IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

DEEP LEARNING FOR AUTOMATIC IDENTIFICATION OF NODULE MORPHOLOGY FEATURES AND PREDICTION OF LUNG CANCER

Ms. Sejal Lunawat, Ms. Raksha Bendale, Ms. Rutuja Mungse, Ms. Poonam Mane,
Prof. Gurunath Chavan, Department of Computer Engineering,
Pimpri Chinchwad College of Engineering and Research, Ravet, Pune

Abstract: In all of the illnesses which have existed in mankind lung most cancers have emerged as one of the maximum fata one time and again. Also, it's far one of the maximum not unusual places and contributes to deaths amongst all cancers. Cases of lung cancer growing unexpectedly is a totally common and critical motive for any dying for each ladies and additionally men. If we come across early most cancers it could assist to do away with the disorder totally. So we require techniques to locate early detection of disorder in most cancers that is evolving very fast. The predominant motive that is misunderstood is lung cancer. Lung most cancers may be the main and critical motive for the deaths which can be associated with most cancers worldwide. From this we are able to conclude that there may be a totally massive chance of human blunders in treating the most cancers in the early stages. An early detection can deliver an affected person a higher threat to therapy and recover. Therefore, we aim to locate and come across most cancers early with photo popularity to lessen mistakes which can be made with the aid of using human beings and we expand the technique to be extra reliable,correct and much less complicated. In the proposed work, photo processing algorithms have been used and a neural implant community to lay out an automatic technique for the early detection of lung cancer.

Index Terms **- Image processing, Artificial neural network, Convolution Neural Network Algorithm, Pooling Layer.**

I. INTRODUCTION

Statistics in numerous countries have shown that lung cancer has the topmost appearance and mortality rate. There are two problems with lung cancer determination. (1) Escape decision also called false negative medically that means people with real cancer aren't detected. The decision result of false negatives will affect that case to miss the smart opening for treatment. (2) Misdiagnosis, also called false positive medically, means people without cancer are diagnosed with cancer. People without cancer but diagnosed as having cancer, will suffer from internal damage and profitable cost. The most important early symptom of lung cancer is by relating pulmonary nodes, excrescences with special morphological features. Beforehand discovery of pulmonary nodes in the Computed Tomography (CT) reviews, explosively affects patient survival rate.

In most cases, the symptoms of lung cancer in the patient's body are simple. Treatment and prognosis depend on the type of medical history. In 2012, 1,242,000 men were diagnosed worldwide. That is, about 16.7% of all cancers in men are the most dangerous, and 583,000 patients were diagnosed in 2012, 8.8% of women, the third most dangerous. Dealing with this barbaric

illness has been a long process, but new advances in technology have achieved the development of forgiveness and adoption qualifications, but it is still a long and costly process. It is also important to note that in developing countries it affects the majority of cancer patients. Imagine that the procedure for diagnosing cancer is very expensive and makes it difficult for such patients to pay for expensive examinations.

Therefore, our design also aims to make cancer screening procedures affordable in a human environment where there is not enough access to expensive medical care.

• Chronic cough or alternate withinside the common coughing method, wheezing.

• Chest ache or belly ache.

• Cachexia (weight loss, fatigue, lack of appetite)

II. LITERATURE SURVEY

Lung cancer research is an area that strongly influences the dynamics of the field of rehabilitation. Early detection of cancer can contribute to increased mortality. It is very tedious and their accuracy depends on the ability of the operator. Qing Zeng Song, Lei Zhao, Xing Ke Luo and Xue Chen Dou (2017) [1] looked at different ways of detecting lung cancer problems from grading benign and malignant. They suggest using CNN, DNN and SAE respectively. They concluded that the layers of the neural network are relatively small, due to the limitations of the data sets. The proposed method can be expected to improve accuracy of the other database.

Raunak Dey, Zhongjie Lu, Yi Hong (2018) [2] investigated 3D networks to classify pulmonary nodules in a CT image into benign or malign orders. The condition was that it doesn't possess automatic pulmonary node finding, which will de-stress the necessity of machined reflections for node points.

Panpan Wu, Ziping Zhao, Haishuai Wang, Shirui Pan, and Bjorn Schuller (2020) [3] acquainted with a fundamental principle of a residual network. They proposed a division system of pulmonary nodes predicated on a deep residual network. It similarly has a failure, this being that a long training time is required when dealing with a large work of lung CT images.

Diego Riquelme and MoulayA. Akhloufi (2020) [4] In this work, they offered distinct deep CAD systems and models. It pursues the common goal of easing the composition of radiologists in lung node discovery. One of the bounds is the data and their imbalanced nature. The use of new loss functions aimed to attack the problem of unstable classes and help attain more effective training. Expansive exploration on lung cancer expectation by a former critic using imaging analysis ways has been demonstrated. Image processing ways with computer- predicated approaches are helpful in prognosticating and making judgments about lung cancer.

Table 1: A summary of various Identification of Nodule Morphology Features and Prediction of Lung Cancer

SR NO	AUTHOR	TITLE	METHODOLOGIES	LIMITATIONS
1	Qing Zeng Song, Lei Zhao, Xing Ke Luo and Xue Chen Dou (2017)	Using Deep Learning for Classification of Lung Nodules on Computed Tomography Images	The classification of benign and malignant is considered. It is proposed to employ, respectively,(CNN),(DNN), (SAE).	The layers of the neural network are relatively small, due to the limitations of the data sets. The proposed method can be expected to improve accuracy of the other database.
2	Raunak Dey, Zhongjie Lu, Yi Hong (2018)	Diagnostic Classification of Lung Nodules using 3D Neural Networks	Investigated 3D networks to classify pulmonary nodules in a CT image into benign or malignant categories.	The limitation is that it does not have automatic pulmonary nodule detection, which will relax the requirement of manual annotations for nodule locations.
3	Panpan Wu, Ziping Zhao, Haishuai Wang, Shirui Pan, and Bjorn Schuller (2020)	Classification of Lung Nodules Based on Deep Residual Networks and Migration Learning	Basic principle of a residual network is applied. Proposed classification method of pulmonary nodules based on a deep residual network.	It also has a deficiency, this being that a long training time is needed when dealing with a large number of lung CT images.
4	Diego Riquelme and MoulayA. Akhloufi (2020)	Deep Learning for Lung Cancer Nodules Detection and Classification in CT Scans	In this work, they presented different deep CAD systems and models. It pursues the objective of alleviating the work of lung nodule detection.	One of the limitations is the data and their imbalanced nature. The use of new loss functions designed to tackle the problem of unbalanced classes and help achieve more efficient training.

III. PROBLEM STATEMENT

You have some kind of health problem and visit the nearest medical center; adviser sug-exploits for CT checkup of Lung. So, you visit for a CT checkup and ideally you need to stay for days to get a report. Again, also you need to consult a doctor regarding reports and also they will suggest further medical treatments. So this is a long process you need to go through. So we're developing a system which determines lung conditions from CT- Overlook images and gives results immediately. System transfer the report on patient correspondence.

IV. PROPOSED METHODOLOGY

MODULE 1: REGISTRATION AND LOGIN:

The login and registration pages are for users to download user information. And the program provides basic information about lung cancer. Login also uses Google Maps to search for the user's location. After successful registration, the system will send the password to the user's email address in case the user forgets the password.

MODULE 2: CNN ALGORITHM

This is done by applying a CNN algorithm that accepts images and converts them into a grayish scale and gives results in the form of a dual value. 0 black and 1 white. It converts a large image into a 50-50 cube and is reprocessed applying the CNN algorithm. It divides the cube into 25 units each. It takes the initial image as input and additionally before reprocessing the final result is drawn after the expected release. Primary processing has a total value of 4 * 5 = 20 cubes of output analysis where the first is the input cable and the last is the output cube.

MODULE 3: POOLING LAYER

This allows for the correct layout of the structure. There are various parameters such as up and down. It is used to change the clarity of the effect and adjust the focus to print the results of the analyzed output.Users will register with personal details; it will include name,email,address etc. Once a user submits the form it will get a temporary password on his email. User will login with the details provided in email.Once a user is logged in, patient id will be provided then loading the dataset ,preprocessing,compiling the model and prediction will be shown to the user.

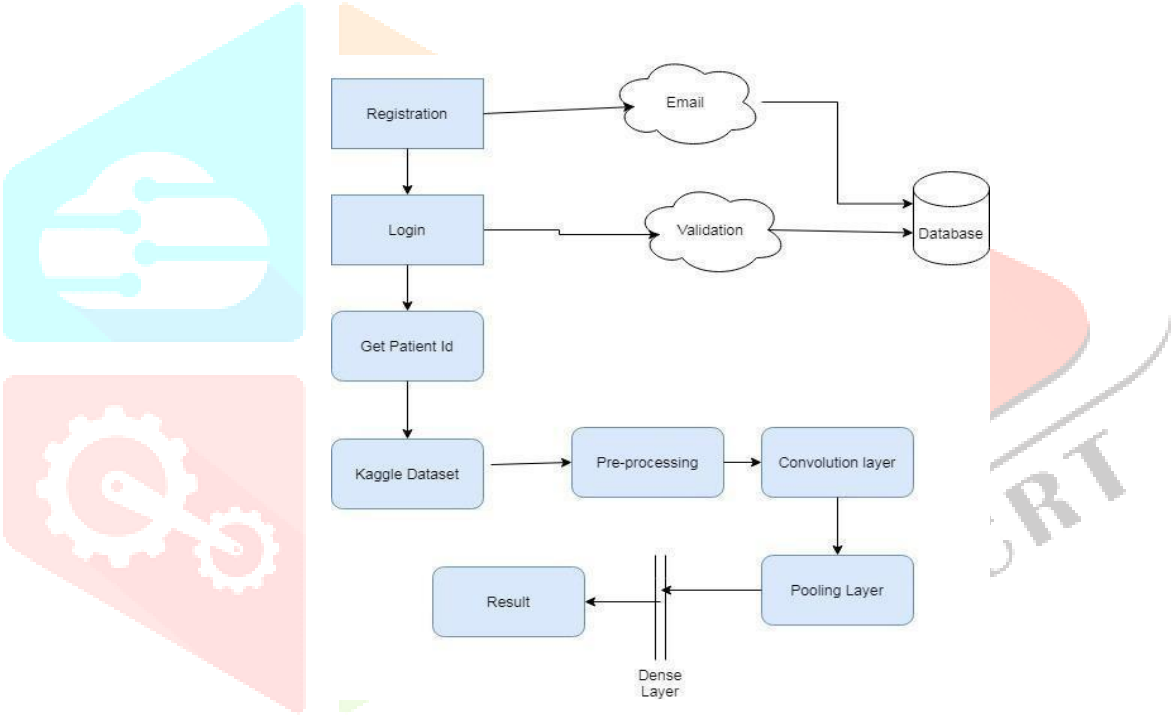

Figure 1. Architecture Diagram.

V. ALGORITHM:

CNN represents a convolutional neural network. This algorithm is often used for machine learning. This can be represented by a 5 * 5 rectangular parallelepiped with parameters such as length, width and height. CNN is an algorithm used for detailed learning that can take input images, give value (readable material and choices) to various elements / items in the image, and distinguish them from each other. The analysis of the results was performed using the following formula:

Actual value - Estimated value = Error

The agenda of this algorithm is to allow machines to see the world like humans, look the same, and use their knowledge to do many things. Tasks such as image and video recognition, image analysis and classification, add-on programs, natural language processing, and deep learning.

ALGORITHM STEPS:

- **LOADING DATASET**– For this project the dataset was taken from the well-known source of data "Kaggle". The name of the dataset was 'Chest X-ray'.
- **BUILDING THE MODEL** –Here we have used a Sequential model. This model is built using sequential It helps us to create the model layer by layer.
- **DATA ANALYSIS & PRE-PROCESSING** – Analysis of data such as age, gender, and photo-taking will affect the likelihood that a patient will develop a specific disease.
- **COMPILING MODEL** - Following three parameters were used while Compiling the model. 'optimizer', 'loss' and 'metrics', learning rate was controlled by the 'optimizer'.
- **PREDICTION** – The Prediction stage involves predicting the disease present in the X-Ray image.

VI. CONCLUSION:

One of the most fatal conditions to own is lung cancer. Early identification and classification of pulmonary nodes are essential for enhancing the survival rates of individuals with lung cancer and are considered to be crucial conditions for computer-supported opinion. Physicians should be apprehensive that size and its change over time remain the most important factors determining nodule handling, as stated in the presently used foreign guidelines, indeed though these factors should be estimated in relation to other bump characteristics, without overlooking the clinical environment. Thus, predictive models that take into account several factors. Beforehand, opinion of lung cancer is required to help with enervating issues and mortality.

In this work, the automatic discovery of lung cancer is proposed beforehand through automatic procedures to reduce mortal error and make the procedure more accurate and complex. In the future, the proposed system can be applied in real- time CT-scan by integrating a suitable GPU, cloud-computing and software interface

VII. REFERENCES:

[1] QingZang Song, Lei Zhao, XingKe Luo, and XueChen Dou, "Using Deep Learning for Classification of Lung Nodules on Computed Tomography Images", Hindawi Journal of Healthcare Engineering Volume 2017, Article ID 8314740, Published 9 August 2017,pp.1-7 pages.

[2] R. Dey, Z. Lu and Y. Hong, "Diagnostic classification of lung nodules using 3D neural networks," 2018 IEEE 15th International Symposium on Biomedical Imaging (ISBI 2018), 2018, doi: 10.1109/ISBI.2018.8363687. pp. 774-778,

[3] Panpan Wu, Xuanhao Sun, Ziping Zhao, Haishuai Wang, Shirui Pan, Björn Schuller, "Classification of Lung Nodules Based on Deep Residual Networks and Migration Learning", Computational Intelligence and Neuroscience, vol. 2020, Article ID 8975078, 10 pages.

[4] Diego Riquelme and Moulay A. Akhloufi, "Deep Learning for Lung Cancer Nodules Detection and Classification in CT Scans ", Perception, Robotics, and Intelligent Machines (PRIME), NB E1A3E9, Canada, Published: 8 January 2020, pp.28-67

[5] Liu B, Chi W, Li X, Li P, Liang W, Liu H, Wang W, He J. "Evolving the pulmonary nodules diagnosis from classical approaches to deep learning-aided decision support: three decades' development course and future prospect". J Cancer Res Clin Oncol. 2020 Jan;. doi: 10.1007/s00432-019-03098-5. Published:2019 Nov 30. PMID: 31786740, pp. 153-185

[6] Varsha Prakash and Smitha Vas.P, "Stage Identification and Classification of Lung Cancer using Deep Convolutional Neural Network" International Journal of Advanced Computer Science and Applications(IJACSA), Volume 11 Issue 7, 2020. pp 561-567

[7] Larici AR, Farchione A, Franchi P, Ciliberto M, Cicchetti G, Calandriello L, Del Ciello A, Bonomo L. "Lung nodules: size still matters." NCBI ,Published 2017 Dec 20:. doi: 10.1183/16000617.0025-2017. PMID: 29263171. pp. 0025-2017

[8] Walter JE, Heuvelmans MA, Bock GH, Yousaf-Khan U, Groen HJM, Aalst CMV, Nackaerts K, Ooijen PMAV, Koning

HJ, Vliegenthart R, Oudkerk M. “Characteristics of new solid nodules detected in incidence screening rounds of low-dose CT lung cancer screening-the NELSON study.” NCBI, Published 2018 Apr 16. PMID: 29661918. pp. 741-747

[9] Vlahos I, Stefanidis K, Sheard S, Nair A, Sayer C, Moser J. “Lung cancer screening: nodule identification and characterization. Transl Lung Cancer” NCBI, Published. 2018 Jun;7: doi: 10.21037/tlcr.2018.05.02. PMID: 30050767; pp. 288-303.

[10] Nasrullah N, Sang J, Alam MS, Mateen M, Cai B, Hu H. “Automated Lung Nodule Detection and Classification Using Deep Learning Combined with Multiple Strategies”. MDPI, Published 2019 Aug 28;19(17):3722. doi: 10.3390/s19173722. PMID: 31466261, pp. 1-19

[11] Ivan William Harsono, Suryadiputra Liawatimena, Tjeng Wawan Cenggoro, “Lung nodule detection and classification from Thorax CT-scan using RetinaNet with transfer learning,” Journal of King Saud University - Computer and Information Sciences, Volume 34, Issue 3, 2022, ISSN 1319-1578, pp. 567-577,