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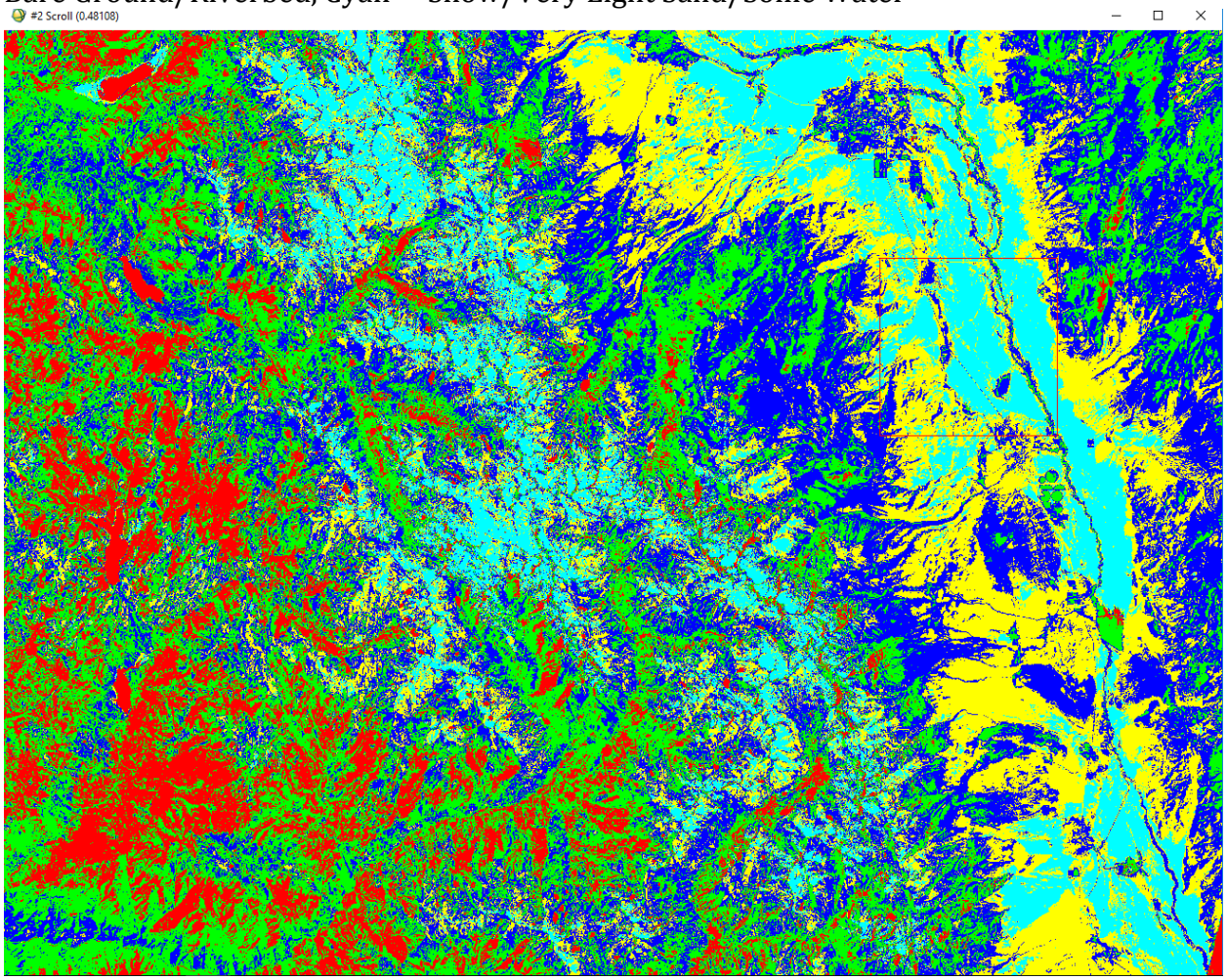
GEOG-361-502

Due 21 Mar 2019

Lab 5 – Classification

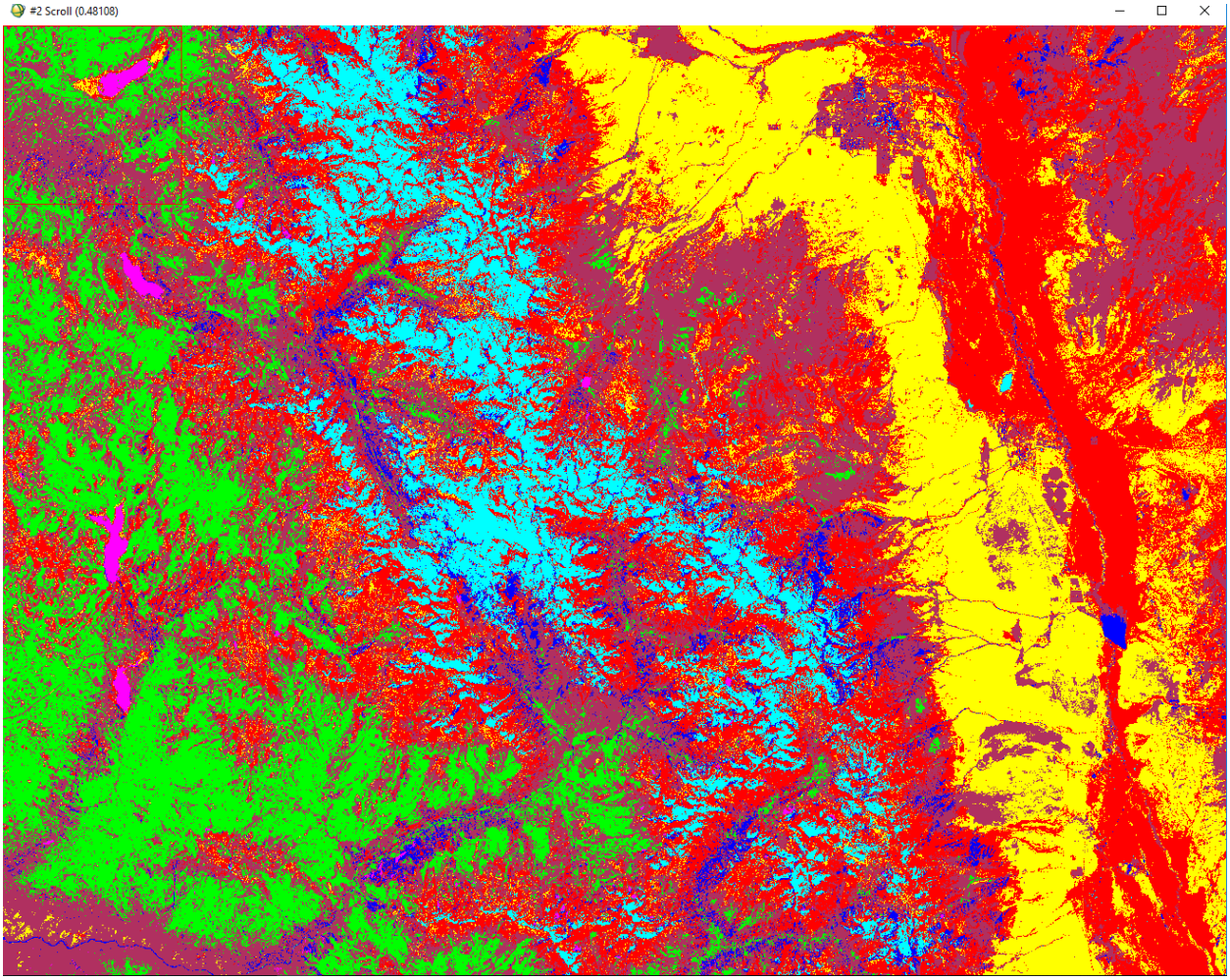
Question 1. Create classifications of the image using the following techniques:

1. IsoData (unsupervised)
   Key: Red = Dense Forest/Water/Other Dark Elements, Yellow = Lighter Rock/Sand, Green = Sparse Forest/Agriculture/Sedimented Water, D. Blue = Bare Ground/Riverbed, Cyan = Snow/Very Light Sand/Some Water



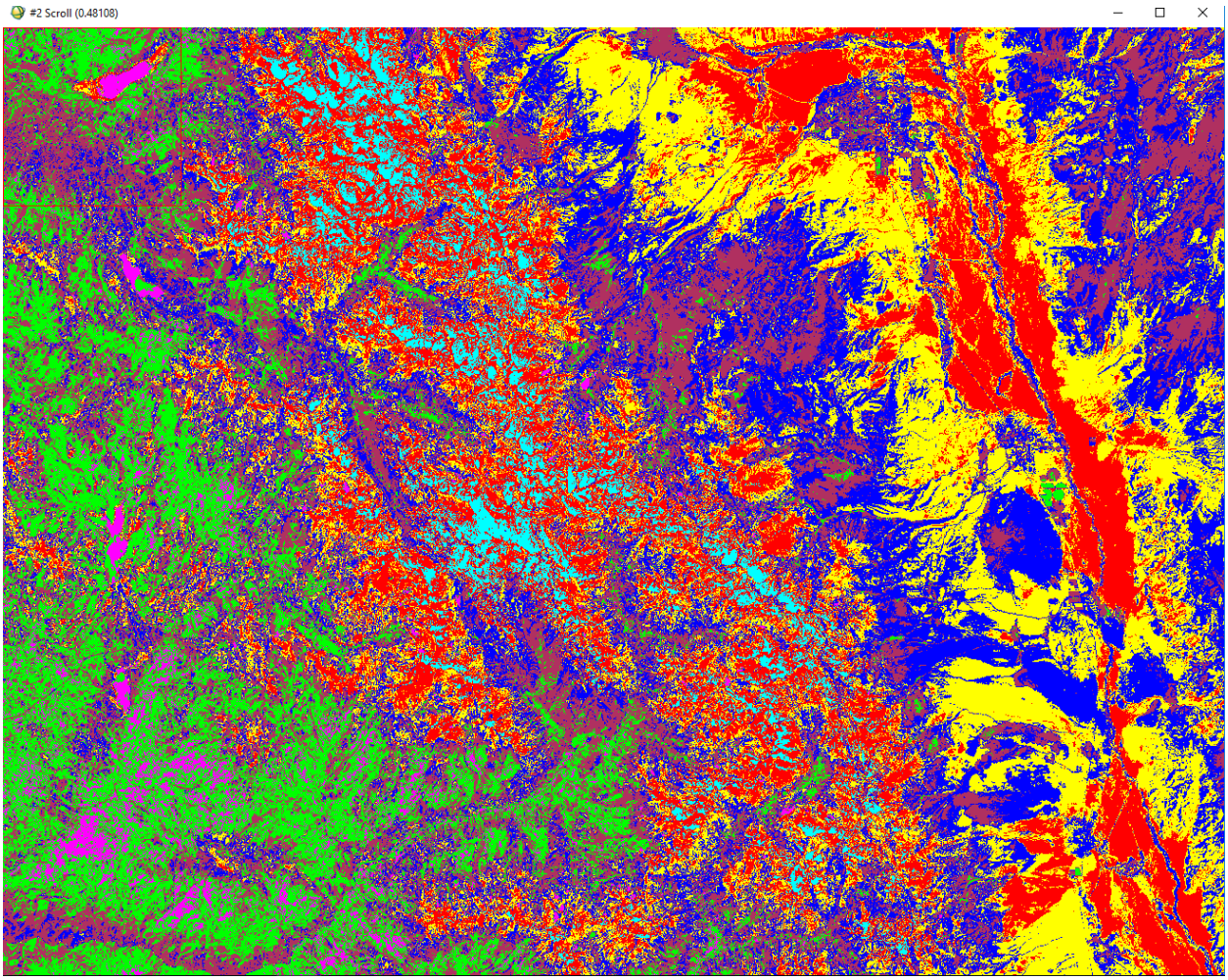
2. Maximum Likelihood (supervised)

Key: Red = Waterside/Alluvial/Lighter Ground, Green = Dense Forest, Blue = Riverbed/Sedimented Lake/Very Dense Forest, Yellow = Bare Ground, Cyan = Snow, Magenta = Lakes, Maroon = Light Forest/Agriculture



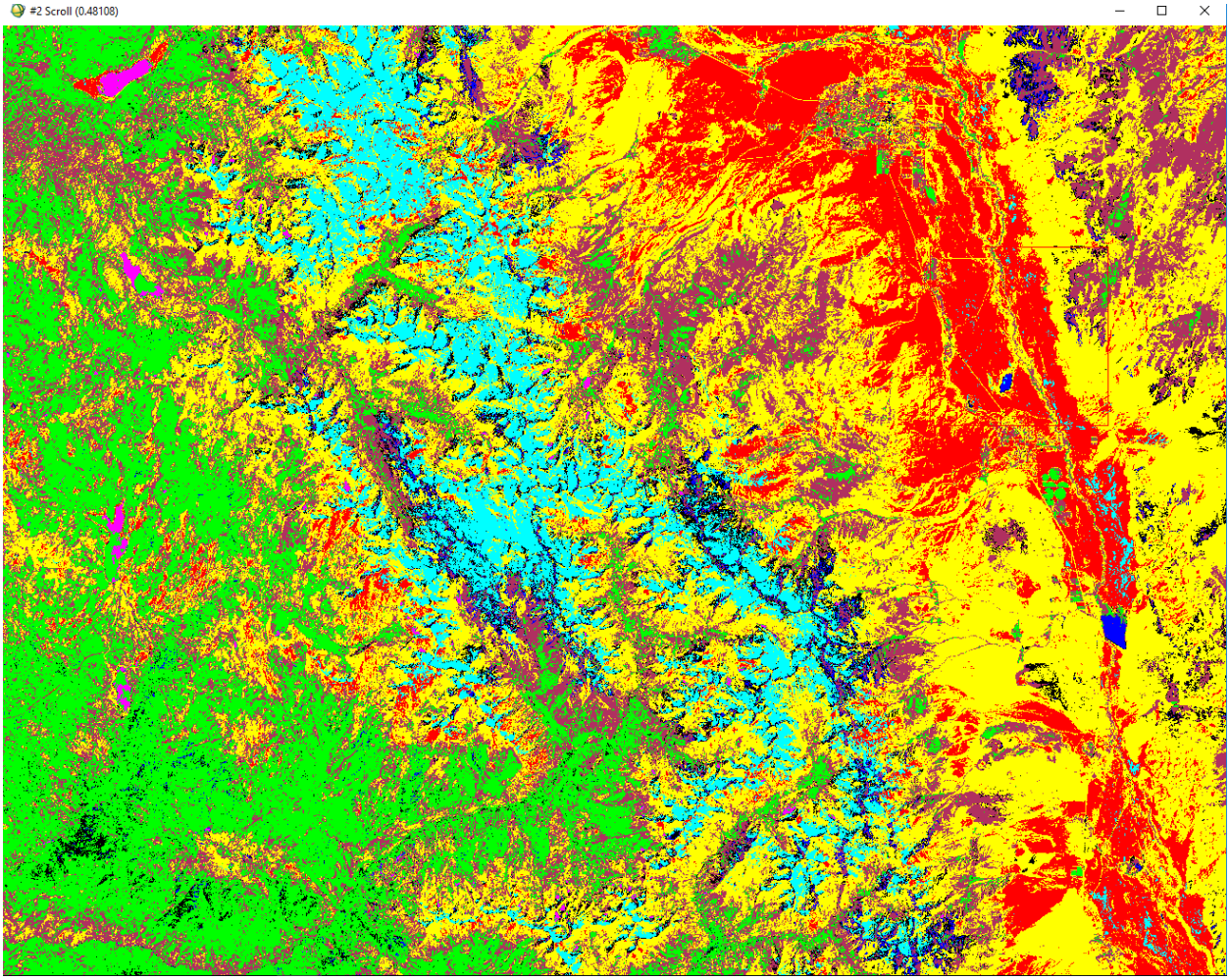
3. Minimum Distance (supervised)

Key: Red = Waterside/Darker Snow/Lighter Ground, Green = Dense Forest/Agriculture, Blue = Riverbed/Darker Ground, Yellow = Bare Ground, Cyan = Snow, Magenta = Lakes/Very Dense Forest, Maroon = Light Forest



4. Decision Tree Classifier

Key: Red = Alluvial/Light Ground, Green = Forest/Heavy Agriculture, Blue = River/Sediment Lake, Yellow = Bare Ground, Cyan = Snow, Magenta = Lakes, Maroon = Light Agriculture/Dark Ground



Question 2. Please provide the outputs and a 1/2 page (total) discussion of the merits and difficulties associated with each classification method – not a description of how the classification was done.

Note : The supervised and unsupervised classifications were all done with just bands 2-4 for RGB. They were kept the same to better compare their results. The decision tree makes use of other bands for more accurate classing.

The initial unsupervised classification was very fast and simple, and gives a very basic overview of how the area is split into its sections. But upon any further inspection, the accuracy is very low, as many areas are wildly misclassified. The best example would be the cyan class which covers both the snow on the mountains and the sand near the dried-up riverbed, which are visibly very different in the RGB composite from Bands 2-4. Unsupervised classification would likely only be useful for a very simply separated area, one with clear distinctions between unlike elements. The least distance classification was more accurate than the first, but was still much outdone by the maximum likelihood result. Due to the identical difficulty of the two regular supervised methods, I would say that Max. Likelyhood would be the best option (at least for images of similar composition to this one) of the two. The decision tree method, while much more accurate and customizable, presents its own problems: In addition to taking about twice as long as the supervised methods, there is also room for misclassified pixels, as the constructed tree may not contain all the pixels in the image, as demonstrated by the few black pixels in my result. This could be fixed and reduced to a very small percentage of unclassed pixels, but it would take significantly more time.

Question 3. Provide a graphical representation of your decision tree (a drawing/graphic/screenshot). Your grade will in part be determined by how accurate you manage to make the best of your classifications.

Note: Null value added to cover unclassified pixels