

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN
Department of Electrical and Computer Engineering
ECE 498MH SIGNAL AND IMAGE ANALYSIS

Lab 7
Fall 2014

Assigned: Thursday, November 20, 2014

Due: Not Due: Do your final project instead

Reading:

Lab 7.1

Download a stack of MR images from <http://courses.engr.illinois.edu/ece498mh/fa2014/lab7data.zip>.

- (a) The original images are only 128×128 pixels. Choose the image from the middle of the stack. Upsample it without interpolation to create a 512×512 image. This is a little hard to do in matlab, since matlab knows that it's a rather foolish thing to do: try

```
[M,N]=size(A);  
B = zeros(4*M,4*N);  
for m=0:(M-1), for n=0:(N-1),  
    B(4*m+1,4*n+1)=A(m,n);  
end, end
```

Show this image in figure 1.

- (b) Interpolate using zero-order hold (piece-wise constant). You can do this by convolving your image from part (a) with an appropriate $g[m, n]$. Show this image in figure 2.
- (c) Interpolate using first-order hold (bilinear interpolation), by convolving your image from part (a) with an appropriate $g[m, n]$. Show this image in figure 3.
- (d) Interpolate using sinc interpolation, by convolving your image from part (a) with an appropriate $g[m, n]$. Show this iamge in figure 4.
- (e) Write a function `MOV=mrimage(IMDIR,K)`; that gets a listing of all image files in directory `IMDIR` (using the matlab `DIR` command), reads them in two at a time, upsamples them by a factor of `K` in all directions (horizontal, vertical, and temporal) using linear interpolation, and then stacks the resulting images into a movie. Play the movie in figure 5.