Hand Tracking

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Abstraction

Hand tracking application can get rid of the limitations and inconvenience of the device, and is used to operate instructions in complex and dangerous environment. This version uses a new protocol to transmit and converts 2D into 3D for fast response and accurate identification.The main techniques are Thresholding and Filtering to detect gesture and movement.

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basic Algorithm	Color Histogram		Web design	
Hardware		Raspberry Building		
Middleware			Data interaction	Signal transmission
Optimization	Hand Location	BG filter		

LANGUAGE: PYTHON, HTML, CSS JAVASCRIPT FRAME: ANGULAR CLI
HARDWARE: RABSBERRY, CAMERA, PC

Histogram based

Here are many ways that can represent the color of the images. In this cases we use color histogram, color histogram represents the distribution of color in an image. For digital images, a color histogram represents the number of pixels in each of a fixed list of color ranges. Using this technique, we can first pinpoint the range of color pixels that we want, such as the pixels of the color of skin, then we can get the whole hand that we want through histogram.

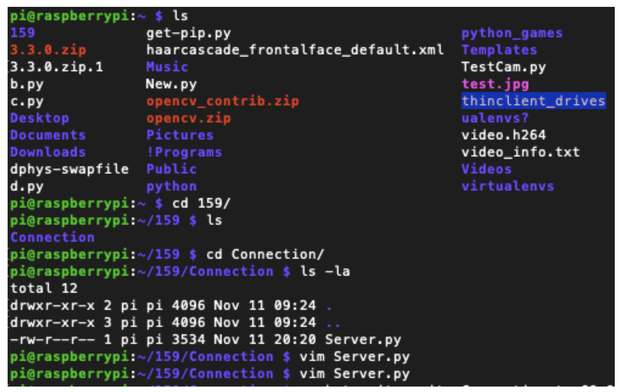
Optimization

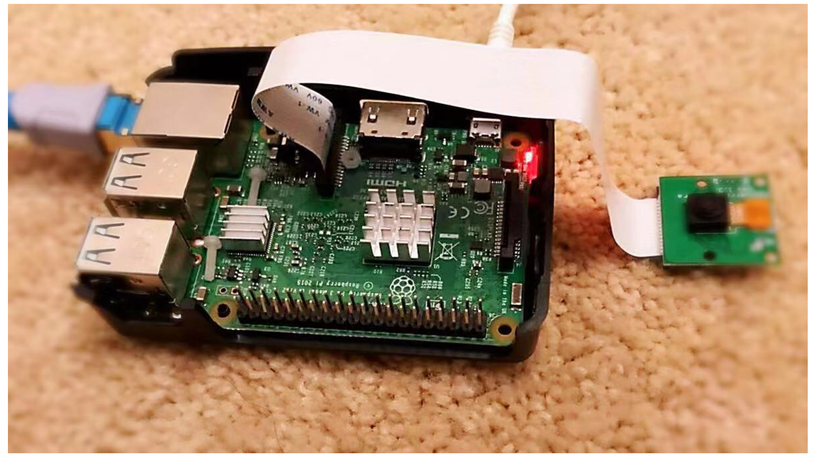
There are some challenges such as how to distinguish the hand from the environment. We can't simply use RGB to detect the skin color, since the RGB may change through the intensity of the external environment. But the other advantage is that color histogram is highly accurate in current condition. In order to mitigate the issues of external environment. We ask users to put their hand on specific position to detect the current RGB light condition every several interval time.

Hardware Building

In order to allow the model to be applied to more applications, we have to adjust the system into the most simple and portable case. In the end, we divided the whole system into two different part: one is just captured data, and the other Is responsible for processing the data and generating the result.

We put the Raspberry Pi directly into the local routing network, and use the port forwarding of the router to communicate. After the Raspberry Pi collects the data, it is transmitted to the cloud for calculation and display data.





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