

Monthly Meeting for OptiColor Project

Month: May

Date: 28-May-2019

Type: Skype Meeting

Atten.: AM (S-Innovations Ltd) and AL (RISE), HP (RISE)

Topics discussed

1 Project Website

- Was unavailable during last week of May

2 WP1 - Project Planning

- A few activities are behind schedule and others are ahead of schedule. As of now, completion date is not affected.

Tasks behind Schedule

- Task 3.2 Develop background-foreground color combination matrix
- Task 6.6 Scientific Paper 1 (Topic: Color combination Matrix)

Tasks ahead of Schedule

- Task 4.3 Develop image processing modules
- Task 4.4 Compare alternative approaches (July)

3 WP3: Literature Study

- Task 3.2 --> The background-foreground color combination matrix serves two purposes:
(1) To have a table that can be used by practitioners to easily select the optimal safety color. (2) As a selection matrix for our software to choose the optimal safety color. However, maximizing the distance in the color space is a better selection criteria (so purpose 2 is not needed any more).
Note: backgrounds with two colors seem to be very important not to be exclusively addressed in any practical color combination matrix.
---> A better color combination matrix to be developed next month.
- We use 6 safety colors instead of 8 as suggested in previous month. Cyan and Pink were removed as they are pretty similar to Blue and Purple respectively.

3 WP2: Dissemination Activities

- Presentation at RISE added - 20 July 2019. Review slides
- Task 6.6 Scientific Paper, to be prepared later when we have a more solid understanding of the problem and solution approach. Currently there is a gap of knowledge.

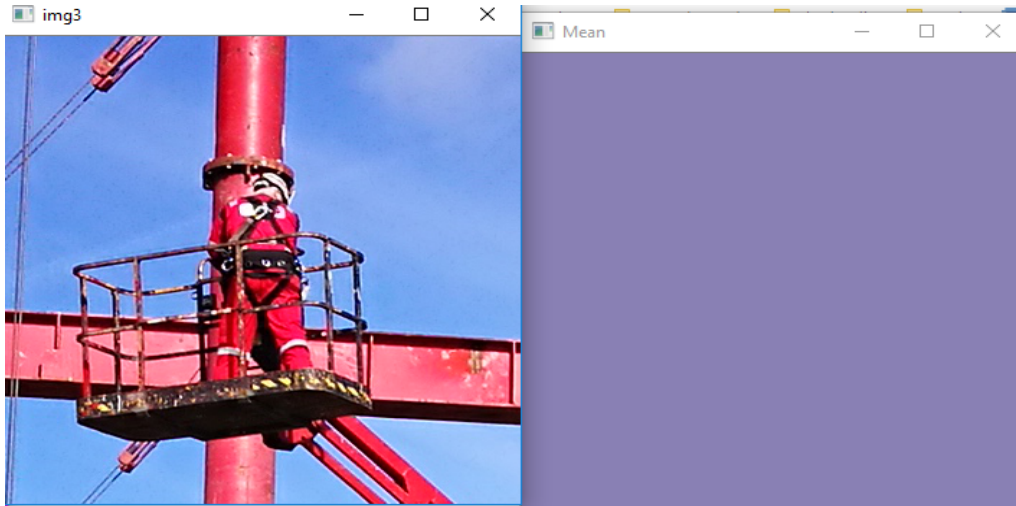
4 WP4: Software development

- Target areas defined from input file (Input text file will be created from the preprocessor)
- Finding the optimal safety color by assessing distance in the color space works nicely. This is the way forward. This way, safety colors are ranked with regards to conspicuousness. Larger distance -> larger contrast --> more conspicuous. RGB space and Euclidean distance tested. Possibly, testing distance in the CIE color space to follow.

4 Color quantization - Main Issue!!!

- 4.1 - **Mean of target area** (rectangle around worker's location): We calculate mean Red, mean Green and mean Blue. This approach is not sufficient for backgrounds with multiple colors (color mixing). Large Standard Deviation renders this approach useless.

Possible work around Windowing (block size 1/6th of target area?). Threshold the standard deviation of the window.

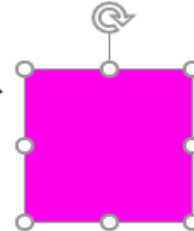


- 4.2 - **Max from Histograms** (Red, Green, Blue).

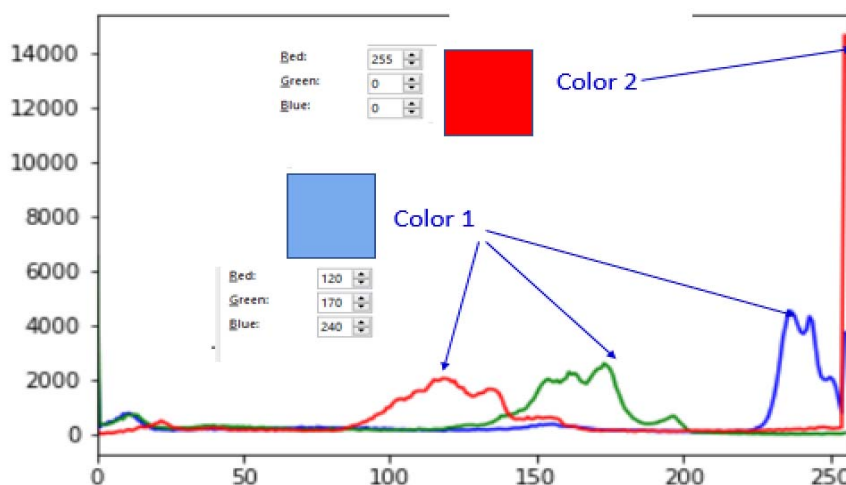
Also not sufficient for backgrounds with multiple colors (color mixing).

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Target image dimensions: (360, 360, 3) and No. of pixels 388800
(180.05372685185185, 127.94288580246914, 137.0760262345679, 0.0)
minVal, maxVal, minLoc, maxLoc
Mean cv2.mean value for Color b is 180.0
Max histogram value for Color b 236.0
(85.0, 4532.0, (0, 204), (0, 236)) <class 'tuple'>
Mean cv2.mean value for Color g is 128.0
Max histogram value for Color g 0.0
(12.0, 6526.0, (0, 247), (0, 0)) <class 'tuple'>
Mean cv2.mean value for Color r is 137.0
Max histogram value for Color r 255.0
(27.0, 14619.0, (0, 2), (0, 255)) <class 'tuple'>
    
```



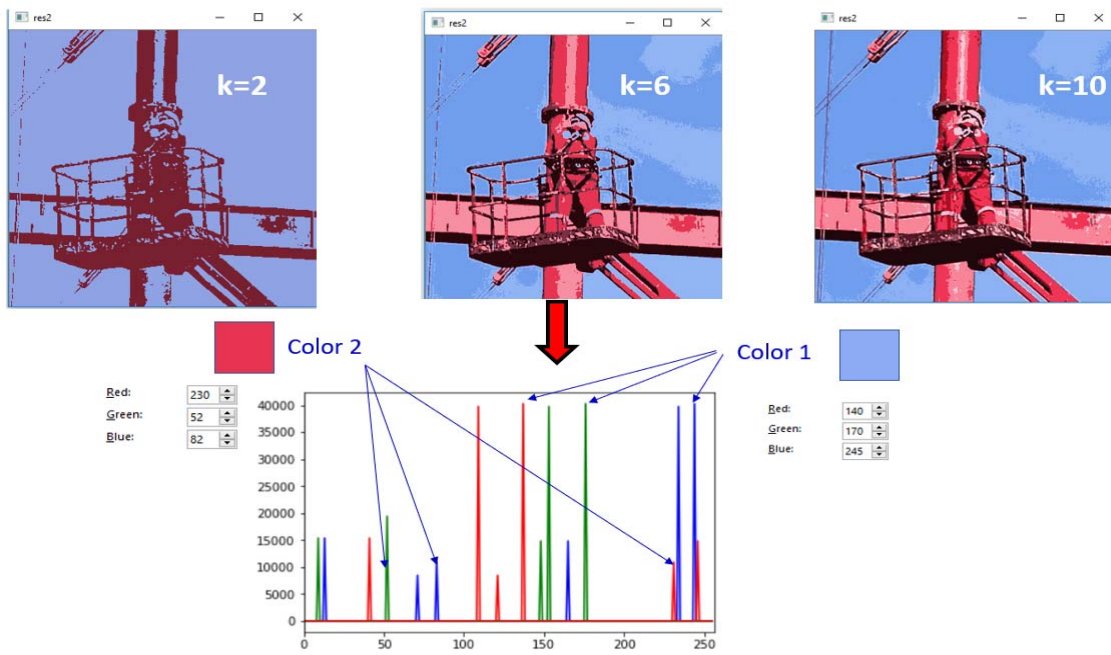
Possible work-around, Clustering Picks



Other work-around method to reverse histogram shape (focus on the minima)

4.3 k-mean Clustering

Can work but too many colors required.



4.3 Other Ideas/issues discussed

- Clustering with predefined colors (32 colors)
- Saturation and light of the specific photo may result to altered colors (for example deep saturated red may look as light red to pink). So, we need a method that is resilient to the condition/parameters of the photo. Maybe use HSL (focus on H, S=240, L=120) Importance coeff from target center, other?? **Other advise normalization $R/(\text{Sum of RGB})$, $G/(\text{Sum of RGB})$, $B/(\text{Sum of RGB})$**

5 WP5: Validation

- Update from RISE (Harris + Ηρακλής)
- Ηρακλής is developing the validation tool (Django, SQL lite)
- Photos prepared. Three packages covering three Offshore Project (3x15 pictures = 45 pictures). Mostly far away shots with 2 or more targets (persons)
- Ground truth rectangles. We discussed how we will address various situations, for example persons very close to each other, only the legs visible and so on. Achillesas shall prepare a file with the upper left and lower right coordinates of the box that defined the target.
- I suggest when showing the original photo to have the color of the personnel cloth edited to much the ideal initial cloth color. For example if the color in the original is orange we should have it edited and made as pure as the orange we use in our set of 6 safety colors. Thus, there won't be any search advantage in the picture with the optimal safety colors.

6 Next Meeting

- If possible to review the presentation slides next Tuesday
- Next meeting was set for 25 June 2019 at 15:00 hours