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Paper Authors
Mr.Polasi.Sudhakar[1], Chegondi Akhila [2], Chode Ram Teja[3] , Karri Goutham [4] ,Pasumarthy Gayatri Sai Prasanna [5]

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SKIN CANCER DETECTION USING MACHINE LEARNING

Mr.Polasi.Sudhakar[1], Chegondi Akhila [2], Chode Ram Teja[3] , Karri Goutham [4] ,Pasumarthy Gayatri Sai Prasanna [5]
[1]Assistant Professor, Dept. of CSE, [2]17ME1A0571, [3]17ME1A0572, [4]17ME1A0586, [5]17ME1A05A6
Ramachandra College of Engineering, A.P., India

ABSTRACT:

Skin cancer is an alarming disease for mankind. The necessity of earlydiagnosis of the skin cancer have been increased because of the rapid growth rate of Melanoma skin cancer, it'shigh treatment costs, and death rate. This cancer cells are detected manually and it takes time to cure in most of the cases. This web application proposed an artificial skin cancer detection system using image processing and machine learning method. The features of the affected skin cells are extracted after the segmentation of the dermoscopic images using feature extraction technique. A deep learning based method convolutional neural network classifier is used for
the stratification of the extracted features. An accuracy of 89.5% and the training accuracy of 93.7% have been achieved after applying the publicly available data set.

1. INTRODUCTION

Skin cancer is an alarming issue and it must be detected as early aspossible. The diagnostic is a manual process that is time consuming as well as expensive. But, today's world science has become advanced by using machine learning and it can be helpful in many ways. Hence, machine learning can make easy for detecting cancerous cells and that is why machine learning specially convolutional neural network is used to detect cancerous cell more quickly, and efficiently.

In this they proposed an efficient system for prescreening of pigmentedskin lesions for malignancy using general-purpose digital cameras. These images can be captured by a smartphone or a digital camera. This could be beneficial in different applications, such as computer aided diagnosisand telemedicine applications. It could assist dermatologists, or smartphone users, evaluate risk of suspicious moles. The proposed method enhances borders and extracts a broad set of dermatologically important features. These discriminative features allow classification of lesions into two groups of melanoma and benign. The algorithm used to
classify the images is ANN(Artificial Neural Networks).they proposed and evaluated six methods for the segmentation of skin lesions in dermoscopic images. This set includes some state of the art techniques which have been successfully used in many medical imaging problems (gradient vector flow (GVF) and the level
set method of Chan et al. (C-LS). It also includes a set of methods developed by the authors which were tailored to this particular application (adaptive thresholding (AT), adaptive snake (AS), EM level set (EM-LS), and fuzzy-based split- and-merge algorithm (FBSM). The segmentation methods were applied to 100 dermoscopic images and evaluated with four
dif-ferent metrics, using the segmentation result obtained by an experienced

dermatologist as the ground truth. The best results were obtained by the AS and EM-LS methods.

2. RELATED WORK

Existing System

Several online Melanoma risk calculators have beendeveloped as web-based versions of the tools described in published studies, including those from the US National Cancer Institute (NCI) and the Victorian Melanoma Service. Others have been developed using established methods for risk prediction and have published their underlying effect estimates online while the provenance of other online tools is unknown. All the systems developed where used to find the risk of melanoma in the upcoming years by using previous years data. The systems were trained with the patient data who was found to be diagnosed by the melanoma cancer in that particular area. The systems trained are used to predict the probability of occurrence of the melanoma in the upcoming 5 years only for the patients of same age, name, gender, symptoms. It is useful to predict the risk only at the final stage of melanoma.For new data the predictive values are not accurate. Can be used for prediction of melanoma risk only for a population of
particular locality. Cannot predict
melanoma at early stages.

Proposed System:

The labeled images "benign" and "malignant" were used inthis system. The images labeled as "other and unknown" were not usedsince the images in those groups could not be diagnosed. Images were put into dataset relying upon their analysis mark which has been extracted from the metadata of the pictures. The dataset has been organized in to two classes one containing all the dangerous dermoscopic pictures and other containing favorable dermoscopic pictures. The images from ISIC(International Skin Imaging Collaboration) dermoscopic archive have been chosen randomly for the experimental section. In our proposed system, there exist three layers. First layer is the input layer where the data sets are trained on. Input layer collects data that are delivering and adding some weight with it that goes to hidden layers. The neurons of hidden layer separate the features from the data to find out a pattern. The pattern is then used as basis to output layers that selects to appropriateclasses. Finally, binary classification are used which appropriately select class 1 and class 0. For our case, class 0 means no harmful cells are present and class 1 means having malignant cancerous cells.

3. METHODOLOGY:

There is a need for automation in recognition of human skincancer systems so that the improper diagnosis and treatment can be minimized. Therefore, this work will initiate a model for human skin cancer recognition which is consistent, efficient and cost effective by exploring machine learning techniques. The ultimate goal is to ease the doctor's role in the recognition of skin cancer by providing better and more reliable results, so that more patients can be diagnosed.Skin cancer is an alarming issue and it must be detectedas early as possible. The diagnostic is a manual process that is time consuming as well as expensive. But, today's world science has become advanced by using machine learning and it can be helpful in many ways. Hence, machine learning can make easy for detecting cancerous cells and that is why

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machine learning speciallyconvolutional neural network is used to detect cancerous cell more quickly, and efficiently.

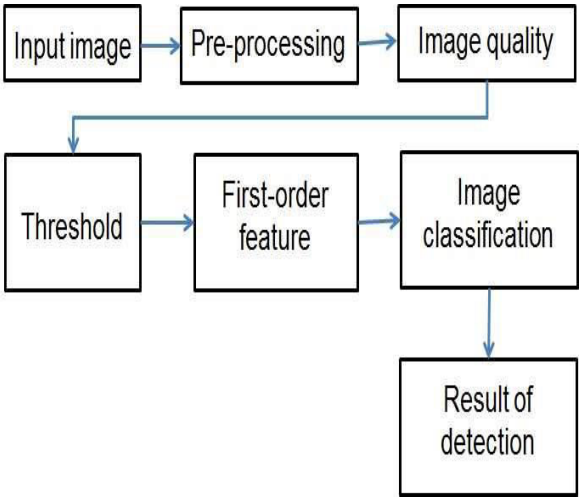

Figure 1: Architecture

The model implementation consists of three modules:

1. Data Acquisition
2. Pre-processing Data
3. Data Analysis Module

Data Acquisition

Data acquisition is the process of importing raw data sets into youranalytical platform. It can be acquired from traditional databases (SQL andquery browsers), remote data (web services), text files (scripting languages),NoSQL storage (web services, programming interfaces), etc. Dataacquisition involves the identification of data sets, retrieval of data, queryof data from the dataset.

Pre-processing

Pre-processing of data involves 2 criteria:

Cleaning Data: Data cleaning involves removal of inconsistent values, duplicate records, missing values, invalid data and outliers.

Data Munging / Data Wrangling: Data Wrangling techniques involve 37scaling, transformation, feature selection, dimensionality reduction and data manipulation. Scaling is performed over the dataset to avoid having certain features with large values from dominating the results. The transformation technique reduced the noise and variability present in the dataset. Multiple features are handpicked for the removal of redundant/irrelevant features present in the dataset. Dimensionality reduction helped in eliminating irrelevant features and made analysis simpler.

Data Analysis Module

The data analysis module comprises of feature selection, model selection, creation of insights and analysis of results. A CNN Algorithm has been utilized to analyse the dataset in order to predict the melanoma.

Input Design

The Skin Cancer Detection system takes input from the user by entering the local host address in the chrome and then the web page is displayed and it consists the detect button to perform the skin cancer detection. While clicking the detect button the page will redirect to the Detection of Skin cancer pages this page is going to accept the input from the user .In this page there is a field called upload an image it takes skin cancer image from file which contains images in the user's local system .

Output Design

The output of our web application is achieved after uploading the image .The result is determined as High Risk, Medium Risk ,Low Risk .

4. STUDY OF RESULTS:

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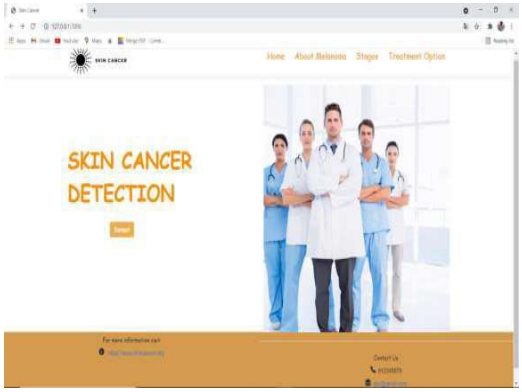

Figure2: Home page

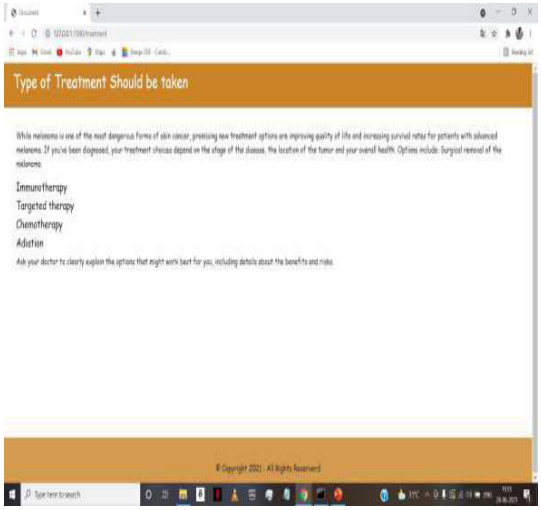

Figure 3: Treatment option

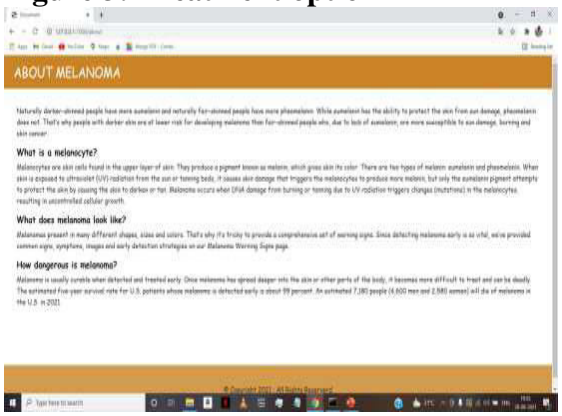

Figure 4: About Melanoma

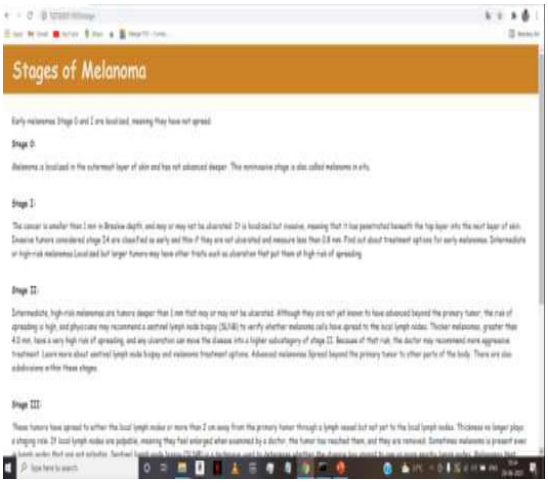

Figure 5: Stages

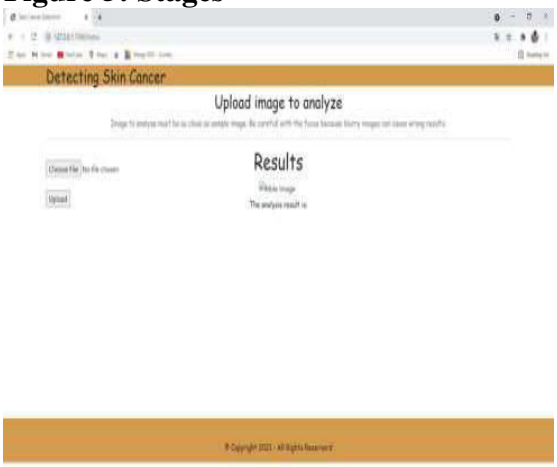

Figure 6: Detection of skin cancer

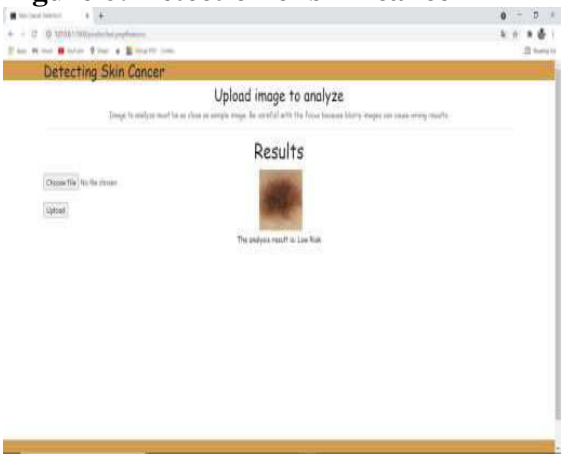

Figure 7: Detection of Low Risk

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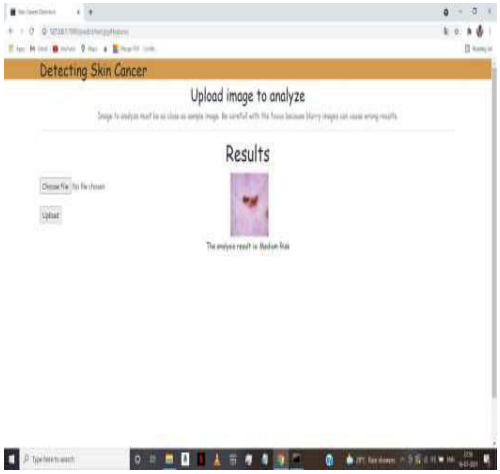

Figure 8 : Detection of Medium Risk

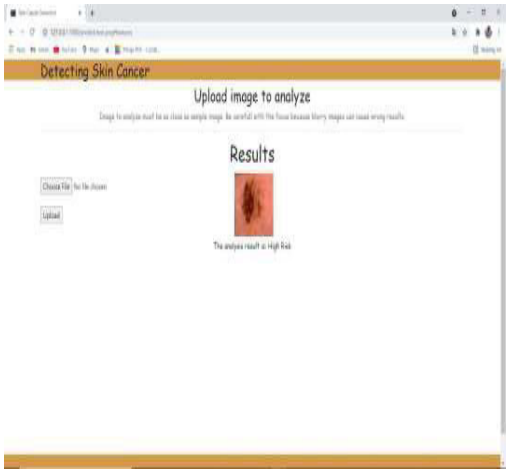

Figure 9: Detection of High Risk

5.CONCLUSION :

Treatment options consists of the types of treatment should be taken for skin cancer .Detect field plays a key role in our web application while clicking the detect button it redirects to the detecting page and analyze the risk factor of the skin cancer by uploading the image of the skin cancer .

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