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{In-browser Eye Tracking and Gaze Prediction}

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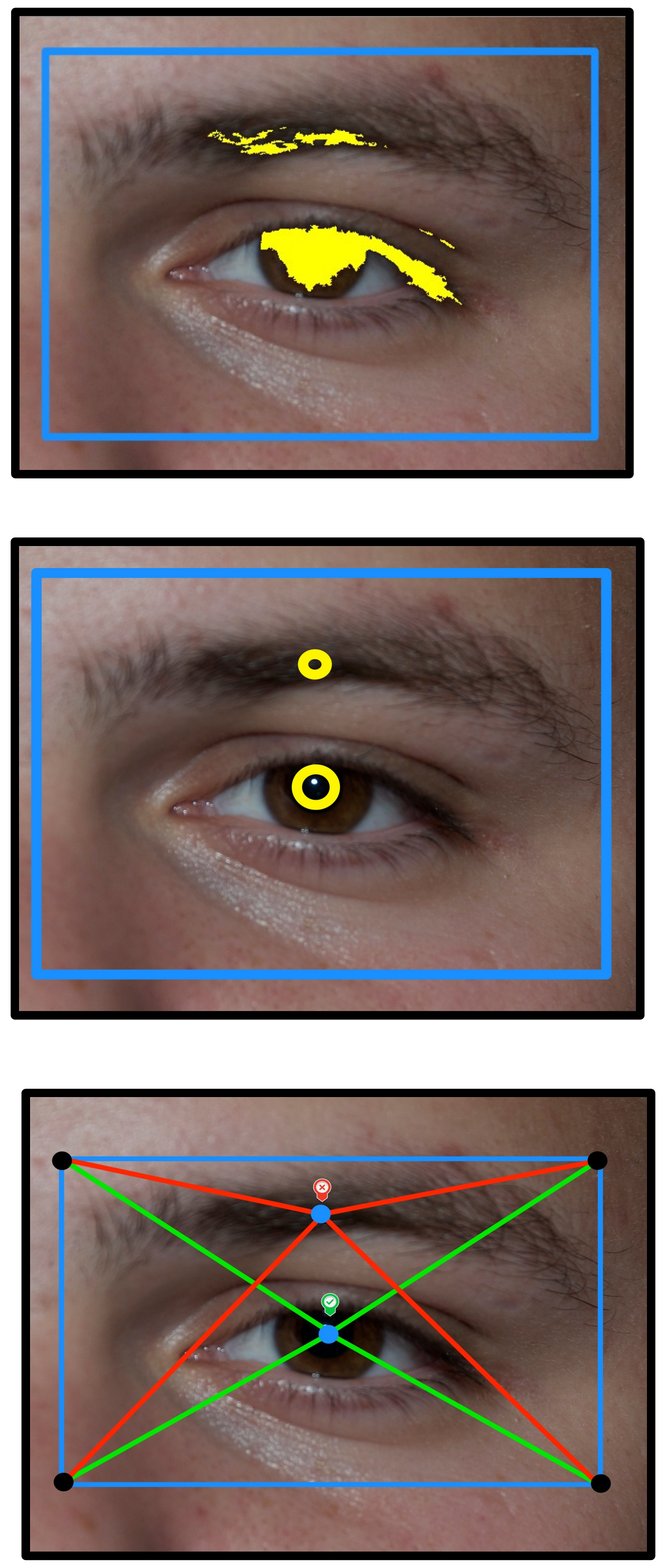
Determining the Gaze Metric

1.Detect the eyes using a Haar Cascade Classifier
2.Convert the ROI image to grayscale
3.Threshold the image and conduct blob detection on the binary image.
4. Assign the blob with the lowest error weight to be the detected pupil
5. Determine the blob centroid and retrieve the resultant vectors from the boundary rectangle to predict gaze direction



http://github.com/wallarelvo/camgaze.js
http://aw204.host.cs.st-andrews.ac.uk/camgaze.js

Research Statement

- To enable a modern web-browser to determine where the user is looking on the screen
  - Solely using HTML5
  - Using a commodity camera (i.e. a webcam)
  - Whilst preserving user privacy

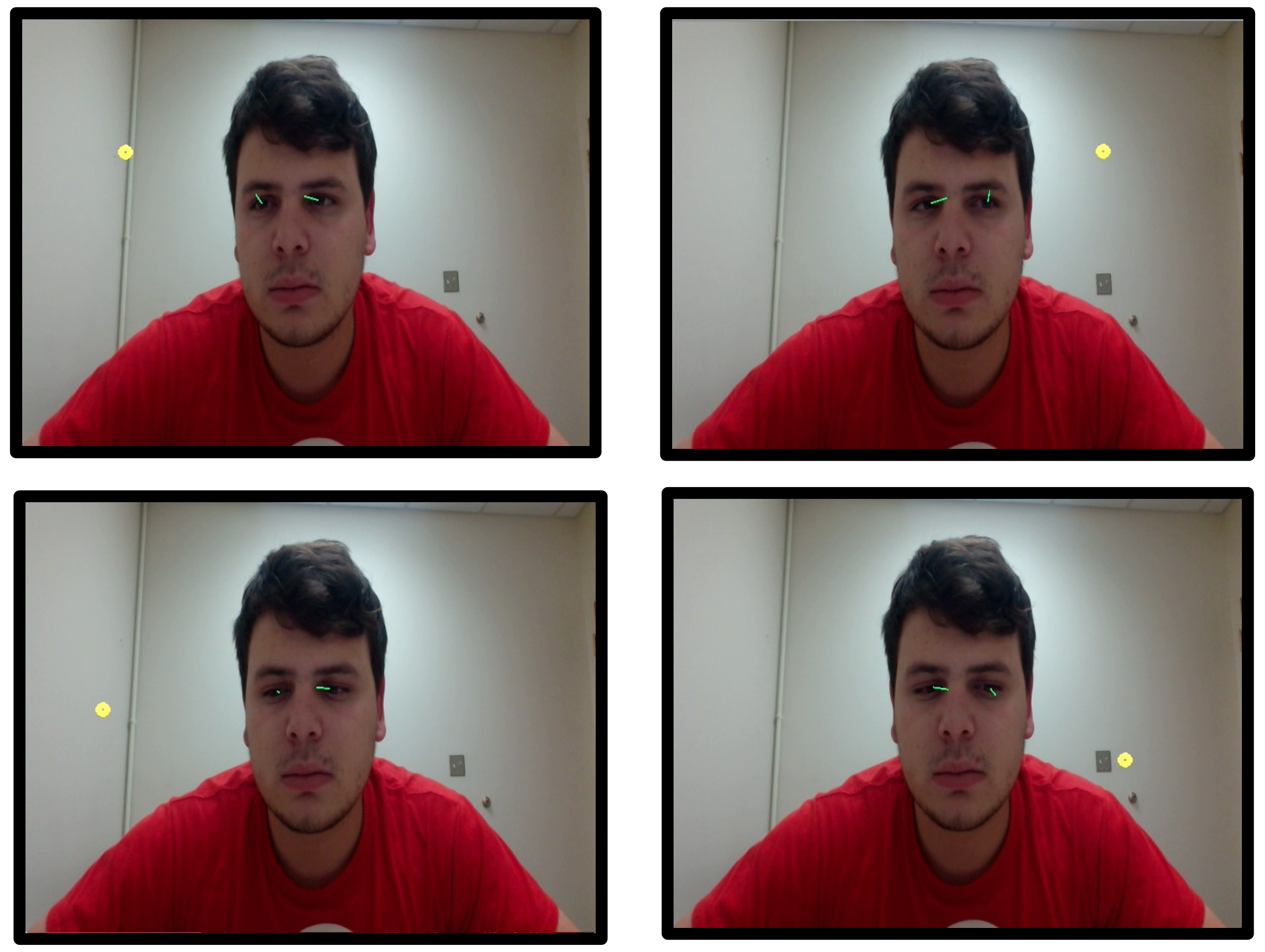
Motivation

- Eye tracking can provide vital data about what is important on the screen
- We can create more intuitive user interfaces
- Using the web, we can crowd source where user's are looking
- User effort is minimized and privacy is maintained

Overview

- Obtain video via Web RTC
- Determine pupil centroids
- Use reference point to determine gaze
- Add face position and head orientation vectors to the gaze metric to determine the resultant vector
- Use calibrated mapping to project the vector onto the screen

Calibration



Results & Future Work

- Able to determine gaze within 2.1 inches
- Plan to use AAM for reference point detection
- Use neural networks for calibration
- Undergo large scale, crowd sourced user testing

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