1905.**Sumanaweera, T.S**

Segmentation and distortion correction in medical imaging
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New in vivo method is presented to correct the non -linear, object shape-dependent spatial distoration in MR images caused by magnetic susceptibility variation. This distoration across the air/tissue interface before and after the correction is qualified using a phantom.The results are compared to the "distortion -free" CT images of the same phantom by fusing CT and MR images using fiducials, with registration accuracy of better than a millimeter.Magnetic susceptibility of cortical bone is measured using a SQUID magnetometer and found to be -8.86 ppm (with respect to air) which is quite similar to that of tissue (-9 ppm). A new method to estimate magnetic suspceptibility of materials from MR images is also presented.Geometric distortion in MR images caused by gradient field non-linearity is quantified accurately using a 3D phantom before and after a commercial correction scheme.This correction scheme improves the accuracy of MR images from about 4 mm to better than 1 mm everywhere within a 200*200*200 mm3 cubic volume of interest centered at the gradient isocenter.This volume corresponds to the typical size of a human head.A computer vision techniques is used to automate the distortion quantification process.