Measuring Distances in Images Using a US Dollar Bill

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The goal of this project is to create a phone app that can be used to measure distances in an image or video feed. Techniques to garner information about a scene can be utilized to attempt to rebuild a scene in 3d. If the scene is mostly planar, vanishing points and parallel lines can be used to get information about the orientation of the plane. However, these problems can often only be solved “to scale.” Though you can find the distance of things in relation to each other, because no information is known about actual distances in the image, relating these images to real world distances is difficult. In this project I aim to use a US dollar bill to relate distances in 2d images to actual distances in the real world. In this way, anyone who has access to a dollar bill and a phone can accurately, quickly, and easily measure distances between two points in an image.

US dollar bills have a very well defined size and appearance. This allows the dollar to be accurately detected in a scene. The prior knowledge of the size of the image can then be used to provide more information about the relation of pixels to actual real-world distances. I aim to create an android app that will take a still image, analyze it to find a dollar bill, and allow the user to pick pixels and display the distance between them. This idea could be extended to apply to video streams by finding dollars in real time. This could further be extended to help reconstruct 3d scenes by providing information about the plane the dollar is on and the vanishing points of that plane. Further, this could be extended to apply to other fixed-size objects other than a dollar. Overall this could allow people to measure distances using just a camera and a dollar, which most people carry with them at all times.

References


[3] Canny, John, A Computational Approach to Edge Detection, Artificial Intelligence Laboratory, Massachusetts Institute of Technology, Cambridge, MA 02139

I will be using an android device.