


Chapter 11

Android Applications for Lung Nodules Classification Using Convolutional Neural Network

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ABSTRACT

Digital image processing is currently used in various fields of research. One of them is in the field of medicine. In fact, experienced radiologists have difficulty distinguishing the cancerous portions of the blood vessels in the lung or detecting fine nodules that suggest lung cancer on X-ray images. Previous studies have shown that doctors and radiologists fail to detect cancerous patches in 30% of positive cases. Implementation of CAD system to classify and detect parts of cancer has been developed, but the results obtained from this implementation are that there are still many errors in the classification results. Therefore, this study will develop android app image technique to perform the classification process of lung cancer. With this research, it is hoped that the developed algorithm can help doctors and radiologists to detect cancer in a short time with more accuracy. Finally, after 20 iterations, a percentage of 90.65% was attained for the test results' performance in classifying 10 X-ray pictures.

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INTRODUCTION

A type of cancer called lung cancer typically affects smokers and takes place in the lungs. The two flexible organs in your chest known as your lungs medical image that will be processed in this study is an image taken using the Lung Computed Tomography Scan (CT scan) technology. CT scan technology was developed through the process of scanning every layer of body tissue from various directions using X-ray radiation. The result of scanning using this technology is known as an X-ray image. Due to the significant number of deaths brought on by lung cancer, lungs were chosen as the study's test subjects. When compared to other cancer including stomach cancer (740,000 deaths), liver cancer, and other types, lung cancer claimed 1.4 million lives in 2008, according to data from the WHO's official website. As, quick action, early diagnosis can actually save lives. Despite being the most sophisticated imaging technology in the medical industry, CT scan scans can be challenging for doctors to interpret and spot cancer. Clinicians may benefit from computer assisted diagnostics in order to accurately identify cancerous cells. Numerous computer-aided methods using machine learning and image processing have been studied and tested. Early-stage lung cancer typically manifests itself without any symptoms or warning indications. Lung cancer signs and symptoms typically appear when the disease is advanced. A cough, which is frequently bloody, a headache, hoarseness, chest pain, wheezing, weight loss, and shortness of breath are among the symptoms. B. S. Chhikara et al (2022) discussed about the lung cancer was the cause of 1.79 million fatalities. For both men and women, It is the main reason why people die from cancer. There is an urgent need for methods of diagnosing pulmonary exacerbations and improving the course of chronic lung diseases. Patients must typically visit a pulmonary hospital and use standard spirometers. The price and the time lost make this solution difficult, though. In addition to paying for medical bills, patients may have to wait in line for a doctor for several hours. An android-based application that aids in measuring lung function has been developed to address this issue. Today, everyone uses Android phones, which are quite common devices, to measure lung function. It may lead to quicker healing, faster exacerbation treatment, and lower expenses for medical care. The lung region's uncontrollable cell development will have an impact on a person's chance of survival. Using computer-aided diagnosis (CAD) methods, it is possible to identify lung cancer at an earlier stage. A more advanced kind of artificial neural networks, deep learning uses multiple layers to produce high-order characteristics from its input and then displays the predicted value at the network's top. One deep-learning tool that has been extensively used to computer vision issues is the convolutional neural network (CNN). Since more computed tomography (CT) scan images, it was difficult for radiologists to swiftly and effectively diagnose disease. Deep learning (DL) techniques were created as a

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