Abstract

Constant efforts are being done to improve the health care of the human race by developing non invasive diagnostic techniques. One of the modality, which has over the time proved its importance, is Computer Tomography Scanner. Researchers across the globe constantly work on improving the quality of the reconstructed image. One of the possible ways to achieve this task is by developing an efficient reconstruction algorithm which can be universally applied to all types of existing scanners. So, a novel algorithm is being developed to solve the problem of reconstruction is discussed in this thesis.

A new algorithm is developed by reformulating the problem of reconstruction, which is popularly known as inverse reconstruction problem. This algorithm is developed for the two beam profiles namely Parallel Beam and Fan Beam profile, so that the algorithm can be implemented universally keeping in mind its practical implantation.

In recent years, soft computing techniques are used to solve the complex problem of engineering where conventional approaches have failed. Extending the application of the soft computing techniques to medical image processing domain, the problem of reconstruction is solved employing soft computing techniques for the solution of the novel developed algorithm.

The novel algorithm developed for the parallel beam and fan beam profile is tested by the multi density phantom. The image reconstructed by the novel approach is compared to the images reconstructed by the exiting analytical and algebraic reconstruction method. This validates the developed algorithm’s computational efficiency and its diagnostic value addition.