LUNG CANCER DETECTION USING CNN

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Abstract — The results of the National Lung Screening Trial, which suggested reduced mortality in high-risk subjects undergoing CT screening, sparked discussion about establishing a lung cancer screening programme. Important questions about the benefit-harm balance, as well as the specifics of a screening program's cost-effectiveness, remain unanswered. A group of experts chest radiology, respiratory medicine, and epidemiology experts Following several meetings, representatives from cardiology and thoracic surgery from all Swiss university hospitals drafted this joint statement. The panel claims that the introduction of a lung cancer virus is uncontrolled and premature.nThe screening programme could result in long-term harm.Without strict quality control, undetectable. This position statement focuses on the requirements for running a programme like this with the the goal of coordinating efforts across the board The underlying statement contains information on current evidence for lung cancer screening reducing mortality, as well as the epidemiologic implications of such a programme in Switzerland. There are also requirements for lung cancer screening centres, as well as recommendations for both the CT technique and the lung cancer screening algorithm. Nodule evaluations are available. Furthermore, related issues such as The topics of patient management, registry, and funding are all covered. Based on based on current knowledge, the panel concludes that lung In Switzerland, cancer screening should be done exclusively. within the context of a national observational study to provide answers to Before considering broad population-based data, there are a few key questions to consider.lung cancer examination.

Keywords:- CNN , Preprocessing, Feature Extraction.

I. INTRODUCTION

Lung cancer is a cancer that is the leading cause of cancer-related death. Patients with this disease have a poor prognosis, with a 5-year survival rate of less than 20%. Because of a diagnosis made at an advanced stage of the disease, the majority of patients have a poor prognosis. In the high-risk population, patients diagnosed early have a significantly higher 5-year survival rate of over 70 percent. This study emphasises the importance of early detection and diagnosis in determining treatment outcomes. Histopathological assessment of tissues obtained by bronchoscopy is a standard procedure needed for early diagnosis after obtaining tumor-suspected CT images. Pathologist tissue assessment is a time-consuming and error-prone task with a diagnostic accuracy of less than 80histological subtypes (squamos carcinoma, adenocarcinoma, small cell carcinoma, and undifferentiated carcinoma).

II. MOTIVATION

• Benefit of early detection of lung cancer
• Low or limited harm from LDCT scan perception
cancer-related experiences of friends or family members

III .LITERATURE SURVEY

Md. Sajid Akbar, Pronob Sarker, Ahmad Tamim Mansoor.," "CNN-based Method for Lung Cancer Detection in Whole Slide Histopathology Images ""[1], Early diagnosis of lung cancer is critical for improvement of patient survival. Histopatho logical assessment of tissue is standard procedure needed for early diagnosis. Tis sue analysis is usually performed by pathologist review, but this procedure is time consuming and error-prone. Automated detection of cancer regions would signifi cantly speed up the whole process and help the pathologist. In this paper we propose fully automatic method for lung cancer detection in whole slide images of lung tis sue samples. Classification is performed on image patch level using convolutional neural network (CNN). Two CNN architectures (VGG and ResNet) are trained and their performance are compared. Obtained results show that CNN based approach has potential to help pathologists in lung cancer diagnosis.

Lin Zhi-heng*, Li Yong-zhen , ""Small-Cell Lung Cancer Detection Using a Supervised Machine Learning Al gorithm"[2], Cancer-related medical expenses and labor loss cost annually . Lung cancer-related deaths exceed 70,000 cases globally every year. Furthermore, 225,000 new cases were detected in the United States in 2016, and 4.3 million new cases in China in 2015. Statistically, most lung cancer related deaths were due to late stage detec tion. Like other types of cancer, early detection of lung cancer could be the best strategy to save lives. In this paper, we propose a novel neural-network based algo rithm, which we refer to as entropy degradation method (EDM), to detect small cell lung cancer (SCLC) from computed tomography (CT) images. This research could facilitate early detection of lung cancers. The training data and testing data are high resolution lung CT scans provided by the National Cancer Institute. We selected 12 lung CT scans from the library, 6 of which are for healthy lungs, and the remaining 6 are scans from patients with SCLC. We randomly take 5 scans from each group to train our model, and used the remaining two sca

Refik Samet, Muhammed Tanriverdi," An Automatic Lung Cancer Detection and Classification (ALCDC) System Us□ing Convolutional Neural Network""[3], The early detection of lung cancer in humans is of significant importance due to its impacts on an individual. The detection of the lung cancer tumor at its early stage is also a challenging problem. Early identification of tumor has the potential to help in saving a

large number of human lives. An automatic lung cancer detection and classification (ALCDC) system based on computed tomography (CT) scan images is effective, but the design of a robust lung cancer detection and classification sys tem is a challenging problem. The existing designs of lung cancer detection and classification systems are based on hand-engineered techniques and their outcomes in terms of accuracy and other performance measures are limited. Driven by the exceptional deep learning (DL) success in several recognition related tasks, an AL CDC system based on CT scan images using DL is introduced. For this purpose, using the convolutional neural network (CNN) model, an ALCDC system is built to detect and classify whether the tumors found in the lungs are malignant or benign. The robustness and effectiveness of the proposed ALCDC system is validated using images from the Lung Image Database Consortium (LIDC) and the Image Database Resource Initiative (IDRI). The results indicate that the proposed ALCDC system gives an accuracy of 97.2comparison shows that the proposed ALCDC system per forms better than the existing state-of-the-art systems. The proposed ALCDC will be helpful in medical diagnosis research and health care systems.

:Priyanka Wagh, Jagruti Chaudhari, Roshani Thakare, Shweta Patil,“ ”Texture Analysis Based Feature Extraction and Classification of Lung Cancer”[4], Lung cancer is most life-threatening disease, treatment of which must be the pri mary goal throughout scientific research. The early recognition of cancer can be helpful in curing disease entirely. There are numerous techniques found in literature for detection of lung cancer. Several investigators have contributed their facts for cancer prediction. These papers largely pact about prevailing lung cancer detection techniques that are obtainable in the literature. A numeral of methodologies has been originated in cancer detection methodologies to progress the efficiency of their detection. Diverse applications like as support vector machines, neural networks, image processing techniques are extensively used in for cancer detection which is elaborated in this work.

Edy Winarno, Imam Husni Al Amin, Herny Februariyanti, A Novel Computer-Aided Lung Cancer Detection Method Based on Transfer Learning from GoogLeNet and Median Intensity Projections”[5], In this research, a fast, accurate, and stable system of lung cancer detection based on novel deep learning techniques is proposed. A convolutional neural network (CNN) structure akin to that of GoogLeNet was built using a transfer learning approach. In contrast to previous studies, Median Intensity Projection (MIP) was employed to include multi-view features of three-dimensional computed tomography (CT) scans. The system was evaluated on the LIDC-IDRI public dataset of lung nodule images and 100-fold data augmentation was performed to ensure training efficiency. The trained system produced 81specificity after

300 epochs, better than other available programs. In addition, a t-based confidence interval for the population mean of the validation accuracies verified that the proposed system would produce consistent results for multiple trials. Subsequently, a controlled variable experiment was per formed to elucidate the net effects of two core factors of the system - fine-tuned GoogLeNet and MIPs - on its detection accuracy. Four treatment groups were set by training and testing fine-tuned GoogLeNet and Alexnet on MIPs and common 2D CT scans, respectively. It was noteworthy that MIPs improved the network's accu□racy by 12.3GoogLeNet outperformed Alexnet by 2access to the GPU-based system was enabled through a web server, which allows long-distance management of the system and its future transition into a practical tool

III. SYSTEM ARCHITECTURE

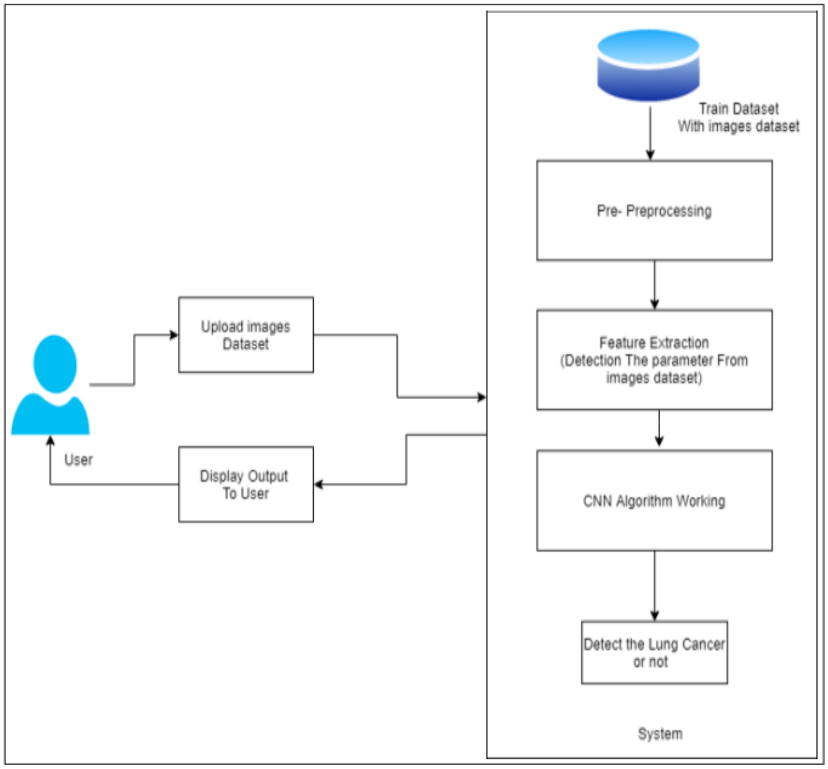


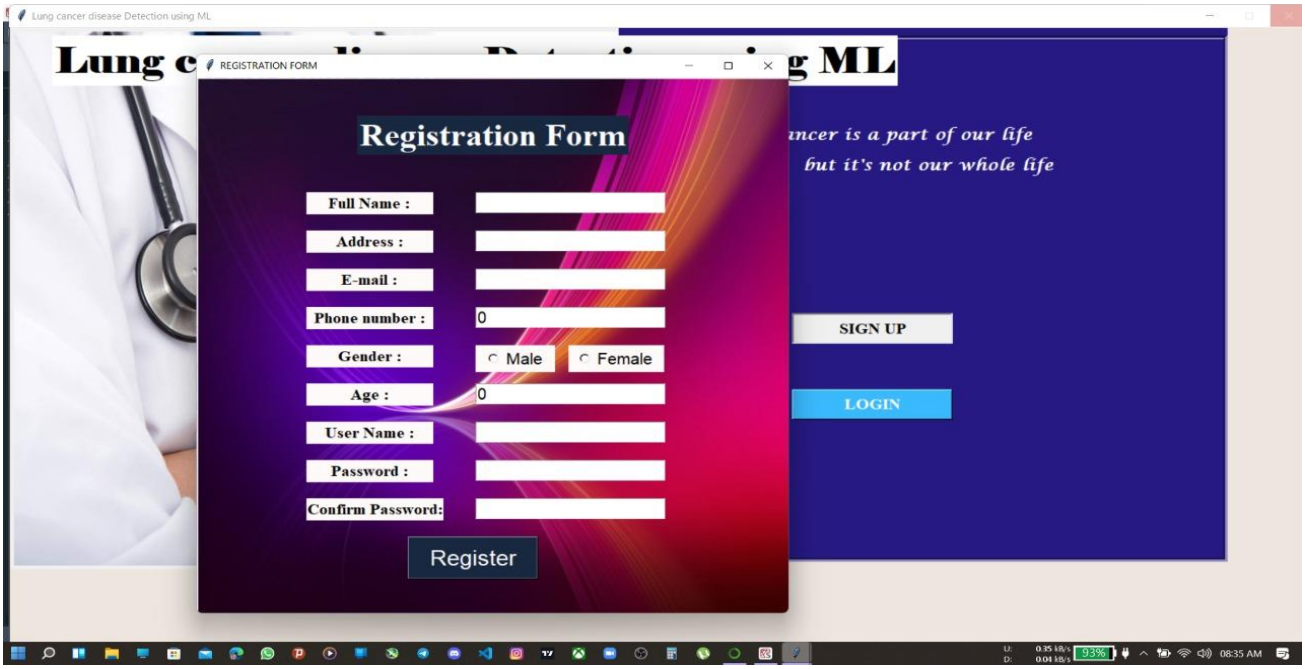
Fig. system architecture

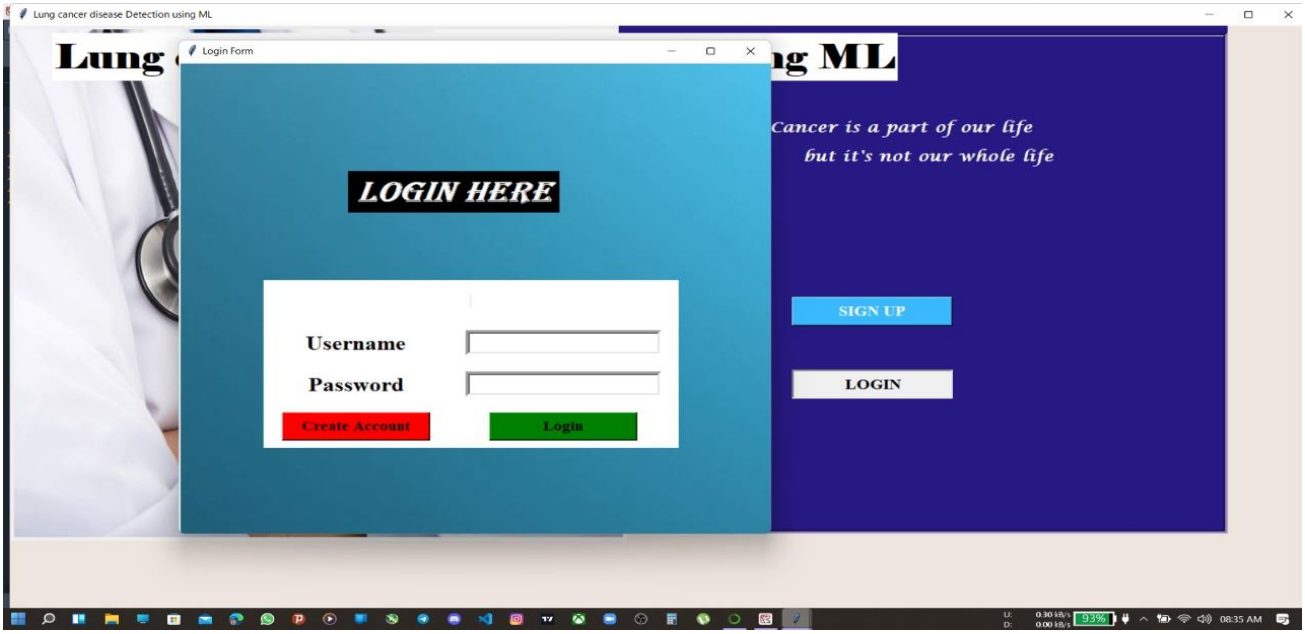
IV. ALGORITHM

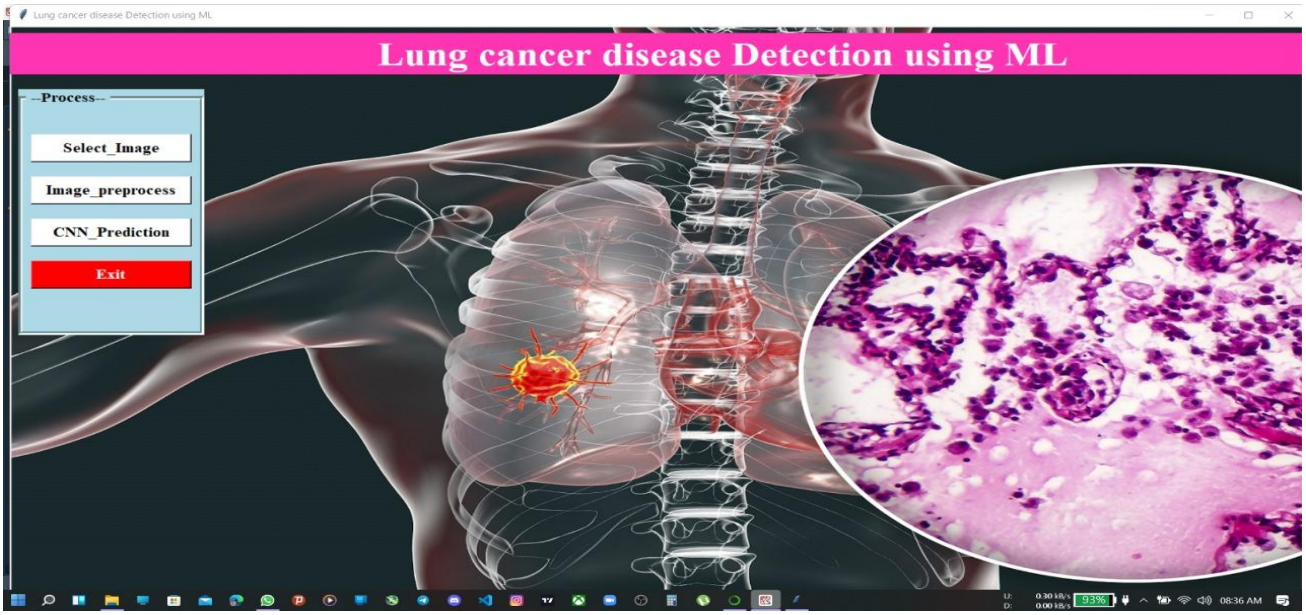
CNN:- A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other. CNN is an efficient recognition algorithm which is widely used in pattern recognition and image processing. It has many features such as simple structure, less training parameters and adaptability. It has become a hot topic in voice analysis and image recognition. CNN is mainly used in image

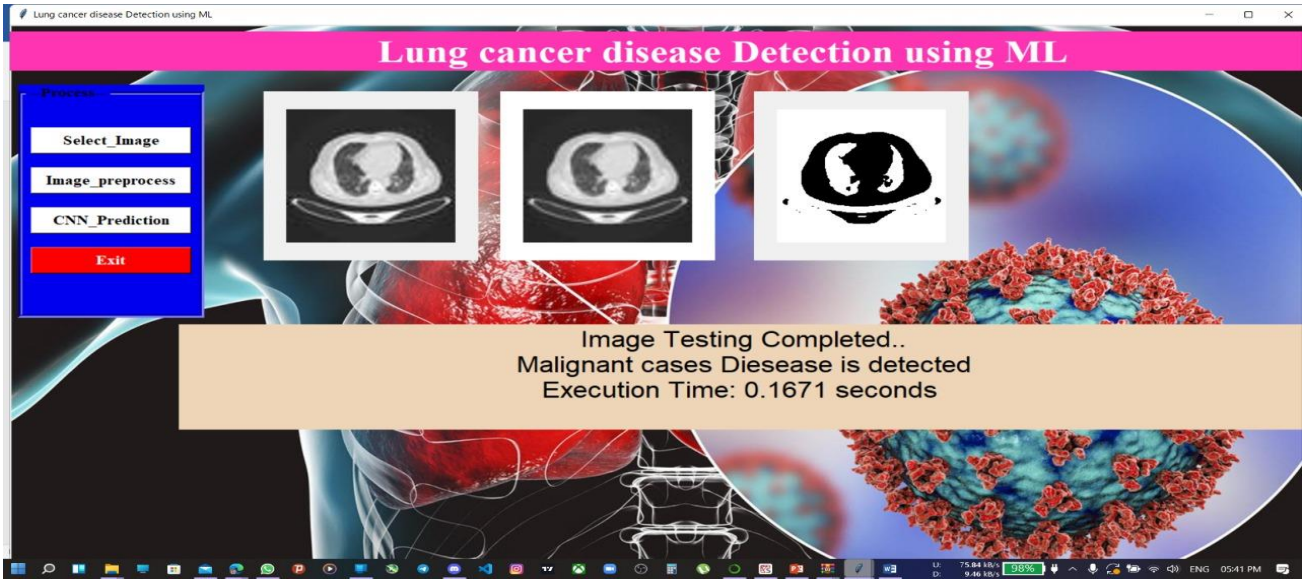
analysis tasks like Image recognition, Object detection & Segmentation. A CNN architecture is formed by a stack of distinct layers that transform the input volume into an output volume (e.g. holding the class scores) through a differentiable function. A few distinct types of layers are commonly used.

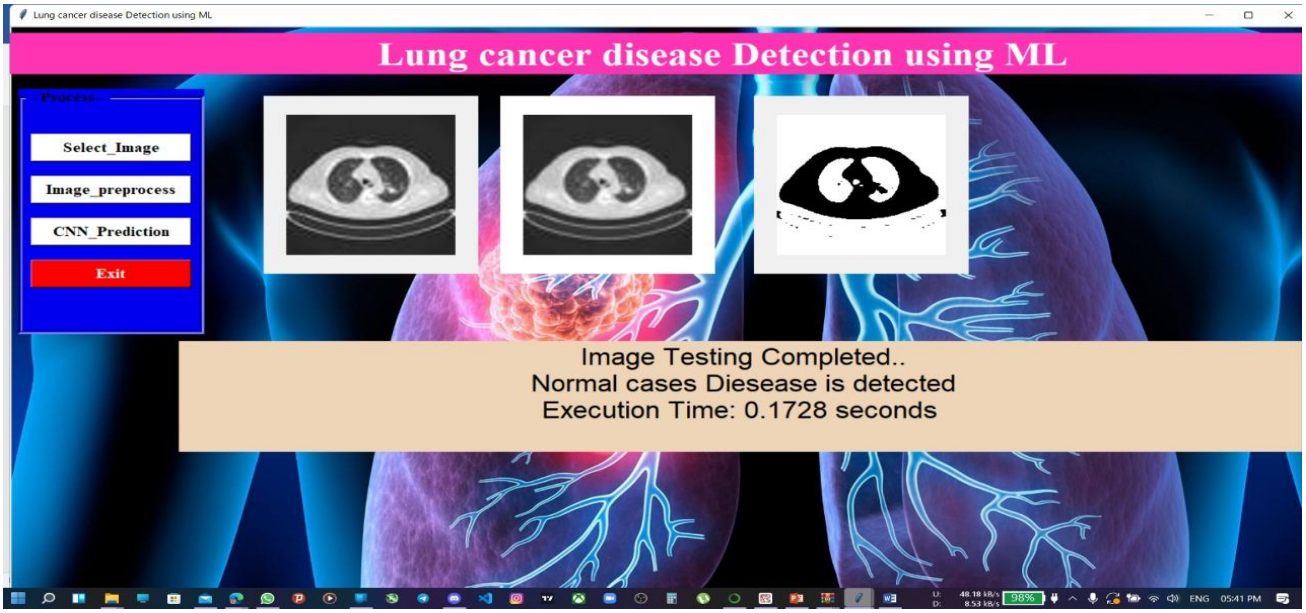
Results:






Lung cancer disease Detection using ML
Process
Select_Image
Image_preprocess
CNN_Prediction
Exit


Lung cancer disease Detection using ML
Select_Image
Image_preprocess
CNN_Prediction
Exit
Image Testing Completed..
Malignant cases Diesease is detected
Execution Time: 0.1671 seconds



V. CONCLUSION

The fully automatic deep learning based method for detection of lung cancer in whole slide histopathology images is proposed in the proposed system. The AUC and patch classification accuracy of the VGG16 and ResNet50 CNN architectures were compared, with the first showing higher AUC and patch classification accuracy. The results show that convolutional neural networks have the potential to diagnose lung cancer from whole slide images, and that the proposed system uses the cnn algorithm to achieve the highest accuracy. We are also saving time.

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