

RESEARCH PROPOSAL ON SKIN CANCER DETECTION USING IMAGE PROCESSING

Skin cancer is one of the most common cancers worldwide, and early detection is essential for improving survival rates. Traditional diagnosis depends on dermatologist expertise and biopsy, which can be time-consuming and subjective. Advances in image processing and machine learning now offer the possibility of automated, accurate, and cost-effective early detection.

Objective:

To develop an automated system that detects skin cancer from dermoscopic images using image processing and machine learning/deep learning techniques.

Method:

The study will use publicly available dermoscopic image datasets such as ISIC/HAM10000. Images will first undergo pre-processing steps including resizing, noise reduction, hair removal, and contrast enhancement to improve clarity. The lesion area will then be segmented using techniques to accurately isolate the affected region.

After segmentation, either handcrafted features (colour, texture, shape) will be extracted or a deep learning model (CNN) will be used to automatically learn relevant features. These features will be fed into a classifier to categorize lesions as benign or malignant.

The system's performance will be assessed using metrics such as accuracy, sensitivity, specificity, and ROC-AUC to ensure reliability and clinical relevance.

Expected outcome:

A reliable system capable of automatically classifying skin lesions as benign or malignant with high accuracy, supporting dermatologists and improving early diagnosis. The work aims to provide a foundation for developing real-time, mobile-based skin cancer screening tools in the future.

Significance:

This work can make skin cancer screening faster, more accessible, and more consistent, especially in areas lacking dermatology specialists. It contributes to the growing field of medical image analysis and AI-assisted healthcare.