# A New Deep Learning Model for Skin Cancer Classification

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***Abstract—Skin cancer is one of the top three perilous types of cancer caused by damaged DNA that can cause death. This damaged DNA begins cells to grow uncontrollably and nowadays it is getting increased speedily. There exist some researches for the computerized analysis of malignancy in skin lesion images. However, analysis of these images is very challenging having some troublesome factors like light reflections from the skin surface, variations in color illumination, different shapes, and sizes of the lesions. As a result, evidential automatic recognition of skin cancer is valuable to build up the accuracy and proficiency of pathologists in the early stages.***

***Index Terms—Skin Cancer, Damaged DNA, Computerized Analysis, Image Analysis Challenges, Automatic Recognition.***

## I. INTRODUCTION

Skin cancer is one of the most prevalent forms of cancer worldwide, with its incidence rising steadily over the past decades. Early detection of skin cancer is crucial for effective treatment and improved patient outcomes. With advancements in deep learning and computer vision techniques, automated systems for skin cancer classification have emerged as promising tools to assist dermatologists in accurate diagnosis. Skin cancer manifests in different forms, each presenting unique characteristics and challenges for diagnosis. Melanoma, for instance, is notorious for its aggressive nature and potential to metastasize if not detected early. Basal cell carcinoma and squamous cell carcinoma, although typically less aggressive than melanoma, can still pose significant health risks if left untreated. Dermatologists rely on visual inspection and dermoscopy, a non-invasive imaging technique, to assess skin lesions and determine the need for biopsy or further intervention.

## II. LITERATURE SURVEY

1.Skinlesion segmentation in dermoscopy images via deep full resolution convolutional networks. Computer Methods and Programs in Biomedicine, 162, 221–231. AUTHORS: Al-Masni, M. A., Al-Antari, M. A., Choi, M.-T., Han, S.-M., & Kim, T.-S. (2018) Automatic segmentation of skin lesions in dermoscopy images is still a challenging task due to the large shape variations and indistinct boundaries of the lesions. Accurate segmentation of skin lesions is a key prerequisite step for any computer-aided diagnostic system to recognize skin melanoma.

2. Pigment network-based skin Cancer detection. In 2015 37th annual international conference of the IEEE engineering AUTHORS: Alfed, N., Khelifi, F., Bouridane, A., & Seker, H. (2015) Diagnosing skin cancer in its early stages is a challenging task for dermatologists given the fact that the chance for a patient’s survival is higher and hence the process of analyzing skin images and making decisions should be time efficient

## III. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM: Various neural networks using deep learning-based models such as PNASNet-5-Large, InceptionResNetV2, SENet154, InceptionV4 have been proposed in the literature using the International Skin Imaging Collaboration (ISIC-ISBI) 2018 test dataset. The PNASNet-5-Large model gave the best results with 76% accuracy. Another study used a linear classifier to classify 10 different skin lesions.

DISADVANTAGES:

- Another study used a linear classifier to classify 10 different skin lesions
- Low Accuracy
- Time Consuming

3.2 PROPOSED SYSTEM: In this study, a deep learning model with 7 convolution layers and 3 neural layers was designed to classify the HAM10000 dataset, which consists of 7classes and includes dermoscopic images. The accuracy rate for the test data of the proposed model was calculated as 99.01%.This result shows that the proposed model can help experts in diagnosing skin cancer.

ADVANTAGES:

- This result shows that the proposed model can help experts in diagnosing skin cancer.
- Accurate Classification
- Less Complexity
- High Performance

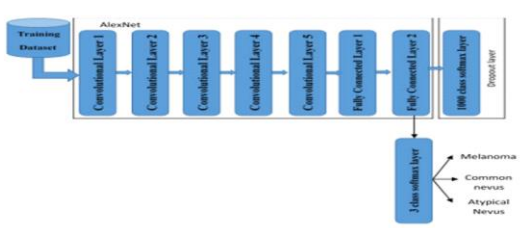
3.3 SYSTEM REQUIREMENTS:
HARDWARE REQUIREMENTS:

- Processor: I3/Intel Processor
- Hard Disk: 120GB
- RAM: 4GB (min)

SOFTWARE REQUIREMENTS:
Operating System: Windows Family
Programming Language: Python
Database: MySQL

3.4 MODULES:
1. Detect Disease
2. Data Collection
3. Data Preprocessing
4. Train & Test Spilt
5. Model Build
6. Predict

## IV. SYSTEM ARCHITECTURE



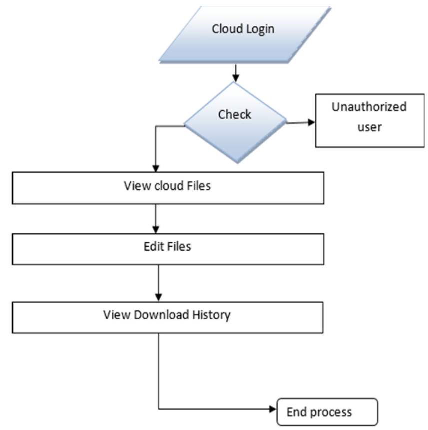

## V. SYSTEM DESIGN

5.1 DATA FLOW DIAGRAM:

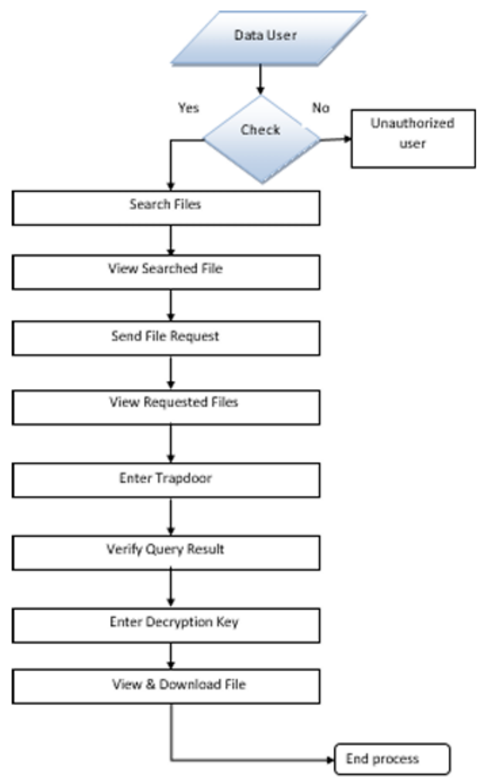
1. The term "bubble chart" or "DFD" is also used to describe it. It is possible to visualize a system in terms of data intake, processing, and output by using a simple visual formalism.

2. Data flow diagram (DFD) is a vital modeling tool.
3. the system's parts are what this tool is utilized for This list includes system procedures, data, an external entity, and information flow within the system.

Cloud Server




Data User




## VI. SOFTWARE ENVIRONMENT

Python: Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has fewer syntactical constructions than other languages.

- Python is Interpreted − Python is processed at runtime by the interpreter. You do not need to compile your program before executing it. This is similar to PERL and PHP.
- Python is Interactive − You can actually sit at a Python prompt and interact with the interpreter directly to write your programs.
- Python is Object-Oriented − Python supports Object-Oriented style or technique of programming that encapsulates code within objects.
- Python is a Beginner's Language − Python is a great language for the beginner-level programmers and supports the development of a wide range of applications from simple text processing to WWW browsers to games.

History of Python

Python was developed by Guido van Rossum in the late eighties and early nineties at the National Research Institute for Mathematics and Computer Science in the Netherlands. Python is derived from many other languages, including ABC, Modula-3, C, C++, Algol-68, SmallTalk, and Unix shell and other scripting languages. Python is copyrighted. Like Perl, Python source code is now available under the GNU General Public License (GPL). Python is now maintained by a core development team at the institute, although Guido van Rossum still holds a vital role in directing its progress.

- Getting Python The most up-to-date and current source code, binaries, documentation, news, etc., is available on the official website of Python https://www.python.org. Windows Installation Here are the steps to install Python on Windows machine.
- Open a Web browser and go to https://www.python.org/downloads.
- Follow the link for the Windows installer python-XYZ. msifile where XYZ is the version you need to install.
- To use this installer python-XYZ.msi, the Windows system must support Microsoft Installer 2.0. Save the installer file to your local machine and then run it to find out if your machine supports MSI.
- Run the downloaded file. This brings up the Python install wizard, which is really easy to use. Just accept the default settings, wait until the install is finished, and you are done.

Interactive Mode

Programming Invoking the interpreter without passing a script file as a parameter brings up the following prompt−$python

Python2.4.3(#1,Nov112010,13:34:43)

## VII. SYSTEM IMPLEMENTATION

Upload image: Upload the test image to predict the disease Analysis : in analysis module first we resize the test image then we convert the test image into grey scale image finally we convert the grey scale image into numerical values like arrays. The conversion of image into grey scale is nothing but data pre-processing. We can do that with the help of opencv library. We can convert the image into numerical values by using numpy library. Detect disease: we already train the cnn with dataset.The training process have the following steps. Data collection: we have to collect the dataset from Kaggle website. Data preprcessing: we have to remove noise from images in this step. Train & test Split: we have to split the data into training and testing data. Model build: we have to train the CNN algorithm with train data and test with test data to get the accuracy. Predict: finally we apply the test image and compare the test image with CNN train image the we can predict the disease of test image.

Sample code: IMPORTANT INFORMATION#

# the model is built with 20 epochs which gives only 43% of validation accurcay

# which will predict 50/50 accurately try to build the model with 200 epochs for

# better accuracy for detection and classification from __future__ import division, print_function

# coding=utf-8 import sys import os import glob

import re

import numpy as np

# Keras

```
from
keras.applications.imagenet_utils
decode_predictions
from keras.models import load_model
from keras.preprocessing import image
# Flask utils
import
preprocess_input,
from flask import Flask, redirect, url_for, request, render_template
from werkzeug.utils import secure_filename
import sqlite3
app = Flask(__name__)
UPLOAD_FOLDER = 'static/uploads/'
```

## VIII SYSTEM TESTING

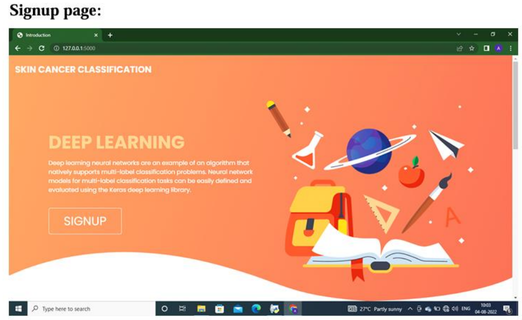
8.1 Functional Testing:

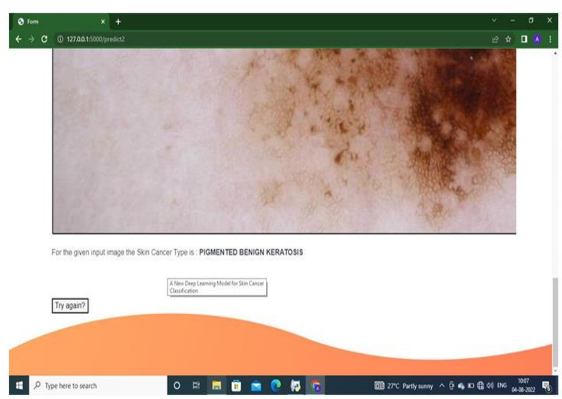
- It is essential to only accept authentic input that has been specifically identified.
- Identification and rejection of specific types of incorrect input.
- In order for the system to function correctly, it is necessary to complete several tasks.
- For each of the application output classes, outputs must be tested.
- Systems and methods for interfacing with other systems and procedures must be established.
- Functional tests are organized and prepared based on requirements, significant functions, or specialized test cases. Additional testing is required to discover business processes, data fields and established procedures. Additional testing needs to be discovered and the value of current tests established in order to complete functional testing,

Unit Testing: During the software development process, unit testing and coding may be accomplished at the same time. It is also possible to segregate unit testing from other testing. It is imperative that strategies and tactics be put to the test. Detailed functional tests will be written up for future reference during field testing. The test's aims and objectives There should be no mistakes in the data. Only by clicking on the link supplied will you be able to view the requested pages. Sending a message or entering data shouldn't necessitate any sort of wait time on your end. The features will be put through their paces in testing. Make that the data is in the correct format by performing an audit on it. No more than one entry should be allowed in the database. Every link needs to point to the appropriate page. 8.5 Integrity Testing: Software integration testing refers to the process of integrating software components one at a time to look for interface issues that could lead to problems. In an integration test, the primary purpose is to ensure that all of the components of a system or company-wide software application interact with each other. Every single one of the above-mentioned tests went perfectly. Everything worked as it should. This is the 8.4th test. End-User Testing is a crucial part of any project, and the end user must play a significant role. The system is further checked to ensure that it meets all necessary functional criteria. Every single one of the above-mentioned tests went perfectly. None of the concerns were discover

## IX SCREENSHOTS

**Signup page:**




**we get the out put**

## CONCLUSION

Two dynamic searchable encryption techniques with a high level of security were provided by the researchers. Both forward and backward collusion between the cloud server and search users can be prevented by the first method. Another solution to the problem of key sharing in the kNN based searchable encryption system is provided by the second. According to performance assessments, the new methods outperform the existing ones in terms of storage, search, and update complexity. Testing shows that schemes are efficient in terms of storage overhead, index construction and trapdoor creation and queries.

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