RESEARCH ASSIGNMENT ON SKIN LESION CLASSIFICATION

1.Literature review :

It has been attached as a pdf in this mail.

2.Identification of prominent algorithms:

From the literature survey we had found that CNN algorithm would be the best and most used one because:

i)Feature Learning: CNNs are capable of automatically learning hierarchical features from raw data, such as images, without the need for manual feature extraction. This ability is crucial in tasks like image classification and segmentation, where identifying discriminative features is challenging.

ii)Spatial Hierarchies: CNNs are designed to preserve the spatial structure of data through convolutional layers. This makes them particularly effective for tasks where spatial relationships are important, such as recognizing patterns in images.

iii)Parameter Sharing: CNNs exploit the idea of parameter sharing, where a small set of weights (filters) is shared across different parts of the input data. This reduces the number of parameters to learn and makes CNNs more efficient and less prone to overfitting, especially in cases of limited training data.

iv)Transfer Learning: CNNs pre-trained on large datasets (e.g., ImageNet) can be fine-tuned for specific tasks with smaller datasets, such as skin lesion classification. Transfer learning allows leveraging features learned from one task/domain to another, leading to improved performance and faster convergence.

v)Performance: Empirical evidence from various studies and competitions (such as the ISIC challenge for melanoma detection) may demonstrate that CNNs consistently achieve state-of-the-art performance on skin lesion classification and segmentation tasks.

vi)Scalability: CNN architectures can be scaled up or down depending on the complexity of the task and available computational resources. This flexibility makes CNNs suitable for a wide range of applications, from simple image classification to complex medical image analysis.

Thus I had chosen a special type of CNN algorithm termed as Fully convolutional Network(FCN).

3.Comparison and Evaluation:

It had been done through my coding part to check the accuracy ,computational efficiency and robustness . I had also attached a pdf which contains the model development runned in colab notebook.

4.Proposal of the best approach:

In previous literature survey they had done through CNN model with Ham10000 dataset. Thus as mentioned earlier through fcn model we can get best output for skin lesion.