**Melanoma detection using Image Processing and Convolutional Neural Network(CNN)**

**Problem statement**

The prevalent ignorance and delayed recognition of skin cancer, particularly melanoma, underscore the need for early detection.An estimated 324,635 cases of melanoma was diagnosed around the world in 2020. The imperative for an efficient automated Skin Cancer Detection System using deep learning technique called CNN.

**Objective**

1. Early Detection:- Develop a system for early identification of skin cancer through automated analysis of lesion images.

2. Accurate Classification:- Create a model capable of classifying sufficiently accurate skin lesions as benign or malignant.

3. Efficient Diagnosis:- Improve diagnostic efficiency by leveraging convolutional neural network and image processing.

4. User-Friendly Interface:- Design an intuitive interface for seamless integration into clinical workflows.

5. Generalizability:- Ensure the system's applicability across diverse populations and skin conditions.

**Abstract**

Skin cancer is considered as one of the most dangerous types of cancers and there is a drastic increase in the rate of deaths due to lack of knowledge on the symptoms and their prevention. Skin cancer is further divided into various types out of which the most hazardous ones are Melanoma, Basal cell carcinoma and Squamous cell carcinoma. This project is about detection and classification of various types of skin cancer using deep learning(CNN) and image processing tools. In the pre-processing stage, dermoscopic images are considered as input. Dull razor method is used to remove all the unwanted hair particles on the skin lesion, then Gaussian filter is used for image smoothing. For noise filtering and to preserve the edges of the lesion, Median filter is used. Since color is an important feature in analyzing the type of cancer, color-based k-means clustering is performed in segmentation phase. The statistical and texture feature extraction is implemented using Asymmetry, Border, Color, Diameter, (ABCD) and Gray Level Co-occurrence Matrix (GLCM). The experimental analysis is conducted on Malignant vd. Benign dataset consisting of many different types of dermoscopic images. For classification purpose, Multi-class Support Vector Machine (MSVM) was implemented and the accuracy obtained is about 96.25.Thus, early detection at premature stage is necessary so that one can prevent the spreading of cancer.

**Dataset-**https://www.kaggle.com/datasets/fanconic/skin-cancer-malignant-vs-benign/data

**Basepaper-**<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9759648/>

https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9720751