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A REVIEW ON MACHINE LEARNING APPROACH FOR DETECTING SKIN CANCER

Dr. P.S Prasad[1], Prof. Vishal Panchbhai[1], Suyash Sanjay Khandalkar[2], Apourva Wankhede[2], Vishakha Gautam[2], Parimal D Bhende[2], Prerna Shukla[2]

[1] (Guide), Department of Information Technology, Priyadarshini College of Engineering, Nagpur, India prakashsprasad@gmail.com
[2]Student, Department of Information Technology, Priyadarshini College of Engineering,Nagpur,

ABSTRACT

Nowadays when anyone contemplates major diseases the denominations that appear in mind are heart diseases or cancers whatever type they may be. Cancer is a very perilous disease as it does not have any particular and does not provide any assurance. The prognostication of diseases is still traditional and needs years of experience but additionally after that, we don't get the precision and opportune treatment on time, hence we decided to work on a particular technology to automate the disease presage system by utilising the latest technologies. We have targeted skin cancer detection topic to work on and this paper is all about pre-research done afore culling the designation.

Keyword*: disease prediction, automated system, machine learning, skin cancer.*

1. INTRODUCTION

Skin cancer is one in every of the foremost dangerous styles of cancer. Carcinoma is caused by unrepaired polymer (DNA) in skin cells that generates genetic defects or mutations on the skin. Carcinoma tends to bit by bit different body components, therefore it's a lot of sturdy within the initial stages, that is why it's best detected at the first stages. The increasing rate of carcinoma cases, high fatality rate, and big-ticket medical treatment need that its symptoms be diagnosed early. Considering the seriousness of those problems, researchers have developed varied early detection techniques for carcinoma. Lesion parameters like symmetry, colour, size, shape, etc. square measure accustomed sight carcinoma and to differentiate benign carcinoma from skin cancer. This paper presents a close systematic review of deep learning techniques for the first detection of carcinoma. analysis papers printed in well-reputed journals, relevant to the subject of carcinoma diagnosing, were analysed. analysis findings square measure given in tools, graphs, tables, techniques, and frameworks for higher understanding.

2. LITERATURE REVIEW

Sanjay Jaiswar et al. [1], As the instant of skin cancer every year with regards to malignant melanoma, the dangerous type of skin cancer. And the detection of skin cancer is difficult from the skin lesion due to artefacts, low contrast, and similar visualisation like mole, scar etc. Hence Automatic detection of skin lesion is performed using techniques for lesion detection for accuracy, efficiency and performance criteria.

K Srinidhi et al. [2], Aim of our proposed method is to categorise skin lesion image as Benign or Melanoma and also to study the performance of Convolutional Neural

Network algorithm using data augmentation technique and without data augmentation technique. Steps involved in the proposed method are Image Pre-Processing, Image Segmentation and Image Classification.

Shi Wang et al. [3], Melanoma is a common type of skin cancer, where early detection can be helpful in its treatment and can suggestively stop death from this deadly skin cancer. Optimization of the

DBN was using a new meta- heuristic method called the developed ,ermal Exchange Optimization algorithm to improve the network efficiency in terms of reliability and accuracy. Performance of the proposed technique was authenticated by comparing it with 7 other methods: fractal analysis, CNN, Delaunay Triangulation, Side-by-Side method, Genetic Algorithm, fusion method, and SVM.

Tulasi Nak et al. [4] The main types of skin cancer are basal cell carcinoma (BCC), squamous cell carcinoma (SCC), melanoma and Merkel cell carcinoma (MCC). Nowadays people are suffering from skin diseases, more than 125 million people are suffering from skin cancer and it's rate is rapidly increasing over the last few decades specially

Melanoma is the most diversifying skin cancer. The characteristics of the skin images are diversified, so that it is a challenging job to devise an efficient and robust algorithm for automatic detection of the skin disease and its severity. Skin tone and skin colour plays an important role in skin disease detection. Proposed system is a combo model which is used for the prevention and early detection of skin cancer, basically skin disease diagnosis depends on the Different characteristics like color, shape, texture etc.

Aishwariya Dutta et al. [5], Our experimental studies for lesion classification demonstrate that the proposed approach can successfully distinguish skin cancer with a high degree of accuracy, which has the capability of skin lesion identification for melanoma recognition. Such a visual assessment, artefacts such as low contrast, various noise, presence of hair, fiber, and air bubbles, etc. This article proposes a robust and automatic framework for the Skin Lesion Classification (SLC), where we have integrated image augmentation, Deep Convolutional Neural Network (DCNN), and transfer learning. Skin cancer, also known as melanoma, is generally diagnosed visually from the dermoscopic images, which is a tedious and time consuming task for the dermatologist. The obtained average area under the receiver operating characteristic curve (AUC), recall, precision

Usha Kumari et al. [6], Skin cancer is the 6th most dangerous type of cancer and the number of deaths is increasing day by day due to skin cancer. Thus early detection and taking preventive measures is an important aspect to cure skin cancer. This project is about the detection of skin cancer in the early-stage using machine learning and image processing. First, the image is taken as input, and then the dull razor method is used to remove unwanted hair, and then the Gaussian method is used for image smoothing. Here colour is the important factor so colour base k-means clustering is performed and after that

Asymmetric, Border, Colour, Diameter(ABCD) and Gray Level Co-occurrence Matrix(GLCM) are implemented for feature extraction. Here they are using the ISIC 2019 Challenge dataset which consists of different types of dermoscopic images then the result is shown this method has an accuracy of the 96.25%

Hemalatha N et al. [7], The development of abnormal cells in the body is the cause of skin cancer, exposure to UV rays is responsible for 90% of skin cancers. A survey conducted by the Cancer Council in 2015 shows that more than 921,000 people are infected out of which 21,513 died. In this paper classification of skin cancer using a Convolution Neural Network is discussed using Tensorflow and keras. Images from the data set are used to classify the type of cancer in the dataset.

The accuracy of the model keeps changing as the number of epochs changes. The dataset used here is skin-cancer-malignant-vs-benign

Jinen Daghrir et al.[8], Melanoma is considered to be the most dangerous cancer and early detection and prevention are necessary to cure it. With the help of an automated diagnosis system that can help doctors and normal people detection of skin cancer becomes easy. In this paper, the authors used the hybrid approach for detecting melanoma skin cancer. Their model relies on the prediction of 3 different methods one is CNN and the other two are classical machine learning classifiers trained with a set of features like border, texture, and color. The results have shown that using the three methods together gives more accuracy. The CNN model takes the input image size of 124x124 pixels. ReLU activation function is used. The experiment is performed on the ISIC dataset which contains more than 23000 images.

Saudamini S et al.[9], There are 3 most common types of skin cancer out of which melanoma is dangerous and detection in the early stage is necessary to prevent the spread of cancer. In this paper, authors detect melanoma using segmentation. Dermoscopic image is taken as input and then a novel image process technique is applied. GLCM (Gray Level Co-occurrence Matrix) feature extraction technique is used and classification of images using SVM and ANN is implemented. Using ANN images are further classified into 3 categories.

Mehwish Dildar et al.[10], This paper presents a detailed systematic review of deep learning techniques for the early detection of skin cancer. Research papers published in well-reputed journals, relevant to the topic of skin cancer diagnosis, were analysed. Research findings are presented in tools, graphs, tables, techniques, and frameworks for better understanding.

3. RESEARCH METHODOLOGY

A comparative study has been done on some commonly used algorithms like Support Vector Machine (SVM) and Convolutional Neural Network (CNN). The study of these two algorithms is carried out for finding the precision in the detection process. Withal, a well kens dataset HAM1000 will be utilised in this project to accumulate a number of results with approx precision. Let's get into the discussion topic by topic.

Support Vector Machine (SVM):

Support Vector Machine (SVM) is a widely used supervised machine learning algorithm generally utilized for relegation and regression processes. It utilises a technical trick Kennedy as the kernel trick in which a boundary line is drawn between the relegated images or videos to make them separate and find precision between them. As per the study, this algorithm provides a higher range of precision when performed in earlier detections but the disadvantage of utilising this algorithm is that it only gives precision on diminutive datasets and selective areas. When it comes to sizably voluminous datasets the algorithm fails to provide precision. Hence the result of utilizing SVM is found to be 70% precise.

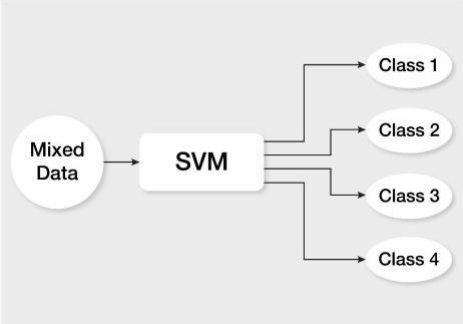

Fig. 1 SVM Classifier

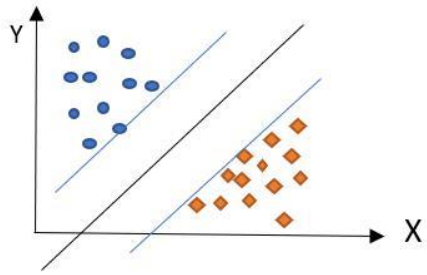

Fig. 2 An ideal hyperplane separating the dataset into red and blue categories

A separable line is drawn between two different classes of dataset that helps to find the perfect class with accuracy from both the X and Y axis.

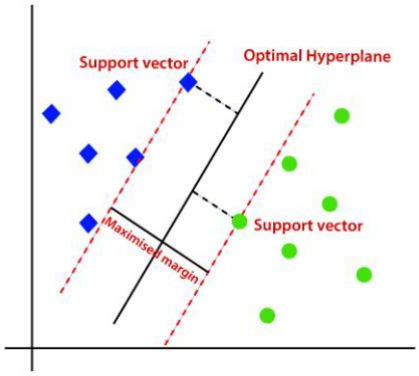

Fig. 3 Optimal Hyper plane using the SVM algorithm

In the above figure 3, SVM is creating the best hyperplane or we can say a decision boundary so that the separation highlights classes of similar categories and new item can be assigned for more accuracy.

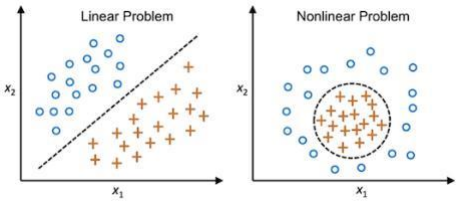

Fig. 4 Linear and non linear separable data

The two methods are shown above in figure 4. The first is linear separation and the second is non linear separation.

Postulating we ken the data is engendered in two groups when the data is linearly separable, we can facilely disunite the data in low dimensions with a line as shown above. However, when the data is non-linear, we may need a more involute polynomial function to dissever the data. Since customary PCA simply computes PCs as a linear amalgamation of the underlying structure in the data, customary PCA will not be able to disunite the nonlinear data.

Convolutional Neural Network (CNN)

CNN is a widely used deep neural network algorithm that performs two layer operations on input data. Operations on images and videos are done by CNN as it has a specialisation in image processing. The architecture of CNN shown in figure 5, consists of multi layer architecture that is ReLU activation layer, feature extraction layer, activation polling, and plenarily connected layer with softmax activation as relegation layer.

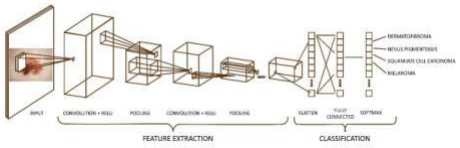

Fig. 5 CNN classification

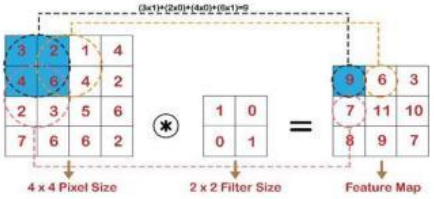

Fig. 6 Illustration of the convolution process

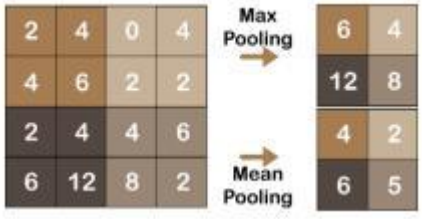

Fig. 7 Pooling Process Illustration

Polling layers within the CNN methodology conventionally are inserted typically once many convolutions layers, There are many benefits of the pooling layer, which may more and more minimise the size of the output volume on the Feature Map in order that it will manage over-fitting. The pooling layer is employed to reduce knowledge utilising max-pooling or mean Pooling

4. CONCLUSION

An automatic skin disease detection system is to be implemented in the proposed architecture. The main focus is on detecting a skin cancer type melanoma using digital image processing. So as a conclusion of this research over two algorithms SVM and CNN, found that SVM is capable of classifying different classes present in the dataset using hyperplane separation but it gives accuracy in small datasets. The SVM fails to provide accuracy in large datasets, hence we decided to use CNN algorithm over SVM. CNN classifies datasets into multiple layers and finds accurate classes in images. CNN has a specialisation in image processing and filtering techniques. CNN provides accuracy to both small datasets as well as large datasets with the implementation of deep neural networks. CNN module in this study consists of three layers with the use of 3 × 3 filter with 16, 32, and 64 outputs in serial order, a fully connected layer, and softmax activation

REFERENCES

[1] Sanjay Jaiswar, Mehran Kadri, Vaishali Gatty, “Skin Cancer Detection Using Digital Image Processing”, International Journal of Scientific Engineering and Research (IJSER).

[2] K Srinidhi, G Jotsna Priya, M Rishitha, K Tejo Vishnu, G Anuradha,”Detection of Melanoma Skin Cancer using Convolutional Neural Network algorithm”, International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-9 Issue-7, May 2020.

[3] Shi Wang and Melika Hamian,”Skin Cancer Detection Based on Extreme Learning Machine and Developed Version of Thermal Exchange”, Hindawi Computational Intelligence and Neuroscience Volume 2021

[4] Tulasi Nakka ,”Detection of Skin Cancer Using Machine Learning”, International Journal of Scientific & Engineering Research Volume 11, Issue 12, December-2020 755 ISSN 2229-5518

[5] Aishwariya Dutta, Md. Kamrul Hasan, and Mohiuddin Ahmad,”Skin Lesion Classification Using Convolutional Neural Network for Melanoma Recognition”, CC-BY-NC 4.0 International licence, November 26, 2020.

[6] Usha Kumari, Laxmi Lydia ,”Skin cancer detection and classification using machine learning”, Research gate (Elsevier), August 2020

[7] Hemalatha N, Nausheeda B.S, Athul K.P, Navaneeth , “Detection of Skin Cancer Using Deep CNN”, International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-8 Issue-5S, January 2020

[8] Jinen Daghrir, Lotfi Tlig, Moez Bouchouicha, Mounir Sayadi, “Melanoma skin cancer detection using deep learning and classical machine learning techniques: A hybrid approach”, International Conference on Advanced Technologies for Signal and Image Processing, Sep 2020.

[9] Saudamini S. Jivtode , “Melanoma Skin Cancer Detection by using Segmentation”, International Journal of Science and Research (IJSR) ISSN: 2319-7064 ResearchGate Impact Factor (2018).

[10] Dildar M, Akram S, Irfan M, Khan HU, Ramzan M, Mahmood AR, Alsaiari SA, Saeed AHM, Alraddadi MO, Mahnishmah, “Skin Cancer Detection: A Review Using Deep Learning Techniques", int J Environ Res Public Health. 2021 May 20;18(10):5479. doi: 10.3390/ijerph18105479.