LAB: Color Image Segmentation

Detect Face Temperature from IR(Infra-Red) images

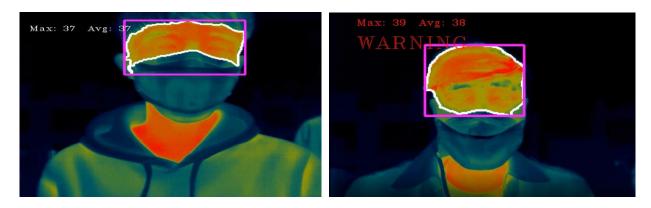
I. Introduction

In this lab, you are required to create a simple program that detects the temperature of a person wearing a mask. You will be given a video of IR images of several people measuring their face temperature. Measure the maximum and average temperature of the face (excluding the mask) and show a warning sign if the average temperature is above 38.0 C.

We will not use any deep learning or any other complex algorithms. Just use simple image processing methods such as :

- InRange, Morphology, Filtering, findContour
- Refer to [Tutorial: Color Image Segmentation] for programming tips

Download the source Video file: Click here



II. Procedure

Part 1. Face Segmentation excluding mask

Segmentation using InRange()

- Recommended to use the program code given in [Tutorial:color segemtation]
- Analyze the color space of the raw image. You can use either RGB or HSV space
- Apply necessary pre-processing, such as filtering.

- By using InRange(), segment the area of ROI: exposed skin (face and neck) that are not covered by cloth and mask. You must use inRange of all 3-channels of the color image.
- Apply post-processing such as morphology to enhance the object segmentation.
- Use findContours() to detect all the connected objects
- Select only the proper contour around the face. (Hint: can use the contour area)
- Then, draw the final contour and a box using drawContours(), boundingRect(), rectangle()
- Need to show example results of each process.

Part 2. Temperature Measurement

Temperature from Intensity data

The intensity value of the image is the temperature data scaled within the pre-defined temperature range. Use the intensity value to estimate the temperature.

- Analyze the intensity values(grayscale, 0-255) of the given image.
- The actual temperature for this lab is ranged from 25(I=0) to 40 C (I=255).



• Estimate the (1) maximum temperature and (2) average tempearture within ONLY the segmented area (Contour Area)

- For average tempeature, use the data within the Top 5% of the tempeature in Descending order.
 - ✓ Hint: cv::sort() in SORT_DESCENDING
- Show the result as TEXT on the final output image.
 - √ Hint: cv::putText()
- Your final output should be similar to result of the the Demo_Video.

III. Report and Demo Video

You are required to write a consice lab report and submit the program files and the demo video.

Lab Report:

- Show what you have done with concise explanations and example results of each necessary process
- In the appendix, show your source code.
- Submit in both PDF and original file (*.docx etc)
- No need to print out. Only the On-Line submission.

Demo Video:

- · Create a demo video
- Submit in Hisnet

Source Code:

- Zip all the necessary source files.
- Only the source code files. Do not submit image files, project files etc.