

Abstract

Registration of image using next generation wavelets and its comparison with wavelets is being discussed in this thesis. As science is growing and new and sophisticated instruments are being developed day by day, biomedical instruments to diagnose the patient are also available in wide varieties to take image of the infected external or internal body organs. So, comparing or fusing two images of different modality, taken at different time and angle, we require that images should be properly aligned. Here, comes the concept of image registration and as we are using it for medical applications so we call this process as Medical Image Registration.

As Medical Image Registration using wavelets has already been studied and talked about by many researchers. Thesis started to find out the possibility to deploy next generation wavelets (i.e. complex wavelets or curvelets) in the field of medical image registration. Wavelets are suffering from some problems like shift variance, lack of phase information, oscillations and aliasing. So, these shortcomings pose difficulty in processing of geometric image features like ridges and edges. Medical images are basically textured images and contain ridges and edges. These problems are dealt with complex wavelets.

So, here a method based on some previous work but uses complex wavelet is implemented and results are analyzed to find out how more useful complex wavelets are in this particular field over wavelets. This work is based on multimodal images and uses two matching criteria Mutual Information and Sum of Absolute difference because mutual information is claimed to be accurate in multimodality but not so good at low resolutions and Sum of Absolute difference gives good results at low resolutions. So, union of these two with complex wavelets is analyzed and compared with wavelets in this thesis work.