

3rd International Conference & Exhibition on **Biometrics & Biostatistics**

October 20-21, 2014 DoubleTree by Hilton Baltimore - BWI Airport, USA

Mathematical and statistical modeling challenges in radiological modalities

Altaf H Khan

National Guard Health Affairs, Saudi Arabia

This paper discusses the reconstructed images from radiological modalities such as: X-ray computed tomography, single photon emission tomography (SPECT), positron emission tomography (PET), ultrasound or magnetic resonance imaging (MRI) and highlights the challenges in drawing statistical inferences from these images in detection of lesions, etc. The reconstruction algorithms are based upon filtered back projection algorithms (FBP) by utilizing Fourier Slice Theorem with an exception to the ultrasound and fMRI images, as ultrasound tomography is based upon Lippmann-Schwinger integral equation and MRI images are purely based upon a physical basis (a kind of quantum mechanical), or Algebraic Reconstruction Techniques. Apart from statistical based approaches used such as maximum likelihood estimation algorithms, commonly known as Expectation-Maximization algorithms, there are other algorithms which are based on Bayesian approaches. To understand these concepts, a priori firm understanding of these reconstructed algorithms need to be known, as well as the knowledge on how to deal with inherent artifacts within reconstructed images such as: Beam hardening, finite beam width, partial volume effect, point source, and effects of measurement errors, etc. Finally statistical inferential predictive models used in diagnostic detections, and can be done by utilization of generalized linear models; its utilities in clinical decision making as well as the current new trends in clinical trials studies are: Detection and diagnosis of lesions and evaluations of their severity will be discussed with examples.

Biography

Altaf H Khan has completed three Master degrees in Biostatistics (2004), Applied Mathematics (1999) and Mechanical Engineering (2003) from the University of Utah. Currently he is working as a Senior Biostatistician at King Abdullah International Medical Research (National Guard Health Affairs), Riyadh (Saudi Arabia) and prior to that worked at the University of Utah Hospital and Prince Sultan Cardiac Center. He has many publications in international journals and proceedings.

ahkhan25@hotmail.com