Activity 2: Practical Image Processing 2

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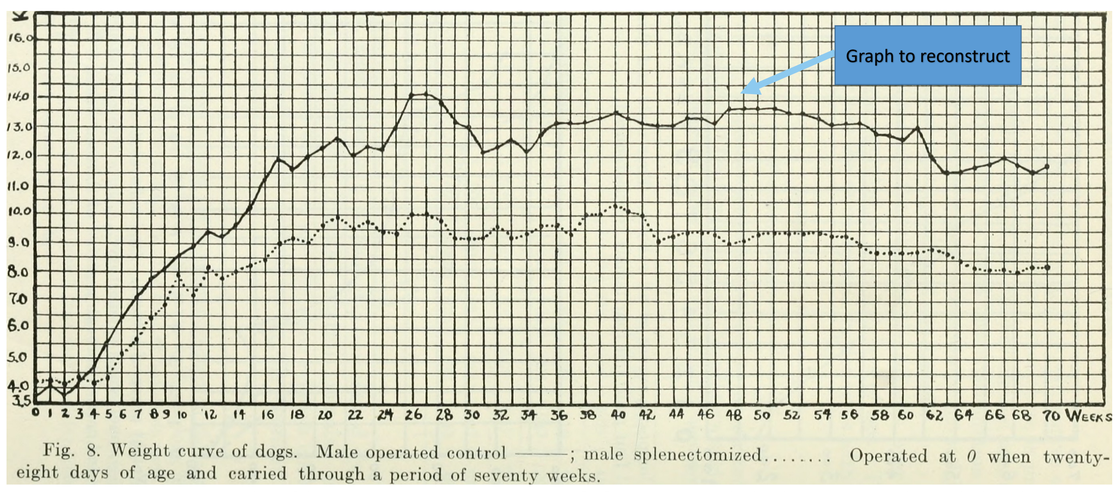
Applied Physics 186

OBJECTIVES

- Convert pixel location of a graph into its corresponding physical value
- Compare the original graph to the reconstructed graph by overlaying the two

GRAPH USED



Scanned graph of hand drawn plot used [1], x-axis is labeled in weeks while the y-axis is unlabeled

[1] The graph was taken from the *American journal of physiology (1920)*

HOW I TACKLED THE ACTIVITY

1. Measure pixel location of the coordinate system's tick marks (both x- and y-axes) and tabulate the values

	Actual_X	Pixel_X
0	0	73
1	1	107
2	2	144
3	3	177
4	4	219
5	5	251
6	6	288

	Actual_Y	Pixel_Y
0	3.5	980
1	4.0	941
2	5.0	866
3	6.0	793
4	7.0	719
5	8.0	649
6	9.0	578

2. Make calibration curve for converting pixel location to its corresponding physical value

3. Tabulate pixel locations of some points on the graph and use calibration curve to convert into physical values

	Pixel Graph X	Pixel Graph Y
0	73	960
1	107	936
2	144	958
3	177	937
4	218	887
5	251	836

convert to →

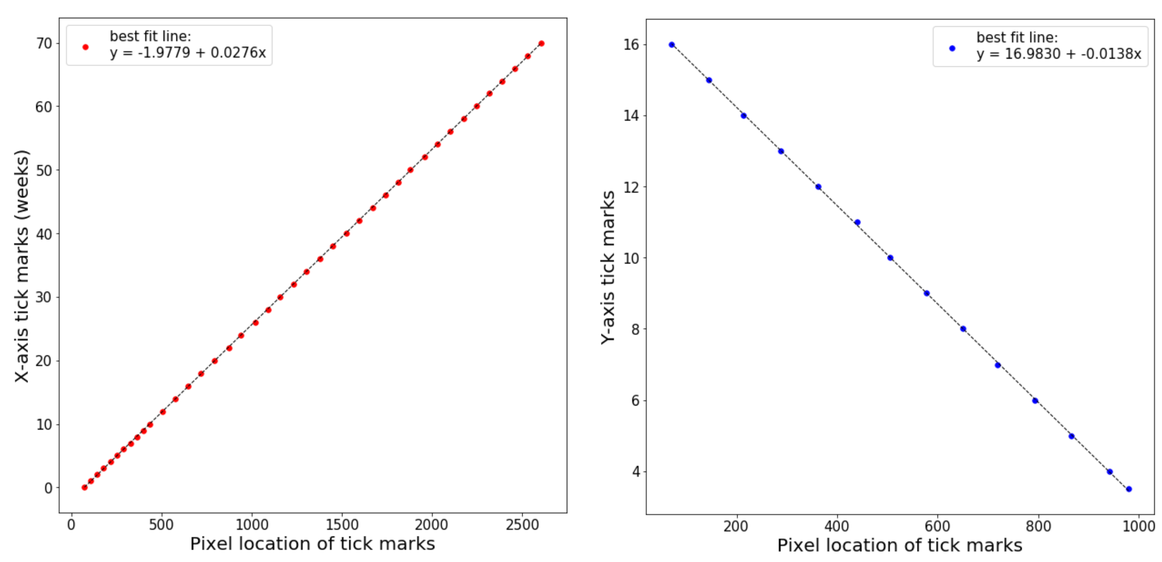
	Actual value X	Actual value Y
	0.0369	3.7350
	0.9753	4.0662
	1.9965	3.7626
	2.9073	4.0524
	4.0389	4.7424
	4.9497	5.4462

4. Reconstruct the graph and compare it to the scanned graph by overlaying the two

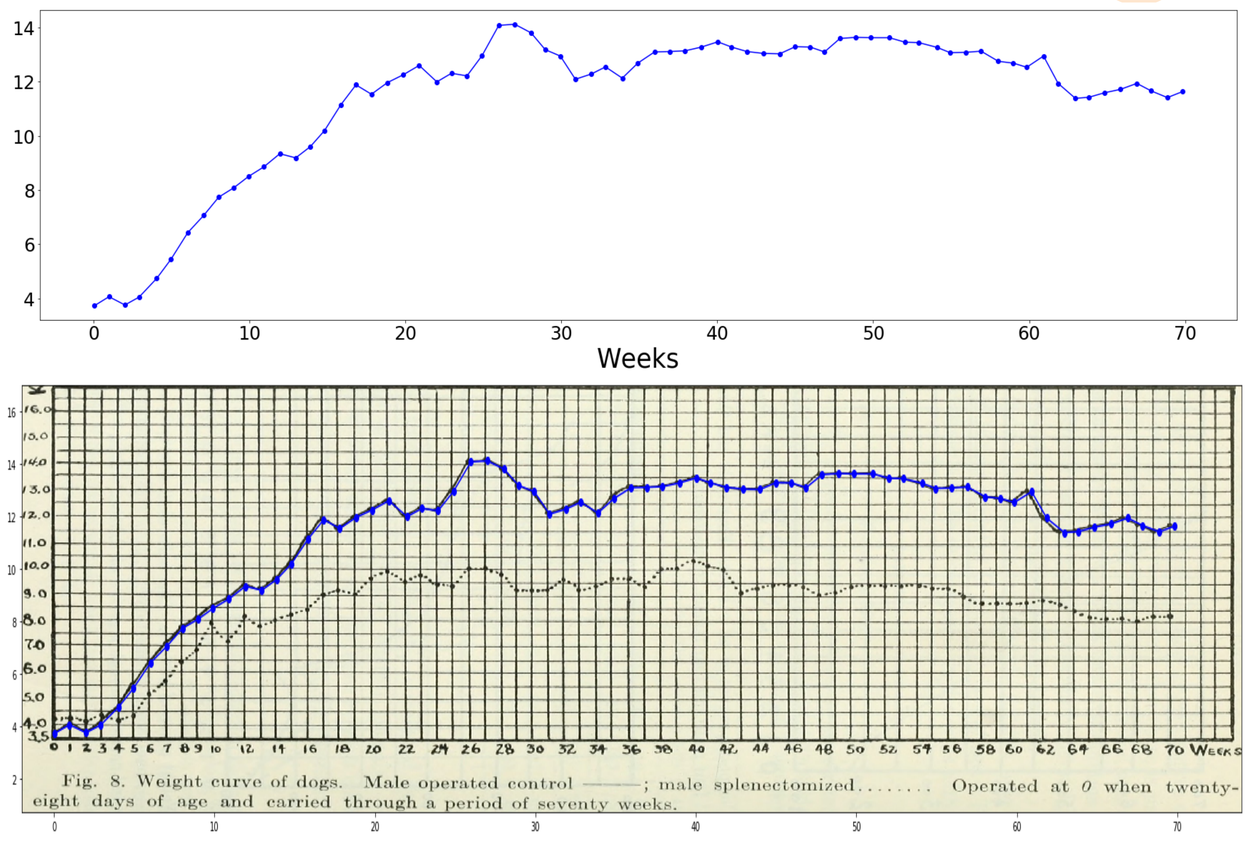
CALIBRATION CURVES

These are the calibration curves used for the tick marks for x-axis (right) and the y-axis (left):

```
X-axis: actual_value = -1.9779 + 0.0276*pixel_loc (R-squared = 1)
Y-axis: actual_value = 16.9830 – 0.0138*pixel_loc (R-squared = 0.99)
```



RECONSTRUCTION OF GRAPH



Reconstructed graph alone (top) and the reconstructed graph overlayed to the scanned graph

Comparing the scanned graph and my reconstructed graph, I can see that I did pretty accurate in converting the pixel location to the actual value. This is because the calibration curves that I got were linear with high R-squared values.

SELF - EVALUATION

Technical Correctness – 5
Quality of Presentation – 5
Initiative – 2 (integrated past lessons on 166 such as finding the calibration curve using Python)

Additional Notes: I used Python in creating the calibration curves and recreating the graph. Here is a link to a folder containing all the raw data I gathered and the notebook I used to process the data. *http://tiny.cc/Activity2AP186*