Chapter 9
Lung Cancer Detection Using Deep Learning Techniques

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ABSTRACT

Early detection that can be done to detect lung cancer is through radiological examination. Chest X-Ray or chest radiography is one of the tools that can be used to analyze lung diseases including pneumonia, bronchitis, and lung cancer. The image from the radiography will show the shape of the lungs difference between normal and abnormal lungs. In abnormal lungs, it will show nodules in the lungs on the results radiography image, but on the other hand, in normal lungs, it does not show nodules in the lungs on the radiographic image. This study to detect lung cancer using radiographic images using deep learning techniques. Therefore, by carrying out early revealing of lung cancer, it is hoped that this scheme will provide suitable action and directions for lung cancer patients and decrease lung cancer transience.

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INTRODUCTION

Cancer diagnosis and treatment have been one of the supreme challenges facing mankind in recent years. Early exposure to the tumor will make it easier to save mil-lions of lives around the world every year. In particular, lung cancer is one of the most common types of cancer. Lung cancer screening can be done using a CT scan, chest X-ray, and saliva cytology. However, CT scans can detect lung cancer tumors earlier and at a stage that is more likely to be treatable, than regular x-rays (Wender et al., 2013). Unlike traditional X-ray procedures, CT scans provide a more detailed and accurate picture that shows any abnormalities or irregularities. Trained radiologists are needed to accurately identify lung cancer on CT scan images. The costs required are relatively high, this causes the lower and middle-class people to be unable to reach the required costs. It obliquely leads to reduced exposure of early signs of lung cancer and thus makes curing this disease much more difficult. Therefore, it is necessary to do automation in detecting lung cancer along with the stage of cancer in CT scan images (de Koning et al., 2020; Tanoue et al., 2015).

The motivation for this study arises from a situation that is occurring in a large number of countries: the overload of work in many professions related to the field of radiologists and doctors, who are experts in interpreting the results obtained and making an appropriate diagnosis. This is a complicated task, requiring very high levels of concentration, and can take a great deal of time. Therefore, the experts who analyze the X-rays mustn't suffer from fatigue or other common problems that can impair their performance. However, this is not the norm. The long hours of work and the increase in people diagnosed with diseases such as lung cancer, who depend on the correct interpretation of X-rays for their early detection, place a huge workload for these specialists (Gabehart, 2003). Despite the difficulties involved in analyzing radiographs, the Radiologists indicate in one of its 5 fundamental principles that radiologists must be available to interpret high-risk cases 24 hours a day, every day of the week. The final objective of this study is the establishment of which application model is to support medical diagnosis and focus on the detection of lung cancer. An application capable of analyzing the entered radiographs will be created, generating the probabilities obtained by a model developed using Deep Learning techniques, and graphically showing the parts of the image that doctors should pay special attention to. To do this, we will carry out an initial analysis of the different Deep Learning frameworks and libraries available and select the most promising options.