ENGI 5631 Signal and Imaging Processing in Biomedical Applications

MRI Laboratory

Magnetic resonance imaging (MRI) is a method of obtaining images of the interiors of objects, especially living things such as humans and animals. It does not use ionizing radiation such as X-ray s. Instead, it employs radio-frequency RF waves and intense Magnetified to excite atom s in the object under evaluation. Patterns in this excitation are observed on a display. MRI can provide real-time, three-dimensional views of body organs, muscles, and joints without invasive surgery. The MRI procedure is considered indispensable by many physicians, especially for the evaluation of sports-related injuries and for the diagnosis of chronic disease conditions. Most lay people lack the medical knowledge to properly interpret an MRI. An MRI can reveal minor damage to tendons, ligaments, and muscles. An MRI display of the heart and surrounding arteries can provide early warning of advancing coronary disease, and can help locate cancerous tumors.

The science of MRI is still considered to be in its infancy. Suggested future applications include the diagnosis and treatment of as-yet unknown disease conditions and psychiatric disorders. Even behavior modification, lie detection, and thought control have been discussed as potential indirect applications of real-time MRI.

MRI is sometimes called nuclear magnetic resonance imaging (NMRI) because it involves the nuclei of atoms. However, because "nuclear" bears some negative connotations, that adjective is usually omitted.

Methods of MRI: -

In the laboratory we saw different coils for the MRI of different objects with different sizes, there were several coils and with sizes according to the shape of the body or patient. The observations which we observed are: -

* The size of the coil matters as per the shape of the object of study, if the coil doesn’t fit the shape of the object the observation may differ.
* The diameter of the coil is an important factor for the measurement as the object should not be greater than the size of the coil's diameter or else it will show the result of the area which is only covered under the coil.

Results:

Provided in Jupiter Notebook

**References: -**

1.Hashemi, Ray Hashman, William G. Bradley, and Christopher J. Lisanti. *MRI: the basics*. Lippincott Williams & Wilkins, 2012.