

Automation of Diagnostic Process for Pulmonary Embolism Using V/Q Scans and Correlating Chest X-Rays With an Intelligent System.

This paper presents design of a software-based artificial intelligence system to diagnose pulmonary embolism using ventilation-perfusion scan and correlating chest x-ray images of the lungs. The proposed hybrid intelligent system will be composed of a tightly integrated suite of artificial intelligence paradigms, which includes a fuzzy inference system, artificial neural networks, and machine learning algorithms. The fundamental promise of the proposed intelligent system is to model the human reasoning process "much more closely" than any existing artificial intelligence paradigm. The proposed hybrid intelligent system will be able to capture the knowledge, intuition, heuristics and the ability to reason under uncertainty of an expert radiologist, very effectively to function as a reliable and accurate diagnosis system. Some of the features include: 1) Promise of a more accurate and quicker diagnosis, in areas where the scans are classified into low or high probability grades compared to visual method. This will result in fewer intermediate probability scans that frequently require angiography for definitive diagnosis, 2) Potential to reduce inter-observer variability, 3) would not suffer from fatigue or psychological factors that can effect the reliability of diagnosis procedure performed by radiologists, 4) Offers a competent second opinion, 5) Offers the expertise of an experienced radiologist in interpreting the scans when a radiologist is not readily accessible, such as in smaller medical clinics or hospitals where economics does not justify to support a full-time nuclear medicine specialist.