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PARALLEL ALGORITHMS FOR PULMONARY NODULE CLASSIFICATION WITH THE HELP OF BAYES THEOREM

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Abstract:
The cancer starts in the lungs is known as lung cancer. The leading world cause of death is lung cancer. In its early stages, lung cancer does not usually cause signs and symptoms. The early diagnosis of lung cancer is required to reduce the mortality rate. A parallel algorithm for pulmonary nodule classification with the help of Bayes theorem is discussed in this study. At first parallel algorithms like task, pipeline and data parallel for feature extraction. Then Bayes theorem is used for classification. The experimental results show the performance of pulmonary nodules classification in terms of accuracy using parallel algorithms and Bayes classification.
Keywords: Pulmonary Nodules, Parallel Algorithms, Bayes Theorem, Classification

Introduction:

A malignant lung tumor that is characterized by uncontrolled cell growth in lung tissues is lung Cancer, also known as lung cancer. Computed Tomography (CT) system for the detection of lung cancer [1]. Lung cancer diagnosis and estimation of multi-stage lung cancer using an SVM classification. The risk of lung cancer can also be estimated [2]. Improvement of the picture and segmentation were performed separately at every point of the classification.

Automatic identification of lung defects due to planocellular cancer of the lung [3]. Given that lung cancer has been identified and is usually too late, the solution is to attempt to detect it at a very early point, using chest x-rays, using the cheapest screening system. Texture analysis Lung cancer extraction and classification based on feature extraction [4]. To order to curate illness entirely, early cancer identification is beneficial. Several methods for detecting lung cancer are available in literature.

Cancer detection with a guided machine learning algorithm small-cell lung cancer [5]. Statistically, late stage diagnosis caused most lung cancer-related deaths. Deep neural

networks lung cancer identification [6]. Our deep neural network adds new features through comprehensive study through introducing additional coating and maximum pooling layers.

An efficient method for parallel algorithms for pulmonary nodule classification with the help of Bayes theorem is discussed. The rest of the paper is organised as follows: Section 2 describes the methods and materials of lung image classification. The section 3 describes about experimental results and discussion. The last section concludes lung cancer classification.

Methods and Materials:

At first, parallel algorithms for the functional extraction are provided to the input lung images. The parallel algorithms like pipeline, data and task algorithms are used. Then Bayes theorem is used for prediction.

Parallel algorithms-based feature extraction:

In computer science, a comparable algorithm is an algorithm that can perform several operations over a certain time in comparison to a conventional serial algorithm.Within the abstract machine models, also known as random access machines, a tradition in computer science has identified serial algorithms [7].An algorithm parallel is an algorithm that can simultaneously execute multiple instructions on different processing devices and then combine every single operation to generate the final results.Figure 1 shows the parallel algorithms.

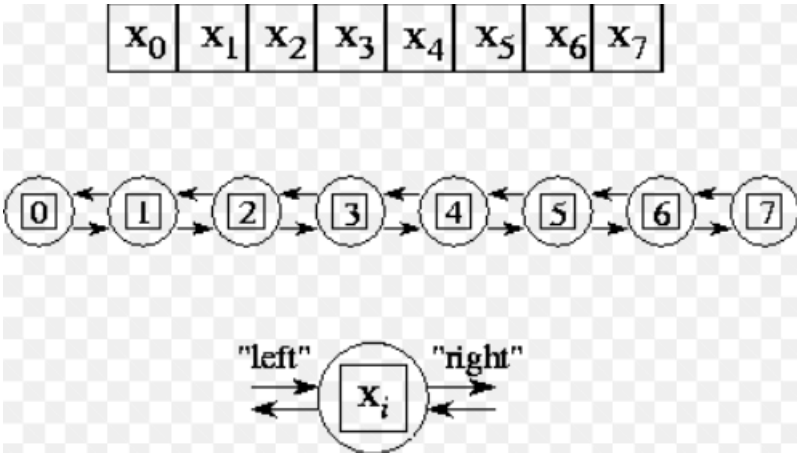

Figure 1 Workflow of parallel algorithms

A parallel algorithm is an algorithm which is capable of executing multiple instructions on different processing devices simultaneously and then bringing together all the different results in a final result.

Bayes Theorem

The statistics and probability of an event has the knowledge that has related to some events [8]. For example, if it is known that there is an ever-increasing risk of developing health issues with age, the theorem Bayes enables a person of a given age to evaluate the risk more confidently than simply if it is representative of the whole population [9].

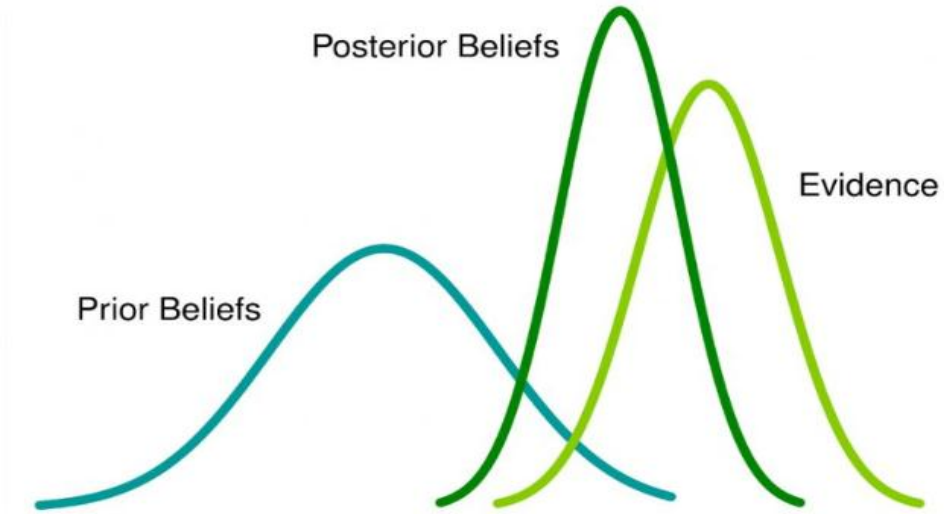

Figure 2 Performance of Bayes theorem

The Bayes' Law is interpreted on the basis of the likelihood given to the terms.The "degree of belief" is measured in the Bayesian interpretation. Bayes's theorem relates the degree of belief in a proposition to and after proof.

Results and Discussion

The performance of the proposed system is made by CT lung images shown in figure 2. The performance is measured in terms of accuracy.

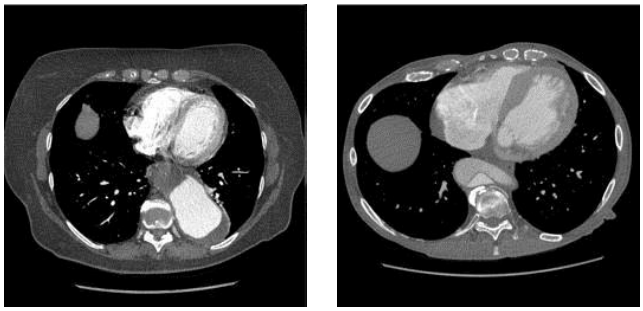

Figure 3Sample lung images

The input lung images are given to parallel algorithms like task, perpendicular and data algorithms for feature extraction. Finally, Bayes theorem is used for classification. Table 1 shows the performance of proposed system.

Table 1 Performance of Bayes theorem

Parallel algorithms	**Performance of Bayes theorem in (%)**		
	Accuracy	**Sensitivity**	**Specificity**
Task	86	84	85
Perpendicular	90	88	89
Data	92	90	91

From table 1, it is observed that the data parallel algorithm performs the higher classification accuracy of 92% and its sensitivity and specificity are 90% and 91%. The task and perpendicular parallel algorithm produce 86% and 90% by using Bayes theorem.

Conclusion:

A method for pulmonary nodule classification using parallel algorithm and Bayes theorem is presented. The performance is evaluated by CT lung images. CT image is given to feature extraction by using parallel algorithms like task, perpendicular and data. Then the Bayes theorem is used for prediction. The classification accuracy is 92% obtained by using data parallel algorithm and Bayes theorem.

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