Project Report Format

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INTRODUCTION

PROJECT OVERVIEW

Dermatological disorders are common in general pediatric practice. A large percentage of misdiagnosis of common diseases, especially skin and other exterior-oriented diseases. This may be due to the fact that in general, it is not necessary for a pediatrician to undertake the necessary training in the field of dermatology and its practical knowledge. Further, diagnosing a patient for a skin disease usually involves careful observation of the symptoms by the doctor using the naked eye and based on his own judgment and experience, will issue a diagnosis on what he or she thinks the disease could be. There has been no singular tool up until now which allows for any and all medical professionals to verify the validity and correctness of their own diagnosis.
If the occurrence of the disease may be due to factors that are outside of that specific medical practitioner's area of expertise , then the true cause for the symptoms will almost surely go unnoticed. Beyond this, they are also prone to commit other mistakes as a consequence of their human nature. Keeping in mind these flaws that are inevitable , having the option to have their diagnosis skills verified and validated by the use of a tool that makes up for some if not most of their inadequacies allows for a satisfactory response to the needs of the patient and the overall competence of the medical practitioner. For these reasons, it is the objective of this project to build a project, that is, an intelligent system using Artificial Intelligence-based classification algorithms to accurately judge and diagnose the dermatological disease by analyzing in-depth, the high-level features that are present in the images of the patient's symptoms.

PURPOSE

This project aims to supplement diagnostic procedures of medical professionals and wherever necessary, do an independent diagnosis and draw out accurate conclusions in order to allow for a wider and more comprehensive analysis of the patient's symptoms by going through the vast and various possibilities of the causes behind a particular disease. This can help make up for the possibility of lack of domain knowledge by a single or even a group of human practitioner(s) and in case of any errors in judgment , will allow for the medical practitioner to reassess and if necessary, correct his or her judgment .

LITERATURE SURVEY

1) AI-based localization and classification of skin disease with erythema

Although computer-aided diagnosis (CAD) is employed in a number of medical specialties, including colonography and mammography, where noninvasive screening procedures are carried out solely with the naked eye and there is a possibility of preventable inaccuracy, it is not utilized in dermatology. This paper presents a novel way to successively combine precise segmentation and classification models, demonstrating that CAD may also be a feasible choice in dermatology. They dissect an image of the skin in order to extract high-level features and normalize the image. Here they first construct a segmented map of the image using a neural network-based segmentation model, after which we group the areas of aberrant skin and feed this data to a classification model.The suggested classification model can classify numerous diseases in a single image and is more accurate than a baseline model trained without segmentation. The field of dermatology may be able to apply CAD wi[th this better performance.

2) Intelligent Segmentation and Classification of Pigmented Skin Lesions in Dermatological Images

In recent years, computer vision-based diagnostic systems have been utilized in a number of hospitals and dermatology clinics with the primary goal of detecting skin cancers early, particularly malignant melanoma tumors, which are among the most common types of skin cancer. The segmentation and categorization of pigmented skin lesions in such dermatological images using intelligent algorithms is covered in this work. Following the proposal of a local thresholding algorithm for the separation of skin lesions, border, texture, and color-based features are derived from the digital pictures. A classification module based on Support Vector Machines (SVM) is built using extracted information to distinguish between malignant melanoma and dysplastic nevus.

3) SMOTE: Synthetic Minority Over-Sampling Technique

It is described how to create classifiers from datasets with imbalances. If the categorization categories are not roughly equally represented, a dataset is unbalanced. Real-world data sets frequently contain a large percentage of "regular" cases and a very small number of "abnormal" or "interesting" examples. The cost of misclassifying an abnormal (interesting) example as a normal example is also true, and it is frequently much larger than the cost of the opposite error. A useful way to improve a classifier's sensitivity to the minority class has been suggested: under-sampling the majority (normal) class.This study also demonstrates that combining our strategy of under- and over-sampling the majority class can lead to higher classifier performance (in ROC space) than adjusting the loss ratios in Ripper or the class priors in Naive Bayes. We oversample the minority class by generating artificial minority class examples. Using C4.5, Ripper, and a Naive Bayes classifier, experiments are carried out.

4) Skin disease analysis and tracking based on image segmentation

Tracking skin conditions is an essential part of the diagnostic process, and measuring the wound's surface is helpful for keeping track of the healing process. We suggest an unique method designed to cut down on time and error in order to address the challenges associated with measuring skin illnesses that are present with the current assessment methodologies. The suggested approach consists of two processes; the first is a preprocessing step that involves picture segmentation to find the margin of the skin region that is diseased. In the second, a different suggested method is used to gauge the wound's "size" and manage the progression of the sickness.In this work, a comparative research was carried out to determine the best segmentation method based on an edge accuracy-based EAC suggested criterion. The surface accuracy based on ROC1 space was compared to the new criterion. The results of the trials demonstrate the performance of the suggested criterion and the effectiveness of the measurement method.

5) AI-based localization and classification of skin disease with erythema

Computer-aided diagnosis (CAD) is used to improve the quality of diagnosis in various medical fields such as mammography and colonography. This study shows that CAD may also be a viable option in dermatology. Given an image of the skin, we decompose the image to extract high-level features. We then cluster sections of abnormal skin and pass this information to a classification model. Our classification model is more accurate than a baseline model trained without segmentation.The segmentation and classification of skin diseases has been gaining attention in the field of artificial intelligence. Clustering algorithms rely on the identification of a centroid that can generalize a cluster of data. Support vector machines (SVMs) are more reliant on the preprocessing of data for feature extraction. Convolution neural networks (CNNs) have gained popularity because of their ability to extract high-level features with minimal preprocessing. Although down-sampling allows CNNs to view an image in its own context, it degrades the resolution of the image. By learning to create a higher-resolution image, CNNs can determine the location of the targets to segment.We have shown that even without a large dataset and high-quality images, it is possible to achieve sufficient accuracy rates. With higher quality and a larger quantity of data, it will be viable to use state-of-the-art models to enable the use of CAD in the field of dermatology.

6) The mathematics of erythema: Development of machine learning models for artificial intelligence assisted measurement and severity scoring of radiation induced dermatitis

The objective of this single-center study was to develop machine learning and deep learning approaches for automatic classification of RISRs. Scarletred® Vision, a novel and state-of-the-art digital skin imaging method capable of remote monitoring and objective assessment of acute RISRs was used to convert 2D digital skin images using

the CIELAB color space and conduct SEV* measurements. A set of different machine learning and deep convolutional neural network-based algorithms has been explored for the automatic classification of RISRsA total of 2263 distinct images from 209 patients were analyzed for training and testing the machine learning algorithms. For a 2-class problem of healthy skin (grade 0) versus erythema (grade ≥ 1), all machine learning models produced an accuracy of above 70%. For estimating the severity grade of each class, the CNN obtained an overall accuracy of 66%. Ensemble learning combines several individual predictions to obtain a better generalization performance.

7) Skin Diseases Classification Using Hybrid AI Based Localization Approach

One of the most prevalent diseases that can be initially identified by visual inspection and further identified with the use of dermoscopic examination and other testing is skin cancer. Since eye observation provides the earliest opportunity for artificial intelligence to intercept various skin images, some skin lesion classification algorithms based on deep learning display improved outcomes. The image processing techniques are involved in the following ways, namely, the given input data sets go through the preprocessing techniques, these techniques are handled by using the median filter in our proposed approach, the preprocessing techniques are helping to remove the noise in the images, the median filter removes the salt and the pepper noise in the given input images.It implements the proposed approach for the skin diseases classification, and our proposed method implements the median filter for the preprocessing technique. The combination of the feature extraction In SCM and the classification in ECNN shows better accuracy when compared to the existing techniques. Preprocessing filter helps to remove the noise in the entire image, thus it provides a better quality of the image to the segmentation process.

8) Skin Disease Classification from Image - A Survey

Identification of skin diseases mostly relies on the expertise of the doctors and skin biopsy results.Classification of skin disease from an image is a crucial task and highly

depends on the features of the diseases considered in order to classify it correctly. Many skin diseases have highly similar visual characteristics, which add more challenges to the selection of useful features. This paper presents a survey of different methods and techniques for skin disease classification.This paper presents the survey of traditional or feature extraction based and CNN based approach for skin disease classification. Pre-trained models like Inception v3, resnet, VGG16, VGG19, Alexnet etc are trained on very large dataset.

Citation

[1] Son HM, Jeon W, Kim J, et al. AI-based localization and classification of skin disease with erythema. Sci Rep. 2021;11(1):5350. Published 2021 Mar 5. doi:10.1038/s41598-021-84593-z

[2] Maglogiannis, I., Zafiropoulos, E.P., & Kyranoudis, C. (2006). Intelligent Segmentation and Classification of Pigmented Skin Lesions in Dermatological Images. SETN

[3] Leo, Breiman. (2001). Random Forests. 45(1):5-32. doi: 10.1023/A:1010933404324

[4] O. Trabelsi, Lotfi Tlig, M. Sayadi, F. Fnaiec Published on march 2020

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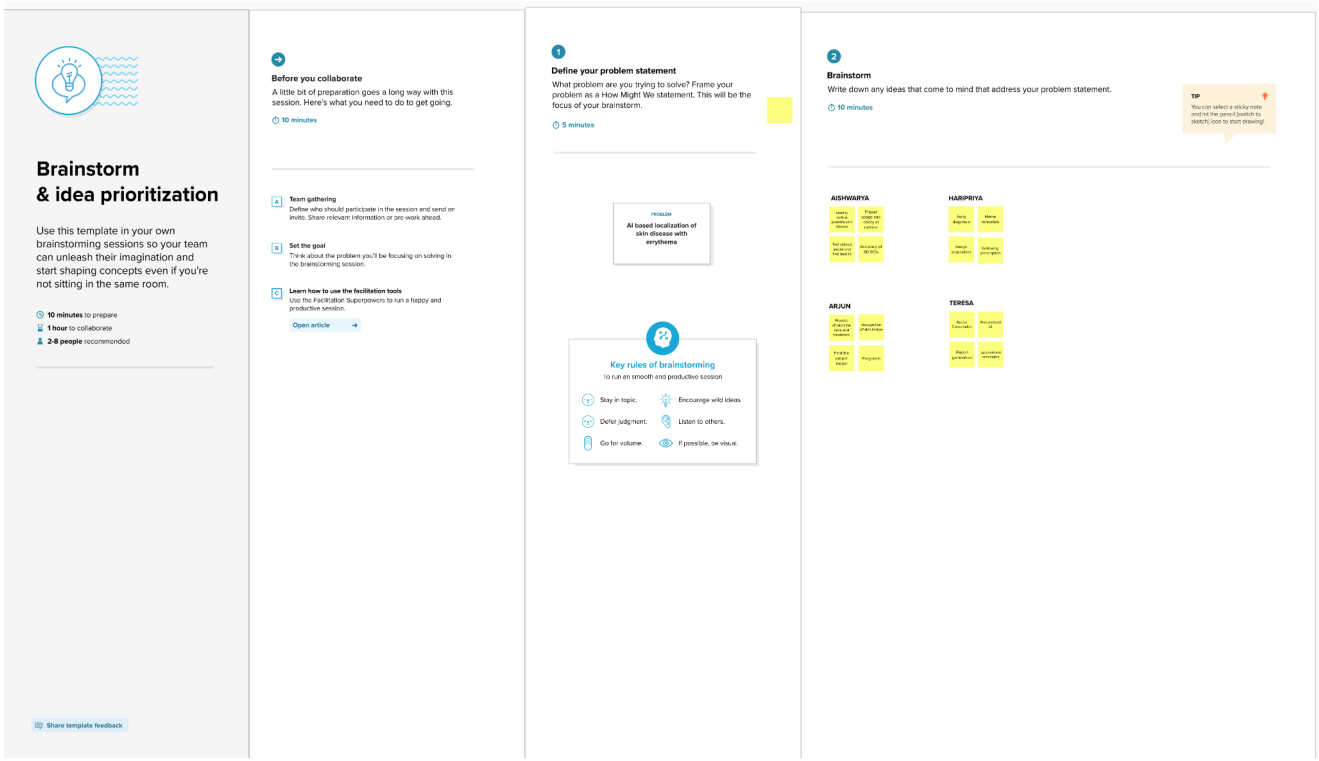
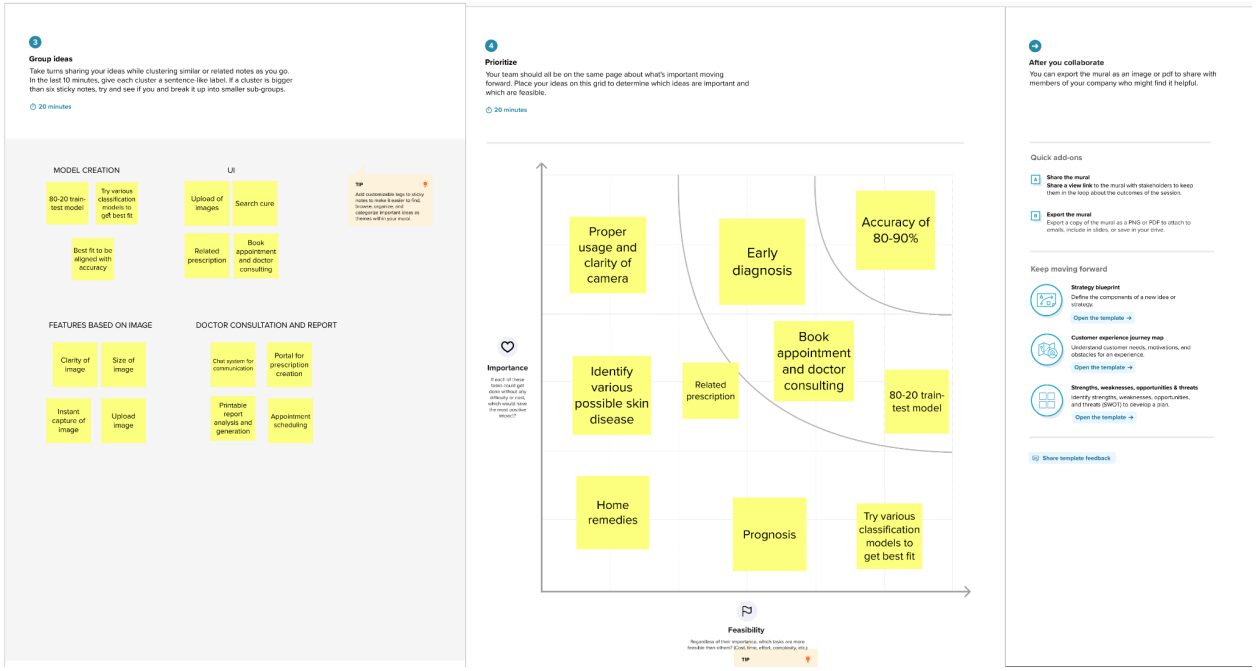
Prof. Yepuganti Karuna VIT University Vellore,India

IDEA AND PROPOSED SOLUTION

EMPATHY MAP CANVAS

IDEATION AND BRAINSTORMING





PROPOSED SOLUTION

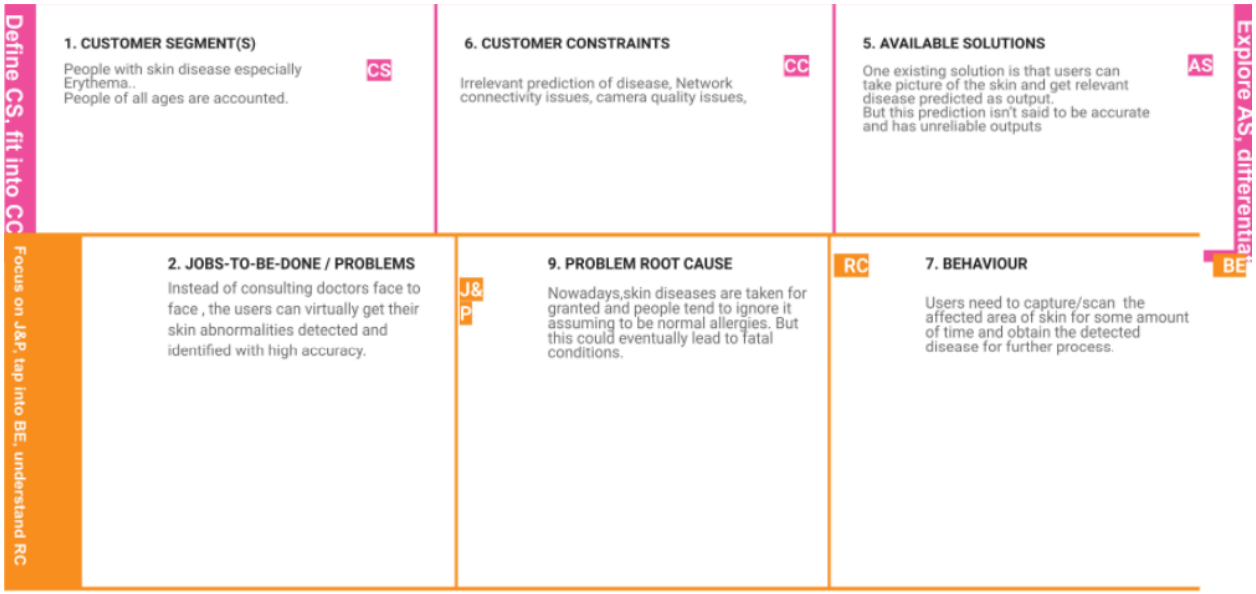
Date	1 October 2022
Team ID	PNT2022TMID27441
Project Name	AI-based localization and classification of skin disease with erythema
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	To build an intelligent system using Artificial Intelligence-based classification algorithms to accurately judge and diagnose the dermatological disease by analyzing in-depth, the high-level features that are present in the images of the patient's symptoms.
2.	Idea / Solution description	The application is able to analyse the individual's affected skin area against the person's normal skin tone and texture and provide a specific treatment solution and can give alterative treatments as well.
3.	Novelty / Uniqueness	Relative to other existing solutions, our project aims to have at least 65% more accuracy using photos taken from a normal smartphone and will suggest a treatment plan for the same.
4.	Social Impact / Customer Satisfaction	Early diagnosis and treatment allows for potential skin diseases to be treated within the first few hours and minimises the spreading to other parts of the body.
5.	Business Model (Revenue Model)	Pharmacists are able to make a considerable amount as regular customers are able to spend more on medicines due to the Consultation charges being nullified.
6.	Scalability of the Solution	As the treatment has been suggested by the application itself, we can have tie-ups with pharmaceutical companies for ordering and delivering the medicines to the customer/patient's door step.

PROBLEM SOLUTION FIT



REQUIREMENT ANALYSIS

FUNCTIONAL REQUIREMENTS

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic) Sub Requirement (Story / Sub-Task)
FR-1	User Registration Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation Confirmation via Email Confirmation via OTP
FR-3	User Profile User will provide their medical details and save in the system
FR-4	Input User capture the skin which is affected or upload the taken image as jpeg format
FR-5	Output Analysis Image will be processed through YOLO and other trained model
FR-6	Provides Description Gives detailed description of type of the skin disease affected

NON - FUNCTIONAL REQUIREMENTS

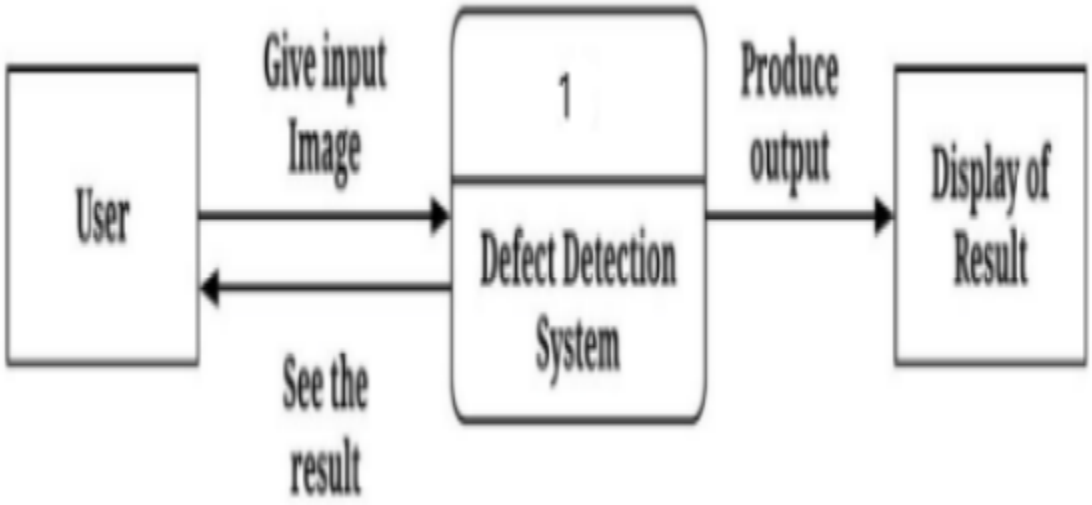
Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Used to classify skin disease with erythema
NFR-2	**Security**	It offers greater security and prevents unauthorized users to access the data
NFR-3	**Reliability**	Even with more users, there will be a good performance without failure
NFR-4	**Performance**	Performance is very high and it provides result with high accuracy and precision.
NFR-5	**Availability**	With a good system, all authorised users can access and view the medical reports of patients.
NFR-6	**Scalability**	Performance will be good even with high user traffic.

PROJECT DESIGN
DATA FLOW DIAGRAM

A **Data Flow Diagram (DFD)** is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.



SOLUTION ARCHITECTURE

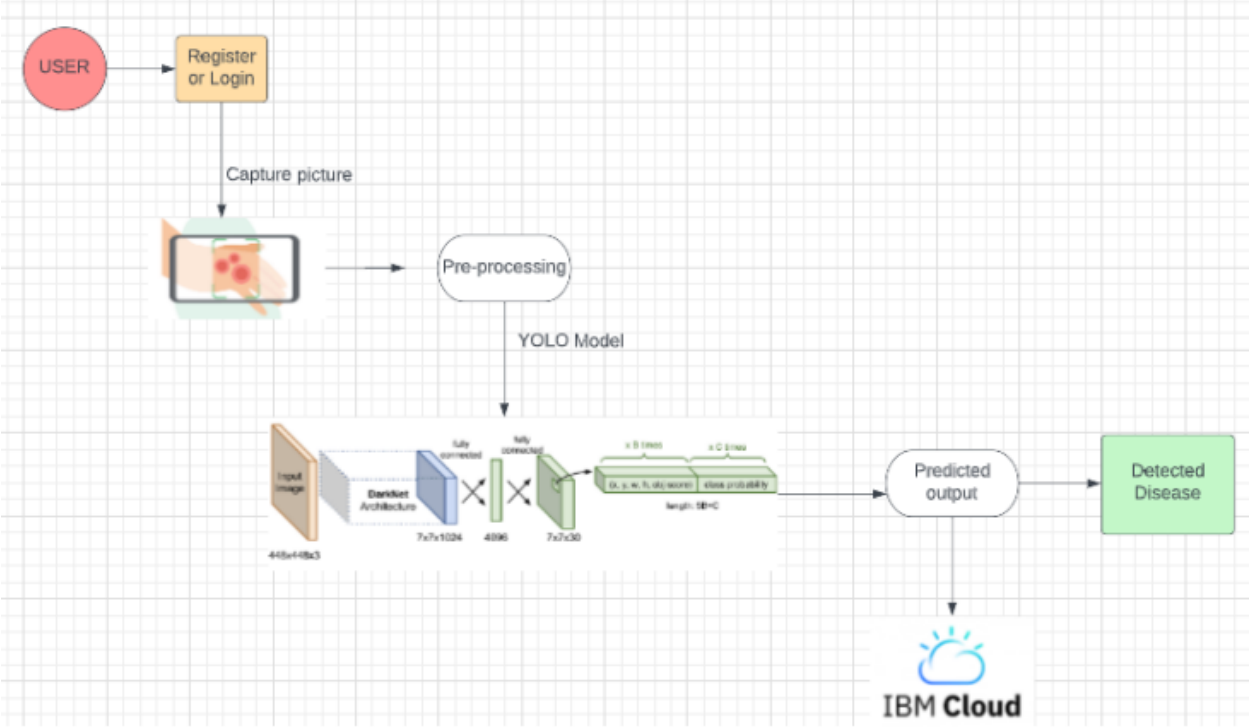
Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions.
Its goals are to:

- Find the best tech solution to solve existing business problems.

- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.

- Define features, development phases, and solution requirements.

- Provide specifications according to which the solution is defined, managed, and delivered.



USER STORIES

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail	I can access the dashboard with Gmail	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I've successfully logged in	High	Sprint-1
	Dashboard	USN-6	As a user ,I can view the number of doctors available currently	Can view only on successful login	Medium	Sprint-1
Customer (Web user)	Registration	USN-1	As a user ,I can register by entering the required credentials	I can access my account	High	Sprint-1
		USN-2	As a user, I can receive email verification after registration	After receiving confirmation email, I can click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Gmail and Facebook	I can register and access the dashboard	Low	Sprint-2

	Login	USN-4	As a user, I can log into the application by entering the correct email and password	I've successfully logged in	High	Sprint-1
	Dashboard	USN-5	As a user, I can view the number of patients currently suffering with psoriasis	Can view on successful login	Medium	Sprint-1

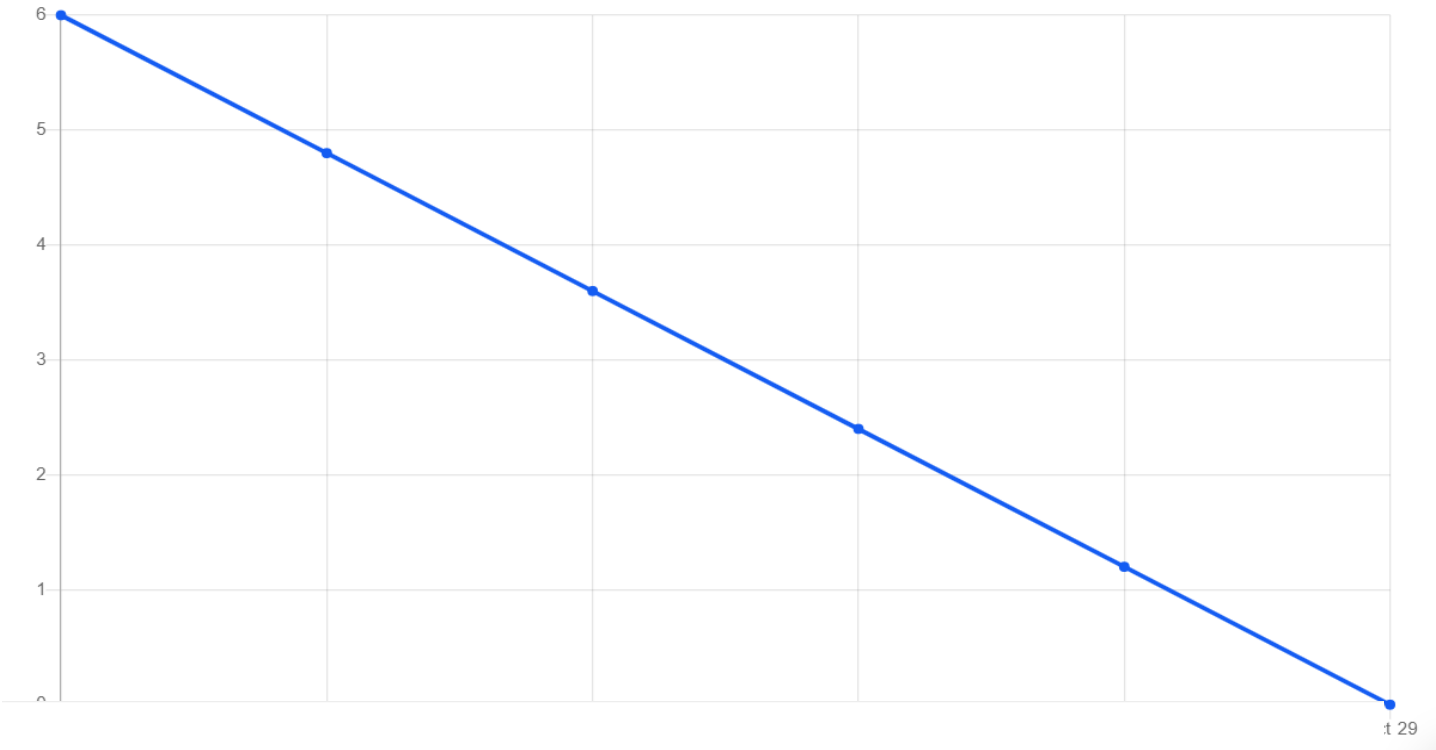
Customer Care Executive	Registration	USN-1	As a customer care executive, I can register by filling the registration form	Register after verifying the details	High	Sprint-1
	Login	USN-2	As a customer care executive, I can receive verification email	Click confirm after receiving verification email	High	Sprint-1
	Chat bot	USN-3	As a customer care executive, I can provide support using chat bot	On getting assigned to a customer	Low	Sprint-2
	Ratings	USN-4	As a customer care executive, I can view my ratings and reviews	On logging into the dashboard	Low	Sprint-2
Administrator	Login	USN-1	As an administrator, I can login by providing the correct credentials	Login to account	High	Sprint-1
		USN-2	As an administrator, I can provide technical support to customer care executive	On issues raised by the customer care executive	High	Sprint-2
		USN-3	As an administrator, I can connect doctors with specific issues	On illness mentioned	Low	Sprint-2

PROJECT PLANNING AND SCHEDULING
SPRINT PLANNING AND ESTIMATION

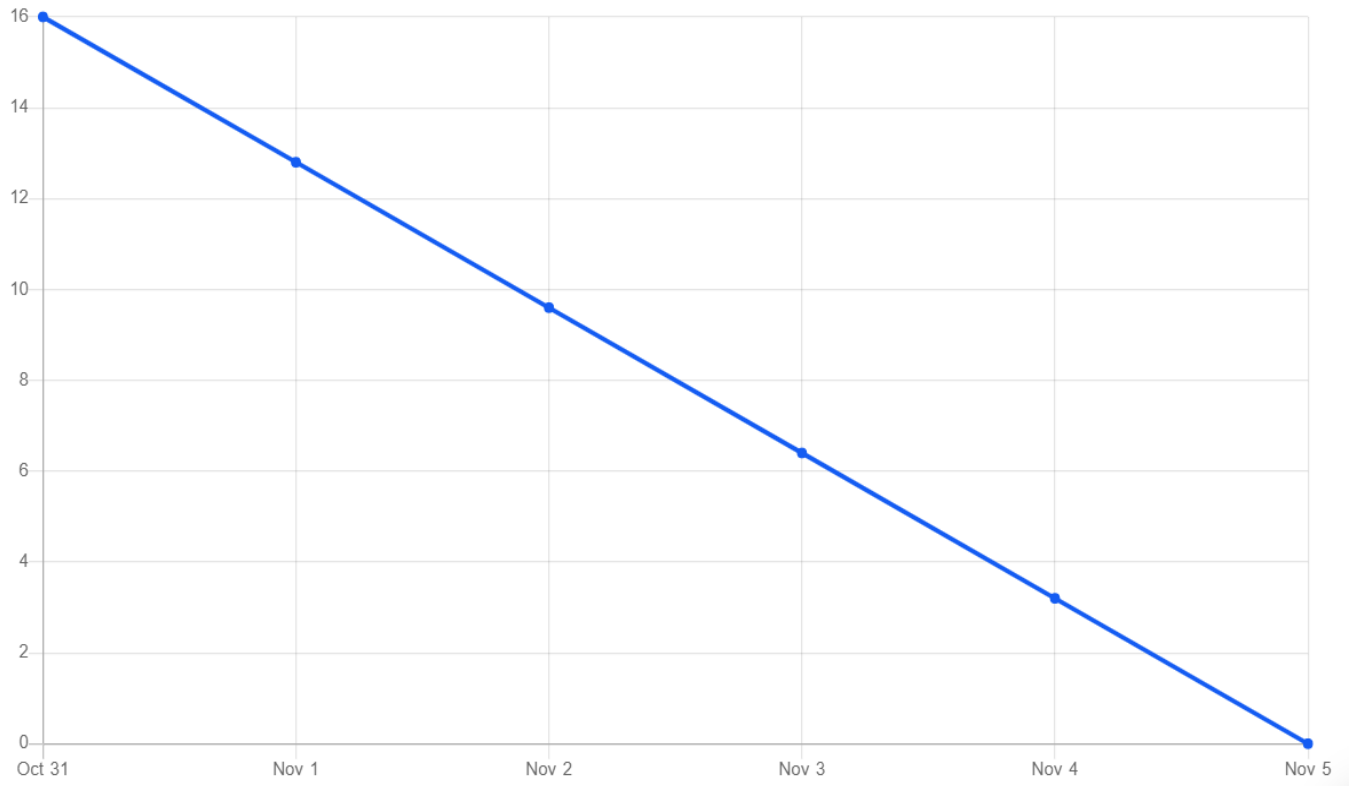
Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	9	6 Days	24 Oct 2022	29 Oct 2022	6	29 Oct 2022
Sprint-2	4	6 Days	31 Oct 2022	05 Nov 2022	16	05 Nov 2022
Sprint-3	2	6 Days	07 Nov 2022	12 Nov 2022	10	12 Nov 2022
Sprint-4	2	6 Days	14 Nov 2022	19 Nov 2022	14	19 Nov 2022

Sprint	Total Story Points	Duration	Average Velocity
Sprint-1	9	6 Days	9/6=1.5
Sprint-2	4	6 Days	4/6=0.6
Sprint-3	2	6 Days	2/6=0.3
Sprint-4	2	6 Days	2/6=0.3
Total	17	24	17/24=0.7

Sprint 1

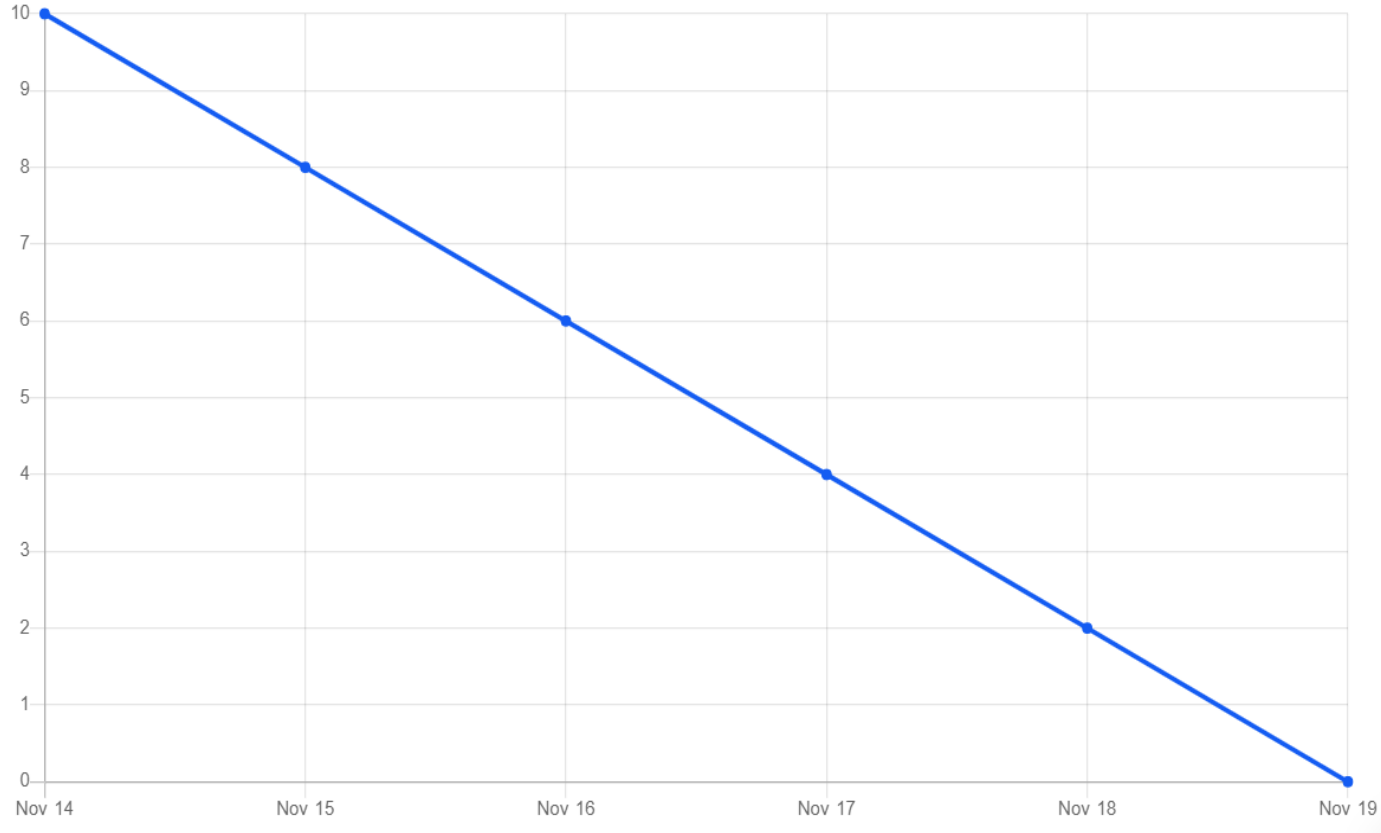


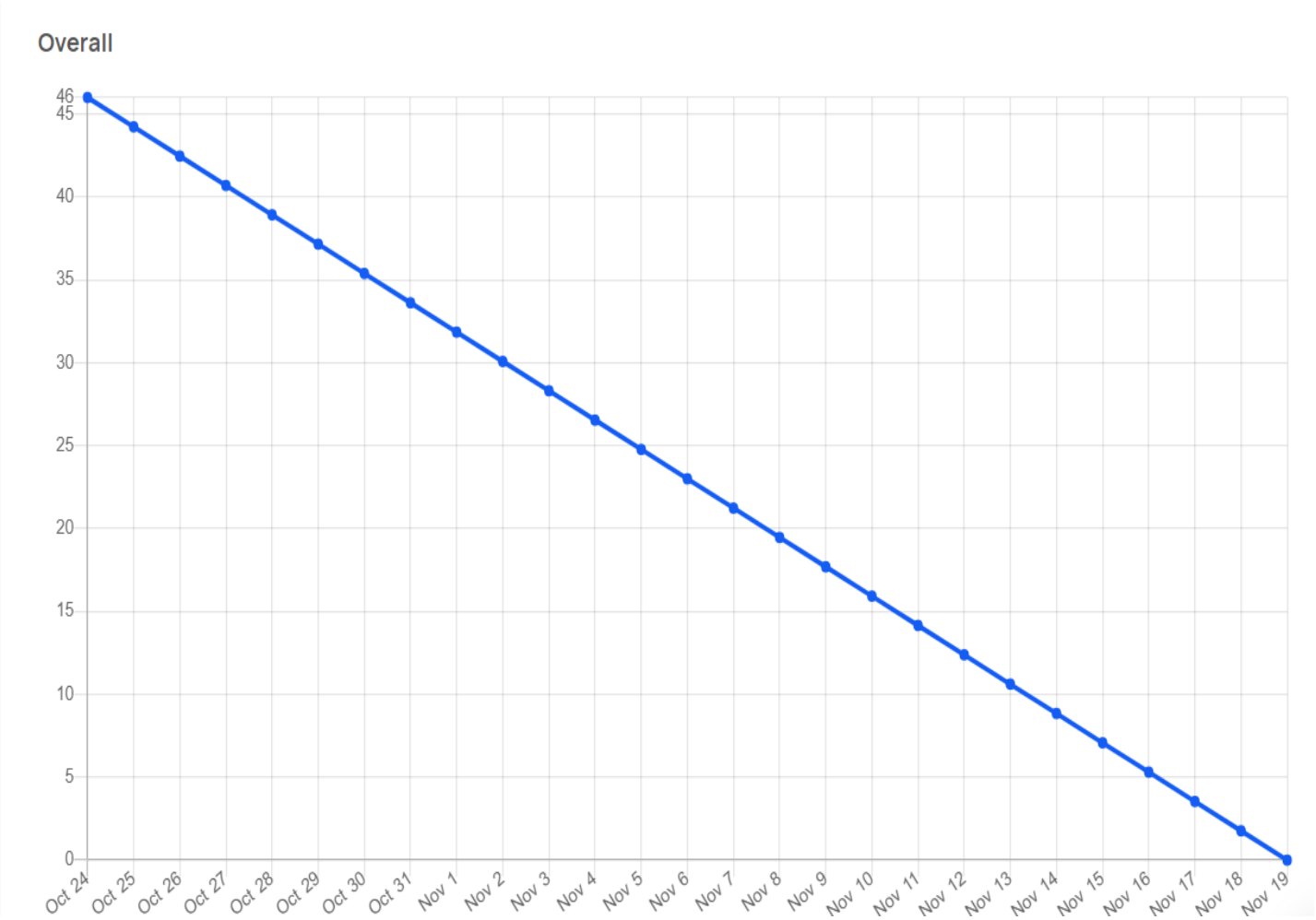
Sprint 2



Sprint 3

Sprint 4




Overall
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SPRINT DELIVERY SCHEDULE

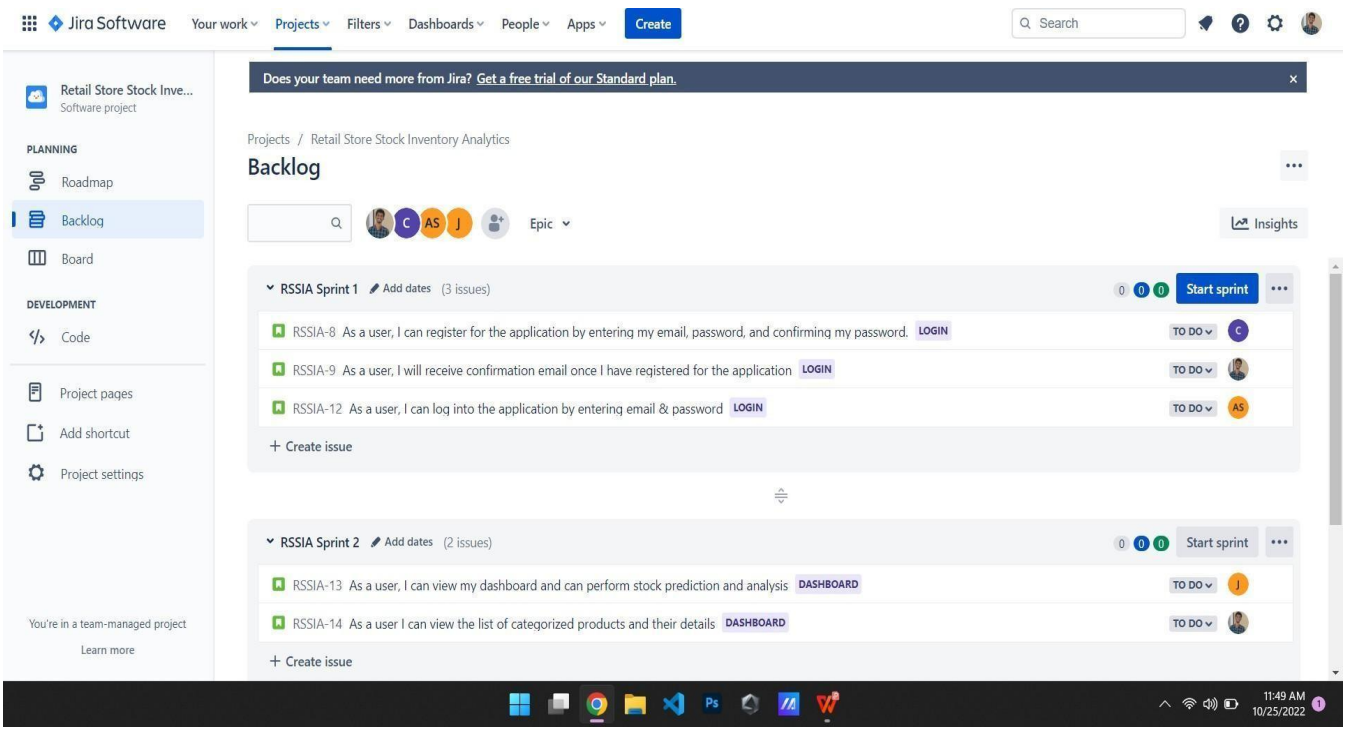
Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	2	High	Haripriya, Arjun Srinivasan
Sprint-1		USN-2	As a user, I will receive confirmation email once I have registered for the application	1	High	Aiswaraya Teresa
Sprint-1		USN-3	As a user, I can register for the application through Facebook	2	Low	Haripriya, Aishwarya
Sprint-1		USN-4	As a user, I can register for the application through Gmail	2	Medium	Aiswaraya Arjun Srinivasan
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	1	High	Aiswaraya Arjun Srinivasan
Sprint-2	Dashboard	USN-6	As a user ,I can view the number of doctors available currently	3	Medium	Aiswaraya, Haripriya,
Sprint-1	Registration	USN-1	As a user ,I can register by entering the required credentials	4	High	Haripriya, Arjun Srinivasan
Sprint-1		USN-2	As a user, I can receive email verification after registration	2	High	Teresa, Haripriya
Sprint-2	Login	USN-3	As a user, I can register for the application through Gmail and Facebook	5	Low	Teresa, Arjun Srinivasan
Sprint-1	Dashboard	USN-4	As a user, I can log into the application by entering the correct email and password currently suffering with psoriasis	5	High	Haripriya Aiswaraya
Sprint-1		USN-5	As a user, I can view the number of patients currently suffering with psoriasis	4	Medium	Arjun Srinivasan Aiswaraya
Sprint-2	Registration	USN-1	As a customer care executive, I can register by filling the registration form	3	High	Aiswaraya, Teresa

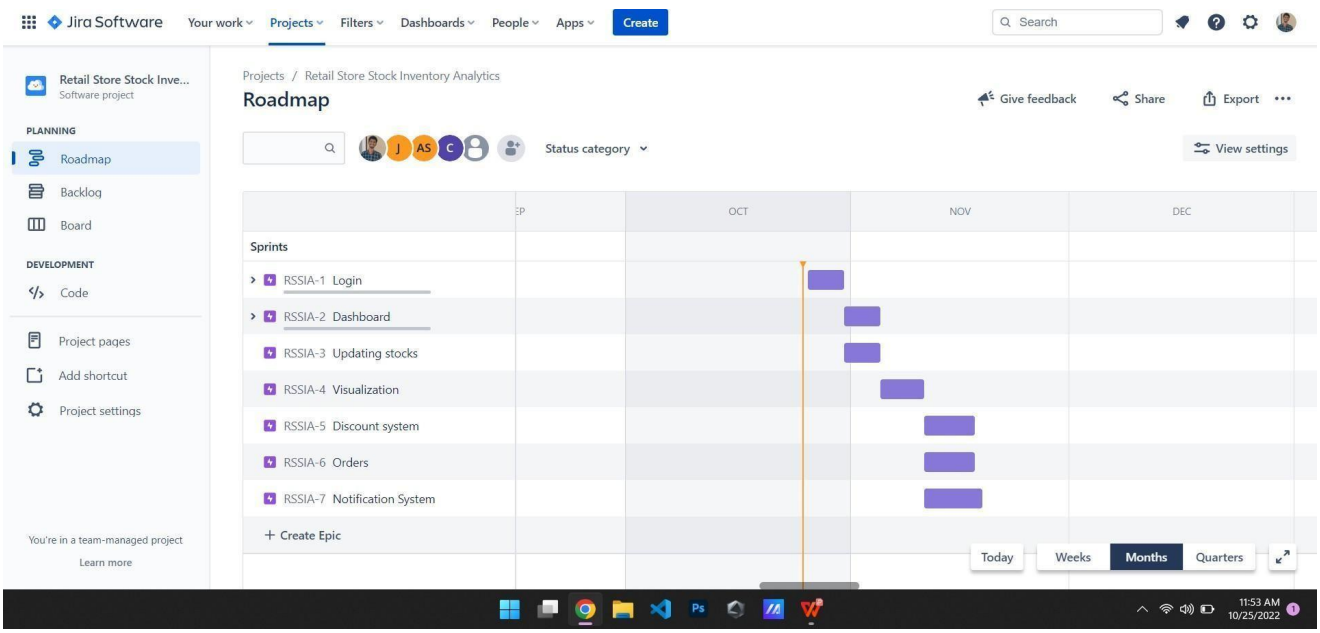
Sprint-2	Login	USN-2	As a customer care executive, I can receive verification email	5	High	Haripriya Aiswaraya
Sprint-3	Chat bot	USN-3	As a customer care executive, I can provide support using chat bot	4	Low	Aiswaraya Arjun Srinivasan
Sprint-3	Ratings	USN-4	As a customer care executive, I can view my ratings and reviews	3	Low	Haripriya, Teresa
Sprint-4	Login	USN-1	As an administrator, I can login by providing the correct credentials	2	Medium	Arjun Srinivasan, Aiswaraya
Sprint-4		USN-3	As an administrator, I can connect doctors with specific	4	Medium	Teresa Aiswaraya,

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	9	6 Days	24 Oct 2022	29 Oct 2022	6	29 Oct 2022
Sprint-2	4	6 Days	31 Oct 2022	05 Nov 2022	16	05 Nov 2022
Sprint-3	2	6 Days	07 Nov 2022	12 Nov 2022	10	12 Nov 2022
Sprint-4	2	6 Days	14 Nov 2022	19 Nov 2022	14	19 Nov 2022

REPORT FROM JIRA





CODING AND SOLUTIONING

FEATURE 1 : PREDICTION

The main feature of the software is the Prediction of the existence of Skin Disease based on the Image uploaded by the User . The primary code is given in the following snippet.

```
def predict(filename , model):
    img = load_img(filename , target_size = (224, 224))
    img = img_to_array(img)
    img = img.reshape(1,224,224,3)
    img = img.astype('float32')
    img = img/255.0
    result = model.predict(img)
    dict_result = {}
    for i in range(7):
        dict_result[result[0][i]] = classes[i]
    res = result[0]
    res.sort()
    res = res[::-1]
    prob = res[:3]
    prob_result = []
    class_result = []
    for i in range(3):
        prob_result.append((prob[i]*100).round(2))
        class_result.append(dict_result[prob[i]])
    return class_result , prob_result
```

FULL CODE

FRONTEND CODE : HTML/JS

```
<!DOCTYPE html>
```

```
<html lang="eng">
   <head>
       <meta charset="UTF-8">
       <meta name="viewport" content="width=device-width, initial-scale=1.0">
       <link rel="stylesheet" href={{url_for('static' , filename =
'css/normalize.css')}}>
       <link rel="stylesheet" href={{url_for('static' , filename =
'css/grid.css')}}>
       <link rel='stylesheet' href={{url_for('static' , filename =
'css/styleSucc.css')}}>

       <link
href="https://fonts.googleapis.com/css2?family=Lato:ital,wght@0,100;0,300;0,400
;1,300&display=swap" rel="stylesheet" type='text/css'>
       <link rel="stylesheet"
href="https://maxcdn.bootstrapcdn.com/bootstrap/4.0.0/css/bootstrap.min.css"
integrity="sha384-Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcJlSAwiGgFAW/dAiS6
JXm" crossorigin="anonymous">
       <title>Results Page</title>
       <style type="text/css">
           th{
               text-align: center;
               font-size: 20px;
           }

           td{
               text-align: center;
               font-size: 18px;
           }
       </style>

<style>
  .disinfo{
     margin-top:50px;
     width:80%;
     height:500px;
  }

</style>
   </head>
   <body>
       <div class = "second-main" style = "height: 100% , width : 100%;">
           <nav>
               <ul style = "padding-right: 2%;" class = "main-nav">
                   <li><a href ="logout.html">Logout</a></li>
               </ul>
           </nav>
           <div class = "header">
               <row style = "width: 100% ; display: flex; justify-content:
center;">
                   <h3 class="header-text">Uploaded Image</h3>
               </row>
               <row style = "width: 100% ; display: flex; justify-content:
center;">
                   <img class = "result-img" src={{url_for('static', filename =
'images/'+ img)}}>
               </row>
```

```
            </div>
            <div class = "info">
                <row style = "width: 100% ; display: flex; justify-content:
center;">
                    <h3 class = "header-text">Model Prediction</h3>
                </row>
                <row style = "width: 100%; display: flex; justify-content:
center;">
                    <p style="color:#16a085">You might have {{
predictions.class1 }} </p>
                </row>
            </div>
        </div>
        <center>
            <iframe
src='https://www.diseaseinfosearch.org/search?term={{predictions.class1}}'
class='disinfo'></iframe>
        </center>
    </body>
</html>
```

BACKEND : PYTHON FLASK

```
app = Flask(__name__)
j_file = open('model.json', 'r')
loaded_json_model = j_file.read()
j_file.close()
model = model_from_json(loaded_json_model)
model.load_weights('model.h5')
```

```
ALLOWED_EXT = set(['jpg' , 'jpeg' , 'png' , 'jfif'])
def allowed_file(filename):
    return '.' in filename and \
           filename.rsplit('.', 1)[1] in ALLOWED_EXT
```

```
classes = [
  'Actinic Keratoses',
  'Basal Cell Carcinoma',
  'Benign Keratosis',
  'Dermatofibroma',
  'Melanoma',
  'Melanocytic Nevi',
  'Vascular naevus'
]
```

```
@app.route('/success' , methods = ['GET' , 'POST'])
def success():
    error = ''
    target_img = os.path.join(os.getcwd() , 'static/images')
    if request.method == 'POST':
        if(request.form):
            link = request.form.get('link')
            try :
                resource = urllib.request.urlopen(link)
                unique_filename = str(uuid.uuid4())
                filename = unique_filename+".jpg"
```

```
                img_path = os.path.join(target_img , filename)
                output = open(img_path , "wb")
                output.write(resource.read())
                output.close()
                img = filename
                class_result , prob_result = predict(img_path , model)
                predictions = {
                      "class1":class_result[0],
                }
            except Exception as e :
                print(str(e))
                error = 'This image from this site is not accesible or
inappropriate input'
            if(len(error) == 0):
                return  render_template('success.html' , img  = img ,
predictions = predictions)
            else:
                return render_template('index.html' , error = error)
        elif (request.files):
            file = request.files['file']
            if file and allowed_file(file.filename):
                file.save(os.path.join(target_img , file.filename))
                img_path = os.path.join(target_img , file.filename)
                img = file.filename
                class_result , prob_result = predict(img_path , model)
                predictions = {
                      "class1":class_result[0],
                }
            else:
                error = "Please upload images of jpg , jpeg and png extension
only"
            if(len(error) == 0):
                return  render_template('success.html' , img  = img ,
predictions = predictions)
            else:
                return render_template('index.html' , error = error)
    else:
        return render_template('index.html')
if __name__ == "__main__":
    app.run(debug = True)
```

FEATURE 2

In case the software has confirmed that a Skin Disease has been detected from the uploaded image then the next step is to consult a Dermatologist . The software itself will set up a consultation with the Dermatologist.

The following code gets the details of the User in order to set up a consultation with the doctor.

```
<section class="book" id="book">
  <h1 class="heading"> <span>book</span> now </h1>
   <div class="row">
       <div class="image">
           <img src="image/book-img.svg" alt="">
       </div>
       <form action="">
           <h3>book appointment</h3>
           <input type="text" placeholder="your name" class="box">
           <input type="number" placeholder="your number" class="box">
           <input type="email" placeholder="your email" class="box">
           <input type="date" class="box">
           <input type="submit" value="book now" class="btn">
       </form>
   </div>
</section>
```

FULL CODE : HTML/JS

```
<!DOCTYPE html>
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta http-equiv="X-UA-Compatible" content="IE=edge">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>complete responsive hospital website design </title>
   <!-- font awesome cdn link  -->
```

```
    <link rel="stylesheet"
href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/5.15.4/css/all.min.cs
s">
    <!-- custom css file link  -->
    <link rel="stylesheet" href="css/style.css">
</head>
<body>
<!-- header section starts  -->
<header class="header">
    <a href="#" class="logo"> <i class="fas fa-heartbeat"></i> Hola. </a>
    <nav class="navbar">
        <a href="#home">home</a>
        <a href="register.html">Register </a>
        <a href="login.html">Login</a>
        <a href="logout.html">Logout</a>
    </nav>
    <div id="menu-btn" class="fas fa-bars"></div>
</header>
<!-- header section ends -->
<!-- home section starts  -->
<section class="home" id="home">

    <div class="image">
        <img src="image/home-img.svg" alt="">
    </div>
    <div class="content">
        <h3>stay safe, stay healthy</h3>
        <p>AI-based localization and classification of skin disease with
erythema</p>
        <a href="#" class="btn"> contact us <span class="fas
fa-chevron-right"></span> </a>
    </div>
</section>
<section class="about" id="about">
    <h1 class="heading"> <span>about</span> us </h1>
    <div class="row">
        <div class="image">
            <img src="image/about-img.svg" alt="">
        </div>
        <div class="content">
            <h3>we take care of your healthy life</h3>
            <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 the last few decades especially Melanoma is most diversifying
skin cancer. If skin diseases are not treated at an earlier stage, then it may
lead to complications in the body including spreading of the infection from one
individual to the other. The characteristic of the skin images is diversified
so that it is a challenging job to devise an efficient and robust algorithm for
automatic detection of skin disease and its severity. Skin tone and skin colour
play an important role in skin disease detection. Colour and coarseness of skin
are visually different. Automatic processing of such images for skin analysis
requires quantitative discriminator to differentiate the diseases.
            To overcome the above problem we are building a model which is used
for the prevention and early detection of skin cancer, psoriasis. Basically,
skin disease diagnosis depends on the different characteristics like colour,
shape, texture etc. The model analyses the image and detect whether the person
is having skin disease or not.</p>
```

```
            <a href="#" class="btn"> learn more <span class="fas
fa-chevron-right"></span> </a>
        </div>
    </div>
</section>
<!-- about section ends -->
<!-- doctors section starts  -->
<section class="doctors" id="doctors">
    <h1 class="heading"> Our <span>Team</span> </h1>
    <div class="box-container">
        <div class="box">
            <h3>Aishwarya</h3>
            <span>Developer</span>
            <div class="share">
                <a href="#" class="fab fa-facebook-f"></a>
                <a href="#" class="fab fa-twitter"></a>
                <a href="#" class="fab fa-instagram"></a>
                <a href="#" class="fab fa-linkedin"></a>
            </div>
        </div>
        <div class="box">
            <h3>Arjun</h3>
            <span>Developer</span>
            <div class="share">
                <a href="#" class="fab fa-facebook-f"></a>
                <a href="#" class="fab fa-twitter"></a>
                <a href="#" class="fab fa-instagram"></a>
                <a href="#" class="fab fa-linkedin"></a>
            </div>
        </div>
        <div class="box">
            <h3>Hari Priya </h3>
            <span>Developer</span>
            <div class="share">
                <a href="#" class="fab fa-facebook-f"></a>
                <a href="#" class="fab fa-twitter"></a>
                <a href="#" class="fab fa-instagram"></a>
                <a href="#" class="fab fa-linkedin"></a>
            </div>
        </div>
        <div class="box">
            <h3>Tresa</h3>
            <span>Developer</span>
            <div class="share">
                <a href="#" class="fab fa-facebook-f"></a>
                <a href="#" class="fab fa-twitter"></a>
                <a href="#" class="fab fa-instagram"></a>
                <a href="#" class="fab fa-linkedin"></a>
            </div>
        </div>
    </div>
</section>
<section class="review" id="review">
    <h1 class="heading"> client's <span>review</span> </h1>
    <div class="box-container">
        <div class="box">
            <img src="image/pic-1.png" alt="">
```

```
            <h3>john deo</h3>
            <div class="stars">
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star-half-alt"></i>
            </div>
            <p class="text">Perfect service and perfect prediction.All done and
dusted in less than 30 minutes and faultless. Would recommend without
hesitation</p>
        </div>
        <div class="box">
            <img src="image/pic-2.png" alt="">
            <h3>john deo</h3>
            <div class="stars">
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star-half-alt"></i>
            </div>
            <p class="text">The service I received was superb. The Predication
procedures clear and transparent</p>
        </div>
        <div class="box">
            <img src="image/pic-3.png" alt="">
            <h3>john deo</h3>
            <div class="stars">
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star-half-alt"></i>
            </div>
            <p class="text">I Used haloc and the service I received was superb .
The Predication was very helpful, efficient and professional. I would highly
recommend to halo medical group</p>
        </div>
    </div>
</section>
<section class="footer">
    <div class="box-container">
        <div class="box">
            <h3>quick links</h3>
            <a href="#"> <i class="fas fa-chevron-right"></i> home </a>
            <a href="#"> <i class="fas fa-chevron-right"></i> about </a>
            <a href="#"> <i class="fas fa-chevron-right"></i> book </a>
            <a href="#"> <i class="fas fa-chevron-right"></i> review </a>
        </div>
        <div class="box">
            <h3>our services</h3>
            <a href="#"> <i class="fas fa-chevron-right"></i> Image upload</a>
            <a href="#"> <i class="fas fa-chevron-right"></i> Prediction</a>
            <a href="#"> <i class="fas fa-chevron-right"></i> diagnosis </a>
        </div>
        <div class="box">
```

```
            <h3>contact info</h3>
            <a href="#"> <i class="fas fa-phone"></i> +111-222-3333 </a>
            <a href="#"> <i class="fas fa-envelope"></i> Prediction@gmail.com
</a>
            <a href="#"> <i class="fas fa-map-marker-alt"></i> Chennai, india
</a>
        </div>
        <div class="box">
            <h3>follow us</h3>
            <a href="#"> <i class="fab fa-facebook-f"></i> facebook </a>
            <a href="#"> <i class="fab fa-twitter"></i> twitter </a>
            <a href="#"> <i class="fab fa-twitter"></i> twitter </a>
            <a href="#"> <i class="fab fa-instagram"></i> instagram </a>
            <a href="#"> <i class="fab fa-linkedin"></i> linkedin </a>
            <a href="#"> <i class="fab fa-pinterest"></i> pinterest </a>
        </div>
    </div>
</section>
```

TESTING
TEST CASES

Test case ID	Feature Type	Component	Test Scenario	Steps To Execute
Sign_up_Page 00	Functional	Home Page	Verify if the user is able to enter is details to sign-up	1.Enter the skin disease prediction url 2.Click on signup option 3.Verify Singup popup displayed or not
Login_Page_TD-1	UI	Home Page	Verify the UI elements in Login/Signup popup	1.Enter the skin disease prediction url 2.Click on signup option 3.Verify login/Singup popup with below UI elements: a.email text box b.password text box c.Login button d.New user? Create account link e.Last password? Recovery password link
Login_Page_TD-2	Functional	Home page	Verify if the user is able to log in to the website with Valid credentials	1.Enter and click on go 2.Click on log in button 3.Enter Valid username/email in the text box 4.Enter valid password in the password text box 5.Click on login button

Upload_data_page00	Functional	Upload data page	Verify if the user is able to upload the image of the problem	1.Enter the url and click on go 2.Enter the valid credentials and click on login 3. Click on upload button,drag on drop the image 4.Click on upload file button
Display_results_page_00	Functional	Display results page	Verify if the disease predicted from the image uploaded	1.Enter the URL and click on go 2.Enter the credentials and click on login 3.Click on upload image and upload the problem image 4.Click on upload and display results

Test Data	Expected Result	Actual Result	Status	Comments	BUG ID
	Signup popup should display	Working as expected	Pass	Steps are clear to follow	
	Application should show below UI elements: a.email text box b.password text box c.Login button with orange color d.New customer? Create account link e.Last password? Recovery password link	Working as expected	Fail	Steps are not clear to follow	BUG-512126
Username: chalam@gmail password: Testing123	Users should be able to login and navigate to the file upload page.	Working as expected	Pass	Everything is defined well	BUG-312432
https://rb.gy/zt5ikl	User should be able to upload problem image	Working as expected	Pass	Working perfectly	BUG-435674

	The predicted results should be displayed upon the uploaded image	Working as expected	Pass		BUG-645376

ACCEPTANCE TESTING
UAT EXECUTION & REPORT SUBMISSION

Purpose of this Document

The purpose of this document is to briefly explain the test coverage and open issues of the [ProductName] project at the time of the release to User Acceptance Testing (UAT).

Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved.

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	9	5	1	4	19
Duplicate	2	1	2	2	7
External	1	1	1	2	5
Fixed	10	1	3	19	33
Not Reproduced	1	1	2	1	5
Skipped	2	0	3	1	6
Won't Fix	1	4	1	1	7
Totals	26	13	12	30	82

Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested.

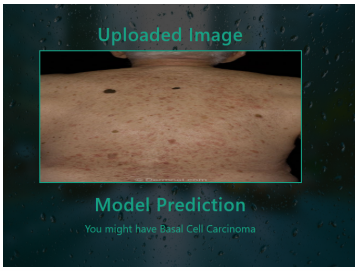
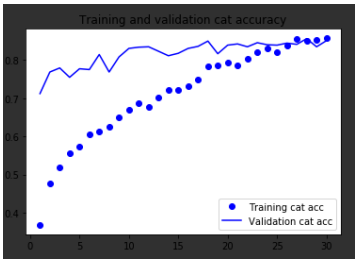
Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	52	0	0	52
Security	3	0	0	3
Outsource Shipping	2	0	0	2
Exception Reporting	8	0	0	8
Final Report Output	5	0	0	5
Version Control	1	0	0	1

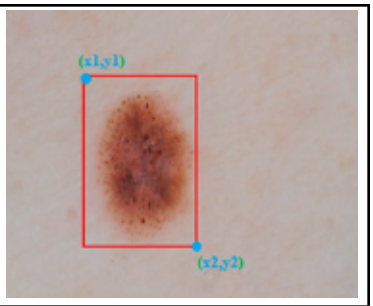
RESULTS

PERFORMANCE METRICS

Model Performance Testing:

Project team shall fill the following information in the model performance testing template.

S.No.	Parameter	Values	Screenshot
1.	Model Summary	-	
2.	Accuracy	Training Accuracy - 85% Validation Accuracy - 87%	

3.	Confidence Score (Only Yolo Projects)	Confidence Score - 0.85 85% Z-value - 1.44	

ADVANTAGES AND DISADVANTAGES

Advantages

● This system usually takes seconds to minutes to diagnose when confronted with a picture of a skin lesion. The inputs, algorithms, and outputs can be accessible to anyone with access to the web. This takes a brief timeframe than the stand by and go time given to a dermatologist arrangement.

● The calculations are regularly versatile and that they can gain from adding new pictures over the long haul.

● This system is prepared to proceed as confirmed dermatologists, and their precision will in any case improve in future.

● It can predict lesions so quickly with lesser cost than given to a dermatologist

Disadvantages

- In general, the advantage of AI is that it can help doctors perform tedious repetitive tasks. For example, if sufficient blood is scanned, an AI-powered microscope can detect low-density infections in micrographs of standard, field-prepared thick blood films, which is considered to be time-consuming, difficult, and tedious owing to the low density and small parasite size and abundance of similar non-parasite objects .
- Medicine is an area that is not yet fully understood. Information is not completely transparent. The characteristics of dermatology determine that the majority of the data cannot be obtained. At the

same time, the AI technology route is immature, the identification accuracy of which must be improved owing to the uncertainty of manual diagnosis. There is no strict correspondence between the symptoms and results of a disease and no clear boundary between the different diseases.

- As a “black box”, the principle of deep learning is unexplained at this stage, which could result in unpredictable system output. Moreover, it is possible that humans could not truly understand how a machine functions, even though it is actually inspired by humans

CONCLUSION

We have shown that even without a large dataset and high-quality images, it is possible to achieve sufficient accuracy rates. In addition, we have shown that current state-of-the-art CNN models can outperform models created by previous research, through proper data preprocessing, self-supervised learning, transfer learning, and special CNN architecture techniques. The ensemble method and feature selection applied to dermatology datasets yields a better performance as compared to individual classifier algorithms. The ensemble method provides a more accurate and effective skin disease predictionFurthermore, with accurate segmentation, we gain knowledge of the location of the disease, which is useful in the preprocessing of data used in classification, as it allows the CNN model to focus on the area of interest. Lastly, unlike previous studies, our method provides a solution to classify multiple diseases within a single image. With higher quality and a larger quantity of data, it will be viable to use state-of-the-art models to enable the use of CAD in the field of dermatology

FUTURE SCOPE

In future, this model may bind with various websites which can provide real-time data for skin disease prediction. Also, we may add large historical data on skin disease which can help to improve the accuracy of the machine learning model. We can build an android app as a user interface for interacting with the user. For better performance, we plan to judiciously design deep learning network structures, use adaptive learning rates, and train it on clusters of data rather than rather than the whole dataset.

APPENDIX

Demo Link : https://www.youtube.com/watch?v=xOEkccopjoA

GitHub Repository Link :
https://careereducation.smartinternz.com/Student/guided_project_workspace/37759

Source Code :

```
<!DOCTYPE html>

<html lang="en">

<head>

   <meta charset="UTF-8">

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

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


   <!---========= CSS ======== -->
```

```
   <link rel="stylesheet" href="rstyle.css">


   <!---------- Iconscout CSS ===== -->
   <link rel="stylesheet"
href="https://unicons.iconscout.com/release/v4.0.0/css/line.css">


   <!--<title>Responsive Regisration Form </title>-->
</head>
<body>
   <div class="container">
       <header>Registration</header>


       <form action="#">
           <div class="form first">
               <div class="details personal">
                   <span class="title">Personal Details</span>


                   <div class="fields">
                       <div class="input-field">
                           <label>Full Name</label>
                           <input type="text" placeholder="Enter your name"
required>
                       </div>


                       <div class="input-field">
                           <label>Date of Birth</label>
                           <input type="date" placeholder="Enter birth date"
required>
                       </div>


                       <div class="input-field">
                           <label>Email</label>
```

```
                        <input type="text" placeholder="Enter your email"
required>
                    </div>

                    <div class="input-field">
                        <label>Mobile Number</label>
                        <input type="number" placeholder="Enter mobile
number" required>
                    </div>

                    <div class="input-field">
                        <label>Gender</label>
                        <select required>
                            <option disabled selected>Select
gender</option>
                            <option>Male</option>
                            <option>Female</option>
                            <option>Others</option>
                        </select>
                    </div>

                    <div class="input-field">
                        <label>Occupation</label>
                        <input type="text" placeholder="Enter your
ccupation" required>
                    </div>
                </div>
            </div>



                    <div class="field button-field">
                        <a href="login.html">
                            <input type="button" value="Submit" />
```

```
                        </a>
                    </div>
                </div>

                    <div class="buttons">
                        <div class="backBtn">
                            <i class="uil uil-navigator"></i>
                            <span class="btnText">Back</span>
                        </div>

                        <button class="submit" onclick="login.html">
                            <span class="btnText">Submit</span>
                            <i class="uil uil-navigator"></i>
                        </button>
                    </div>
                </div>
            </div>
        </form>
    </div>

    <!--<script src="script.js"></script>-->
</body>
</html>
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>complete responsive hospital website design </title>

    <!-- font awesome cdn link  -->
```

```
   <link rel="stylesheet"
href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/5.15.4/css/all.min.c
ss">

   <!-- custom css file link  -->
   <link rel="stylesheet" href="css/style.css">

</head>
<body>

<!-- header section starts  -->

<header class="header">

   <a href="#" class="logo"> <i class="fas fa-heartbeat"></i> Hola. </a>

   <nav class="navbar">
       <a href="#home">home</a>
       <a href="register.html">Register </a>
       <a href="login.html">Login</a>
       <a href="logout.html">Logout</a>

   </nav>

   <div id="menu-btn" class="fas fa-bars"></div>

</header>

<!-- header section ends -->

<!-- home section starts  -->

<section class="home" id="home">
```

```
   <div class="image">
       <img src="image/home-img.svg" alt="">
   </div>

   <div class="content">
       <h3>stay safe, stay healthy</h3>
       <p>AI-based localization and classification of skin disease with
erythema</p>
       <a href="#" class="btn"> contact us <span class="fas
fa-chevron-right"></span> </a>
   </div>

</section>

<!-- home section ends -->

<!-- icons section starts  -->

<!-- icons section ends -->

<!-- services section starts  -->

<!-- services section ends -->

<!-- about section starts  -->

<section class="about" id="about">

   <h1 class="heading"> <span>about</span> us </h1>
```

```
   <div class="row">


       <div class="image">

           <img src="image/about-img.svg" alt="">

       </div>


       <div class="content">

           <h3>we take care of your healthy life</h3>

           <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 the last few decades especially Melanoma is most diversifying
skin cancer. If skin diseases are not treated at an 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 is diversified so that it is a challenging job to devise an
efficient and robust algorithm for automatic detection of skin disease and its
severity. Skin tone and skin colour play an important role in skin disease
detection. Colour and coarseness of skin are visually different. Automatic
processing of such images for skin analysis requires quantitative
discriminator to differentiate the diseases.


           To overcome the above problem we are building a model which is used
for the prevention and early detection of skin cancer, psoriasis. Basically,
skin disease diagnosis depends on the different characteristics like colour,
shape, texture etc. Here the person can capture the images of skin and then
the image will be sent the trained model. The model analyses the image and
detect whether the person is having skin disease or not.</p>

           <a href="#" class="btn"> learn more <span class="fas
fa-chevron-right"></span> </a>

       </div>


   </div>


</section>


<!-- about section ends -->


<!-- doctors section starts  -->
```

```
<section class="doctors" id="doctors">

   <h1 class="heading"> Our <span>Team</span> </h1>

   <div class="box-container">

       <div class="box">

           <h3>Aishwarya</h3>
           <span>Developer</span>
           <div class="share">
               <a href="#" class="fab fa-facebook-f"></a>
               <a href="#" class="fab fa-twitter"></a>
               <a href="#" class="fab fa-instagram"></a>
               <a href="#" class="fab fa-linkedin"></a>
           </div>
       </div>

       <div class="box">

           <h3>Arjun</h3>
           <span>Developer</span>
           <div class="share">
               <a href="#" class="fab fa-facebook-f"></a>
               <a href="#" class="fab fa-twitter"></a>
               <a href="#" class="fab fa-instagram"></a>
               <a href="#" class="fab fa-linkedin"></a>
           </div>
       </div>

       <div class="box">
```

```
            <h3>Hari Priya </h3>
            <span>Developer</span>
            <div class="share">
                <a href="#" class="fab fa-facebook-f"></a>
                <a href="#" class="fab fa-twitter"></a>
                <a href="#" class="fab fa-instagram"></a>
                <a href="#" class="fab fa-linkedin"></a>
            </div>
        </div>
        <div class="box">

            <h3>Tresa</h3>
            <span>Developer</span>
            <div class="share">
                <a href="#" class="fab fa-facebook-f"></a>
                <a href="#" class="fab fa-twitter"></a>
                <a href="#" class="fab fa-instagram"></a>
                <a href="#" class="fab fa-linkedin"></a>
            </div>
        </div>



   </div>

</section>

<!-- doctors section ends -->

<!-- booking section starts   -->
```

```
<section class="book" id="book">

   <h1 class="heading"> <span>book</span> now </h1>

   <div class="row">

       <div class="image">
           <img src="image/book-img.svg" alt="">
       </div>

       <form action="">
           <h3>book appointment</h3>
           <input type="text" placeholder="your name" class="box">
           <input type="number" placeholder="your number" class="box">
           <input type="email" placeholder="your email" class="box">
           <input type="date" class="box">
           <input type="submit" value="book now" class="btn">
       </form>

   </div>

</section>

<!-- booking section ends -->

<!-- review section starts  -->

<section class="review" id="review">

   <h1 class="heading"> client's <span>review</span> </h1>

   <div class="box-container">
```

```
        <div class="box">
            <img src="image/pic-1.png" alt="">
            <h3>john deo</h3>
            <div class="stars">
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star-half-alt"></i>
            </div>
            <p class="text">Perfect service and perfect prediction.All done and
dusted in less than 30 minutes and faultless. Would recommend without
hesitation</p>
        </div>

        <div class="box">
            <img src="image/pic-2.png" alt="">
            <h3>john deo</h3>
            <div class="stars">
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star-half-alt"></i>
            </div>
            <p class="text">The service I received was superb. The Predication
procedures clear and transparent</p>
        </div>

        <div class="box">
            <img src="image/pic-3.png" alt="">
            <h3>john deo</h3>
```

```
            <div class="stars">
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star"></i>
                <i class="fas fa-star-half-alt"></i>
            </div>
            <p class="text">I Used haloc and the service I received was superb
. The Predication was very helpful, efficient and professional. I would highly
recommend to halo medical group</p>
        </div>

    </div>

</section>

<!-- review section ends -->

<!-- blogs section starts  -->



<!-- blogs section ends -->

<!-- footer section starts  -->

<section class="footer">

    <div class="box-container">

        <div class="box">
            <h3>quick links</h3>
            <a href="#"> <i class="fas fa-chevron-right"></i> home </a>
            <a href="#"> <i class="fas fa-chevron-right"></i> about </a>
```

```
            <a href="#"> <i class="fas fa-chevron-right"></i> book </a>
            <a href="#"> <i class="fas fa-chevron-right"></i> review </a>

        </div>

        <div class="box">
            <h3>our services</h3>
            <a href="#"> <i class="fas fa-chevron-right"></i> Image upload</a>
            <a href="#"> <i class="fas fa-chevron-right"></i> Prediction</a>

            <a href="#"> <i class="fas fa-chevron-right"></i> diagnosis </a>

        </div>

        <div class="box">
            <h3>contact info</h3>

            <a href="#"> <i class="fas fa-phone"></i> +111-222-3333 </a>
            <a href="#"> <i class="fas fa-envelope"></i> Prediction@gmail.com
</a>

            <a href="#"> <i class="fas fa-map-marker-alt"></i> Chennai, india
</a>
        </div>

        <div class="box">
            <h3>follow us</h3>
            <a href="#"> <i class="fab fa-facebook-f"></i> facebook </a>
            <a href="#"> <i class="fab fa-twitter"></i> twitter </a>
            <a href="#"> <i class="fab fa-twitter"></i> twitter </a>
            <a href="#"> <i class="fab fa-instagram"></i> instagram </a>
            <a href="#"> <i class="fab fa-linkedin"></i> linkedin </a>
            <a href="#"> <i class="fab fa-pinterest"></i> pinterest </a>
```

```
        </div>

    </div>



</section>

<!-- footer section ends -->

<!-- custom js file link  -->
<script src="js/script.js"></script>

</body>
</html>
```

python code:;

```
import os
import uuid
import flask
import urllib
from PIL import Image
from numpy import number
from tensorflow.keras.models import load_model
from flask import Flask , render_template  , request , send_file
from tensorflow.keras.preprocessing.image import load_img , img_to_array
from keras.applications.mobilenet import preprocess_input, decode_predictions
from keras.models import model_from_json



app = Flask(__name__)
j_file = open('model.json', 'r')
loaded_json_model = j_file.read()
j_file.close()
model = model_from_json(loaded_json_model)
model.load_weights('model.h5')



ALLOWED_EXT = set(['jpg' , 'jpeg' , 'png' , 'jfif'])
def allowed_file(filename):
   return '.' in filename and \
          filename.rsplit('.', 1)[1] in ALLOWED_EXT

classes = [
  'Actinic Keratoses',
  'Basal Cell Carcinoma',
  'Benign Keratosis',
  'Dermatofibroma',
```

```
  'Melanoma',
  'Melanocytic Nevi',
  'Vascular naevus'

]


def predict(filename , model):
    img = load_img(filename , target_size = (224, 224))
    img = img_to_array(img)
    img = img.reshape(1,224,224,3)

    img = img.astype('float32')
    img = img/255.0
    result = model.predict(img)

    dict_result = {}
    for i in range(7):
        dict_result[result[0][i]] = classes[i]

    res = result[0]
    res.sort()
    res = res[::-1]
    prob = res[:3]

    prob_result = []
    class_result = []
    for i in range(3):
        prob_result.append((prob[i]*100).round(2))
        class_result.append(dict_result[prob[i]])

    return class_result , prob_result
```

```
@app.route('/')
def home():
       return render_template("index.html")



@app.route('/about')
def about():
   return render_template("about.html")

@app.route('/contact')
def contact():
   return render_template("contact.html")
# more changes to be made in contact

# @app.route('/about1/')
# def about():
#     return "this is about page"







@app.route('/success' , methods = ['GET' , 'POST'])
def success():
   error = ''
   target_img = os.path.join(os.getcwd() , 'static/images')
   if request.method == 'POST':
       if(request.form):
```

```
            link = request.form.get('link')
            try :
                resource = urllib.request.urlopen(link)
                unique_filename = str(uuid.uuid4())
                filename = unique_filename+".jpg"
                img_path = os.path.join(target_img , filename)
                output = open(img_path , "wb")
                output.write(resource.read())
                output.close()
                img = filename

                class_result , prob_result = predict(img_path , model)

                predictions = {
                      "class1":class_result[0],
                        "class2":class_result[1],
                        "class3":class_result[2],
                        "prob1": prob_result[0],
                        "prob2": prob_result[1],
                        "prob3": prob_result[2],
                }

            except Exception as e :
                print(str(e))
                error = 'This image from this site is not accesible or
inappropriate input'

            if(len(error) == 0):
                return  render_template('success.html' , img  = img ,
predictions = predictions)
            else:
                return render_template('index.html' , error = error)
```

```
        elif (request.files):
            file = request.files['file']
            if file and allowed_file(file.filename):
                file.save(os.path.join(target_img , file.filename))
                img_path = os.path.join(target_img , file.filename)
                img = file.filename

                class_result , prob_result = predict(img_path , model)

                predictions = {
                      "class1":class_result[0],
                        "class2":class_result[1],
                        "class3":class_result[2],
                        "prob1": prob_result[0],
                        "prob2": prob_result[1],
                        "prob3": prob_result[2],
                }

            else:
                error = "Please upload images of jpg , jpeg and png extension
only"

            if(len(error) == 0):
                return  render_template('success.html' , img  = img ,
predictions = predictions)
            else:
                return render_template('index.html' , error = error)

    else:
        return render_template('index.html')

if __name__ == "__main__":
```

```
app.run(debug = True)
```