Traffic Sign Effectiveness

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Will improving the visual saliency of traffic signs be effective?

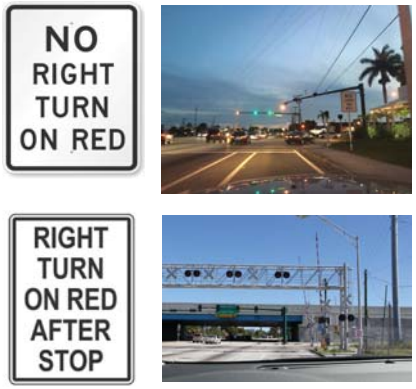
Introduction

- Studies on traffic sign conspicuity and recall (Inman, 2012) established that they are most recognizable through color and shape (Fleyeh, 2015).
- A basic idea behind this hypothesis is that remodeling the optical characteristics will improve visual attention for a given background and thus, reducing the number of traffic violations and ensure public safety.
- Visual salience is the perception that renders some objects in the world to stand out from its given environment and immediately grab our attention.
- In the context of road signs, visual salience plays a significant role. Studies reveal poor salience of traffic signs contribute to the increase of traffic violations.

Method

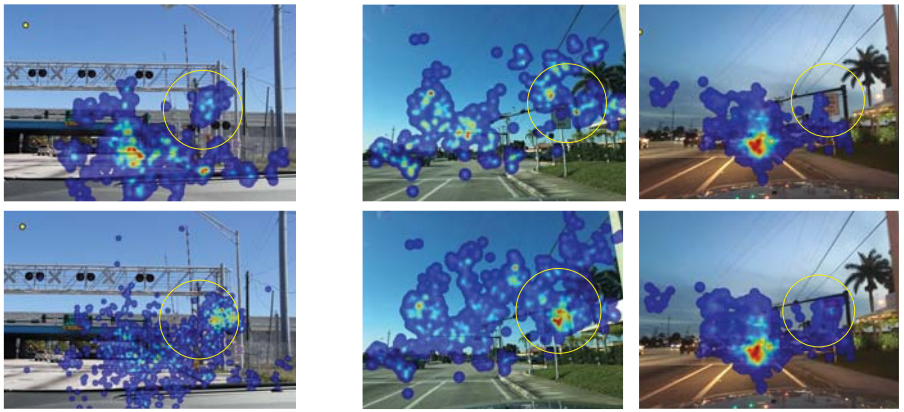
- The participants looked at 12 photos, taken from two intersection at 3 times of the day, in random order, for 4 seconds each.
- Through photoshop manipulation, the investigators replaced the traffic signs and implemented the human visual tendencies to look at shape and color as main focal points in order to produce visually salient and conspicuous signs.
- Participants were asked to sit at arm's length away from the 15" display screen to simulate driving experience.
- The experiment collected data from 22 college students, licensed drivers, 10 male and 12 female, ages 18-26.
- The eye-tracking system and software (Gazepoint 300) tracked the subjects fixations.
- The investigators collected data on the longest fixations to examine the efficiency of the proposed sign.

Current traffic signs go unnoticed and thus lead to traffic violations.



Redesigning traffic signs implementing high contrast and visual simplicity.

The results clearly indicate that redesigning the traffic sign will increase the saliency and conspicuity of the signs.



The significance of the color red on the heat map indicates the AOI (areas of interest).

Results

- The results clearly indicate that redesigning the traffic sign with a a simpler, more contrasting design increases saliency and conspicuity of the traffic sign.
- The investigators set a parameter for collecting data using the guidelines for gaze as 0.5sec-1sec and fixation as over 1sec.
- Of the 22 participants, data from 4 participants were omitted due to missing information.
- 85% of the photos with the redesign attracted gazes, while the original sign attained 82%.
- The redesign increased gaze by 3%.
- 61% of the photos with the redesign attracted fixations, while the original sign attained 44%.
- The redesign increased fixation by 17%.

Discussion

- The investigators used photos from three different times of the day, and noticed a substantial difference in gaze and fixations on the signs.
- 11% did not look at either sign with cloudy afternoon skies, while the amount of fixations were much higher and more concentrated around signs with clear blue morning skies, and at night.
- There were less fixations on the image at the middle of the day (for no turn on red) which was also the image where the sign was furthest away from the viewer on the road.
- Further research should be done to include a broader age range of licensed drivers, or drivers with eye glasses.

References

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- L. Simon, J. Tarel, & R. Brémond (2008). *Alerting the Drivers About Road Signs with Poor Visual Saliency*. Paris, France: Univertié Paris.
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