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1. Introduction

a. Overview

Skin diseases are more common than other diseases. Skin diseases may be caused by fungal infection, bacteria, allergy, or viruses, etc. The advancement of lasers and Photonics based medical technology has made it possible to diagnose the skin diseases much more quickly and accurately. But the cost of such diagnosis is still limited and very expensive.

So, image processing techniques help to build automated screening system for dermatology at an initial stage. The extraction of features plays a key role in helping to classify skin diseases. Computer vision has a role in the detection of skin diseases in a variety of techniques.

b. Purpose

To over come the problem we proposed an image processing-based method to detect skin diseases. This method takes the digital image of disease effect skin area, then use image analysis to identify the type of disease. Our proposed approach is simple, fast and does not require expensive equipment. The approach works on the inputs of a color image. Then resize the of the image to extract features using Convolutional Neural Network. After that classified feature using Multiclass SVM. Finally, the type of disease is shown to the user. The system successfully detects 5 different types of skin diseases with an accuracy rate of 70%.

2. LiteratureSurvey

a. ExistingProblem

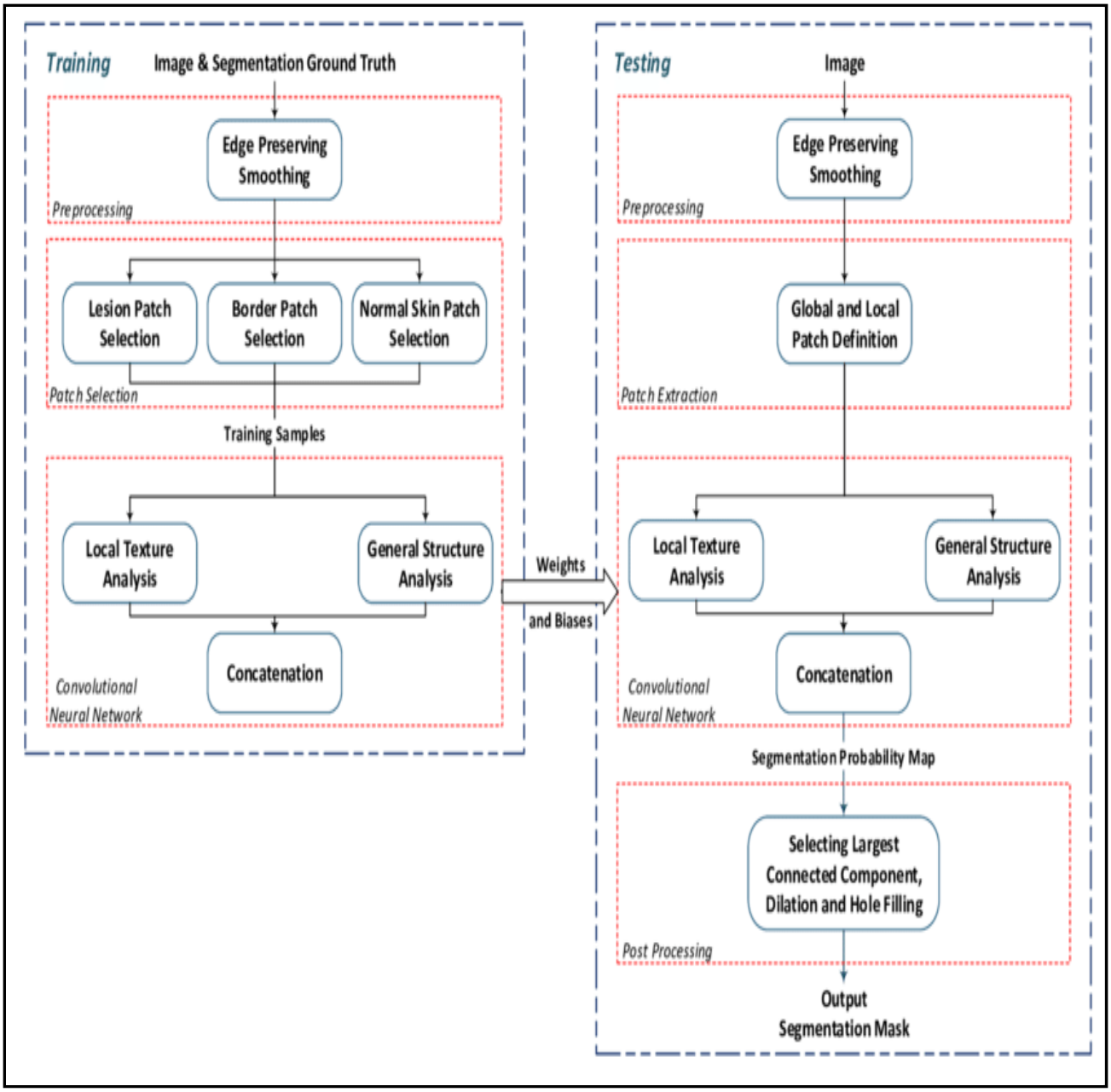
Now a day's people are suffering from skin diseases, More than 125 million people suffering from Melanoma and many more skin diseases.Skin diseases may be caused by fungal infection, bacteria, allergy, or viruses, etc. If skin diseases are not treated at earlier stage, then it may lead to complications in the body including spreading of the infection from one individual to the other.Skin diseases can be prevented by investigating the infected region at an early stage.The advancement of lasers and Photonics based medical technology has made it possible to diagnose the skin diseases much more quickly and accurately. But the cost of such diagnosis is still limited and very expensive. Skin tone and skin colour plays an important role in skin disease detection. One more problem with skin disease is the difficulty in recognizing the main cause. This difficulty occurs because the symptoms of different diseases are quite similar with each other.

b. Solution

To overcome the above problem we are building a model which is used for the prevention and early detection of skin disease.An application is built where a person can upload an image from UI ,then image will be sent to the trained model. The model analyse the image and detect the skin disease that person had.Our proposed approach is simple, fast and does not require expensive equipment other than a camera and a computer. The approach works on the inputs of a color image.Our system can successfully detect 5 different skin diseases with an accuracy of 70%. Our system will use a Convolution neural network to train the images of skin diseases.

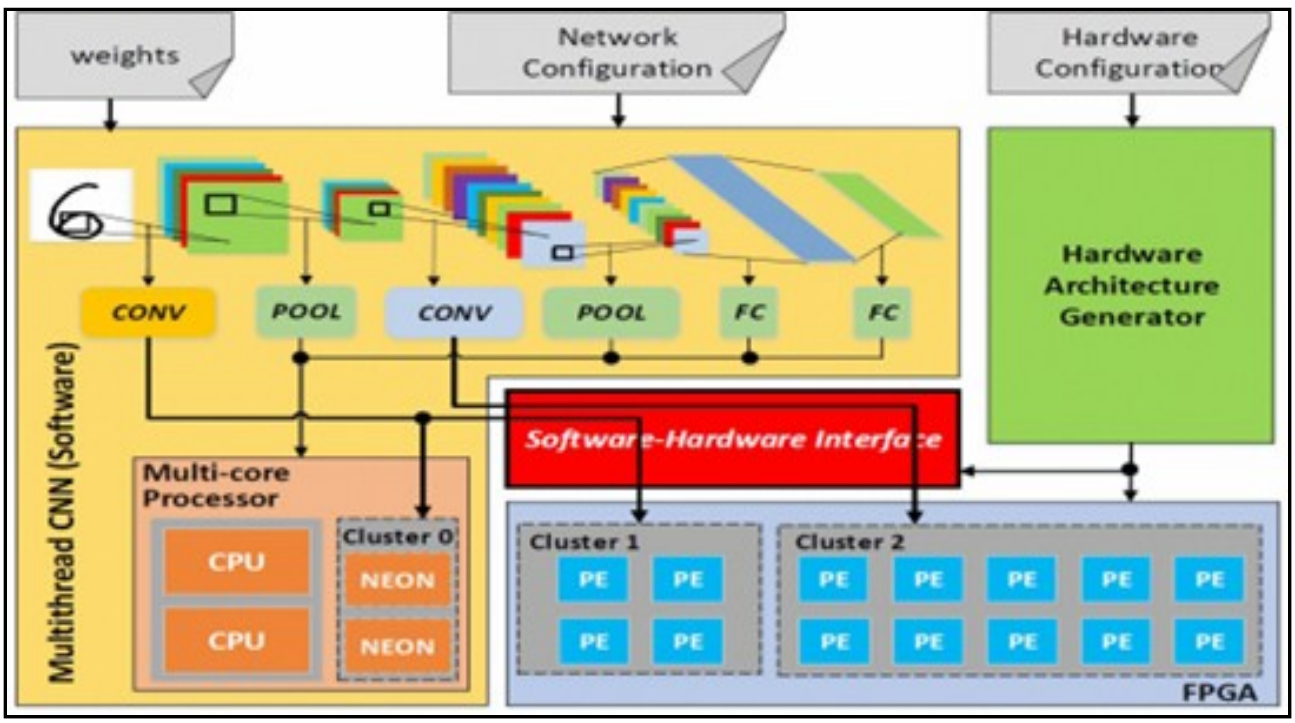
3.TheoriticalAnalysis

3.1 Block Diagram



3.2. Hardware /Software designing

The model is designed using Jupyter notebook in Anaconda which is a open-source distribution of the Python and R programming languages for scientific computing, that aims to simplify package management and deployment.The application building is done using flask which is a web framework that provides tools, libraries and technologies that allow the developer to build a web application. This web application can be some web
pages, a blog, a wiki or go as big as a web-based calendar application or a commercial website.



4.EXPERIMENTAL INVESTIGATION:

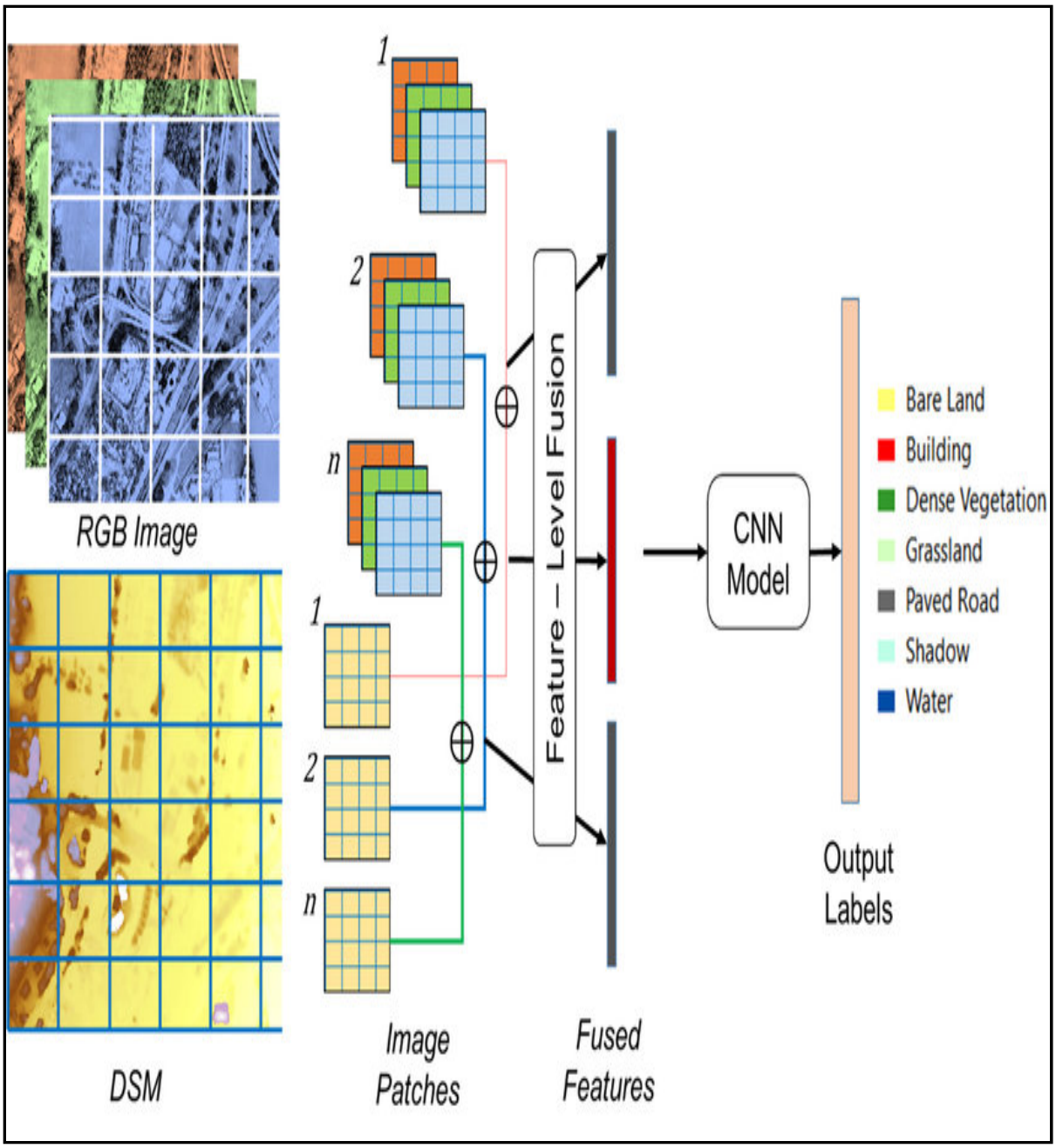
To identify the different skin diseases ,“Acne, Melanoma, Pelling skin, Ring worm, Vitiligo” are selected as the research objects. Seventy images are selected to be identified(trained) accordingly “Acne, Melanoma, Pelling skin, Ring worm, Vitiligo”, thirty images as testing samples .

METHOD	ACNE	MELANOMA	PEELING SKIN	RINGWORM	VITILIGO
NUMBER OF TEST	30	30	30	30	30
RECOGNITION ON NUMBERS	28	29	28	26	26
RECOGNITION ON RATE(%)	93	96	93	86	86

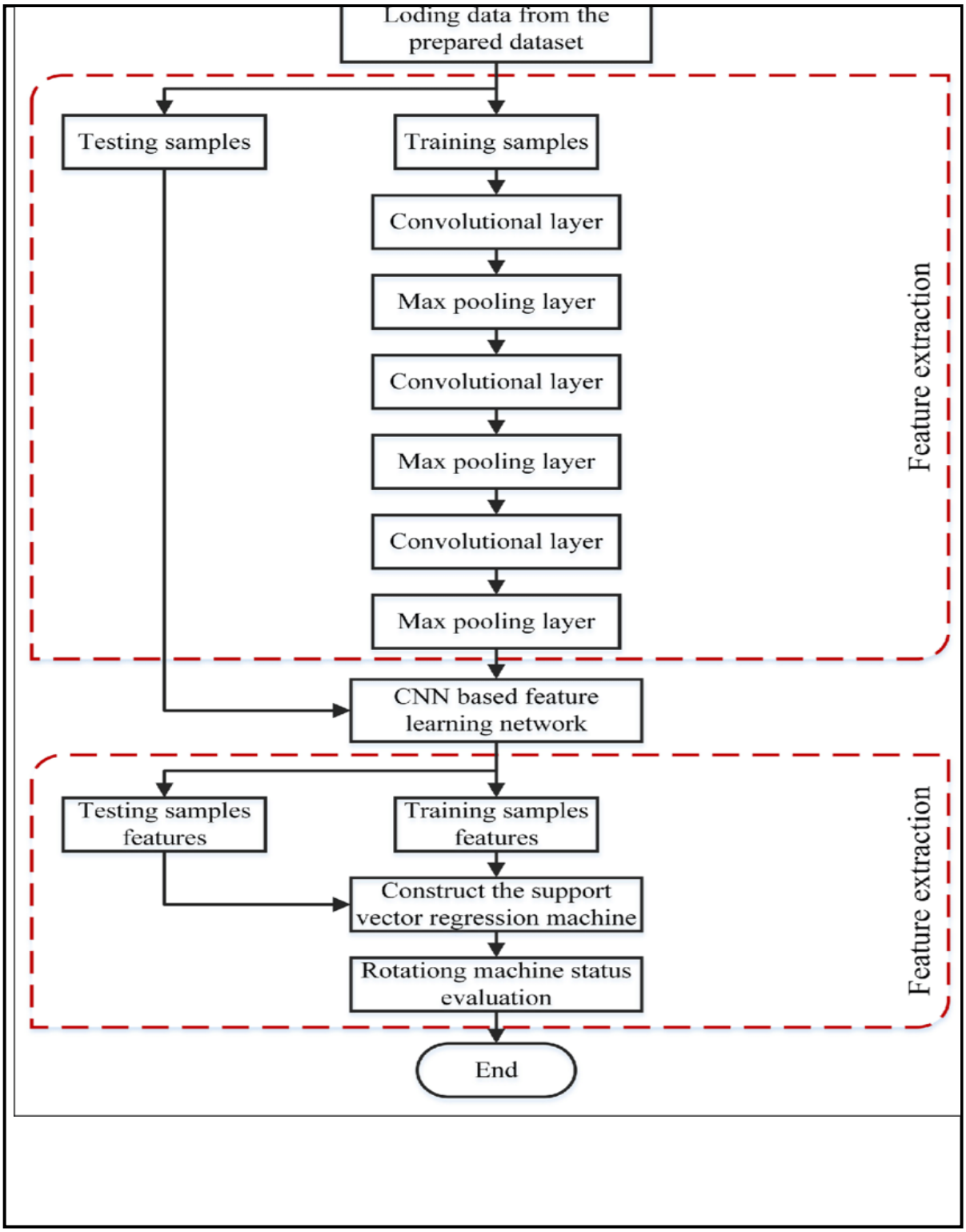
Above table presents the results of different recognition algorithms. It is used to identify images on thirty test samples . The recognition accuracy of five diseases at 93%, 96%, 93%, 86%, and 86%.

5. Flowchart

Flowchart of the proposed convolutional neural network (CNN) based classification model.



algorithm flowchart of cnn:



6.Result:

This section displays accuracy results for the convolutional neural network constructed during this project. Neural network accuracy, while not good enough to confidently identify “most” the pictures in the skin diseases dataset, proved that image classification using a CNN is possible. The results are promising, in that with a more properly trained network, more layers, or larger input images, a convolution neural network, constructed using the six layers types prescribed by this project, has the capability of being an effective tool for image classification.

7.Advantage and disadvantages of cnn

Advantage	Disadvantage
(i) Easy model building with less formal statistical knowledge required.	(i) Clinical interpretation of model parameters is difficult (black boxes).
(ii) Capable of capturing interactions between predictors.	(ii) Sharing an existing ANN model is difficult.
(iii) Capable of capturing nonlinearities between predictors and outcomes.	(iii) Prone to overfitting due the complexity of model structure.

8.Applications of Convolutional Neural Networks

How to make use of convolutional neural networks? Companies are usually on the lookout for a convolutional neural networks guide, which is especially focused on the applications of CNNs to enrich the lives of people.

Simple applications of CNNs which we can see in everyday life are obvious choices, like facial recognition software, image classification, speech recognition programs, etc. These are terms which we, as laymen, are familiar with, and comprise a major part of our everyday life, especially with

image-savvy social media networks like Instagram. Some of the key applications of CNN are listed here -

1. **Decoding Facial Recognition**

Facial recognition is broken down by a convolutional neural network into the following major components -

a. Identifying every face in the picture
b. Focusing on each face despite external factors, such as light, angle, pose, etc.
c. Identifying unique features
d. Comparing all the collected data with already existing data in the database to match a face with a name.

A similar process is followed for scene labeling as well.

2. **Analyzing Documents**

Convolutional neural networks can also be used for document analysis. This is not just useful for handwriting analysis, but also has a major stake in recognizers. For a machine to be able to scan an individual's writing, and then compare that to the wide database it has, it must execute almost a million commands a minute. It is said with the use of CNNs and newer models and algorithms, the error rate has been brought down to a minimum of 0.4% at a character level, though it's complete testing is yet to be widely seen.

3. **Historic and Environmental Collections**

CNNs are also used for more complex purposes such as natural history collections. These collections act as key players in documenting major parts of history such as biodiversity, evolution, habitat loss, biological invasion, and climate change.

4. **Understanding Climate**

CNNs can be used to play a major role in the fight against climate change, especially in understanding the reasons why we see such drastic changes and how we could experiment in curbing the effect. It is said that the data in such natural history collections can also provide greater social and scientific insights, but this would require skilled human resources such as researchers who can physically visit these types of repositories. There is a need for more manpower to carry out deeper experiments in this field.

5. **Grey Areas**

Introduction of the grey area into CNNs is posed to provide a much more realistic picture of the real world. Currently, CNNs largely function exactly like a machine, seeing a true and false value for every question. However, as humans, we understand that the real world plays out in a thousand shades of grey. Allowing the machine to understand and process fuzzier logic will help it understand the grey area us

humans live in and strive to work against. This will help CNNs get a more holistic view of what human sees.

6. **Advertising**

CNNs have already brought in a world of difference to advertising with the introduction of programmatic buying and data-driven personalized advertising.

7. **Other Interesting Fields**

CNNs are poised to be the future with their introduction into driverless cars, robots that can mimic human behavior, aides to human genome mapping projects, predicting earthquakes and natural disasters, and maybe even self-diagnoses of medical problems. So, you wouldn't even have to drive down to a clinic or schedule an appointment with a doctor to ensure your sneezing attack or high fever is just the simple flu and not symptoms of some rare disease. One problem that researchers are working on with CNNs is brain cancer detection. The earlier detection of brain cancer can prove to be a big step in saving more lives affected by this illness.

9. Conclusion:

CNNs display a high performance as state-of-the-art skin lesion classifiers. Unfortunately, it is difficult to compare different classification methods because some approaches use nonpublic datasets for training and/or testing, thereby making reproducibility

difficult. Future publications should use publicly available benchmarks and fully disclose methods used for training to allow comparability.

10.Future Scope

We have restricted out study to isolated Numeral recognition and the isolated character recognition because of lack of standard benchmarking Datasets. Based on our obtained results the following are the future directions for continuing the research in Devanagari Character recognition

1. The work specifically belongs to isolated Devanagari characters with assumption that the images are of good quality and therefore complex normalization, skew removal and slant removal operations are not performed. Accuracy improvement can be observed is these operations are also applied.
2. The developed model can be further extended for the holistic approach of conjunct/ word recognition. Investigations in Devanagari Handwriting Recognition 148
3. Segmentation algorithm can be build for conjunct and word recognition for Devanagari script. After segmentation our approach can be used as the base model for recognition of characters and sub-characters. Then the contextual information or dictionary search may be used for word recognition
4. The effect of Linear and Nonlinear Normalization of the isolated patterns as Preprocessing step has not been analysed.
5. Development of Language model and grammar rules can be used for the word and sentence recognition for Devanagari.
6. The performance of degraded patterns of Devanagari samples for the recognition of Historical documents can be done as future scope.

11.Bibilography

- https://en.wikipedia.org/wiki/Convolutional_neural_network
- https://www.quora.com
- https://www.google.com
- https://www.kaggle.com/c/statoil-iceberg-classifier-challenge
- http://earth.esa.int/seasar2008/participants/36/pres_36_alexandrov.pdf
- https://towardsdatascience.com/