

AYUMUKHA: Facial Recognition and Detection Using Artificial Intelligence for Skin Care

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Abstract- The AyurMukha is designed with Image processing and detecting techniques to identify the pigmented area on the face which helps to detect the Visual health rate of the skin. This processing is related to Artificial Intelligence. Machine Learning is the sub-part of Artificial Intelligence also involved in this work of research. The pigmentation on the face is detected by the image given by the user identifying the area of the darker part on the face and results in the how much level the skin on the face has pigmentation whether it is low, medium or high. After detecting facial Pigmentation, the latest algorithms of Artificial Intelligence train the system about every Natural ingredient and food Plan, and Suggests Ayurvedic natural remedies with the prior procedure. CNN played a crucial role in this project where in-depth layered Neural Networks and Multi Layered Neural Networks were used. The Goal of AyurMukha is to present the public with cost-free Skin Care with no Marketing Strategies. "AyurMukha", is a skin care treatment for the face Naturally with no chemicals, the desired therapy will be suggested by analysing the condition of the User's face with image capturing, Tips, Remedies and a good diet to achieve healthy Skin. The recommended skin therapies are from India's knowledge of Life called "Ayurveda". So, this is purely Natural, and trustworthy with 100% no side effects.

Keywords: AyurMukha, Skincare, Artificial Intelligence, Machine Learning, Facial Recognition, Image Processing, Data Preprocessing. Conventional Neural Networks.

1. Introduction:

As Biologically known our Body's largest sense organ is the Skin, it reflects our Inner health and repair of our Body. So, maintaining Good and Healthy Skin leads to a long life and the betterment of our health day by day. With this criterion of vision, we took an initiation for designing the AYURMUKHA to improve and get connected with your skin.

1.1 Skincare:

AYURMUKHA focus completely on your Skincare by scanning the face for multiple Parameters like Dullness, Dark spots, Abnormal Pigmentation, Uneven tone, Oiliness, Dryness, Scaly Skin, Dark circles, Acne etc. And suggests the desired Daily Food Routine and suitable Natural Skin Treatment. In the present project, we focused only on Abnormal pigmentation. In the upcoming extension of the project, all the parameters will be proposed. As we know pigmentation has become the major troubleshooter query nowadays, so as a point we firstly wanted to introduce the Ayurmukha with pigmentation detection and prior remedies based on the Pigmentation level whether it is Low, medium or High.

1.2 Artificial Intelligence:

Artificial Intelligence is software and a study of developing the Intelligence of Machines through various tools in this project the concept of Biometric Facial Recognition which is one of the tools of Artificial Intelligence helps in designing Facial Scanning and detection of flaws on the skin. Also based on Artificial Intelligence, we train the system that could be able to suggest Skincare treatment, according to the Facial Scan and Skin Analysis.

1.3 Machine Learning:

Machine Learning is a sub-part of Artificial Intelligence involved in training the system through Supervised Machine Learning. This proceeds how the given data can be manipulated to fulfil the customer's requirements.

1.4 Pigmentation:

The pigment defines the amount of Melanin present on the skin layer which affects the colour of the skin the percentage of the element called Melanin defines the skin colour. The abnormal pigmentation on the skin can be

caused by many reasons example high exposure to the sun, Vitamin deficiency etc. How to overcome the pigmentation and maintain even pigmented skin will be possible through our project Ayurmukha.

1.5 Image Processing:

The user will give the image. That particular image is taken as input by the system and shows the output of the level of pigmentation on the face.

1.6 Ayurveda:

शरीरेन्द्रियसन्त्वात्मसंयोगो धारी जीवितम् ।
नित्यगश्चानुबन्धश्च पर्यायौरायुरुच्यते ॥

The body when combined with the sense organs, mind and soul becomes Life.

1.7 Instead of taking the algorithm of facial recognition as a base we also train the algorithm to detect extra features that are mentioned below using CNN Conventional Neural Networks:

- Skincare devices: Certain devices use light or other technologies to measure specific skin parameters, but their accuracy may vary.
- Preprocess the image: Enhance the image for skin analysis by adjusting lighting, contrast, and noise levels.
- Segment the skin: Use AI-based segmentation techniques to isolate the skin region from the background and hair.
- Extract features: Analyse the segmented skin region to extract features like texture, colour, and pores.
- Classify skin health: Train a machine learning model on labelled datasets to classify skin health based on extracted features. This model should consider factors like age, ethnicity, and lighting variations.
- Identify specific concerns: Train separate models to detect dark spots, pigmentation, skin type, dark circles, and acne based on specific features.
- Importantly in this work of research only Facial pigmentation is taken into consideration and the remedies are suggested accordingly through the data set created.
- The Created data set is trained with the remedies and also the food plan to resolve the pigmentation internally so that not only with the external Remedies taken from Ayurveda but also the whole body will be cured with the maximum problem and overall body will be Healthy and Energetic.

2. Methodology:

2.1 Facial Flaw Detection:

In the name of this project AyurMukha Ayur means “Life” Mukha means “Face”, so AyurMukha is all about Facial Care. To ensure the good health of the customer’s face a tool called Facial Recognition and Detection is a necessary tool. Facial Scan is the body of this app without facial Detection the flaws in the customers cannot be recognised and a suitable remedy also can’t be suggested. Facial Recognition is a concept that comes from the huge technologies called Artificial Intelligence.

2.2 System Training:

System training is the last constraint where the whole process comes together to give the Users their favourable Suggestions through Ayurvedic references where external remedies and an internal food diet are trained to the system through a Neural Networking algorithm to give the best results.

2.3 Neural Networking Implementation according to the output resulting from the facial detection of the user:

A Multilayered Neural Network is constructed to train the system in depth to predict the suitable remedies for the user based on their skin type. The Neural Network has the nodes of the input layer and output layer and predictive results based on the input parameters like Skin type and pigmentation on the face. So, through neural Networks the system can detect the flaws in the skin for example if the system detects that the user’s skin has a percentage of acne then the system may suggest the remedy to take sufficient Water, less oil diet, consume fresh fruits and vegetables and a facial pack of 1 tablespoon of honey, 1 pinch of turmeric, 1 teaspoon of milk, on full spoon masoor dal powder and a teaspoon of Multan Miti together on the face the everyday night before sleep. So, this is a random example of how the system is going to respond by considering all the inputs together.

The sequence of Methodology with the clear definition is as follows; -

2.4 Data Compilation:

Assemble a dataset of facial visuals depicting diverse skin types, statuses, and age groups. Gather insights on Ayurvedic skincare treatments, components, and their advantages.

2.5 Facial Recognition:

Employ computer vision methods to identify and pinpoint faces within the images captured or from the camera feed. This stage is critical for pinpointing the area of focus for skincare assessment.

2.6 Data Preprocessing:

Process the identified facial images to enrich quality and standardize them for examination. This could encompass normalisation, resizing, and noise elimination.

2.7 Attribute Extraction:

Utilize facial identification algorithms to extract crucial traits from the processed visuals. This may involve recognising facial landmarks, skin texture, fine lines, imperfections, and other attributes.

2.8 Ayurvedic Skin Evaluation:

Apply Ayurvedic tenets and expertise to scrutinize the extracted characteristics and delineate the skin type, dosha imbalance, and specific skin issues based on the facial attributes of the individual.

2.9 Recommendation of Solutions:

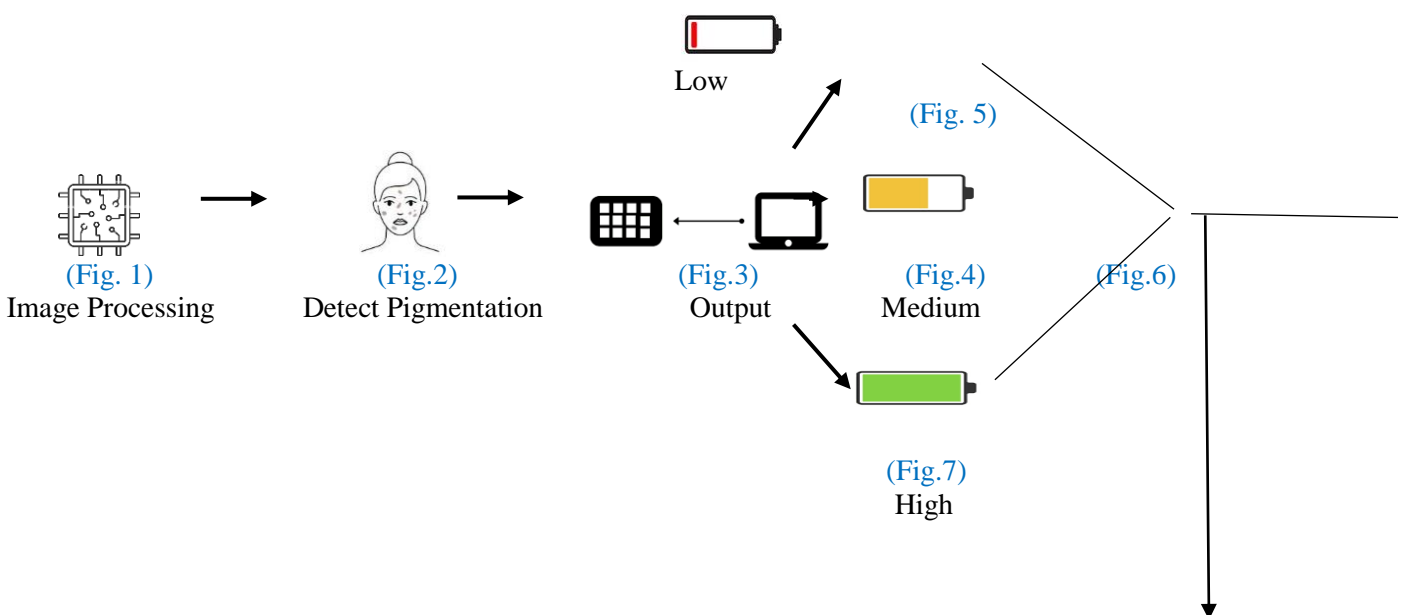
Develop an artificial intelligence (AI) model that correlates the detected skin issues with Ayurvedic skincare solutions and constituents. This model could propose customized skincare regimens, items, or therapies based on the individual's skin evaluation.

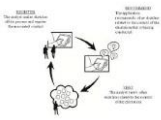
2.10 Live Input Mechanism:

Introduce a real-time input system where users can interact with the setup via the camera feed or uploaded images to obtain immediate suggestions and guidance on Ayurvedic skincare solutions. The method when technologically made the practical Methodology is to build to cure the Abnormal Pigmentation of the Skin. In the Practical Methodology which is purely related to the user side Primarily the face detection algorithm scans and detects the pigmentation level of the user's face and shows the output as Low, Medium, or High. Now the System takes the conditional statement based on the output shown and recommends the desired Ayurvedic Remedy, with the proper measurements and usage. The Speciality of Ayurmukha is not only suggesting external remedies for Skin care but also food suitable for the clients/users to make their skin shine internally. The Users are going to have good and satisfying results because Ayurmukha totally encourages and promotes the use of Natural Ingredients and gradually makes people get out of all the chemical or Animal-based most expensive skin products due to which many Unethical activities are taking place. So, this is the small initiation to protecting our mother and building a connection with Nature.

Below is the Flowchart of our project Ayurmukha.

3. Structural Outline:





(Fig.8)

Procedure (How To Use)
Suggested Items Listed

A screenshot of a 'NUTRITION INFORMATION' table. The table lists various nutrients and their values. To the right of the table are three blue callout boxes with text: 'This table can be used to compare the nutrient content of different foods', 'This table can be used to track the nutrient intake of an individual', and 'This table can be used to identify the nutrient sources of a food item'.

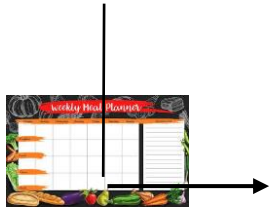
(Fig.9)

Detailed Information of
In Remedies



(Fig.10)

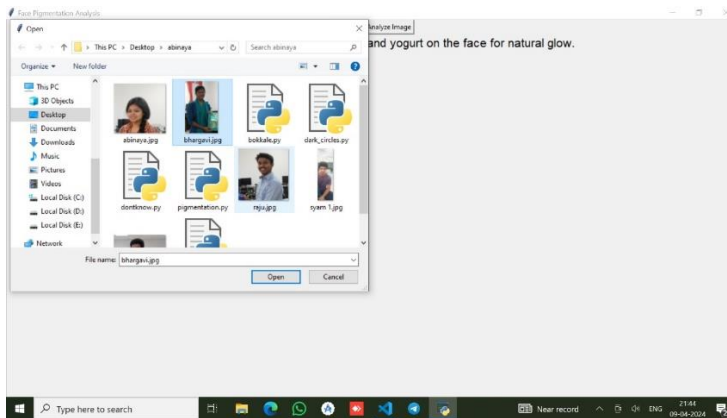
Suggest Ayurvedic Remedies



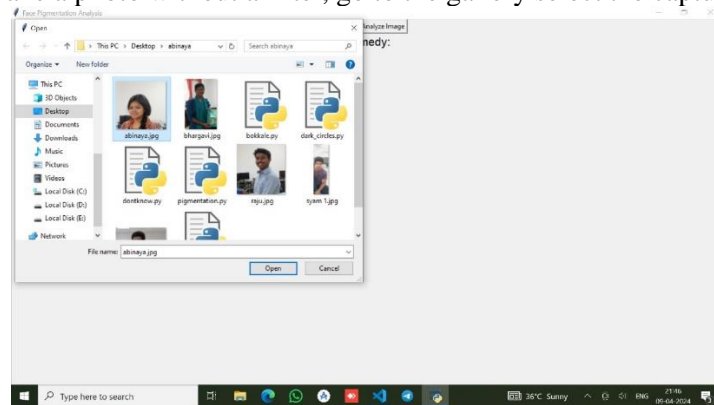
(Fig.11)

Food Plans That Are Suitable For
The Prior Pigmentation Level of The Skin

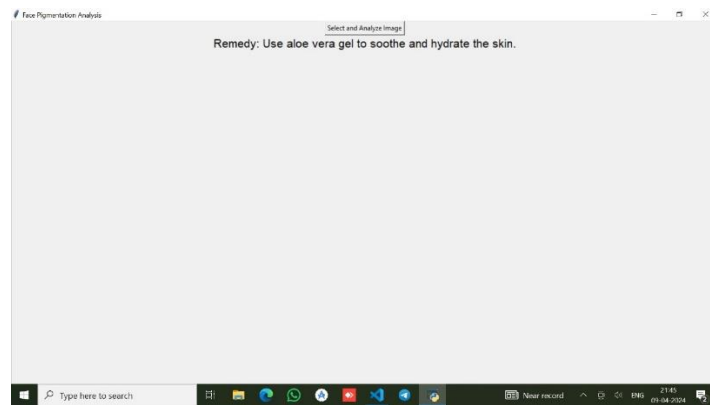
4. Results/Outputs:



Step 1: Take a photo without a filter, go to the gallery select the captured photo.



Step 2: The system will take the selected image as input and process the image to identify the pigmentation on the face.



Step 3: Shows the output of pigmentation level.



Step 4: Suggest the Ayurvedic remedy with a Food diet plan.

5. Conclusion:

The Ayurmukha project marks a significant advancement in skincare technology, leveraging image processing to detect facial pigmentation and soon to include a comprehensive range of facial parameters such as acne, dark circles, and spots. By integrating Ayurvedic principles, the project aims to offer holistic solutions for skincare concerns. The initial phase of the project, focusing on detecting face pigmentation, demonstrates promising results in its ability to accurately identify and analyse skin imperfections. This lays a strong foundation for the extension of the project to encompass a wider array of facial flaws, thereby providing users with a more comprehensive understanding of their skin health. Furthermore, the integration of Ayurvedic remedies into the project offers a natural and holistic approach to skincare. By recommending Ayurvedic treatments tailored to the specific skin concerns identified through image processing, Ayurmukha strives to address skincare issues at their root cause, promoting long-term skin health and vitality. In addition to personalized skincare recommendations, the incorporation of dietary plans underscores the project's commitment to holistic wellness. By emphasizing the importance of nutrition in supporting healthy skin, Ayurmukha empowers users to make informed lifestyle choices that complement their skincare routines. Overall, the Ayurmukha project represents a groundbreaking initiative at the intersection of technology and traditional medicine, revolutionizing the way we approach skincare. Through its innovative use of image processing and Ayurvedic principles, Ayurmukha is poised to redefine the skincare landscape, offering users personalized solutions for radiant and healthy skin. The conclusion of Ayurmukha is not yet completed. The further extension of the project will be on the research of all the parameters of the face like dark circles, acne, pores, skin tone detection, skin type etc. At present, we only focus on the Pigmentation. We conclude the project with the proposal of designing an Android Application with an Attracting User Interface and User Experience. More Updated things will be induced with the latest version of technologies using even more facial detecting parameters to capture the flaws on the face even better to get good results. And we are going to get deeper into Ayurveda and research to suggest the remedy and define the Natural ingredients and get skin care cost-free, and chemical-free.

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