



Invention Available for Licensing Medical Imaging

Title: ***Phase-Based Digital Imaging***

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Applications:

- Improved digital imaging for medical applications
- Mammography for breast cancer screening and staging
- Coronary imaging, bone imaging, other applications

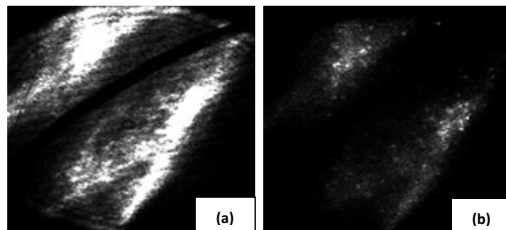
Benefits:

- Improved imaging of calcifications and hard tissues
- High resolution; greater sensitivity to detect microcalcifications
- Low cost; simple to use and to implement on any computer platform

Technology Description: Advanced digital imaging technologies have become critical components of modern healthcare, particularly for the imaging of calcified materials: structures or deposits within the human body that are indicative of certain medical conditions. These include calcified deposits that block blood flow in the coronary arteries, and microcrystalline deposits in breast tissue that can become cancerous. Many imaging technologies in current practice have important limitations of safety (e.g. reliance on radioisotopes or hazardous compounds), resolution, cost, or limited specificity. X-ray mammography is the current standard for detecting and monitoring breast cancer and for screening of asymptomatic women, but the microcalcifications implicated in disease are often embedded in dense soft tissue, making the diagnosis of mammograms subjective and dependent on the interpretation of the radiologist.

This invention is particularly useful for the identification and imaging of those features of the body which cause high spatial frequency features in the acquired image, particularly hard tissue structures such as bone or calcified or crystalline masses, lesions or cysts. The invention features the use of digital image processing techniques such as the fast Fourier Transform to enhance the identification of microcalcifications. A preferred embodiment of the invention employs phase-only image reconstruction of digital mammograms in which high spatial frequency components, like microcalcifications are shown in a dark background. The phase-only information can be processed with averaged amplitude information to reconstruct the original digital image.

Patent and Publication Status: This invention is covered by [U.S. Patent No. 7,653,232](#). The research underlying the invention has been published in [Academic Radiology 12\(6\): 708-721 \(2005\)](#).



The processed image (b) shows calcifications more clearly than the original mammogram (a).

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