Explanation of blood glucose level determination script (Amy pay attention)
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Draft 1 (will probably take many iterations and explanations)
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Colors are associated with three primary (additive) color values: red, green, and blue (RGB). Each color is thought of as a positional vector or point in 3-space (the “color space”).

From provided data, two colors are selected as endpoints (highest and lowest possible blood glucose values) of a line segment. These will be called P0 and P1. These are the color values of the color of the solution at the lowest and highest glucose concentrations. There is another point selected with the average color of the indicator (this comes from the image processing, which is not included here).

Let the point on the segment P0P1 closest to point P be called Q. Q is found by adding the vector component of PP0 orthogonal to P0P1, and adding it to P. (Alternatively, it can be found by adding the projection of PP0 to P0.) The ratio of the norms of P0Q and P0P1 are passed to a function calibrated to the color changes between P0 and P1.

BGLD.js is one written solely in terms of components and basic arithmetic. BGLD2.js is written more abstractly for ease of understanding. Neither are tested nor final.

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Future improvements:

This approach is linear, and makes many assumptions about the linearity of color spaces and color changes. (Hopefully it’s right or close to right?) The calibrated function can make a non-linear association if the color change is linear.

If the color change of the indicator is not linear (has multiple color changes that do not result in a linear simultaneous change of r, g, and b), this algorithm can be implemented with multiple line segments with endpoints at every calibration point. The orthogonal distance from each line segment is calculated, and the segment that is closest will be used in the final calculation.

Also play around with color schemes. RGB is the most common, but others include HSL and HSV. These might be useful for color subtraction later on.