



INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK

LUNG NODULE DETECTION USING PATCHED BASED CONTEXT ANALYSIS METHOD WITH SUPPORT VECTOR MACHINE: A REVIEW

MAYURI P. BAMNOTE, PROF. R.S. MANGRULKAR, PROF. A. D. GOTMARE

1. PG Student, Dept. of Computer Science & Engg., B.D.C.O.E, Sewagram-442001
2. Head and Associate Professor, Dept. of Computer Science & Engg., B.D.C.O.E, Sewagram-442001.
3. Professor, Dept. of Computer Science & Engg., B.D.C.O.E, Sewagram-442001

Accepted Date: 15/03/2016; Published Date: 01/05/2016

Abstract: Prediction and diagnosis of cancer is very important task in healthcare industry. Cancer is of the leading cause of death globally so it is very essential to detect and predict it at very initial stage. Lung nodule, which leads to lung cancer is detected by various medical imaging techniques which includes X-ray, Computerized Tomography (CT). Classification as well as Detection of nodules is important task because the nodules are commonly attached to the blood vessels. Many studies have shown that early prediction is the best way to cure this disease. The classification based upon the four types of lung nodules which is well-circumscribed, vascularized, juxta-pleural and pleural-tail.

Keywords: Lung Cancer, Computerized Tomography, Classification, Detection.



PAPER-QR CODE

Corresponding Author: MISS. MAYURI P. BAMNOTE

Access Online On:

www.ijpret.com

How to Cite This Article:

Mayuri P. Bamnote, IJPRET, 2016; Volume 4 (9): 168-173

INTRODUCTION

Lung nodules are masses which is small in size present in the human lung, and are spherical in shape; however, they can be pulled by surrounding anatomical structures, such as vessels and adjacent pleura [1]. Figure 1 shows the four types of lung nodules. Lung nodules can be divided into four types:

1. Well-circumscribed (W): nodule located centrally in the lung but without any connection to vasculature.

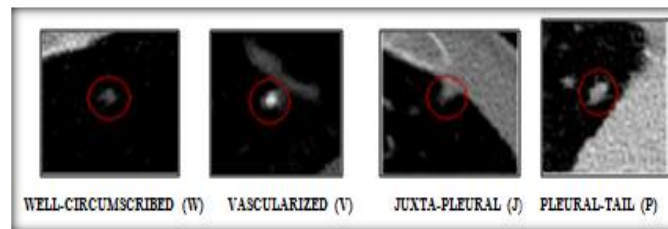


Figure 1: Transaxial Ct images with four types of Lung Nodule

2. Vascularized (V): location of this nodule is centrally in the lung but closely connected to neighboring vessels.

3. Juxta-Pleural (J): here the large portion of the nodule connected to the pleural surface.

4. Pleural- tail (P): location of nodule near the pleural surface connected by a thin tail.

Computed tomography (CT) is the used for reliable imaging modality to gain structural information about lung nodules and its surrounding structures. The purpose of this paper is to review related work on automatic diagnosis of lung cancer and summarization various segmentation and classification techniques for detection of candidate lung nodules. The paper is organized in five sections. Section II covers literature survey pertaining to lung nodule detection using various classifiers. Section III covers the Methods for classification. Section IV covers proposed method. Section V covers conclusion

LITERATURE REVIEW

Sr. No.	References	Evaluation Approach
1.	Fan Zhang, Yang Song, Weidong Cai, Min-zhao Lee, Yun Zhou, Heng Huang, Shimin Shan.	Three main stages were explained :Adaptive patch-based division, concentric multilevel partition, HOG feature set is designed.
2.	R.Harini Karthika , P.Thirugnanam	It describes the Multilevel Pattern Recognition And Semantic Of LDA Analysis
3.	Amal Farag,Shireen Elhabian, James Graham et.al.	Briefly discussed the modeling of the Lung Nodules for Detection in LDCT Scans
4.	Ravivarman.R, Sasirekha.N	Survey on Lung Nodule Classifications
5.	William J. Kostis, Anthony Reeves, David F. Yankelevitz,	Three-Dimensional Segmentation and Growth-Rate Estimation of Small Pulmonary Nodules in Helical CT Images
6.	Yang Song, Weidong Cai, Yun Zhou, David Dagan Feng,	Feature-Based Image Patch Approximation for Lung Tissue Classification

7.	Prashant Naresh , DR. Rajashree shettar	Image processing, as well as classification techniques were discussed
8.	Stefano Diciotti, Giulia Picozzi, Massimo Falchini, Mario Mascalchi, Natale Villari, Guido Valli	3-D Segmentation Algorithm were discussed

METHODS FOR CLASSIFICATIONS

1. Support Vector Machine (SVM)

SVM introduced by Cortes and is generally used for classification purpose.

The fundamental idea of SVM can be described as follows.

Initially, the inputs are formulated as feature vectors. 2 Then, by using the kernel function, these feature vectors are

Mapped into a feature space. 3 Finally, a division is computed in the feature space to separate the classes of training vectors.

Classifiers having own set of advantages and disadvantages as well as it's own area of importance's. None of algorithms can satisfies all criteria. The following points show the characteristics of the support vector machine.

1. Speed of learning is good
2. Speed of class is excellent
3. Tolerance to missing value is good
4. Irrelevant to attribute is excellent
5. Redundant to attribute is very good

6. Highly interdependent to attribute is very good
7. Tolerance to noise is good
8. Attempt for incremental learning is good

2. Probabilistic Latent Semantic Analysis (PLSA)

It is a statistical method for the analysis of two-mode and co-occurrence data. It will overcome the problem of sparse representation in data classification. It is useful to differentiate the overlapping contextual structures shared among various types of lung nodules i.e. well-circumscribed, vascularized, juxta-pleural and pleural-tail.

PROPOSED METHOD

In the proposed system, LDCT lung image dataset were taken as input. Image preprocessing operation carried using the Weiner filter. The process of image patches division in which the segmented limb part, left lung part and right lung part patches were formed. Patches were formed according to the local anatomical structures respectively.

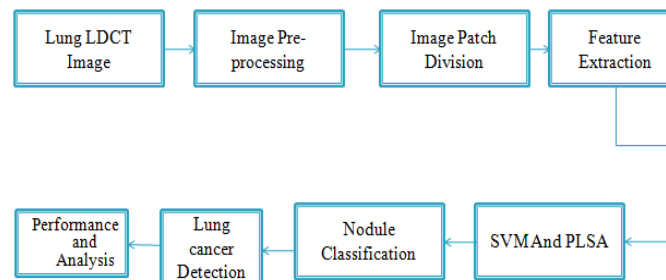


Figure 2: Block Diagram of proposed system

CONCLUSION

In this paper, four types of lung nodules were discussed. The classification methods were discussed which includes support vector machine classifier and probabilistic latent semantic analyser respectively. Support vector machine will be used for lung nodule classification purpose. Probabilistic latent semantic analyser will be used for differentiate between lung nodules and its categories.

REFERENCES:

1. Fan Zhang, Yang Song, Weidong Cai, Member, Min-Zhao Lee, Yun Zhou, Heng Huang, Shimin Shan, Michael J Fulham, and Dagan D. Feng, "Lung Nodule Classification With Multilevel Patch-Based Context Analysis", *IEEE Transactions On Biomedical Engineering*, Vol. 61, No. 4, April 2014.
2. R.Harini Karthika, P.Thirugnanam," Multilevel Pattern Recognition and Semantic Of LDA Analysis", *Journal of Electronics and Computer Sciecne*, Issn- 3967-0867, Vol 2 Issue 3 March 2015.
3. Amal Farag, Shireen Elhabian, James Graham, Aly Farag,Salwa Elshazly, Robert Falk, Hani Mahdi, Hossam Abdelmunim,Sahar Al Ghaafary," Modeling of the Lung Nodules for Detection in LDCT Scans",*32nd Annual International Conference of the IEEE EMBS Buenos Aires, Argentina*, August 31 - September 4, 2010
4. Ravivarman.R,sasirekha.N2 ,"Survey On Lung Nodule Classifications", *International Journal Of Research In Engineering And Technology* ,issn: 2319-1163 | Pissn: 2321-7308,volume: 04 Issue: 01, Jan-2015
5. William J. Kostis, Anthony P. Reeves, David F. Yankelevitz, and Claudia I. Henschke, " Three-Dimensional Segmentation and Growth-Rate Estimation of Small Pulmonary Nodules in Helical CT Images", *IEEE Transactions On Medical Imaging*, Vol. 22, No. 10, October 2003
6. Yang Song, Weidong Cai, Yun Zhou, David Dagan Feng," Feature-Based Image Patch Approximation for Lung Tissue Classification", *IEEE Transactions On Medical Imaging*, Vol. 32, No. 4, April 2013
7. Prashant Naresh, Dr. Rajashree shettar," Image Processing and Classification Techniques for Early Detection of Lung Cancer for Preventive Health Care: A Survey", *Int. J. of Recent Trends in Engineering & Technology*, Vol. 11, June 2014.
8. Stefano Diciotti,Giulia Picozzi, Massimo Falchini, Mario Mascalchi, Natale Villari, and Guido Valli," 3-D Segmentation Algorithm of Small Lung Nodules in Spiral CT Images", *IEEE Transactions On Information Technology In Biomedicine*, Vol. 12, No. 1, January 2008