CS-754 Project Proposal

Waqar Mirza and Aditya Kudre

March 2022

1 Project Proposal

Group Members:

- Waqar Mirza, Roll No: 200070090
- Aditya Kudre, Roll No: 200070039

Paper Details:

- **Title:** Enhancing Sparsity by Reweighted l_1 Minimization
- **Authors:** Emmanuel J. Candès, Michael B. Wakin and Stephen P. Boyd

1.1 Datasets chosen for implementation

In order to implement and test our Algorithm (Iterative Reweighting of l_1 norm), we will be using primarily medical images in particular MRI scans. A large list of medical imaging datasets can be found in this open source Github Repository (Link: https://github.com/sfikas/medical-imaging-datasets). We will be using an MRI dataset containing MRIs of Knee and Brain which is provided by NYU and Facebook AI and can be found here (Link: https://fastmri.org/dataset/). Just for completeness, we will also be using the 256×256 Shepp-Logan Phantom. For conducting some basic experiments, we will be using some randomly generated 1-D signals of length $n = 256$.

1.2 Evaluation Metrics to be used

We will be comparing the images reconstructed from the usual l_1 mimimization with the ones reconstructed from the Algorithm proposed in this paper (Iterative Reweighting of l_1 norm). This will be done by first calculating the l_2 reconstruction error or simply the mean square error between the original image as well as the images reconstructed from the two approaches. We will be comparing the errors to find out the degree of accuracy of our Algorithm. As always, images would also be visually inspected.