DETECTION OF MELANOMA IN SKIN CANCER USING DEEP LEARNING

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DETECTION OF MELANOMA IN SKIN CANCER USING DEEP LEARNING

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Abstract:
Melanoma Cancer is a type of skin cancer and it is the most dangerous one because it causes the most of skin cancer deaths. The Melanoma comes from melanocyte cells, melanin-producing cells, so that melanomas are generally brown or black colored. Melanomas are mostly caused by exposure to ultraviolet radiation that damages the DNA of skin cells. The Diagnoses of melanoma cancer are often performed manually by using visuals of the skilled doctors, analyzing the result of dermoscopy examination and match it with medical sciences. Manual Detection weakness is highly influenced by human subjectivity that makes it inconsistent in certain conditions. Therefore, a computer assisted technology is needed to help classifying the results of dermoscopy examination and to deduce the results more accurately with a relatively faster time. The making of this application starts with problem analysis, design, implementation and testing. This application uses Deep Learning technology with Convolutional Neural Network for classifying image Data.
Keywords: Convolutional Neural Network, Deep Learning, Image Classifications, LeNet-5, Python

I.INTRODUCTION

The skin is a vital organ that covers the entire outside of the body, forming a protective the outer part, the skin is prone to disease. One of these diseases is known as skin cancer. Skin cancer is an abnormality in skin cells caused by mutations in cell DNA. One of the most dangerous types of skin cancer is melanoma cancer. Melanoma is a skin malignancy derived from melanocyte cells, the skin pigment cells that produces melanin. Because these cells are still able to form melanin, melanoma is mostly brown or black colored. Common symptoms of melanoma are the appearance of new moles or changes in existing moles. Changes to the mole can occur due to exposure to ultraviolet light that damages the DNA of skin cells and genes that control cell growth and division resulting in the formation of malignant cells. Deep learning has become a hot topic discussed in the machine learning world because of its significant capability in modeling various complex data such as images and sound. Convolutional Neural Network is one of deep learning's methods that has the most significant result in image recognition because it tries to imitate the same way of recognizing images in visual cortex as human so that they are able to process the same information

II.EXISTING SYSTEM

Many researches have been working on the computer vision approach for skin cancer detection. For segmentation of skin lesion in the input image, existing systems either use manual, semi-automatic or fully automatic border detection methods. The Previous Procedures of detecting this disease undergoes manual treatment and it doesn't involve any kind of Technology. In This system the samples are detected by using manual methods that is with the periodic inspection of blood sample using microscope. Each cell was segmented and observed briefly. All these processes were executed manually, hence it was a time-consuming method. In Previous some are used The Diagnosis of the skin cancer is done by dermatologist where they can access the images of cancer patients and analyze the result whether the patient has cancerous cells or not.

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III.PROPOSED SYSTEM

In this Proposed System we are using Deep Learning Technology to detect the skin cancer. Convolutional Neural Network is the one of the Technology in Deep Learning. The Convolutional Neural Network is used for classifying the image Processing. In skin cancer there are various types of skin diseases. But, In that Melanoma is one of the most Malignant disease which is being detected in the system respectively. MATPLOTLIB library is used for the Graphical Representation. The skin cancer might attack on any part of the body i.e, Neck, Legs, Arms etc. So, it can detect whether which part of the body is effected and the cancer cells are being produced. Generally if there's any rash or abnormality on the skin, People can neglect and they lack in analyzing whether it's skin cancer or not.

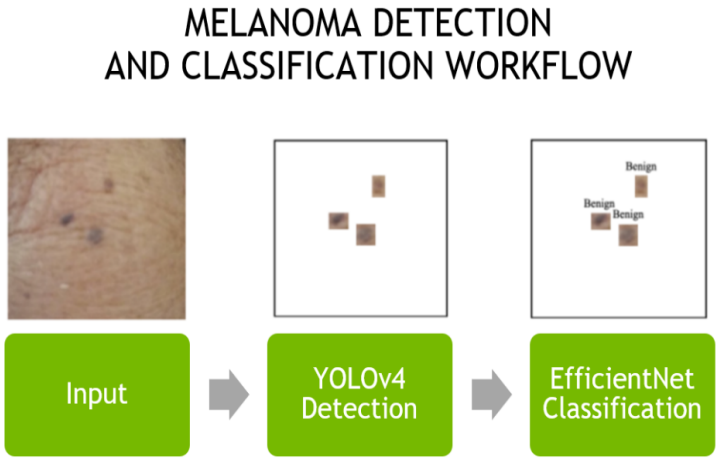

Figure 1: Classification of a Melanoma Detection

IV.RELATED WORK

Figure 2: Melanocyte Cell

Melanoma comes from melanocyte cells, melanin-producing cells that are usually present in the skin. Because most melanoma cells still produce melanin, melanoma is often brown or black. Melanoma can appear on normal skin, or can appear as a mole or other area of the skin that undergoes changes. Some moles that arise at birth can develop into melanoma. In, addition, melanoma can also occur in the eyes, ears, gingival of the upper jaw, tongue, and lips. Melanoma cancer is often characterized by the appearance of new moles or when there is a change in shape from an old mole. Normal moles usually have one color, round or oval, and are less than 6 millimeters in diameter, while melanoma has these characteristics:

- Has more than one color
- Has an irregular shape
- Its diameter is greater than 6 mm

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- It feels itchy and can bleed

To distinguish normal moles from melanoma, it can be examined for its form with the ABCDE list, as follows:

- Asymmetrical: Melanoma has an irregular shape and cannot be divided in half.
- Border: Melanoma has an uneven and rough edge, unlike normal moles.
- Color: Melanoma is usually a mixture of two or three colors.
- Diameter: Melanoma is usually larger than 6 millimeters in diameter, and is different from ordinary moles.
- Enlargement or evolution: Moles that change shape and size after a while will usually become melanoma.

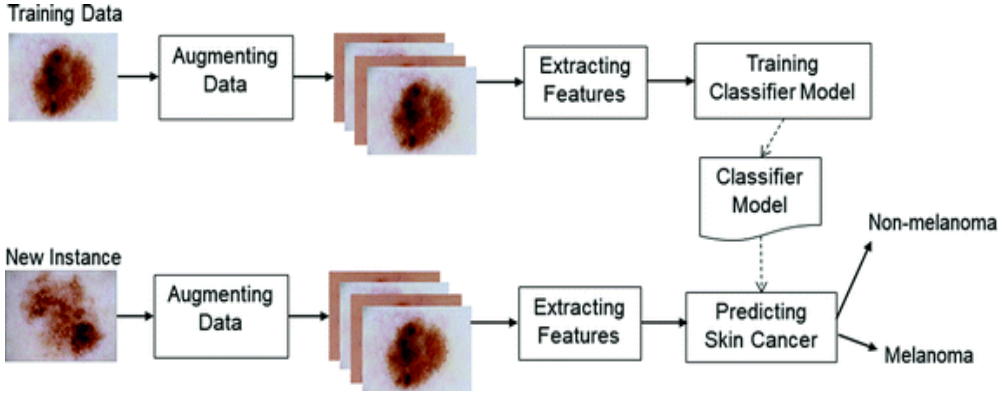

Figure 3: Block Diagram for Melanoma Detection

V.DEEP LEARNING

Deep learning is a machine learning technique that utilizes many layers of nonlinear information processing to perform feature extraction, pattern recognition, and classification. Deep Learning utilizes artificial neural networks to implement problems with large datasets. Deep Learning techniques provide a very strong architecture for Supervised Learning. By adding more layers, the learning model can better represent labelled image data. In deep learning, a computer learns to classify directly from images, text, or sound. Just as a computer is trained to use large numbers of data sets and then change the pixel value of an image to an internal representation or vector feature where classifiers can detect or classify patterns in the input.

VI.CNN

Convolutional Neural Network is one of deep learning's algorithms that is claimed to be best model for solving problems in object recognition. CNN is the development of Multilayer Perceptron which is designed to process two dimensional data. CNN is included in the type of Deep Neural Network because of the high network depth and many applied to image data. In the case of image classification in research on virtual cortex on cat's visual sense, MLP is less suitable for use because it does not store spatial information from image data and considers each pixel to be an independent feature that results in unfavorable results. object oriented API for embedding plots into applications using general purpose GUI toolkits like Tkinter, wxPython, Qt, or GTK. There is also a procedural "pylab" interface based on a state machine, designed to closely resemble that of MATLAB, though its use is discouraged. SciPy makes use of Matplotlib

VII.SOFTWARE

PYTHON

It is an interpreted high level general-purpose programming language. Python's design philosophy emphasizes code readability with its notable use of significant indentation. Its language construct as well as its object-oriented approach aim to help programmers write clear, logical code for small and large scale projects. Python is dynamically-typed and garbage-collected. It supports multiple programming paradigms, including structured, object-oriented and functional programming. Python

is often described as a "batteries included" language due to its comprehensive standard library. Python 3.7.8. version is used Here

LIBRARIES:

Matplotlib

It is a plotting library for the Python Programming language and its numerical mathematics extension NumPy. **NumPy**

It is a library for the Python Programming language, adding support for large, multi-dimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays. **Pandas**

It is a software library written for the Python programming language for data manipulation and analysis. In particular, it offers data structure and operations for manipulating numerical tables and time series **Seaborn**

It is a library in Python predominantly used for making statistical graphics. Seaborn is a data visualization library built on top of matplotlib and closely integrated with pandas data structures in Python. Visualization is the central part of seaborn which helps in exploration and understanding of data. **IPython**

The Interactive Python is a command shell for interactive computing in multiple programming languages, originally developed for the Python programming language, that offers introspection, rich media, shell syntax, tab completion, and history.

Sklearn

The sklearn library contains a lot of efficient tools for machine learning and statistical modeling including classification, regression, clustering and dimensionality reduction. The sklearn is used to build machine learning models.

Keras

It is a powerful and easy-to-use free open source Python library for developing and evaluating deep learning models. It wraps the efficient numerical computation libraries Theano and TensorFlow and a few lines of code.

TensorFlow

It is a free and open-source software library for machine learning. It can be used across a range of tasks but has a particular focus on training and inference of deep neural networks TensorFlow is a symbolic math library based on dataflow and differentiable programming.

VIII.RESULTS

Case-1: This Graph shows the Diseases in Skin Cancer and which disease is dangerous.

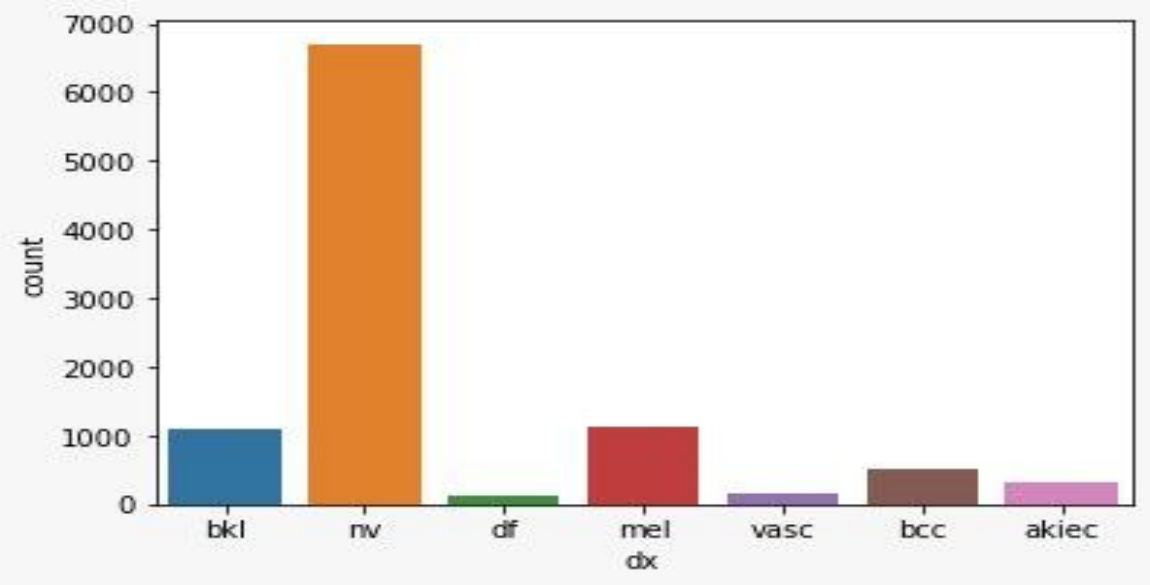

Figure 4: Identifying the Diseases in Skin Cancer

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Case-2: This Graph shows that which localization parts can effected.

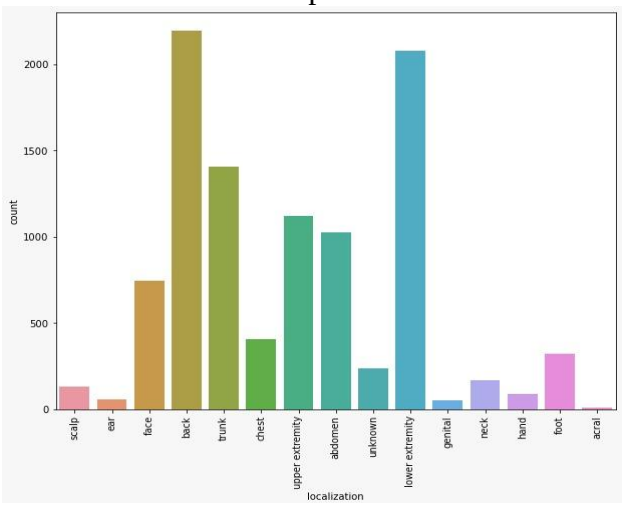

Figure 5: Localization of the place where it is mostly occurs

Case-3: This Graph shows that whether it is skin cancer or not.

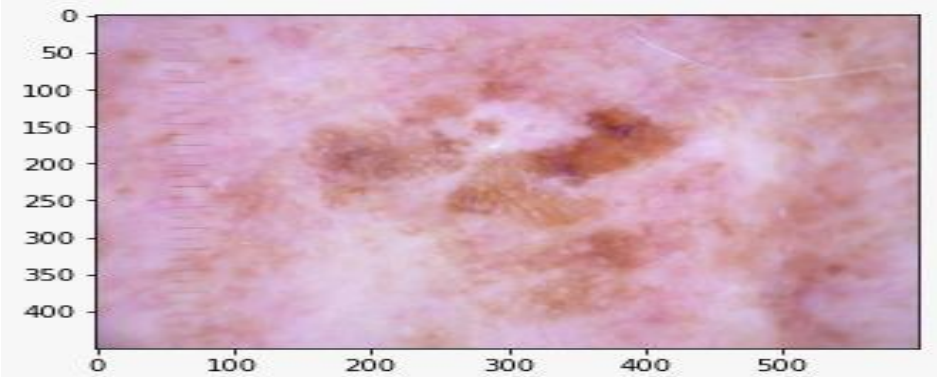

Figure 6: Detection of Skin Cancer

Case-4: This Figure shows that all the images of Diseases in Skin Cancer.

Figure 7: Stages of skin cancer

IX.CONCLUSION & FUTURE SCOPE

In this paper, a Convolutional Neural Networks based approach have been proposed for melanoma classification. A system is developed that can help patients and doctors to be able to detect or identify skin cancer classes whether it is benign or malignant. From the experimental and evaluation section, it can be said the model can be considered as a benchmark for skin cancer detection by assisting healthcare professionals. By taking some random images any doctor can identify the accurate results but in traditional approach too much time are taken to detect the cases correctly. Unfortunately, it is difficult to compare different classification methods because some approaches use non-public datasets for training and testing, thereby making reproducibility difficult. Future publications should use publicly available benchmarks and fully disclose methods used for training to allow comparibility.

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