*Enhancing Visual Attention for MiRAE**

**Minimalist Robot for Affective Expression*

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motivation

In order to interact successfully with people, socially interactive robots also need to be able to see the things we see. I am working with an interactive robotic face, MiRAE (Minimalist Robot for Affective Expression), to develop its capability to attend to visual cues in a way that seems natural to humans.

development process

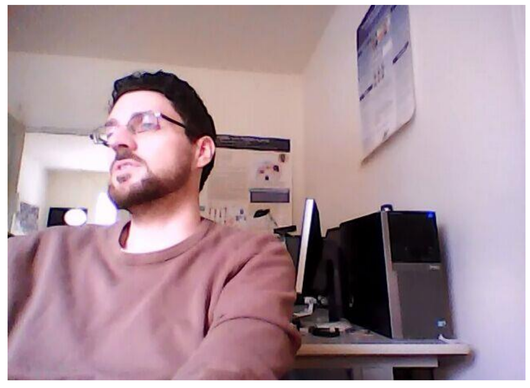
- Do literature review on (primate) visual attention system and different approaches to developing computer vision models for it.
- Evaluate implementations of the chosen visual attention model to compute the saliency map (which shows how the significance level of the different parts of an image differs within the image) of the given image from open source code.
- Incorporate the code with MiRAE's source code, and test on the testing platform.
- Optimize and alternate the code for specific needs of MiRAE.

future steps

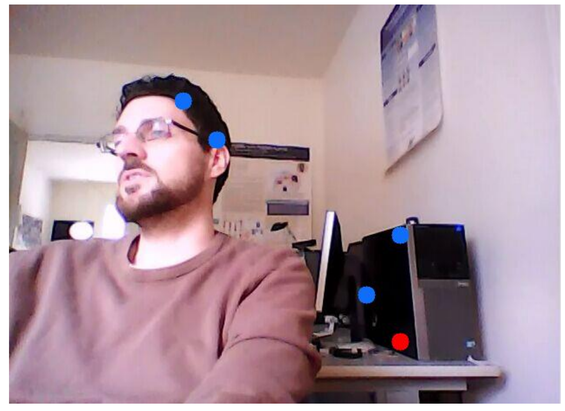
- The exact role of the calculated saliency values of the input images from the camera in MiRAE's social interactions is yet to be discussed.
- The calculated values might be used to add complexity to current point of interest (e.g. faces) or to find a point of interest when there isn't one.

b) saliency map

a) input image



How it computes saliency



c) output image

Implementation

Step a) to b)

- Implemented the visual attention model from Laurent Itti's quick processing model introduced in 1998.
- The model calculates the center-surround difference maps of color, intensity and orientation from a reduced version of the input image.
- Then the calculated difference maps were incorporated into one saliency map.

Step b) to c)

- Selects the most salient point (red) from the calculated saliency map
- and four more points (blue) that are relatively more salient,
- in order to find a group (n <= 5) of the (roughly) points from the most salient regions of the map,
- and display the points on the output image.

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Reference

Itti, Laurent; Koch, Cristof; Niebur, Ernst (1998). "A Model of Saliency-Based Visual Attention for Rapid Scene Analysis". IEEE Trans Pattern Analysis and Machine Intelligence 20 (11): 1254-1259.