

The goal of this project is to learn about image segmentation algorithms. You should investigate the Canny Edge Detector and at least one of the Snakes/Active Contour/Level Sets methods (the names are used differently in online and published descriptions). You may wish to use a manual or automated thresholding algorithm. Feel free to use any algorithms you have learned about previously.

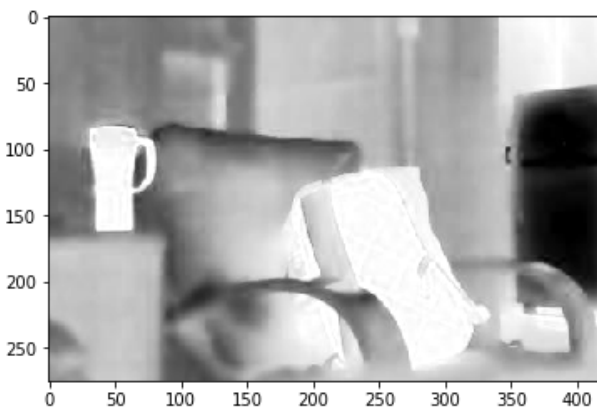
You can use skimage or opencv implementations. You will be asked to work in three person groups.

The following data are available to you.

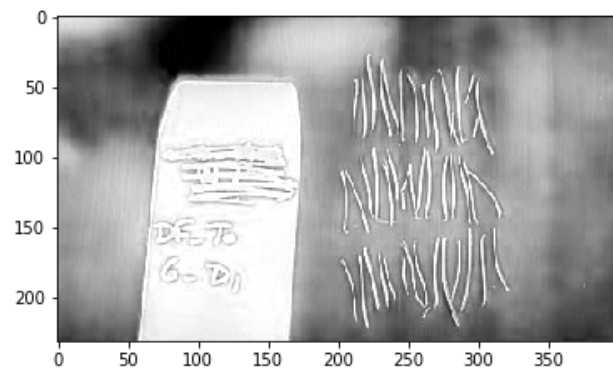
**2 Thermal Infrared Images**, ThermalInfrared1.jpg and ThermalInfrared2.jpg. The first contains a coffee cup and a computer backpack with a computer in it, a chair, a refrigerator, some walls and some other things. The second contains an envelope with writing on it and some pine needles.

Investigate the capability of combining any image processing algorithms you have learned so far with at least one of the segmentation algorithms to segment the objects in the first image.

Investigate the capability of combining any image processing algorithms you have learned so far with at least one of the segmentation algorithms to segment the pine needles in the second image.



Thermal Infrared 1



Thermal Infrared 2

**3 Grayscale Images** of birds, Bird1.jpg, Bird2.jpg, and Bird3.jpg. Investigate the capability of combining any image processing algorithms you have learned so far with at least one of the segmentation algorithms to segment the birds in the images.



Bird1

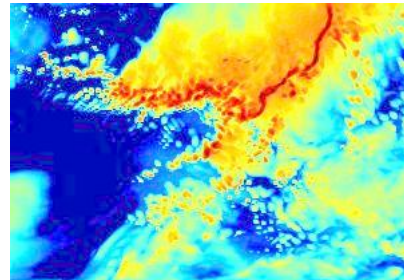
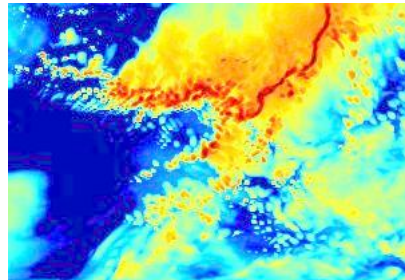
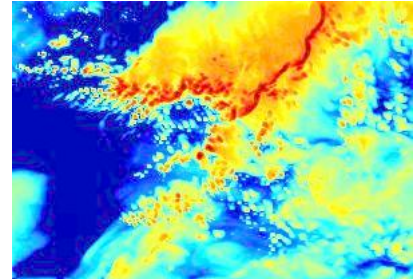
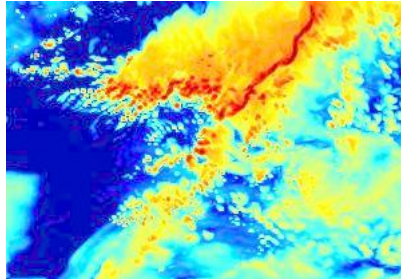
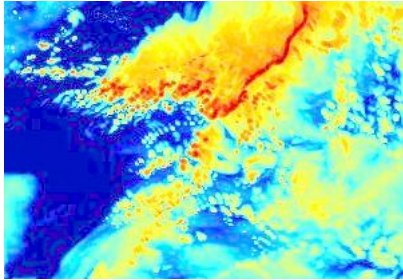


Bird2



Bird3

**5 Radar Reflectivity Images**, Squall1.jpg, ..., Squall5.jpg. These are color images. The goal is to segment the image so that the squall line is a segment. You don't have to process all these images because they are very similar. However, these images are part of a sequence and if you have time and are curious, you could see if you can gain something from using the sequence to help in the segmentation.



You should submit a report, a brief presentation of your work, and your code. The report and presentation should be in .pdf files unless you have animations in a powerpoint presentation. In the latter case, you can submit a powerpoint file.

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### **Report Format.**

Your report should be  $\leq 4$  pages and have the following format:

#### **APIVIP Project 2 Report**

##### **Image Segmentation**

<Student Names:> {Student1Name}, {Student2Name}, and {Student3Name}

<Student UF Names:> {Student1UFName}, {Student2UFName} and {Student3UFName}

### **Section 1. <1-1.5 pages>. Experiments.**

<Description of your investigations including, the images you used the range of parameter choices for each image type, and any other variations.>

### **Section 2. <2-2.5 pages> Results and Observations.**

<Try to find out something interesting about the algorithm performance>

### **Section 3. References** (not counted in page limit).

### **Presentation Format.**

The presentation should *follow the report* but have images. Prepare to present for 12 minutes and 8 minutes to answer questions. Please don't read the slides. Each team member should present for 4 minutes chosen in a way that shows understanding.

The presentation should have

- 2 slides describing the experiments

- 4 slides on your observations that include images.

No questions should be asked until after the presentation but after exactly 12 minutes, your presentation will be finished. The order of the presentations will be picked using a random permutation.