**Skin Disease Identification using image Analysis**

1. **Introduction**

* Now a day’s people are suffering from skin diseases, More than 125 million people suffering from Psoriasis also skin cancer rate is rapidly increasing over last few decades specially
* Melanoma is most diversifying skin cancer.
* If skin diseases are not treated at earlier stage, then it may lead to complications in the body including spreading of the infection from one individual to the other.
* The skin diseases can be prevented by investigating the infected region at an early stage.
* The characteristic of the skin images are diversified, so that it is challenging job to devise an efficient and robust algorithm for automatic detection of the skin disease and its severity.
* Skin tone and skin color plays an important role in skin disease detection.
* To overcome the above problem we are building a model which is used for the prevention and early detection of skin cancer, psoriasis.
* An application is built where a person can upload an image from UI, then image will be sent the trained model.
* The model analyze the image and detect the skin disease that person had.
* Our system will use a Convolution neural network to train the images of skin diseases.

a. Overview:-

* The project is about identifying skin diseases using CNN.
* In this project a person can upload an images of the defected skin from UI, then image will be sent to the trained model.
* Then model will predict the skin disease.
* Our system will use a Convolution neural network to train the images of skin diseases.

b. Purpose:-

* This model is built to detect the skin diseases at an early stage so they can be treated easily.
* This model will find patterns in images and identify features.
* It makes accurate and reliable medical image analysis tech through the use of Convolutional Neural Networks a type of deep neural network that is used to analyze images.

1. **Literature Survey**

* Skin diseases are frequent diseases to every person and various types of infections are becoming very frequent.
* You know that all of these diseases are very harmful, especially if not controlled at an early stage.
* Skin diseases not only damage the skin. It can have a large effect on a person’s daily life, destroy confidence of a person, hang their movement, and turn to depression.
* Sometimes, many people try to treat these allergies by using their own therapy. However, if these methods are not appropriate for that type of skin disease then it would make it more harmful.
* Skin diseases can easily transfer from human to human so there is a need to control it their initial stage to prevent it from spreading.
* This paper presents an implementation of a skin diseases diagnosis system which helps user to detect human skin diseases and provides medical treatments timely.
* For this purpose, user will have to upload a disease affected skin image to our system and give answers to the questions which are asked to user according to the symptoms of the skin.
* These symptoms are used to identify the disease and provide a medical treatment.
* This system works on technologies like image processing and data mining for skin diseases detection.
* So the whole project is divided in to below major parts,
* Image preprocessing, segmentation and feature extraction.
* Classification model and skin disease predication

1. Existing problem:-

* I was first getting wrong predictions for the images which I was testing to get the results.

b. Proposed Solution:-

* I increased my number of images in my training classes so that my model could get more insights to predict correct.
* And I increased the number of epochs while training the model to get more accuracy and less loss.

**3.** **Theoretical Analysis**

a. Block Diagram:-

b. Hardware / Software designing:-

Classification

Input Image

Preprocessing

Seborrheic dermatitis

Vitiligo

Psoriasis

Feature Extraction

Software Designing:-

* Anaconda Navigator
* Spyder
* Jupyter notebook
* Css
* Html
* Javascript

Hardware Designing:-

* Laptop or computer with minimum 4GB RAM
* Hard disk utilization 40GB or above.

**3. Experimental Investigations**

* The science of solving clinical problems by analyzing images generated in clinical practice is known as medical image analysis.
* The aim is to extract information in an affective and efficient manner for improved clinical diagnosis.
* The recent advances in the field of biomedical engineering have made medical image analysis one of the top research and development area.
* One of the reasons for this advancement is the application of machine learning techniques for the analysis of medical images.
* Deep learning is successfully used as a tool for machine learning, where a neural network is capable of automatically learning features.
* This is in contrast to those methods where traditionally hand crafted features are used.
* The selection and calculation of these features is a challenging task.
* Among deep learning techniques, deep convolutional networks are actively used for the purpose of medical image analysis.
* This includes application areas such as segmentation, abnormality detection, disease classification, computer aided diagnosis and retrieval.
* In this study, a comprehensive review of the current state-of-the-art in medical image analysis using deep convolutional networks is presented.
* The challenges and potential of these techniques are also highlighted.

1. **FlowChart**

Display Result

Classify Test Image

Input Test Image

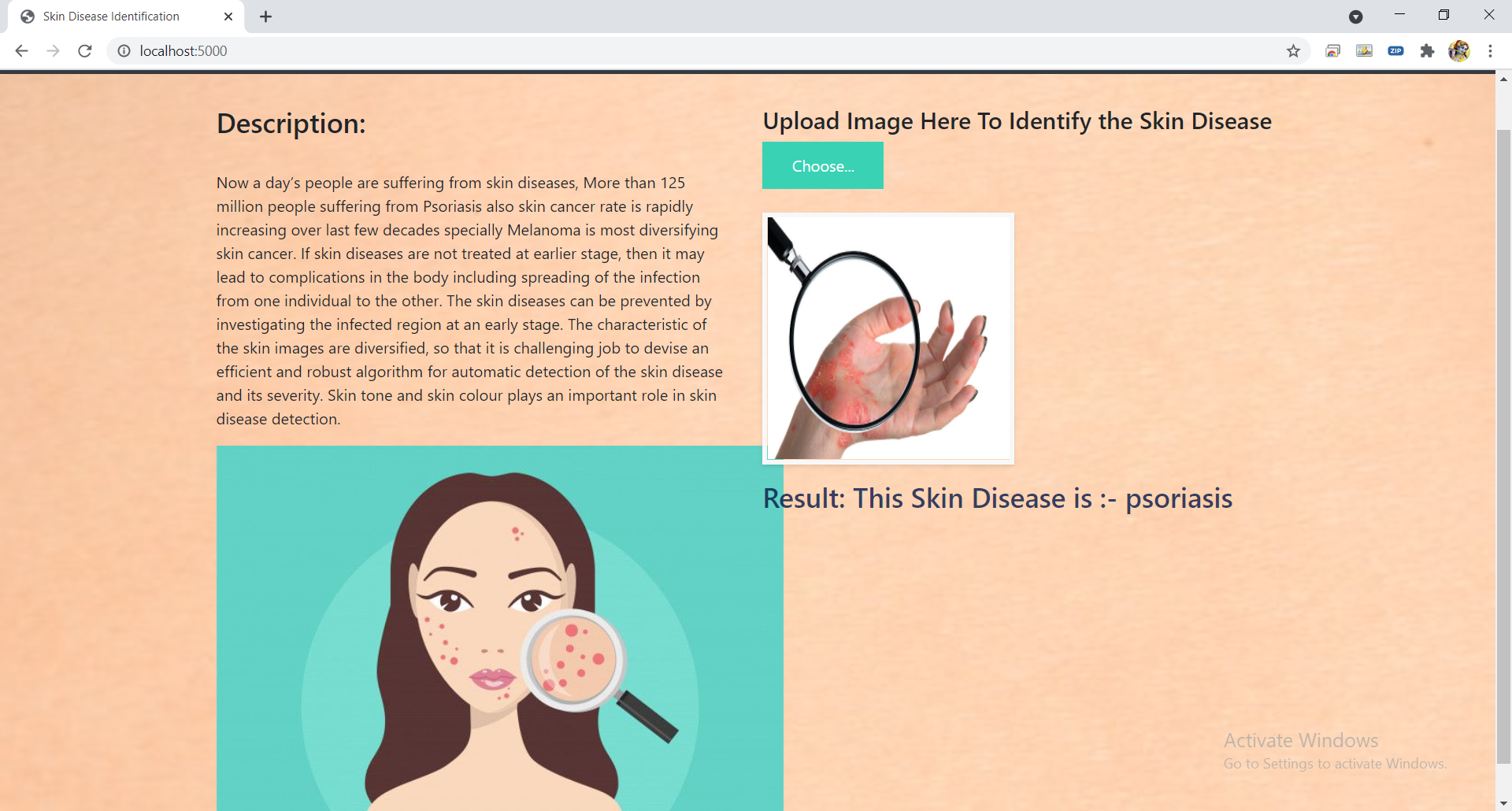
Train the CNN

Feature Extraction using CNN

Image Preprocessing

Upload the dataset

1. **Result:-**



1. **Advantages and Disadvantages**

Advantages:-

* The main advantage of CNN compared to its predecessors is that it automatically detects the important features without any human supervision.
* Skin Cancer which can be detected at a very early stage
* It is easy to understand and fast to implement.
* It has the highest accuracy among all alghoritms that predicts images.
* It decreases the needs of human effort developing its functionalities.

Disadvantages:-

* Large data is needed for training the model
* Takes more time for training the model.
* It is significantly slower due to an operation such as maxpool
* If the CNN has several layers then the training process takes a lot of time if the computer doesn’t consist of a good GPU.

**6. Applications:-**

* This model will be use for self diagnosis
* It will also be available in smartphones.
* First it will be used by medical staff to get the feedback.

**7. Conclusion:-**

* This paper gives a description of various skin diseases diagnosis models for humans by using image processing from which researcher can get an idea for an efficient techniques.
* This paper has comparison made between existing models on the basis of accuracy, speed and scale, which give a clarity output details.
* There are future scopes of improvements in present methodologies as no model guarantee hundred percent accuracy and is also limited to few number of skin diseases.
* In future present methodologies can be expanded for the detection of skin diseases in animals.
* A common model should be implemented for identification of all types of skin disease.

**8. Future Scope:-**.

* In future present methodologies can be expanded for the detection of skin diseases in animals.
* A common model should be implemented for identification of all types of skin disease.
* This model can be improved more in future by giving it more images to train so that it can predict more skin diseases and could also give medical advises.

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**10. Appendix:-**

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**11. Source code:-**

**PYTHON CODE**

App.py:-

import numpy as np

import os

from tensorflow.keras.models import load\_model

from tensorflow.keras.preprocessing import image

from flask import Flask , request, render\_template

#from werkzeug.utils import secure\_filename

#from gevent.pywsgi import WSGIServer

app = Flask(\_\_name\_\_)

model = load\_model("MYproject\_disease.h5")

@app.route('/')

def index():

return render\_template('index.html')

@app.route('/predict',methods = ['GET','POST'])

def upload():

if request.method == 'POST':

f = request.files['image']

print("current path")

basepath = os.path.dirname(\_\_file\_\_)

print("current path", basepath)

filepath = os.path.join(basepath,'uploads',f.filename)

print("upload folder is ", filepath)

f.save(filepath)

img = image.load\_img(filepath,target\_size = (128,128))

x = image.img\_to\_array(img)

print(x)

x = np.expand\_dims(x,axis =0)

print(x)

preds = model.predict\_classes(x)

print("prediction",preds)

index = ['Vitligo','psoriasis','seborrheic dermatitis']

text = "This Skin Disease is :- " + str(index[preds[0]])

return text

if \_\_name\_\_ == '\_\_main\_\_':

app.run(debug = False, threaded = False)

**HTML CODE**

index.html

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<meta http-equiv="X-UA-Compatible" content="ie=edge">

<title>Skin Disease Identification</title>

<link href="https://cdn.bootcss.com/bootstrap/4.0.0/css/bootstrap.min.css" rel="stylesheet">

<script src="https://cdn.bootcss.com/popper.js/1.12.9/umd/popper.min.js"></script>

<script src="https://cdn.bootcss.com/jquery/3.3.1/jquery.min.js"></script>

<script src="https://cdn.bootcss.com/bootstrap/4.0.0/js/bootstrap.min.js"></script>

<link href="{{ url\_for('static', filename='css/main.css') }}" rel="stylesheet">

<style>

.bg-dark {

background-color: #0C0C0Cimportant;

}

#result {

color: #0a1c4ed1;

}

body

{

background-image: url("https://us.123rf.com/450wm/ruslan/ruslan1209/ruslan120900040/15497367-human-skin-background.jpg?ver=6");

background-size: cover;

}

</style>

</head>

<body>

<nav class="navbar navbar-dark bg-dark">

<div class="container">

<a class="navbar-brand" href="#">Skin Disease Identification Using Image Analysis</a>

</div>

</nav>

<div class="container">

<div id="content" style="margin-top:2em">

<div class="container">

<div class="row">

<div class="col-sm-6 bd">

<h3>Description: </h3>

<br>

<p>Now a day’s people are suffering from skin diseases, More than 125 million people suffering from Psoriasis also skin cancer rate is rapidly increasing over last few decades specially Melanoma is most diversifying skin cancer. If skin diseases are not treated at earlier stage, then it may lead to complications in the body including spreading of the infection from one individual to the other. The skin diseases can be prevented by investigating the infected region at an early stage. The characteristic of the skin images are diversified, so that it is challenging job to devise an efficient and robust algorithm for automatic detection of the skin disease and its severity. Skin tone and skin colour plays an important role in skin disease detection. </p>

<img src="https://i.pinimg.com/736x/ac/89/ac/ac89acd3685fdbf34245327b6b64049d.jpg" height="50%",width="5%">

</div>

<div class="col-sm-6">

<div>

<h4>Upload Image Here To Identify the Skin Disease</h4>

<form action = "http://localhost:5000/" id="upload-file" method="post" enctype="multipart/form-data">

<label for="imageUpload" class="upload-label">

Choose...

</label>

<input type="file" name="image" id="imageUpload" accept=".png, .jpg, .jpeg">

</form>

<div class="image-section" style="display:none;">

<div class="img-preview">

<div id="imagePreview">

</div>

</div>

<div>

<button type="button" class="btn btn-info btn-lg " id="btn-predict">Predict</button>

</div>

</div>

<div class="loader" style="display:none;"></div>

<h3>

<span id="result"> </span>

</h3>

</div>

</div>

</div>

</div>

</div>

</div>

</body>

<footer>

<script src="{{ url\_for('static', filename='js/main.js') }}" type="text/javascript"></script>

</footer>

</html>

**CSS**

.img-preview {

width: 256px;

height: 256px;

position: relative;

border: 5px solid #F8F8F8;

box-shadow: 0px 2px 4px 0px rgba(0, 0, 0, 0.1);

margin-top: 1em;

margin-bottom: 1em;

}

.img-preview>div {

width: 100%;

height: 100%;

background-size: 256px 256px;

background-repeat: no-repeat;

background-position: center;

}

input[type="file"] {

display: none;

}

.upload-label{

display: inline-block;

padding: 12px 30px;

background: #39D2B4;

color: #fff;

font-size: 1em;

transition: all .4s;

cursor: pointer;

}

.upload-label:hover{

background: #34495E;

color: #39D2B4;

}

.loader {

border: 8px solid #f3f3f3; /\* Light grey \*/

border-top: 8px solid #3498db; /\* Blue \*/

border-radius: 50%;

width: 50px;

height: 50px;

animation: spin 1s linear infinite;

}

@keyframes spin {

0% { transform: rotate(0deg); }

100% { transform: rotate(360deg); }

}

**JAVASCRIPT**:

$(document).ready(function () {

// Init

$('.image-section').hide();

$('.loader').hide();

$('#result').hide();

// Upload Preview

function readURL(input) {

if (input.files && input.files[0]) {

var reader = new FileReader();

reader.onload = function (e) {

$('#imagePreview').css('background-image', 'url(' + e.target.result + ')');

$('#imagePreview').hide();

$('#imagePreview').fadeIn(650);

}

reader.readAsDataURL(input.files[0]);

}

}

$("#imageUpload").change(function () {

$('.image-section').show();

$('#btn-predict').show();

$('#result').text('');

$('#result').hide();

readURL(this);

});

// Predict

$('#btn-predict').click(function () {

var form\_data = new FormData($('#upload-file')[0]);

// Show loading animation

$(this).hide();

$('.loader').show();

// Make prediction by calling api /predict

$.ajax({

type: 'POST',

url: '/predict',

data: form\_data,

contentType: false,

cache: false,

processData: false,

async: true,

success: function (data) {

// Get and display the result

$('.loader').hide();

$('#result').fadeIn(600);

$('#result').text(' Result: ' + data);

console.log('Success!');

},

});

});

});

UI output Screenshot:-

http://127.0.0.1:5000/

