Rice analysis report

Project by:

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- **Reading images**

  We read images using user directory path with the help of OS library module.
  We first make an array of image folders then iterate each folder for the images.

- **Essential work**

  As images are in RGB we first convert them in grayscale using (rgb2gray) then to binary using thresholding (threshold Otsu). We then erode the image to smooth its edges. We select a specific image then label it using (measure. Label) basically it gives each connected component a label so that we can easily obtain features of that specific labeled region. Now we use another function by the name of (regionprops) which will basically give us the details of labeled region.
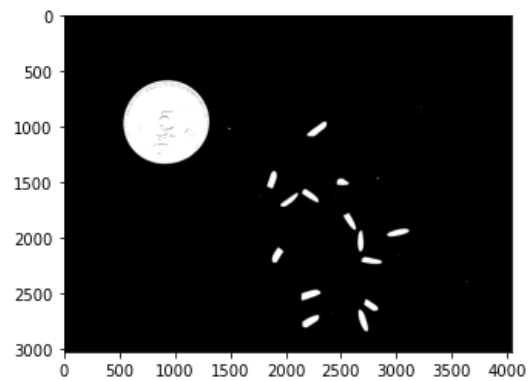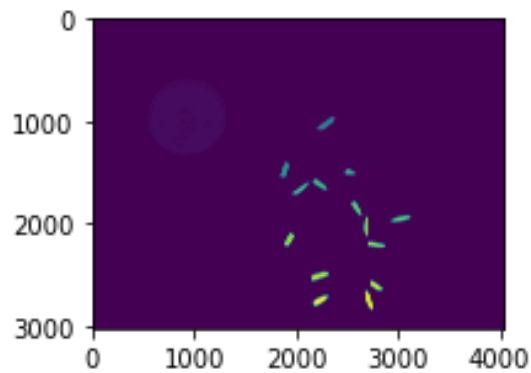
  Original RGB image:

  Grayscale image:
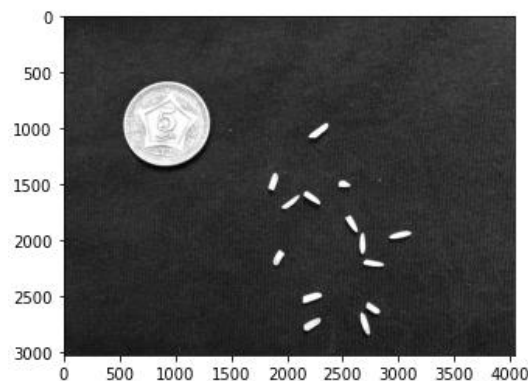
Binary image:

Labeled image:

- **Grain count**

After the above working we can iterate all the labels of the selected image as all grains are labeled, we can easily count each rice grains using a loop. As there was a coin in the image, we can get rid of it using (region. area) as we define a specific area to work on.
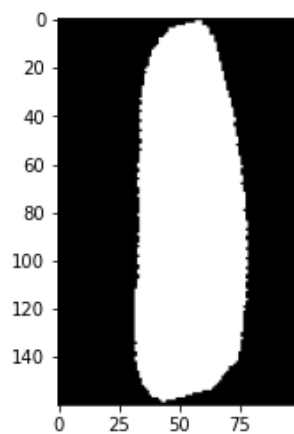
Region bounded with bbox:

- **Calculate dimensions (Length and width)**

  For calculating length and with of each gain we use region props property (major_axis_length) for length and (minor_axis_length) for width.

  Y-axis = Length
  X-axis = Width

  ```
  Lengh of rice:  163.57756618876414
  Width of rice:  45.75359313246324
  ```
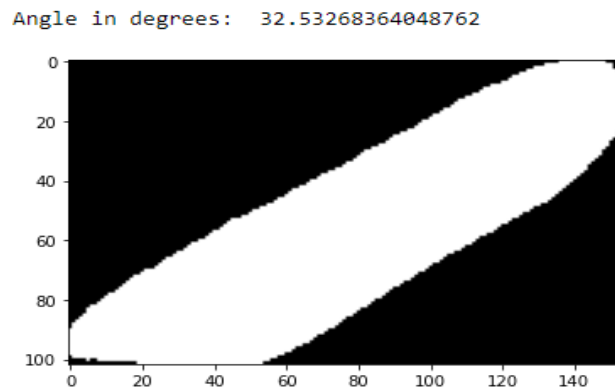

- **Calculate the angle**

  For calculating the angle of each grain, we use region props property (orientation) But it gives output in radians so to convert radians into degree we use the following formula:

  Degree= region. orientation * (180/ π) + 90

Example:

$$Degree = -0.94669 * (180/\pi) + 90$$

$$Degree = 32.532$$

Angle in degrees: 32.53268364048762

- **Rotate the grain**

For rotating a grain to 90-degree angle we have to specify a formula so that each grain greater then 90 degree or less then 90 degrees can exactly rotate to 90 degrees. So, for this if angle is less than 90-degree we took 90 as a constant value and subtracted the current angle of grain resulting a value needed it to rotate exactly 90-degree and similarly if the angle is greater than 90, we subtracted current angle with constant 90-degree and that resulted a value which we rotate in negative direction to make a 90-degree angle. we pass that value to (rotate) function which will rotate it Surely you won't get my point so I will explain with an example.
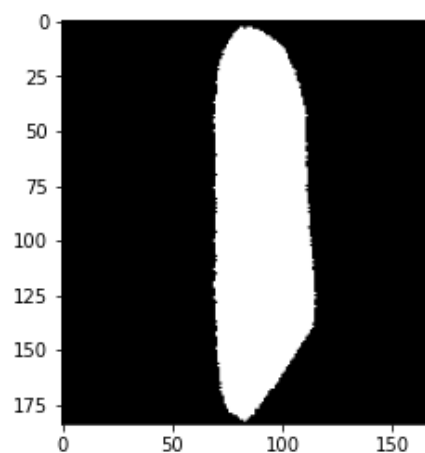
Example:

1) Angle less than 90-degree:

Before rotation the angle was 32 degrees…

Angle in degrees: 32.53268364048762
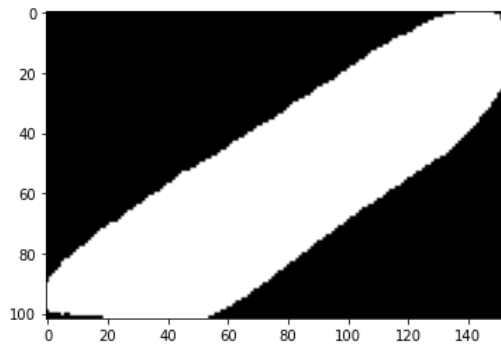
We have to make it 90-degree so as its less than 90-degree
we subtract constant 90 degree with 32 degree 90-32 we get 58
now we have to rotate it 58-degree anti-clock wise to make it
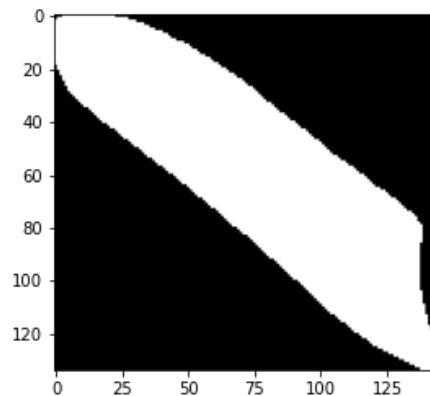90-degree, as 32+58 results in 90-degree.

After rotation:

2) Angle greater than 90-degree:

Before rotation the angle was 140-degrees...

Angle in degrees: 140.15080040022764

We have to make it 90-degree so as its greater than 90-degree we subtract current degree i.e., 140 with constant 90-degree 140-90 we get 50 now we have to rotate it 50-degree in negative clockwise direction as its greater than 90 to make it 90-degree, as 140-50 results in 90-degree.

After rotation:
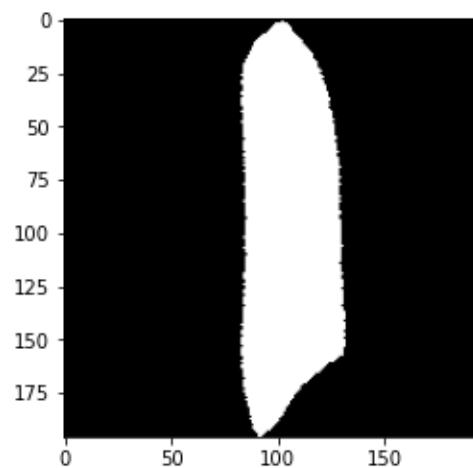
- **Saving in csv**

Now as all the details are fetched, we can easily open individual csv file and save the details in them.

Grain Number	Angle in degrees	Length of rice	Width of rice	Orientation in radian
0	35.75842772	207.5917085	54.43170678	-0.946694028
1	72.96443121	160.0239813	56.70097796	-0.297326765
2	171.4622229	100.8549623	50.95456065	1.421784006
3	145.8457767	173.1677514	48.48582056	0.974692676
4	36.46792205	186.3768062	40.44160556	-0.934311016
5	121.6328126	163.9626818	51.22904157	0.552096731
6	12.0901137	197.4304556	45.19784782	-1.359784036
7	90.02066171	181.3433918	43.24950731	0.000360615
8	61.90554602	141.5344323	60.59439311	-0.490340723
9	172.1589217	184.6447579	43.88251531	1.433943693
10	17.47905715	183.6482286	59.86064502	-1.265729229
11	146.1873281	140.3534376	53.72943642	0.980653873
12	107.9986142	200.3208128	50.51349666	0.314135079
13	29.95978239	171.3040893	60.49729191	-1.047899481
Adhwar Pic 1 total count is	14			

- **Saving each grain**