The Relative Impact of Ghosting and Noise on the Perceived Quality of MR Images

Magnetic resonance (MR) imaging is vulnerable to a variety of artifacts, which potentially degrade the perceived quality of MR images and, consequently, may cause inefficient and/or inaccurate diagnosis. In general, these artifacts can be classified as structured or unstructured depending on the correlation of the artifact with the original content. In addition, the artifact can be white or colored depending on the flatness of the frequency spectrum of the artifact. In current MR imaging applications, design choices allow one type of artifact to be traded off with another type of artifact. Hence, to support these design choices, the relative impact of structured versus unstructured or colored versus white artifacts on perceived image quality needs to be known. To this end, we conducted two subjective experiments. Clinical application specialists rated the quality of MR images, distorted with different types of artifacts at various levels of degradation. The results demonstrate that unstructured artifacts deteriorate quality less than structured artifacts, while colored artifacts preserve quality better than white artifacts.