Zoher Ghadyali, Nitya Dhanushkodi, Cynthia Chen
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Project Proposal

Our goal in this project is to understand the math behind the Harr Wavelet Transform and to use the transform for various practical applications. After making sure we can understand and present a conceptual understanding of this transform, we will use both the FFT and the Harr Wavelet Transform to perform image compression. If we can succeed in doing both of these goals successfully, we will move on to using the Harr Wavelet Transform to perform fingerprint analysis.

Our first goal is to understand the math behind the Harr Wavelet Transform. We want to know enough to use the transform successfully and enough to explain it to the class as our minimum deliverable. Each of us plans to do our own research and explain the way the transform works to each other so that the team itself develops an understanding of the math. We will then start our presentation with a mathematical explanation of the Harr Wavelet Transform. The deadline for this goal is Friday, April 17th.

Our second goal is to compare the FFT and the Harr Wavelet Transform in the field of image compression. We will implement compression using both transforms. We will compare the runtimes, computational complexity, and overall performance of the compression. We will also seek to understand the difference between the FFT and the Harr Wavelet Transform. The FFT decomposes signal into sines and cosines, while Harr Wavelet does take into account the real and Fourier space. As a result, understanding the difference in the math and implementation could further our understanding of both the FFT and wavelet analysis. Our deadline for this goal is Friday, April 24th.

Our third and final goal, if we can do the first two goals successfully while following our deadlines is to perform fingerprint analysis. We can use a combination of the Harr Wavelet Transform and basic edge-detection filters to identify if two fingerprints are a match. Additionally, we would like to attempt to match a known fingerprint to a partial print. If we can complete both of our above goals by Friday, April 24th, we will hopefully have enough time to make significant progress towards this goal and even identifying if two fingerprints are matched would be satisfying this goal. The deadline for this goal is Monday, May 4th.