PLOT DIGITIZER

EE 465 PROJECT

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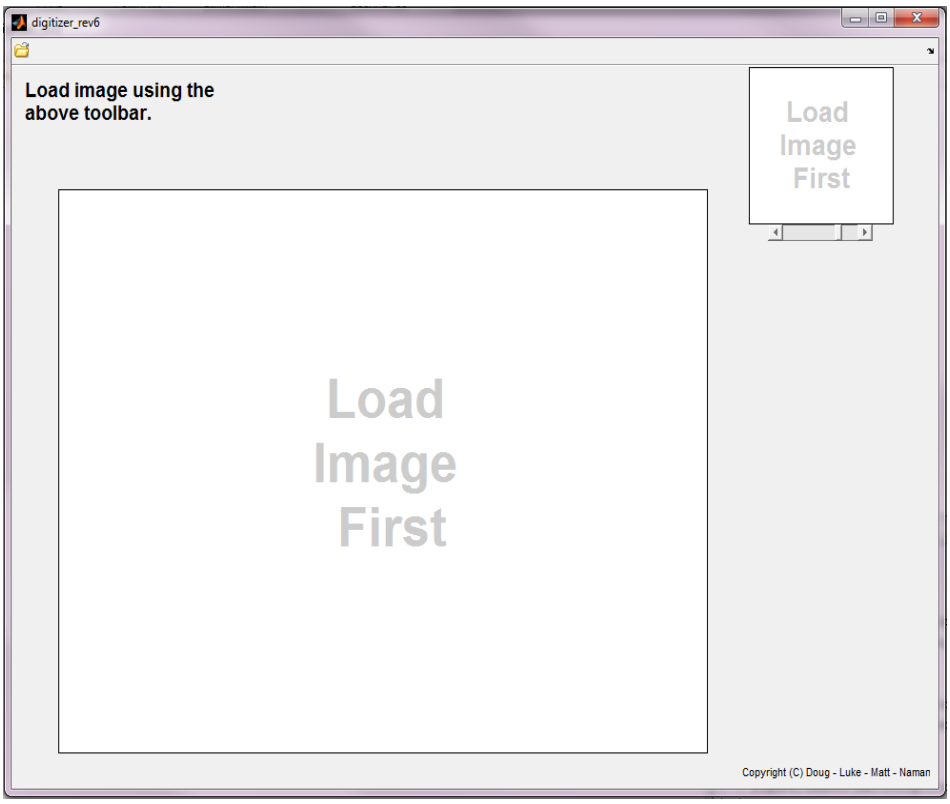
AIM: To digitize and get the data from the image of any given plot.

APPLICATIONS: The plot digitizer can be applied to various scenarios such as mentioned below:

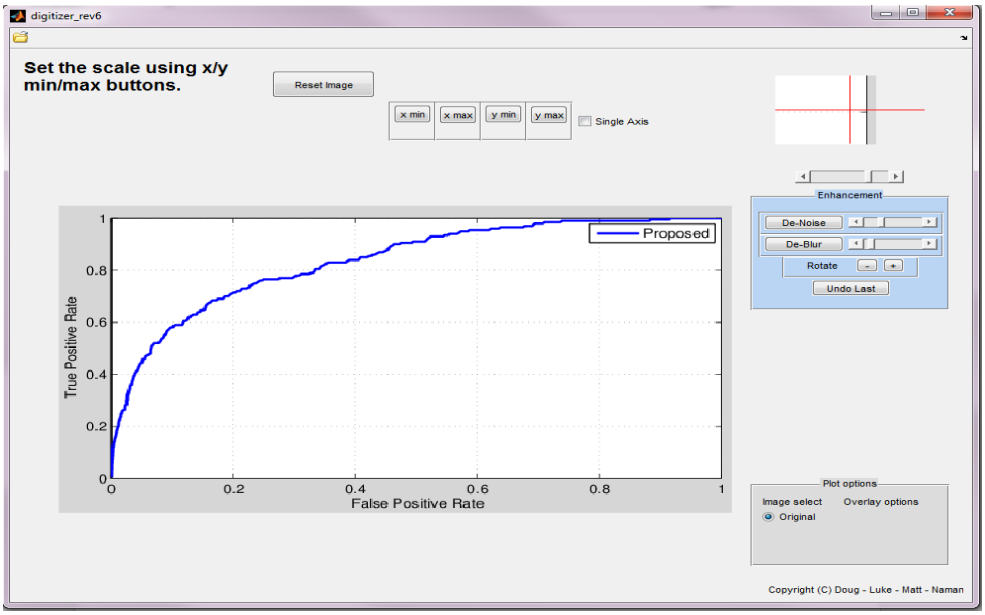
1. To get a plot from a research paper and digitize the data for comparison purposes.
2. To get a map and find distance between two locations. This is highly useful when you are looking at a map of a park etc.
3. To digitize any data map such as voltage map. The voltage map, or any data map, defines the operating range / capabilities of a certain component. It is generally produced by an original manufacturer and in research is highly useful for systems modeling where a component can be represented by a lookup table.

USAGE:

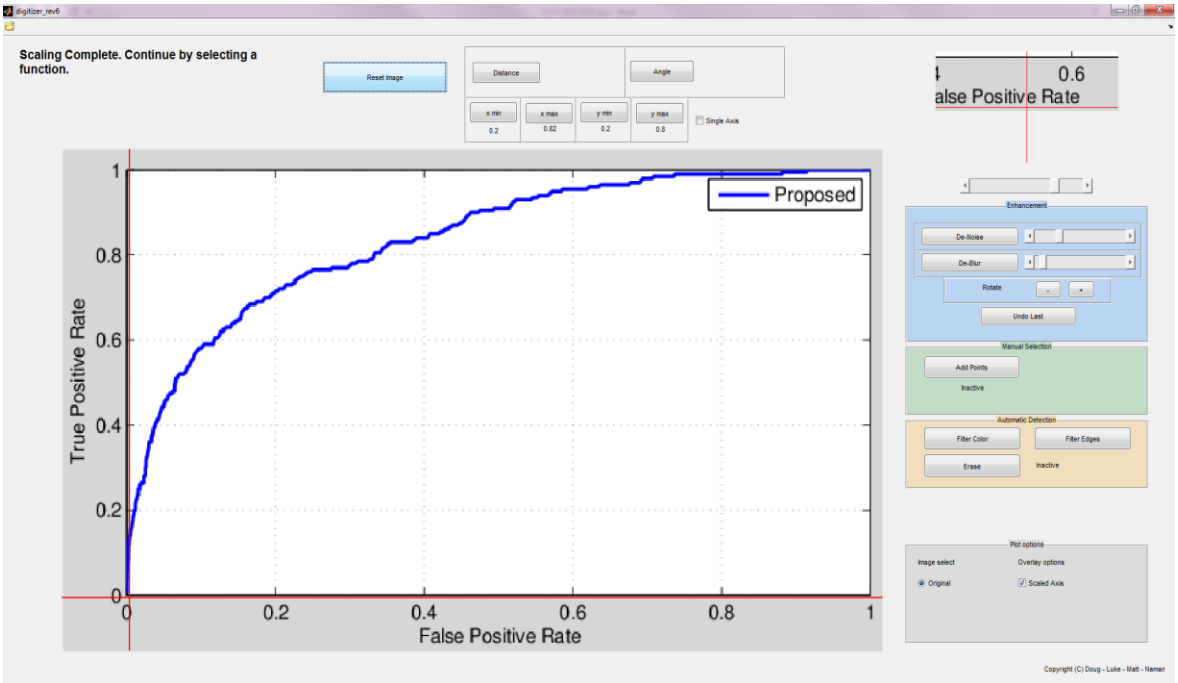
- Running the application brings the following screen.



- Load an image of the plot that you want to digitize. Doing this will bring up several set of buttons for different functionalities.



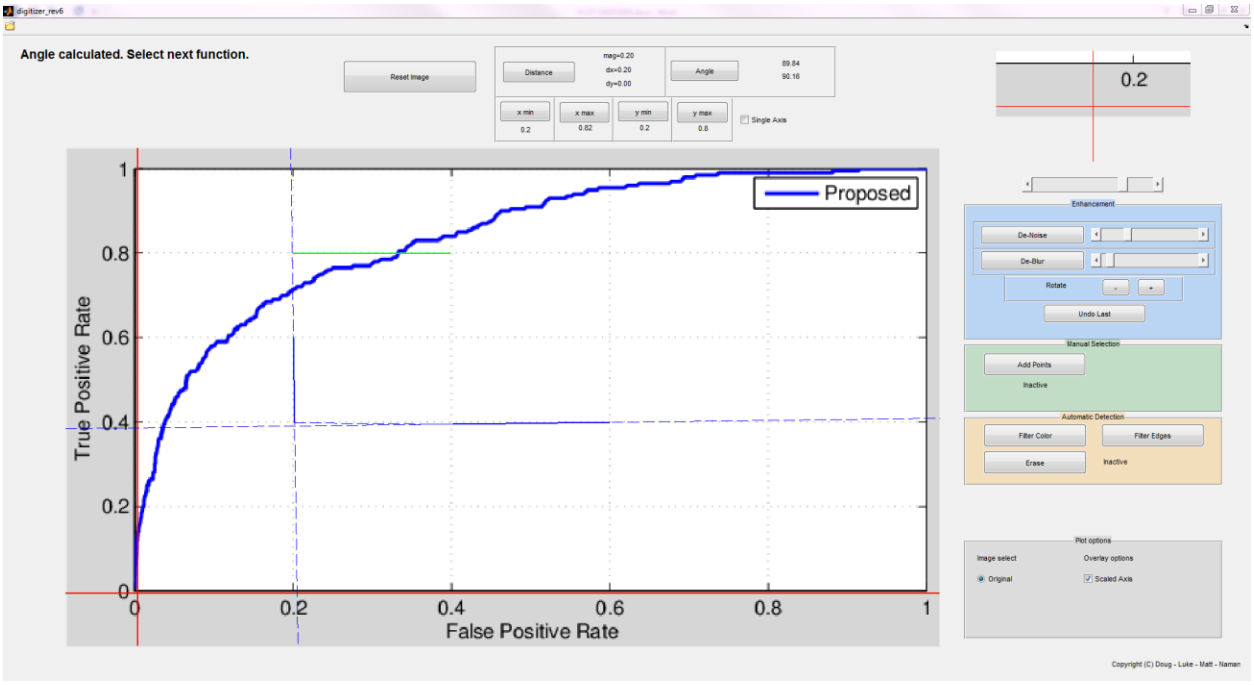
- The GUI has a zoom in functionality where the top right window zooms into the plot. The next step is to define the scale of our graph. For a general plot, we will need to define both the X and Y axis. For an image of a map, we can click on single axis and select only one axis.



- Click on the *xmin* button and choose a position with known x coordinate value. Enter the value in the displayed text box. Similarly, do this for the other *xmax, ymin and ymax* values.

- The plot will display the scaled axis in red.

- Depending upon the application, there are several features that the user can now try.
  - **Distance**: Click on distance and select two points. The app will display the scaled distance among the two selected points.
  - **Angle**: Click on angle and select four points. The app will display the angle between the two lines.
  - **Enhancement:** The enhancement panel contains the functionality to increase the quality of the original image. We can remove noise using the *denoise* option or sharpen the image using the *deblur* option.

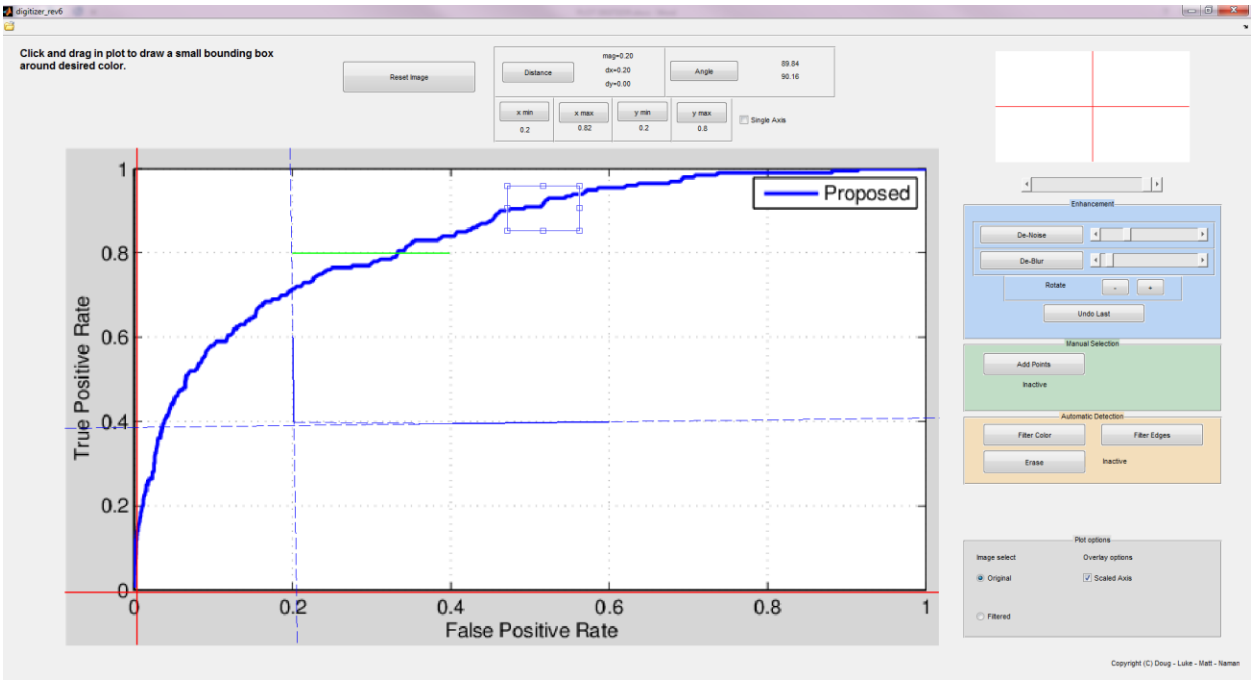


- There are three ways, the user can try to get the data points from the plot which are explained later.
  - Filter through specific color.
  - Filter through edge selection.
  - Manual addition of points.

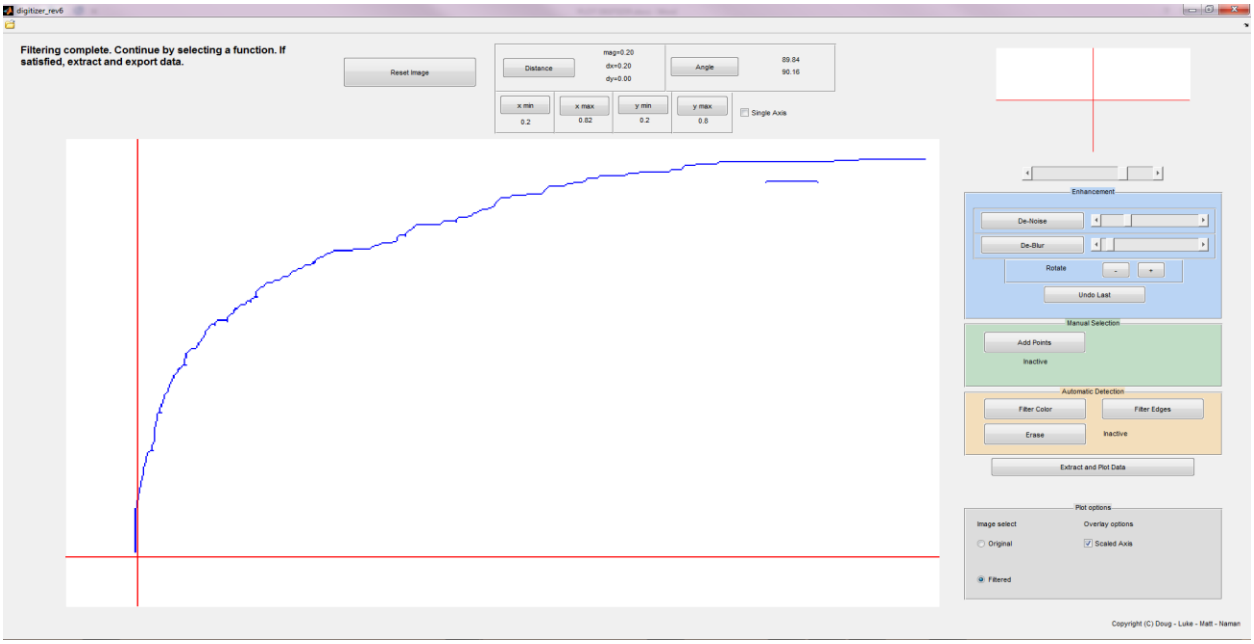
- Once the data is filtered, we can extract and plot the recovered data from the original plot. We can overlay the filtered plot to visualize the amount of data recovered, and can make additions based on it.

Filter through color

This utilizes the *DeltaE* concept to differentiate among the different colors. Click on Filter Color and create a rectangle that contains the color you are looking for.



The resulting image will be filtered as follows:

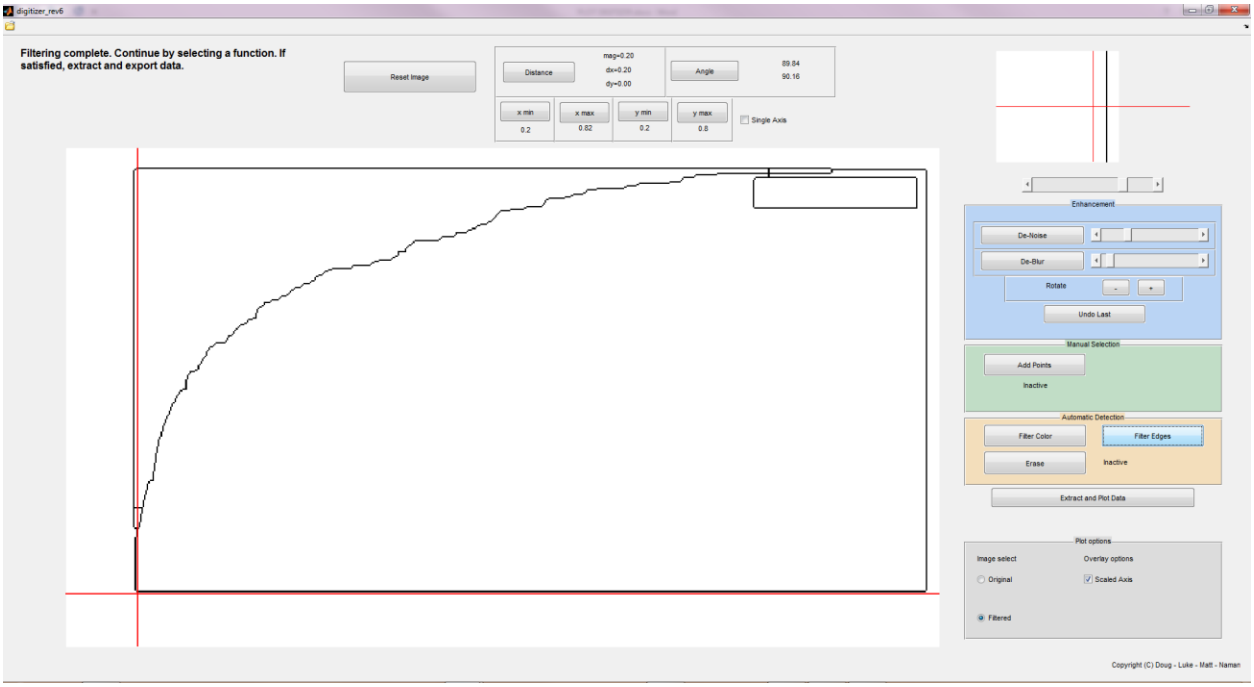


If we want, we can use the erase functionality to select a rectangle, which will erase the contents of the rectangle.

Filter through edges

The filter through edges option uses image analysis techniques like dilation, thresholding to get the edges in the graph. We can use the erase functionality to remove any spurious edges after filtering.

For example, filtering through edges will give us the following result on the original image.



Manual Point Selection

At any time, we can add manual points by clicking on the **Add Points**. Select any pixel on the image and that pixel data will be added to our list of data.

Finally click on **export data** option to export the data and save it as either mat, dat, txt or excel file.

Plot Options

1. Scaled Axis – Click on it to show the scaled axis.
2. Extracted Data – Click on it to overlay the extracted data on the original image.
3. At any time we can view the original image or the filtered image to see the progress of our task.
4. We can also reset the image if any filtering fails.

TOTAL NUMBER OF LINES OF CODE ~1900