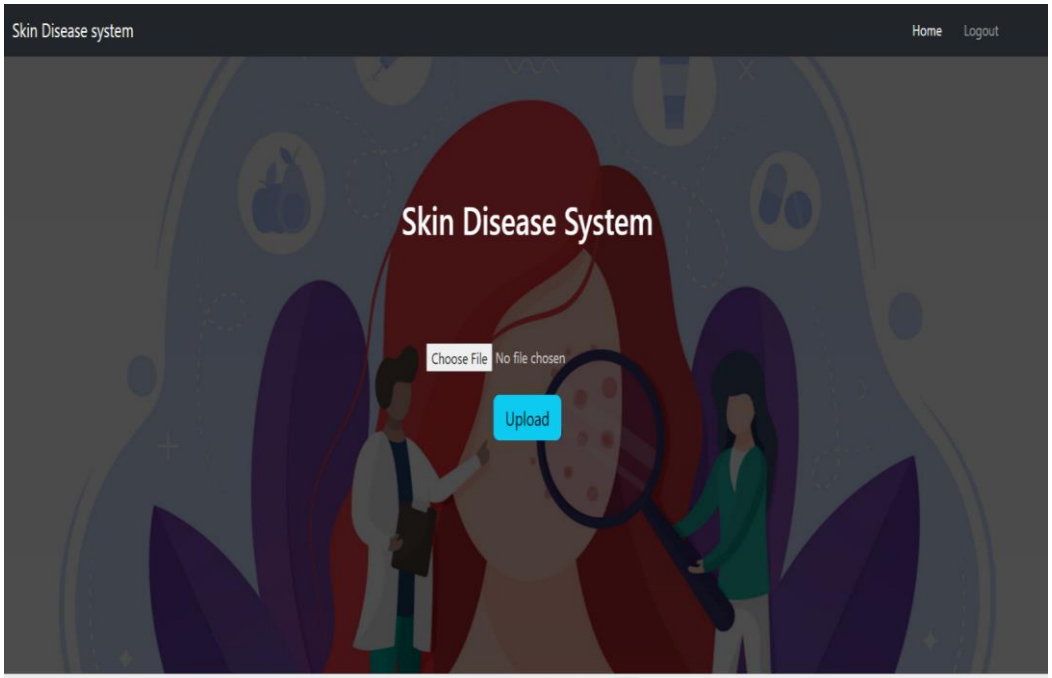
For using the system, user needs to login to the system. Here the user can enter into the system by entering the correct credentials. Login page verifies the identity of the user. Then the user can use the system for detecting the disease.

After logging, user will be able to see the predict option.



For predicting the disease, the user needs to upload the image of disease. For that the user needs to click the image using phone camera and then selects it from choose image option.

Then the system will processed the image and the it will give the results.

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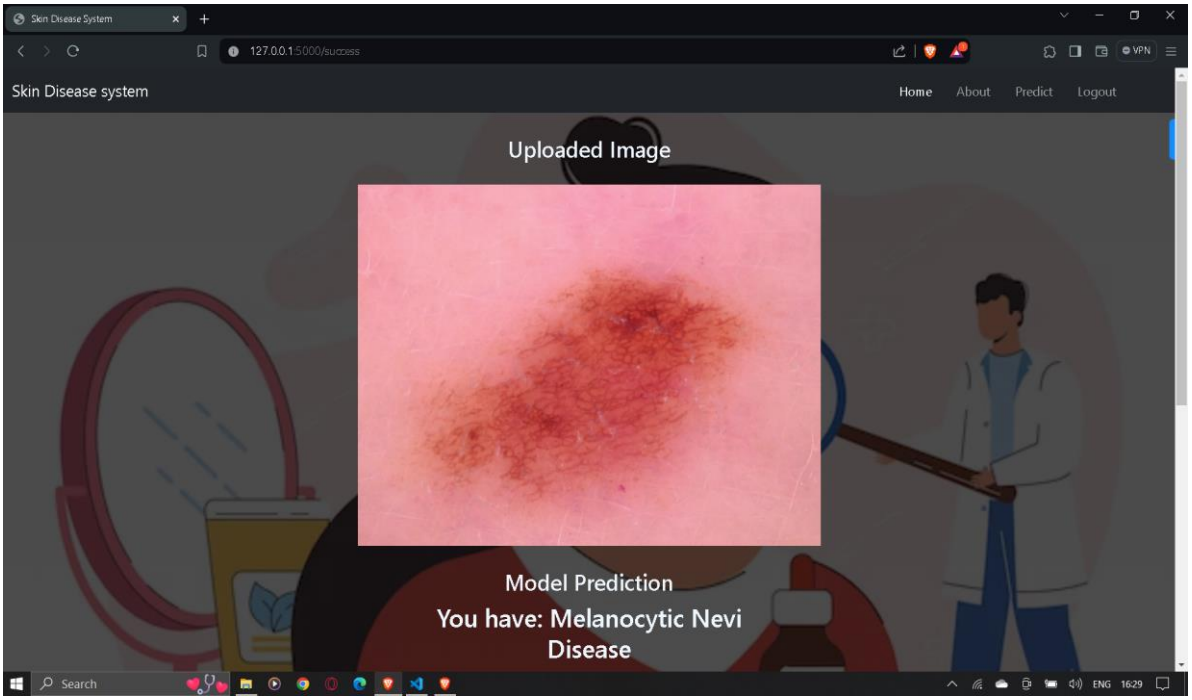
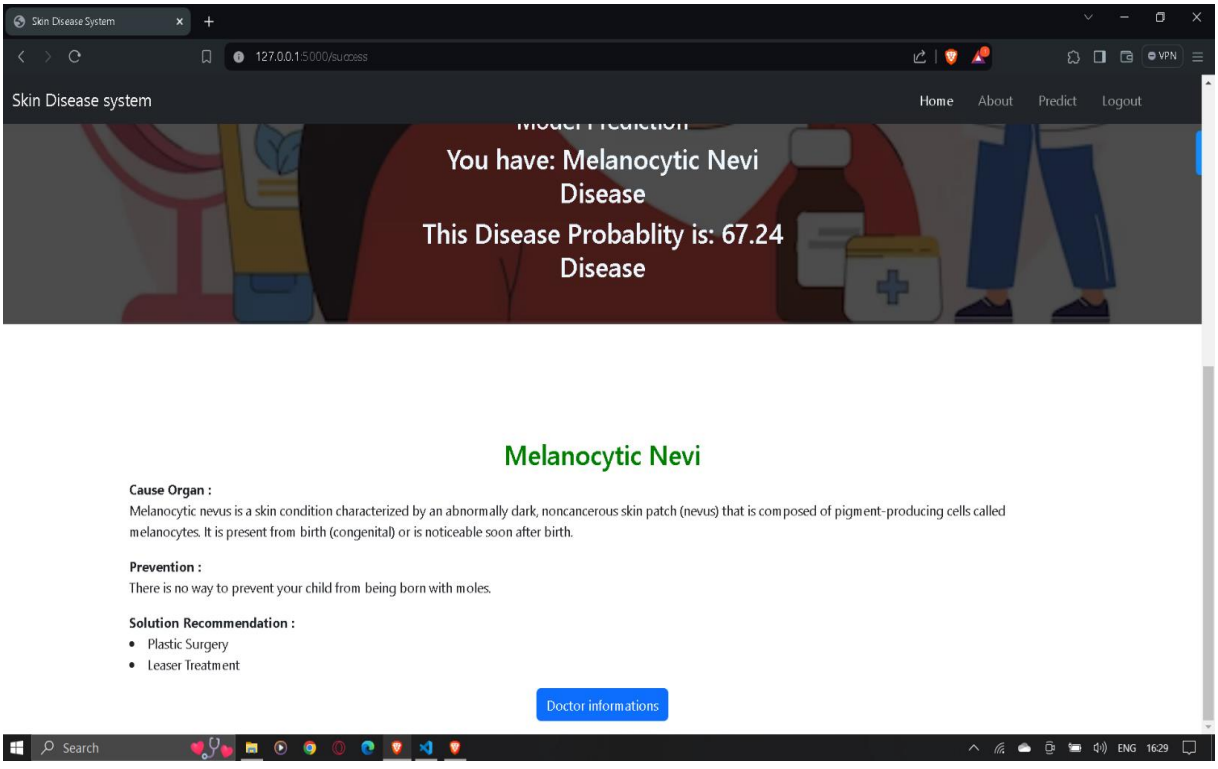


In result, the system will show the disease name, probability of disease which is predicted by model.



Also, the system will show the causes of disease and the precautions which needs to take to get recure from that particular disease.

Then the system also shows the doctors suggestion option. By using this option user can get the contacts of the doctor for taking appointment.

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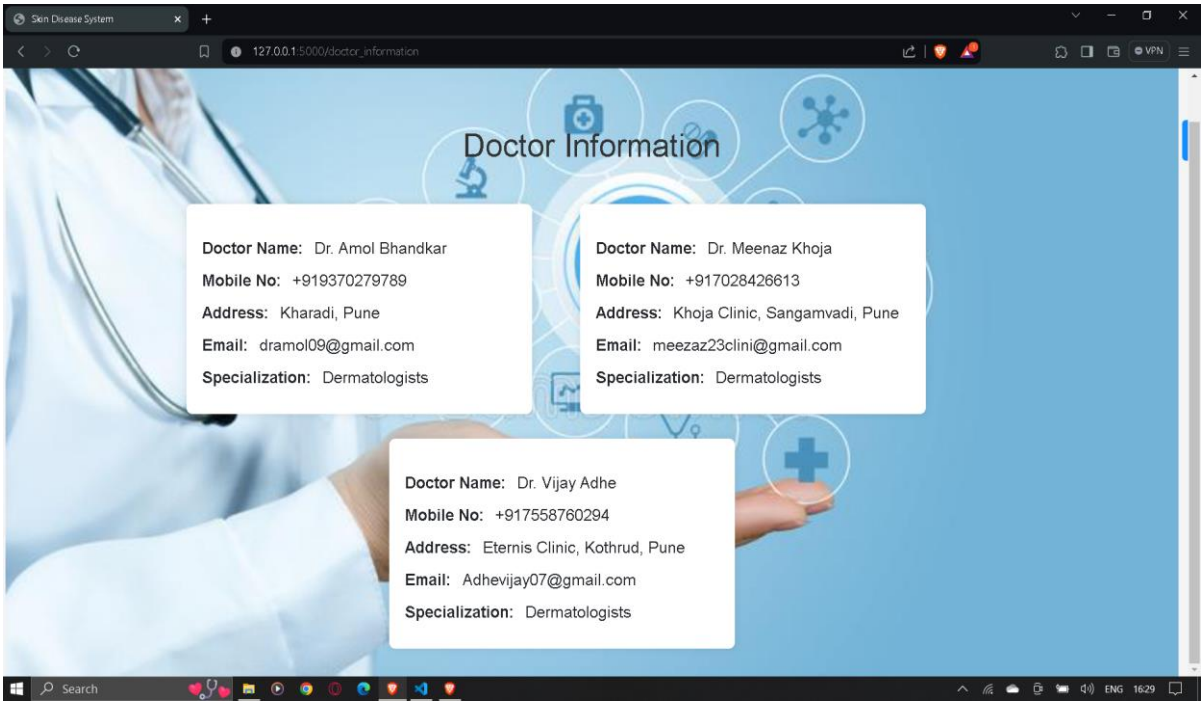
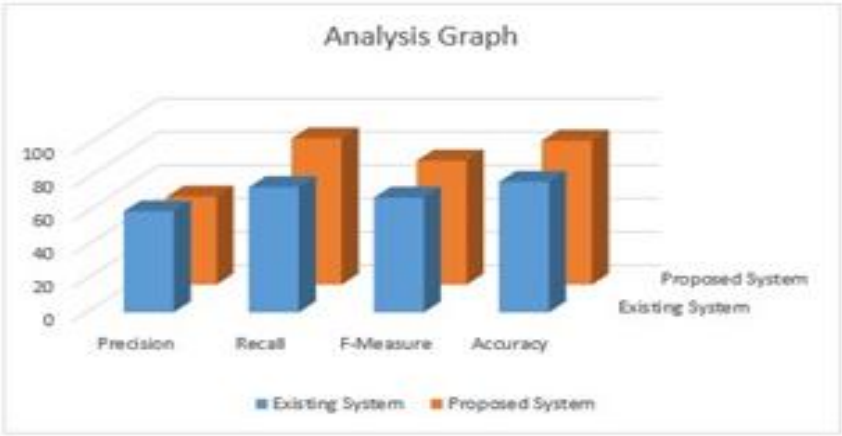


After that the user can use these details to contact to the doctor.

VI. RESULT AND DISCUSSION

The section shows overall accuracy of CNN classification technique. So, this works gives better disease prediction compare to existing method.



CNN Classification Accuracy Graph

Table 1: Method Comparison

	Existing System	Proposed System
Precision	60.6	52.70
Recall	75.1	87.64
F-Measure	68.8	74.31
Accuracy	78.29	86.26

VII. CONCLUSION

The healthcare sector is totally apart from other industries. Customers want the highest possible standard of care and facilities, regardless of the price. Because there are fewer available cosmetologists, there is a demandfor the adoption of contemporary techniques in the field of cosmetic dermatology. Therefore, cosmetic

dermatology, or the study of the skin, hair, and nails, needs to be automated so that it can give a quick diagnostic to help the cosmetologist and speed up the process of illness detection for the patients.

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