Photol 09 Homework 4 RECTIFICATION

assigned 23 Oct, due 1 week (30th)

Produce a rectified image from the Oakland, CA photo that was used for HW #3. Use the parameter values ($a_0, a_1, \ldots$) and the local origin (X_{mean}, Y_{mean}) from the posted solution for HW #3. Use a 2m GSD, and limits:

$X_{min} = 562050$, $X_{max} = 566470$

$Y_{min} = 4182740$, $Y_{max} = 4187020$

Make the rectified image with 3 variations:

(a) nearest neighbor interpolation, (b) bilinear, (c) bicubic

what are the differences in the result?

Make an ESRI world file for geo-referencing:

It is a text file, with name to go with image file: XYZ.jpg & XYZ.jgw →

```
+GSD
0
0
-GSD
X_UL
Y_UL
```

Loop through all pixels in the output or target image, determine the corresponding X,Y and X'y', project into the (source) image (hit, miss ?). If hit, then interpolate 3 color components and store in output image.

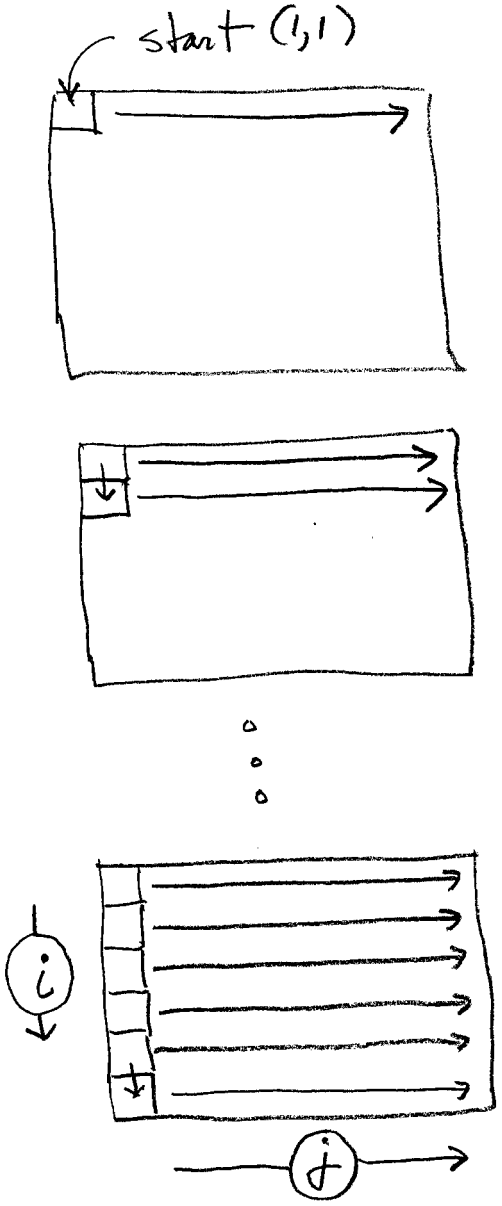
Road vectors will be provided in a "shape file".

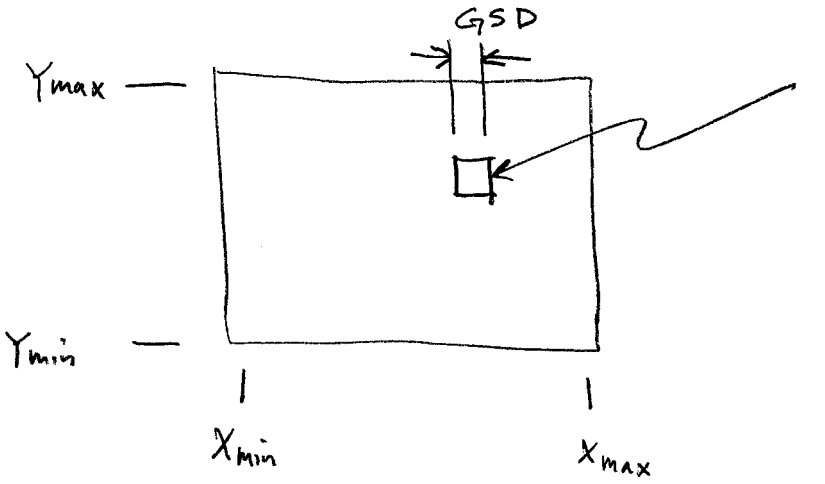
Merge one of your image files with vector overlay in ArcGIS or ArcView. Submit hardcopies + 3 digital images.

When you have the rectified image up in Arc*** measure the length and bearing/azimuth of the football field in the foreground.

Code hints:

```
A = imread('input_image.jpg');
[inrow, incol, inband] = size(A);
Xmin = , Xmax = , Ymin = , Ymax = , GSD = , ...
outrow =
outcol =
B = zeros(outrow, outcol, 3, 'uint8');
for i = 1: outrow
    for j = 1: outcol
        % find X,Y ∈ X'Y'
        % project for l,s (fractional)
        if (inside source photo)
            B(i,j,1) = R
            B(i,j,2) = G
            B(i,j,3) = B
        else
            B(i,j,1) = 128
            B(i,j,2) = 128        (gray)
            B(i,j,3) = 128
        end
    end
end
image(B); axis equal;
imwrite(B, 'output_image.jpg', 'JPEG');
```





each pixel in output image has a unique

i, j	row, column
X, Y	UTM
X', Y'	UTM, local