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Blind People Hand Gesture Recognition using Image Processing

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ABSTRACT: Human beings looking forward to life in a futuristic and luxurious world like smart homes. In this research, a successful user-friendly smart home prototype built with low cost. The prototype has a series of Light Emitting Diode (LED) (LED). The LEDs in prototype considered as home appliances and the control (ON/OFF) of the LED depends on recognising palm and fist hand movements in real-time video. A palm and fist movements identified by a newly suggested algorithm to identify gestures depending on the aspect ratio of the observed hand with the minor and main axes. The hand is detected using positive (hand) and negative image datasets based on the Viola-Jones process. Human beings expect to live like intelligent homes in a future-oriented, luxury environment. A user-friendly smart home prototype constructed at low cost is a success. in this study..

KEYWORDS: Smart homes, Viola-Jones method, hand detection, Arduino

I. INTRODUCTION

Introduction

People are looking forward to life like intelligent homes in a modern, glamorous setting. This research is a promising, cost-effective and intelligent home prototype. A sequence of LEDs has been added in the prototype (LED). The prototype LEDs considered as household appliances and the control (ON/OFF) of the LED rely on palm and fist hand motions for realtime video recognition. A palm and fist motions detected with the recently suggested algorithm to distinguish gestures based on the look-to-mind ratio of the hand and the axis. The hand is identified using the Viola-Jones technique using both positive (hand) or negative image datasets.

II. THEORETICAL CONCEPT

Distinguishing gesture, like thumb, finger, indices, is a distinction of the mode of gesture. Pre-recognition of hand identity is essential. Hand recognition requires hand position and image-scale determination that is highly important for vision applications. By using the solid Viola Jones algorithm, the person's hand can be marked with a variety of features. Viola and Jones proposed to use a precise picture and boosted classification to combine hair-like computational features using an AdaBoost cascading computer training algorithm for training the readable face recognition detector [13]. As the first step to minimize the estimation of hair characteristics the input picture becomes an integral image The functions similar to the hair were used to combine the boost algorithm to delete the hand characteristics. The hairlike feature f is used for two, three or four bonded black and "white" (x). The hair- like value is the difference between the rectangular quantities of black and white. The 87 Lux ambient light measured from this distance from the Webcam by the 7m- long Luxmeter unit. Optimistic (hand) datasets of hand gestures taken by the built-in webcam and video (used as training algorithms) containing space resolution (1280x720) (30 fps). Figure 2 shows prototype computer software and hardware. The Arduino Uno card stocks the 5 volt LEDs with a USB cable linking the LEDs to your motherboard with a jumper cord.
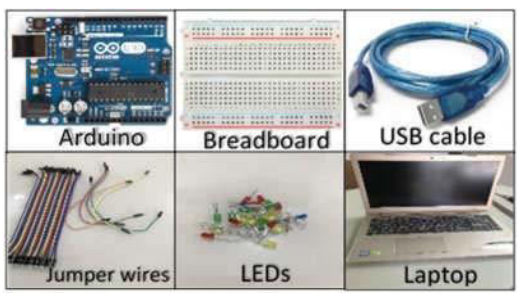
FIGURE 2.1   FIGURE 2.2

The proposed test system's hardware elements.

smart home prototype (see Fig. 3a) was linked: 8 LEDs were attached by jumping wires to Arduino on breadboards and LEDs, connecting the negative end of each LED to the GND ground of Arduino and the positive end of every LED with the digital output pins of Arduino. The relationship of the prototype is as seen in Fig. 3b as a sketch of a pattern.
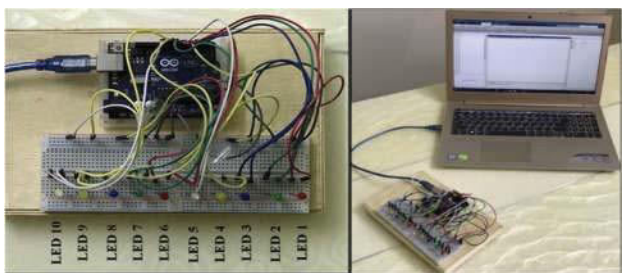

FIGURE 2.4   FIGURE 2.5
The suggested prototype system (2.4) real connection, (2.5) schematic connection.

III.   ALGORITHM DETAILS

The detected human hand and two movements are recognised, namely palm and fist. Matlab software
was used to track and detect hand movements. The human hand is identified using the Viola-Jones approach, where an algorithm trains a Matlab argument This is the approach used by Cascade Object Detector to teach a device to detect side. Cascade item detector used to acquire a custom hand classifying model (the product of computer training) configured as an XML file for hand detection in real-time video or images of input, which is a file that contains strong hand features needed following an AdaBoost algorithm training. In order to learn the palm and fist hand movements the proposed recognition process is carried out in two steps: training and identification phase. The machine must be equipped to identify human hands in a dynamic environment.

FIGURE   3.1   FIGURE   3.2
FIGURE 3. Any data entries set images (3.1) positive, (3.2) negative.

Algorithm steps

Steps 1: To detect hand in, use an XML file to (I) (I).
Step 2: Crop hand picture(Ih) detected from (I)
Step 3: Transform (Ih) into the colour space of HSV (Ihsv).
Stage 4: Transform (Ihsv) to an imbinarize binary image (Ibin).
Step 5: (reigonprops) to (ibin) for the achievement of large (mj) and small(mi) axis characteristics (Ibin).
Step 6: use (mi) and (mj) aspect ratios (rt) (showed in Fig. 5)
Rt = mj to get acknowledgment of palm and fist gesture: If rt to 1.6 then palm to other (Ih) to fistmi
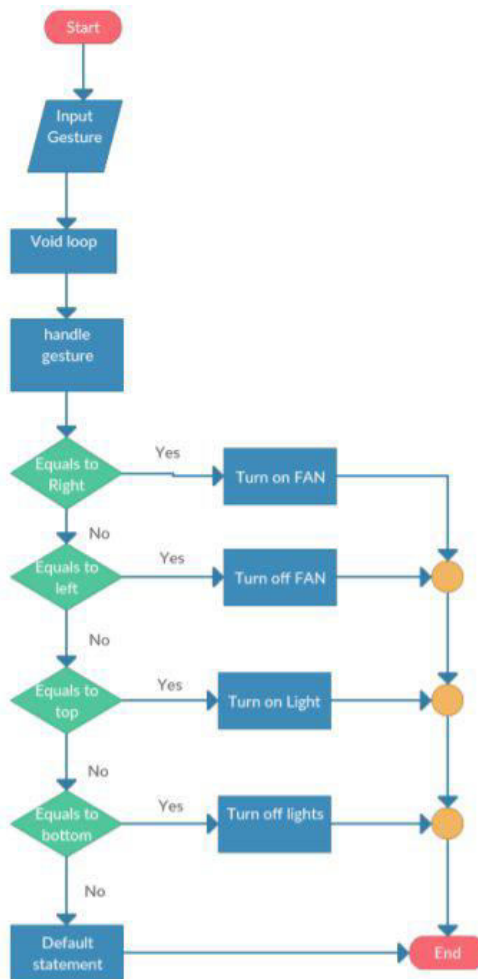

FIGURE 3.3 Hand gesture

FIGURE 3.4 Flow Diagram of Hand Gesture

As a command sent to Arduino in the Smart home prototype as shown on the table, CN is suggested as the number used in characterising the case, while ID is used to track the ON/OFF of any given LED switch (1). In one hand and two hand frames, the CN is used. CN agreed on a raised hand style and based on the expression The position of the raised hand (right or left) is: CN=1 if a hand gesture style is palm for the right raised hand and CN=2 for a fist hand gesture type. CN=4 for the

left hand raised if the hand is palm, and CN=8 if the left hand raised.

IV. GESTURE BASED HOME AUTOMATION PROTOTYPE
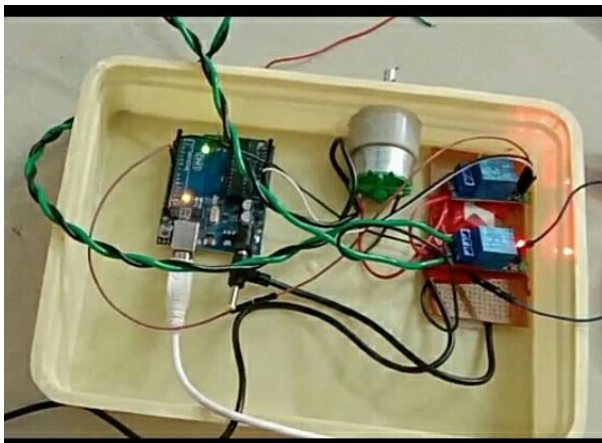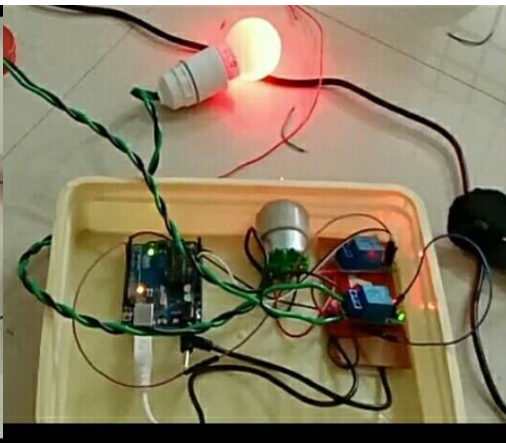

FIGURE 4.1   FIGURE 4.2

If we show the number one the fan will be on, if we show the number two the fan will be off, if we show the number three the light will on, if we show the number four light will be off. The numbers are shown with the help of fingers.

V. RESULTS AND DISCUSSIONS

Two hand signals, palm and fist, are used to control the prototype, when various gestures are proposed to control LEDs in the prototype. The motion of the hands is recognised with the latest algorithm seen in Fig. 7. Where the human hand has been identified using Viola-Jones. LED prototypes. For eg, the hand case for index recognition is used to monitor the ON/OFF status switch LED number 8. (LED 8The hand frame is marked and acknowledged when the case id=8 is seen on the webcam (the right hand is fist and the left hand is palm). The id is sent to Arduino as an LED-8 control order after an index id=8 has been assigned: If LED 8 is OFF and before the webcam the hand case of id=8 shows, the Arduino gets id=8 and then the LED 8 is activated. Driven 9 is enabled. If LED 8 is on, and before the webcam the same hand case is again shown, then the id will be forwarded to Arduino while the LED 8 will be OFF turned on. The same LED 8 system checks the 8 LEDs in the intelligent home prototype. A single case of a hand input was then enabled and the same case was detected, irrespective of when the LED ON was switched on and off.When - LED has his own case to convert to ON/OFF and doesn't change LED (ON/OFF) status.

VI. CONCLUSION

A reliable outcome was achieved by the suggested control scheme based on known palm and fist behaviour. The machine used is user-facilitating, cost-effective and uses only 8 LEDs and can be expanded over 8 depending on the operator's needs. The machine reacts quickly to the action. The time is around 0.52 sec for LED controls by the recognised movements between the recording of hand case of recognised gestures using the webcam and receiving commands on LEDs for control of turning ON/OFF. The right illumination effect is important to identify and detect the side.

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