

## RESEARCH PROPOSAL

Cancer is one of the most dangerous disease in human life. It can cause death over the world because of late diagnosis. Lung cancer, also known as lung carcinoma, is a malignant lung tumor characterized by uncontrolled cell growth in tissues of the lung. Lung cancer occurs as a result of uncontrolled proliferation of tissues and cells in the lungs. When these masses grow up uncontrolled in its environment it can spread damage the surrounding tissues. This growth can spread beyond the lung by the process of metastasis into nearby tissue or other parts of the body. Approximately 1.3 million people die every year in the world due to lung cancer. Lung cancer is the leading cause of cancer death among both men and women, making up almost 25% of all cancer deaths. Each year, more people die of lung cancer than of colon, breast, and prostate cancers combined. Most cancers that start in the lung, known as primary lung cancers, are carcinomas. The two main types are small-cell lung carcinoma (SCLC) and non-small cell lung carcinoma (NSCLC). The most common symptoms are coughing (including coughing up blood), weight loss, shortness of breath, and chest pains.

The vast majority (85%) of cases of lung cancer are due to long-term tobacco smoking. About 10–15% of cases occur in people who have never smoked. These cases are often caused by a combination of genetic factors and exposure to radon gas, asbestos, second-hand smoke, or other forms of air pollution. Lung cancer mainly occurs in older people, most people diagnosed with lung cancer are 65 or older. A very small number of people diagnosed are younger than 45. The average age of people when diagnosed is about 70. Overall, the chance that a man will develop lung cancer in his lifetime is about 1 in 15. For a woman, the risk is about 1 in 17. These numbers include both smokers and non-smokers. For smokers the risk is much higher, while for non-smokers the risk is lower. Black men are about 15% more likely to develop lung cancer than white men. The rate is about 14% lower in black women than in white women. Both black and white women have lower rates than men, but the gap is closing. The lung cancer rate has been dropping among men over the past few decades, but only for about the last

decade in women. Despite their overall risk of lung cancer being higher, black men are less likely to develop SCLC than are white men.

The American Cancer Society's estimates for lung cancer in the United States for 2020 are about 228,820 new cases of lung cancer (116,300 in men and 112,520 in women) and about 135,720 deaths from lung cancer (72,500 in men and 63,220 in women). On a positive note, the number of new lung cancer cases continues to decrease, partly because people are quitting smoking. Also, the number of deaths from lung cancer continues to drop due to people stopping smoking and advances in early detection and treatment. The death rate from cancer in the US declined by 29% from 1991 to 2017, including a 2.2% drop from 2016 to 2017, the largest single-year drop ever recorded, according to annual statistics reporting from the American Cancer Society. The decline in deaths from lung cancer drove the record drop. Deaths fell from about 3% per year from 2008 - 2013 to 5% from 2013 - 2017 in men and from 2% to almost 4% in women.

A total of 1,806,590 new cancer cases and 606,520 deaths are expected in the US in 2020, which is about 4,950 new cases and more than 1,600 deaths each day. Symptoms of lung cancer may not lead to significant complaints until the disease is quite advanced. Progression of lung cancer without symptoms is the most important factor that makes this cancer so dangerous. Almost a quarter of patients have cancer without any symptoms.

Early diagnosis is very important in lung cancer. Because lung cancer often has the ability to rapidly spread to the bones, liver, brain and adrenal glands. However, with the newly developed lung cancer treatment methods, the average life expectancy and quality have increased.

Biomedical Image Processing is the latest emerging tool in medical research used for the early detection of cancers. Today, with advances in imaging techniques such as low-dose spiral computed tomography, Lung cancer can be detected at an early stage. Statistics on survival in people with lung cancer vary depending on the stage (extent) of the cancer when it is diagnosed. Lung cancer may be seen on chest radiographs and computed tomography (CT) scans. The diagnosis is confirmed by biopsy which is usually performed

by bronchoscopy or CT-guidance. The widely used methods based on a statistical parameter map (SPM) analysis. But there are many shortcomings of this approach when considering high-resolution data.

First, the often used Gaussian filtering results in a blurring effect and in delocalization of the activated area. Secondly, the SPM approach only considers false alarms due to noise but not rejection of activated voxels.

So proposed to embed the Functional Magnetic Resonance Imaging (fMRI) analysis problem in to a Bayesian framework consisting of two steps: i) data restoration and ii) data analysis. Deep Learning can be used for the classification of fMRI Scanned Images as cancerous/non-cancerous. The process of feature extraction in Convolution Neural Networks is such that features can be defined and computed.

In this research artificial Intelligence is proposed in the medical field to diagnose diseases at an early stage. Deep Learning is another branch of Artificial Intelligence research that will help in better performance in CNN based systems. Functional magnetic resonance images (fMRI's) provide high-resolution datasets which allow helps to obtain accurate delineation and sensitive detection of activation areas involved in cognitive processes.

Here MATLAB can be used for implementation of CNN and Deep Learning. The Deep Learning Toolbox available on MATLAB for Deep Learning and CNN can be used to analyze, predict the lung cancer with more accuracy.

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