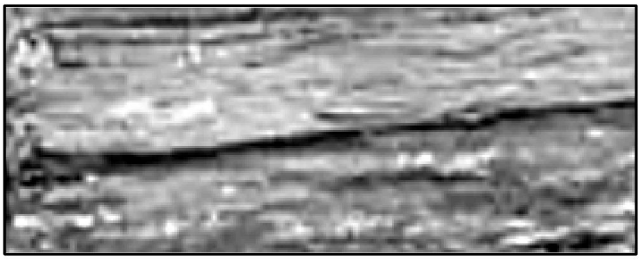
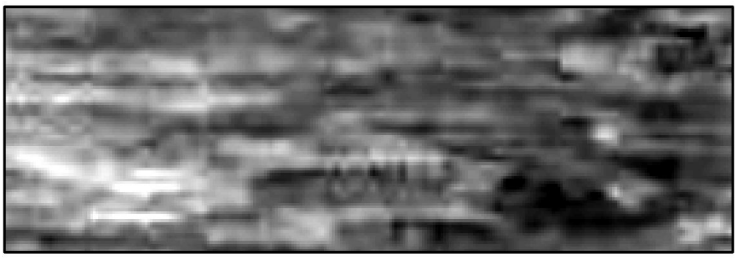
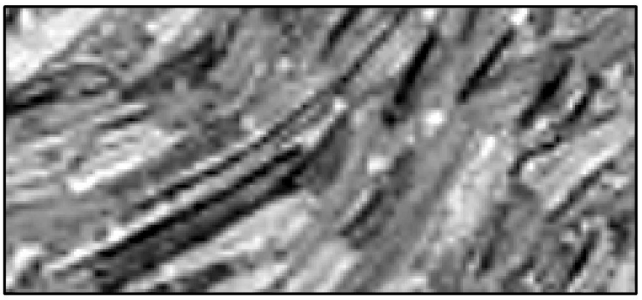
Identifying the Five Painting Samples



A

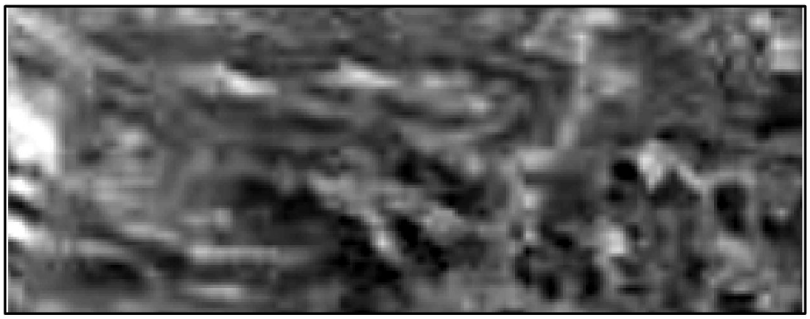


B



C

D



E

By observation, I hypothesized that painting A, C, D is the same class, and painting B and E is one class, because the A, C and E samples have more diagonal downward strokes, B, E are relatively more horizontal. To test the hypothesis, I used the following three criteria to identify them:

1. Number of tall hills;

2. Number of deep valleys;

3. Percentage of rough area;

Identifying the Five Painting Samples

Criterion 1: Number of Tall Hills

Criterion 1: Number of Tall Hills

I identified the number of tall hills in each painting. The steps are as follows:

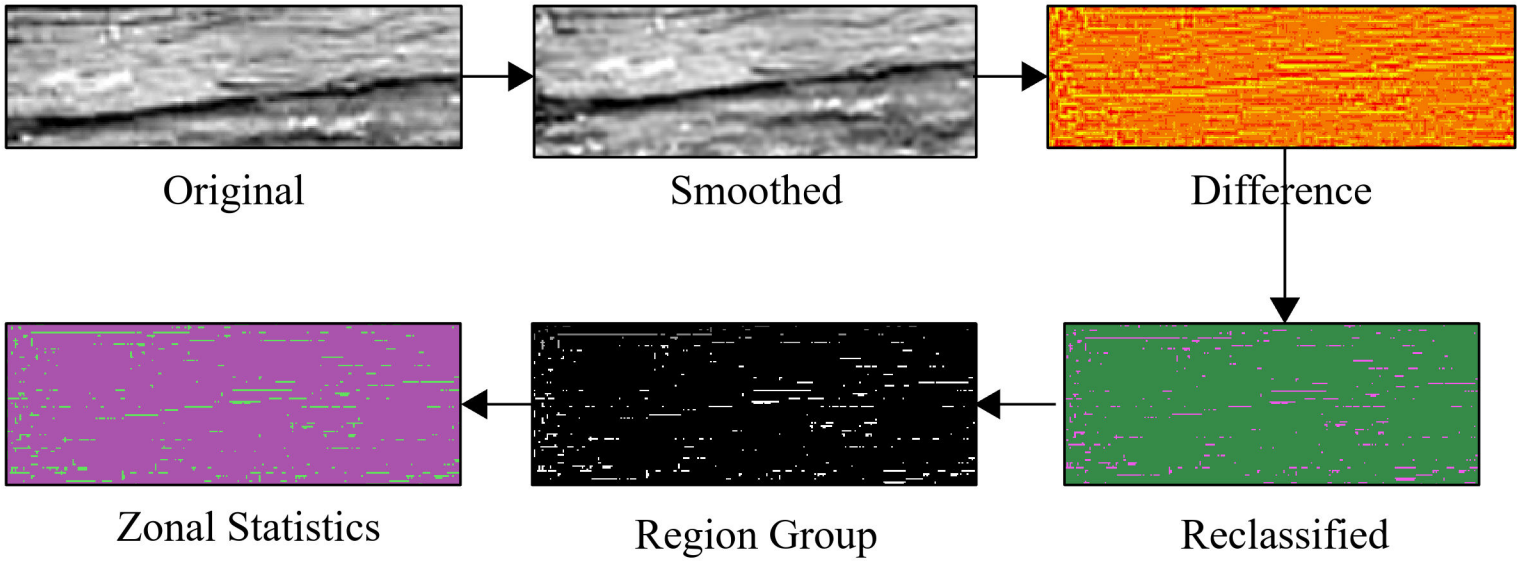
1. Using the Focal Statistics-Mean to generate the smoothed surface.

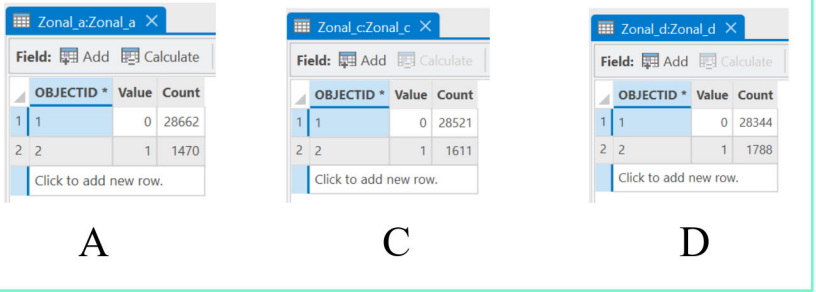
2. Then I use the Raster Calculator to calculate the difference between the original surface and the smoothed surface. The results range from negative values to positive values.

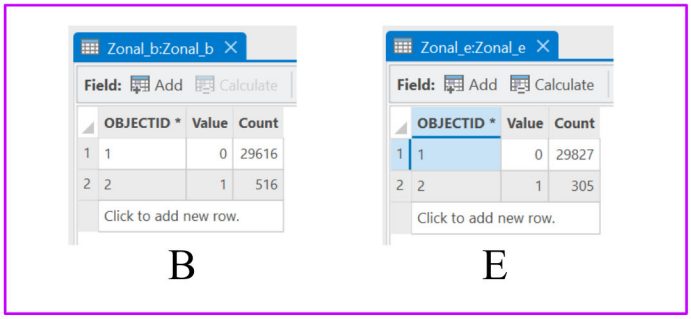
3. Reclassify the difference grid to identify "tall hill" pixels, the elevation difference which is greater than or equal to 0.3 is tall hill.

4. Region Group to identify the unique tall hills.

5. At last, I used Zonal Statistics->Maximum to apply the highest region value to the entire region.







Identifying the Five Painting Samples

Criterion 2: Number of Deep Valleys

Criterion 2: Number of Deep Valleys

I identified the number of deep valleys in each painting. The steps are as follows:

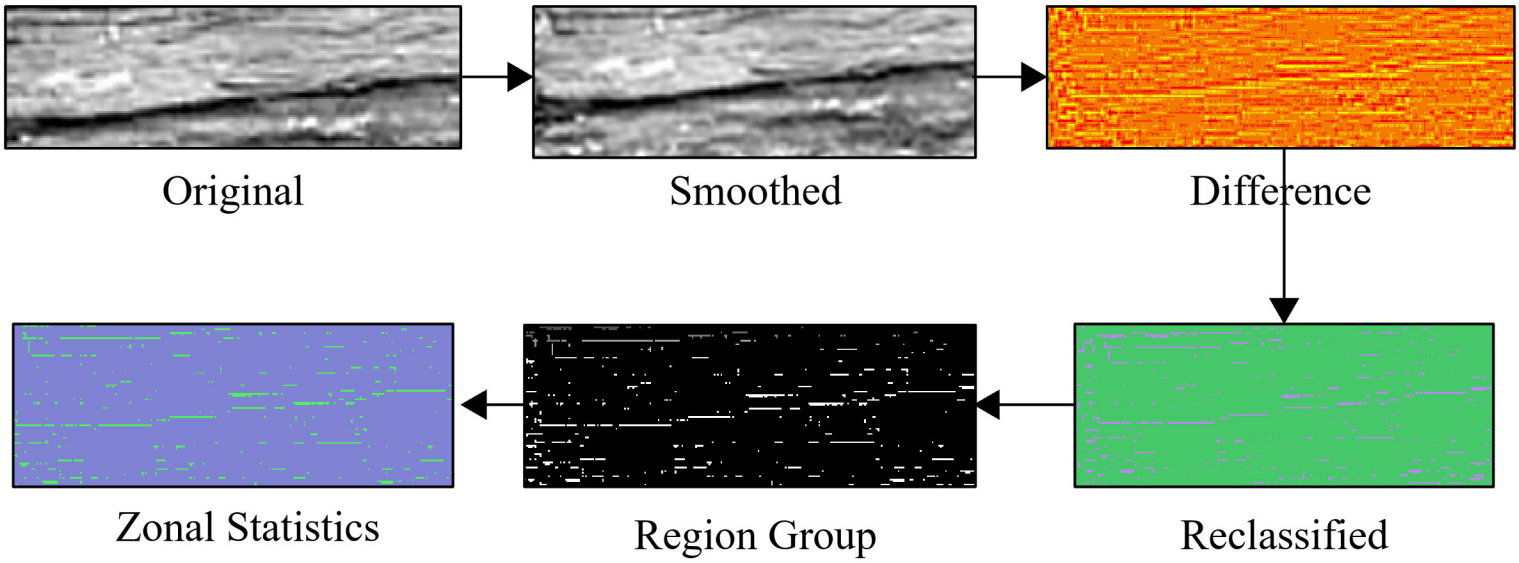
1. Using the Focal Statistics-Mean to generate the smoothed surface.

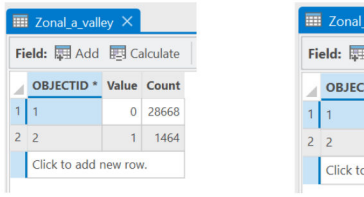
2. Then I use the Raster Calculator to calculate the difference between the original surface and the smoothed surface. The results range from negative values to positive values.

3. Reclassify the difference grid to identify "deep valley" pixels, the elevation difference which is smaller than or equal to -0.3 is deep valley.

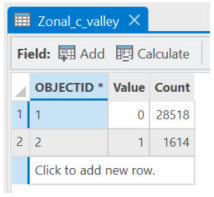
4. Region Group to identify the unique deep valleys.

5. At last, I used Zonal Statistics->Maximum to apply the highest region value to the entire region.

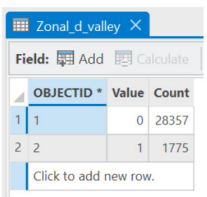




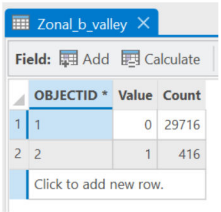
A



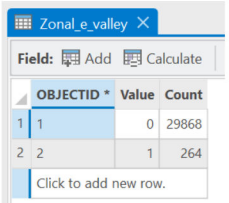
C



D



B



E

Identifying the Five Painting Samples

Criterion 3: Percentage of Rough Area

Criterion 2: Percentage of Rough Area

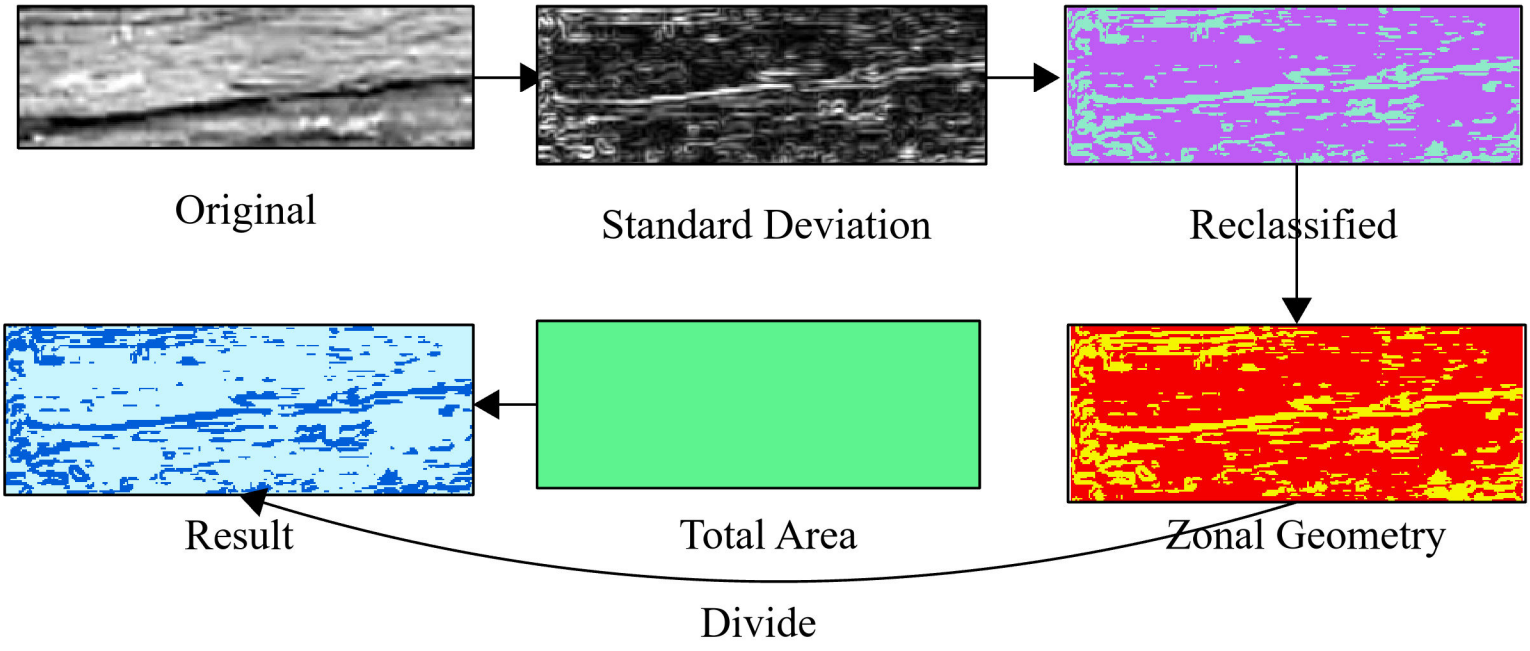
I identified the percentage of area which is rough in each painting. The steps are as follows:

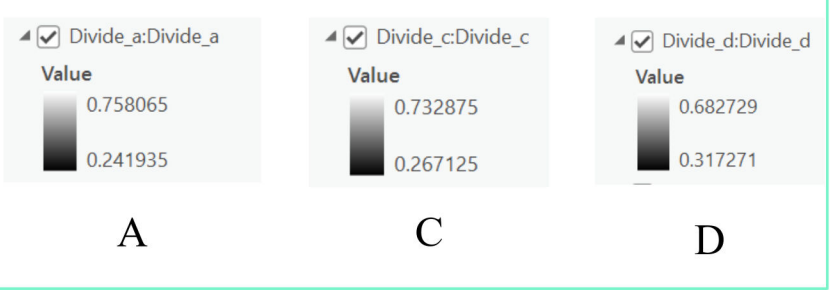
1. Using the Focal Statistics-Standard Deviation to generate the roughness surface.

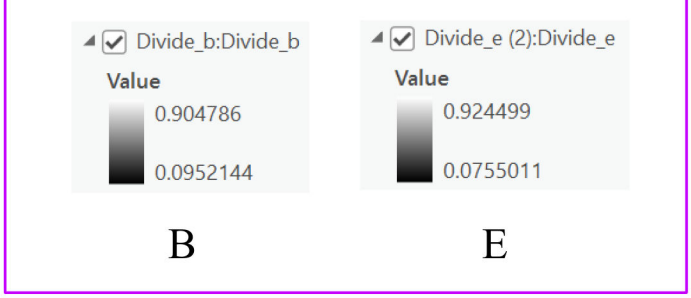
2. Then I use the Reclassify to find the rough area whose value is greater than or equal to 0.5.

3. Through the Zonal Geometry->Area tool, I calculated the area of these rough pixels. Also, I calculated the overall area of each painting using the Reclassify ones grid and the Zonal Geometry->Area tool.

4. Using the Raster Calculator->Divide tool to calculate the percentage of the rough area.







Identifying the Five Painting Samples

Painting A

Tall Hill Count: 1470;

Deep Valley Count: 1464;

Percentage of Rough Area: 75.8%.

Painting B

Tall Hill Count: 516;

Deep Valley Count: 416;

Percentage of Rough Area: 90.1%.

Painting C

Tall Hill Count: 1611;

Deep Valley Count: 1614;

Percentage of Rough Area: 73.2%.

Painting D

Tall Hill Count: 1788;

Deep Valley Count: 1775;

Percentage of Rough Area: 68.3%.

Painting E

Tall Hill Count: 305;

Deep Valley Count: 264;

Percentage of Rough Area: 92.4%.

According to the summaries above, we can find that the Painting A, C and D have similar characteristics. They are category 1. The other patintings B and E are category 2. My hypothesis is correct.