

Project ID :

R24-086

1. Topic (12 words max)

Skin Health Monitoring: Detection and Early Intervention for Skin Issues

2. Research group the project belongs to

Knowledge Inspired Computing (KIC)

3. Research area the project belongs to

Bio-Medical and Health Informatics (HI)

4. If a continuation of a previous project:

Project ID	
Year	

**5. Brief description of the research problem including references (200 – 500 words max)
– references not included in word count.**

In the realm of dermatological research, the project leverages advanced image analysis to predict and identify skin diseases based on skin tones in uploaded images. This innovative approach streamlines diagnostics and enables early intervention.

The research project introduces the calculation of effective and cure percentages, providing a systematic assessment of dermatological treatment outcomes. This standardized methodology aims to enhance understanding across various skin conditions.

Taking a patient-centric approach, tailored solutions based on percentages are designed. Textual, audio, and video formats ensure accessibility, catering to diverse learning preferences and needs. This holistic support framework enhances patient engagement and comprehension.

An AI-based chatbot is integrated to revolutionize patient communication and accessibility. Serving as a virtual assistant, it addresses skin-related concerns promptly and reliably. This technology fills gaps in dermatological expertise, transforming how queries and doubts are addressed.

In essence, the comprehensive research project explores technical aspects of skin disease identification and treatment evaluation while emphasizing patient-centric approaches and innovative technologies in reshaping dermatological healthcare.

6. Brief description of the nature of the solution including a conceptual diagram (250 words max)

Skin diseases pose significant challenges in healthcare, often requiring precise identification and tailored treatments for optimal outcomes. In response to these challenges, our proposed solution integrates cutting-edge technologies to revolutionize dermatological care. By combining advanced algorithms such as YOLO (You Only Look Once), NLP (Natural Language Processing), CNN (Convolutional Neural Networks), and RNN (Recurrent Neural Networks), our system aims to offer a comprehensive approach to skin disease prediction, evaluation, and patient support. This integrated solution not only streamlines the diagnostic process but also provides quantifiable measures for treatment effectiveness, ensuring personalized and effective care.

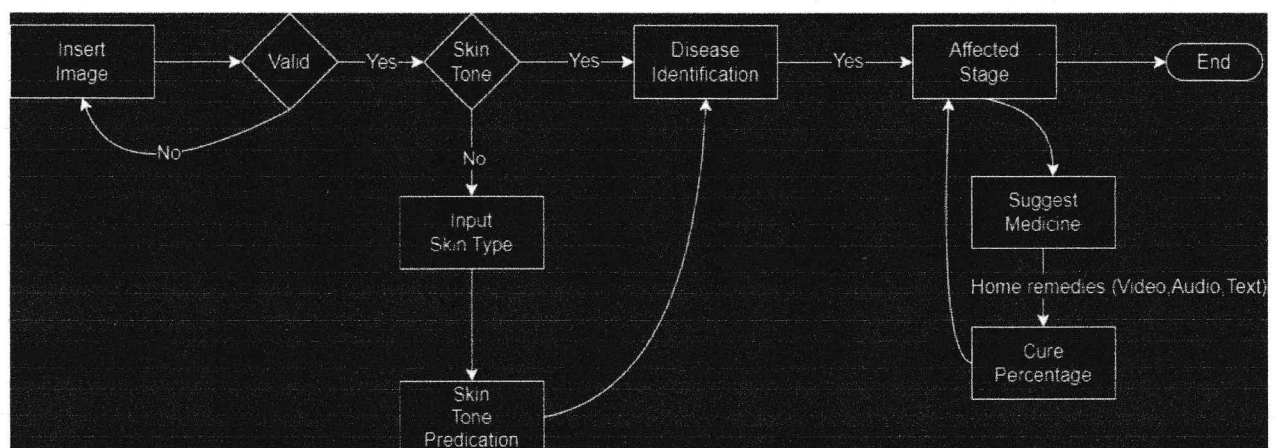
The first component of our solution employs YOLO and NLP for predicting skin diseases based on uploaded images. This allows for efficient object detection and contextual understanding, laying the foundation for accurate identification of skin tones and relevant features.

Moving to the second component, the system utilizes NLP and CNN to calculate effective and cure percentages. This data-driven approach objectively assesses treatment outcomes, providing valuable insights into the success of dermatological interventions.

Tailoring solutions based on these percentages forms the third component, where advanced algorithms like RNNs generate text and speech synthesis algorithms create audio formats. Video recommendations further enhance communication, ensuring accessibility to a diverse audience and improving patient engagement.

The fourth and final component introduces an AI-based chatbot powered by CNN. This virtual assistant clarifies doubts, offering real-time support and information related to skin conditions. The chatbot not only enhances accessibility but also serves as an invaluable resource for individuals seeking immediate assistance.

In conclusion, our integrated solution stands at the forefront of dermatological healthcare, leveraging a combination of state-of-the-art algorithms to predict skin diseases, objectively evaluate treatment outcomes, and provide personalized, multi-modal support. This transformative approach aims to redefine the standards of care in dermatology, enhancing both efficiency and effectiveness in the management of skin diseases.



**7. Brief description of specialized domain expertise, knowledge, and data requirements
(300 words max)**

The project will be implemented using Python as the primary programming language. The chosen Integrated Development Environments (IDEs) include PyCharm for local development and Colab-Web IDE for collaborative and cloud-based work, offering a seamless and versatile development experience.

The research project focuses on the implementation of cutting-edge technologies related to machine learning algorithms, Natural Language Processing (NLP), and Deep Learning. Specifically, Convolutional Neural Networks (CNN) and transformers play a pivotal role in achieving accurate predictions and assessments.

For the skin disease prediction component utilizing YOLO, Kaggle datasets sourced from Google will be employed. These datasets provide a diverse and comprehensive collection of images for training and testing the machine learning models.

Libraries:

1. TensorFlow and Keras: Foundational libraries for implementing machine learning and deep learning models, including CNNs.
2. NLTK (Natural Language Toolkit): A powerful library for NLP tasks, assisting in the analysis of textual data.
3. Transformers (Hugging Face): Leveraged for advanced NLP tasks, providing pre-trained models like BERT and GPT.
4. Matplotlib: Used for data visualization, essential for creating plots and charts.
5. Scikit-learn: A versatile library for machine learning, offering tools for data analysis and model evaluation.
6. Speech Recognition: Facilitates the integration of speech recognition for the audio component in the solution.
7. PyDub: Useful for audio file manipulation, enabling seamless integration of audio formats.

8. Objectives and Novelty

Main Objective			
Identifies the disease based on the skin tone of the person and it gives the stage of the disease and provides a solution suitable for the disease in the early stage			
Member Name	Sub Objective	Tasks	Novelty
Lakshana K IT21010194	Predicting the skin disease based on the skin tone using the image uploaded	1. Analyze and clean dataset. 2. Assess accuracy across 3-4 ML algorithms. 3. Develop a model using the most accurate algorithms. 4. Evaluate the model through testing and outcome prediction. 5. Validate the model's effectiveness.	This valuable information empowers individuals to discern skin diseases by recognizing specific nuances in their skin tones. Early identification based on these subtle variations facilitates prompt intervention and tailored treatment. It enhances awareness about the diverse manifestations of skin conditions across different skin tones. Ultimately, this knowledge fosters proactive self-care and timely medical

				attention.
Rushanth B IT21150098	Calculation of affected stage and cure percentage	<ol style="list-style-type: none"> 1. Analyze and clean dataset. 2. Assess accuracy across 3-4 ML algorithms. 3. Develop a model using the most accurate algorithms. 4. Evaluate the model through testing and outcome prediction. 5. Validate the model's effectiveness. 	<p>Utilizing the affected stage in predicting the current disease stage, offering insights into its progression. Comparing this with the earliest stage allows for analyzing the extent of successful treatment. This data-driven approach informs decisions on ongoing care and underscores the importance of adaptive interventions.</p>	
Sujeevan K IT19178882	Based on the effective percentage providing solutions for early-stage diseases (in text format and audio format by recommending the video)	<ol style="list-style-type: none"> 1. Analyze and clean dataset. 2. Assess accuracy across 3-4 ML algorithms. 3. Develop a model using the most accurate algorithms. 4. Evaluate the model through testing and outcome prediction. 5. Validate the model's effectiveness. 	<p>Utilizing both text and audio formats enhances solution accessibility for those with speaking disabilities. Video demonstrations further amplify effectiveness by providing visual guidance for recommended treatments for early-stage diseases. This multi-modal approach caters to diverse</p>	



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IT4010 – Research Project - 2024

Topic Assessment Form

			approach caters to diverse learning preferences and ensures inclusive communication.
	AI based chatbot to clarify the doubts	<ol style="list-style-type: none">1. Analyze and clean dataset.2. Assess accuracy across 3-4 ML algorithms.3. Develop a model using the most accurate algorithms.4. Evaluate the model through testing and outcome prediction.5. Validate the model's effectiveness.	<p>The AI chatbot in this project helps users by providing clear and personalized information about home remedies for different skin issues. Using language understanding and learning, the chatbot continually improves its responses based on user interactions, offering reliable advice on natural treatments, preventive measures, and post-treatment care. Users can easily seek guidance in text, audio, or video formats, making it a user-friendly tool for managing skin concerns through home remedies.</p>

9. Supervisor checklist

a) Does the chosen research topic possess a comprehensive scope suitable for a final-year project?

Yes	X	No	
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b) Does the proposed topic exhibit novelty?

Yes	X	No	
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c) Do you believe they have the capability to successfully execute the proposed project?

Yes	X	No	
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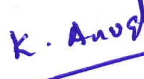
d) Do the proposed sub-objectives reflect the students' areas of specialization?

Yes	X	No	
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e) Supervisor's Evaluation and Recommendation for the Research topic:

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10. Supervisor details

	Title	First Name	Last Name	Signature
Supervisor	Ms	Thamali	Dassanayake	
Co-Supervisor	Ms	Karthiga	Rajendran	
External Supervisor	Dr	Anushan	Kailainathan	
Summary of external supervisor's (if any) experience and expertise				

Dr. K. Anushan
 MBBS, MD (Dermatology)
 SLMC: 28794
 Consultant Dermatologist (Act)
 B.H. Point Pedro

This part is to be filled by the Topic Screening Panel members.

Acceptable: Mark/Select as necessary

Topic Assessment Accepted	
Topic Assessment Accepted with minor changes (should be followed up by the supervisor)*	
Topic Assessment to be Resubmitted with major changes*	
Topic Assessment Rejected. Topic must be changed	

* Detailed comments given below

Comments

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The Review Panel Details

Member's Name	Signature

***Important:**

1. According to the comments given by the panel, make the necessary modifications and get the approval by the **Supervisor** or the **Same Panel**.
2. If the project topic is rejected, identify a new topic, and request the RP Team for a new topic assessment.
3. The form approved by the panel must be attached to the **Project Charter Form**.