# MEASURING LUNG ABNORMALITIES IN IMAGES-BASED CT

A. Lay-Ekuakille*[1], P. Vergallo[2], I. Jabłoński[3][§], S. Casciaro[4][#] and F. Conversano[5][#]

Department of Innovation Engineering, University of Salento,73100, Lecce, Italy

[§] Chair of Electronic and Photonic Metrology, Wrocław University of Technology, Poland

[#] National Council of Research, Institute of Clinical Physiology, 73100 Lecce, Italy.

Email: aime.lay.ekuakille@unisalento.it

Abstract - Diagnosis by imaging is one of the most important findings in biomedical imaging because it allows not only the diagnosing of a specific pathology but to perform online and offline surgical operations using imaging as it is noticed in interventional radiology. This paper illustrates the use Hough transform in identifying pathological structures included in CT (Computer Tomography) and HRCT (High Resolution Computer Tomography) images related to patients suffering from lung disease. These abnormal areas appear as bulges of the trophic vessels and they are similar to circular structures with level of lighter gray near to white. Circular Hough transform (CHT) identifies regions with a circular shape. However, a metrics is defined in order to understand if the pointed out area has a pathological morphology. CHT is used here for helping to detect possible events of indolent tumors or undetermined significance pathologies for lung apparatus.  For this aim, we use entropy approach with CHT because it measures the scatter of the directional elements in an image. In fact a high entropy value is related to areas with a strong contrast in grayscale, and abnormalities in the image are present as a set of points with more lighter than the dark background.  The results have shown, by means of an accuracy true table, rendering a comparison between clinicians'diagnosis and CHT detection, it is possible to indicate, with a better accuracy,  potential areas of undetermined significance pathologies.  Finally, a receiver operational curve (ROC) is used as an accuracy index for evaluating the positive impact of entropy on diagnosis.

Index terms: Hough and Radon transform;  Biomedical imaging; Computer tomography detection accuracy; Indolent tumor; Receiver operational curve.