sStudent Name: Click or tap here to enter text. Student ID: Click or tap here to enter text.

Undergraduate Student:  Graduate Student

[If applies]

Student Name: Click or tap here to enter text. Student ID:Click or tap here to enter text.

Undergraduate Student:  Graduate Student

# Image Acquisition Driver:

In this analysis do not acquire the full image. We want to have an image that is “good enough” to identify structures but gather a small amount of data to make the scanning process faster.

1. Acquire the “Cardiac” image using the band trajectory at 35 degrees. Add small description of each step.

Click or tap here to enter text.

Click or tap here to enter text.

Click or tap here to enter text.

  

1. Acquire different degrees and band sizes of the same image and analyze the pro and cons of each result. State in the analysis the parameters used on each. Add your observations in the analysis.



Analysis:

Type here

1. Acquire 50% of the “Cardiac” image using the Cartesian trajectory



Acquire different percentages of the same image and analyze the pro and cons of each different percentage. State in the analysis the parameters used on each. Add any observations to your analysis



Analysis:

Type here

1. Acquire the “Cardiac” image using the radial trajectory. Experiment with different parameters and add in your analysis any pro and cons of each option. Add the parameters used on your analysis.



Acquire the “Brain” image using the radial trajectory. Use the same parameters as used before and add in your analysis any observations and comparison with the acquired “Cardiac” results. Does this technique benefits more to the Cardiac or Brain image? What technique is better for each? What did you find to be the best parameters? What technique do you believe would do a better job?



Analysis:

Type here

1. Explore and find a trajectory with its respective parameters that give better results than the ones discussed above. Explain why you believe that is better and if there are downside of using that specific trajectory. You may use the Cardiac or Brain image. Add the result image below and how you came to that result.



Analysis:

Type here

# Image Noise Driver:

1. Apply the Butterworth Lowpass filter to the Brain image. Experiment with the cutoff and order (N) values to identify their relationship and how it affects the resulting image. For each image below, calculate the signal to noise ratio.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Cutoff | N = | N = | N = | N = |
|  |  |  |  |  |
|  | SNR= | SNR= | SNR= | SNR= |
|  |  |  |  |  |
|  | SNR= | SNR= | SNR= | SNR= |
|  |  |  |  |  |
|  | SNR= | SNR= | SNR= | SNR= |
|  |  |  |  |  |
|  | SNR= | SNR= | SNR= | SNR= |

Analysis:

Type here

1. Apply the Gaussian Lowpass and Highpass to the Brain image. Experiment with the cutoff value to identify how it affects the resulting image.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lowpass | | | | |
| Cutoff |  |  |  |  |
|  |  |  |  |  |
| Highpass | | | | |
| Cutoff |  |  |  |  |
|  |  |  |  |  |

Analysis:

Type here

1. Load the matrix file “noisyimage.npy” and explore multiple techniques to improve the quality of the image. Present below three choices that you have found best results. Explain the process and the parameters used.
2. Result



1. Result



1. Result



[Challenge Bonus]: In comparison to the image below, how does your choices compare? You can achieve the same result with a specific method and cutoff value. Place here the information.



Analysis:

Type here