Online Hand Gesture Recognition by Using OpenCV

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Abstract—**Human beings communicate with systems like computer desktops, handheld devices like remote control televisions, video games and many more. From long years back computers and many devices are operated by using wired devices like keyboard and mouse as inputs but now the recent trend on basis of gesture recognistion.By using gesture recognition algorithm or method , devices like computer systems, televisions and video games and many are controlled by hand gestures. In this paper, the input image is taken from the web camera which is colour image, by using background subtraction method the coloured image is converted into threshold image which is black and white image. Next the contour, convex hull, convexity defects are calculated. Finally the planned algorithm counts the number of fingers present in the image.**

IndexTerms—**Handheld devices, wired devices, computer Systems, Gesture recognition, background subtraction.**
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I. INTRODUCTION

Earlier days and now also to interact with computers mouse and keyboards are used. Using keyboards and mouse to interact with systems or other devices a new technology called gesture recognition is in trend. In this whole paper processing the real time image is carried out. Gestures provide the useful information to understand. Real time Gesture recognition can be used in many applications depending upon the requirement like for medical applications mainly for physically impaired people and for commercial purpose ranging from consumer shops to till home held applications.

In the planned algorithm the input image is taken from the web camera which is an RGB image consists of 3 channels with intensity levels ranges from 0 to 255.The input image is captured from the camera which consists of many objects with hand image. Background subtraction which removes the background noise leaving only hand image with hand as white colour and background as black colour. After background subtraction contour, convex hull and convexity defects of a hand image is calculated. At last the the number of fingers in the hand image is counted. The tools used are OpenCV with C language.

II. RELATED WORK

In paper[1], For the unrestrained environments the real time hand gesture recognition is discussed. The algorithm consists of three steps they are tracking the hand image in real time, education gesture and hidden Markov models is used for hand recognition. In order to get motion descriptors and region kalman filters and hand blobs are used. The mentioned algorithm is implemented in MATLAB.

In paper[2],For the incessant gestures the hand recognition is introduced. Four steps for the recognition incessant gestures include tracking the real time hand image, Extraction of the feature, Using Hidden Markov model and finally hand gesture recognisition. For the tracking real time moving hand image tracking algorithm is used. For the extraction of feature Fourier descriptor is used .For the input hand image recognisition hidden Markov model is used. The mentioned algorithm is implemented in MATLAB.

In paper[3],Vision based hand detection is discussed. The proposed hearty real time algorithm a precise gesture is essential to activate the hand detection followed by tracking. Planned algorithm consists of segmentation process by some features like skin colour and motion.

III. METHODOLOGY

Real time image is captured by the web camera which is coloured .The real time captured image consists of many needless objects which are not necessary for detection of hand image so the captured image is carried out with background subtraction to detect the hand image. After background subtraction the hand image is in white colour and background is in black colour. Find the contour with the maximum area and check for the area greater than certain value and find the convex hull. Where the contour gives the information about the boundary pixels and convex hull gives the information about the lines which connects the fingers that will not exceed the boundary pixel means contour .Find the Convexity defects between the adjacent fingers and counts the number the fingers.
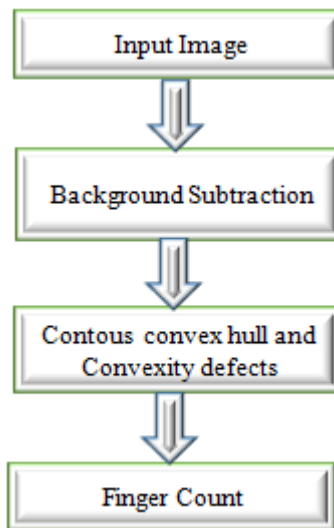
Figure 1. Implemented flow chart

IV. EXPERIMENTAL RESULTS

The following are carried out figures shows the experimental results which are obtained while running the algorithm. As mentioned the abstract of this paper counting the number of fingers from 0 to 5.The very first image is the Raw image means this is the image captured by the camera which is colored image. The colored image with the background objects is segmented by using background subtraction method. So the second image is the threshold image with hand has white in color and background in black in color. The next image is the full perfect image with back ground subtraction. In the first image Red color Number shows the Number of counts that the fingers up and closed.
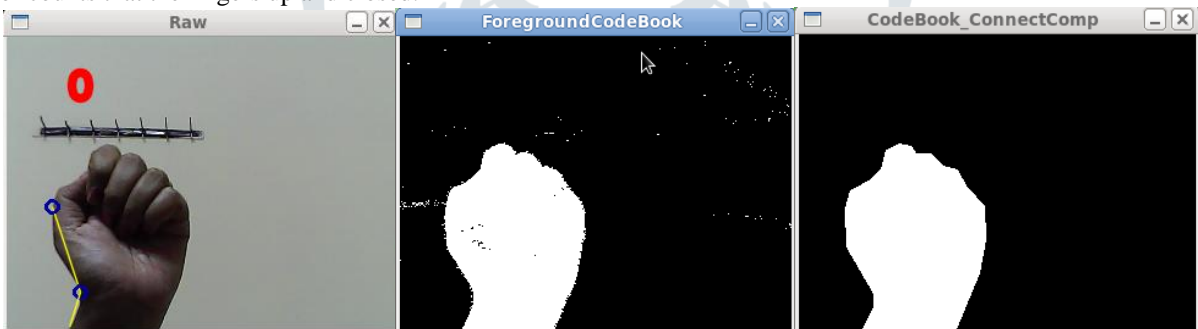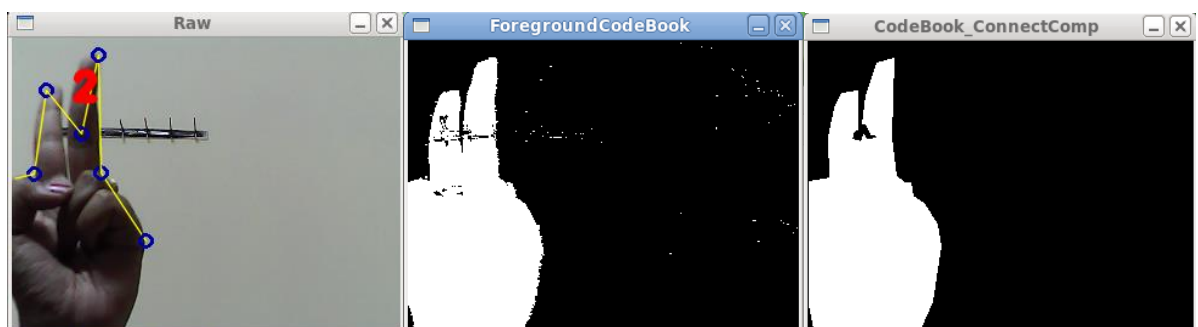

Figure 2. Count 0

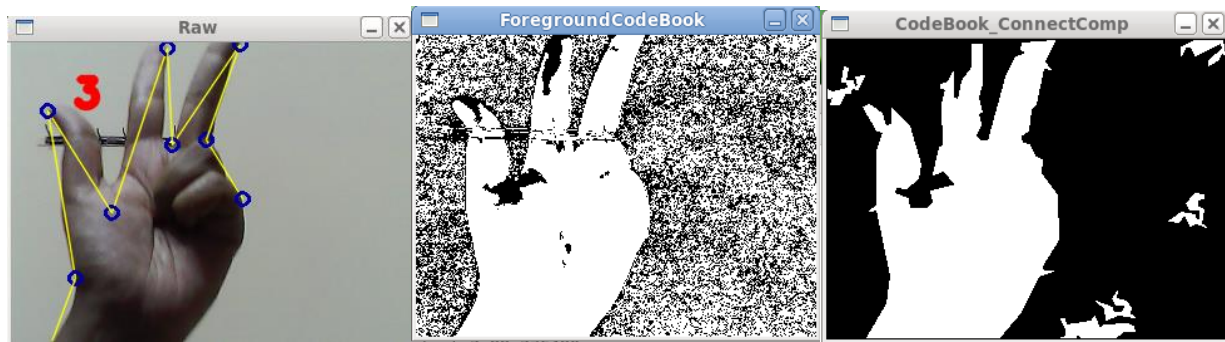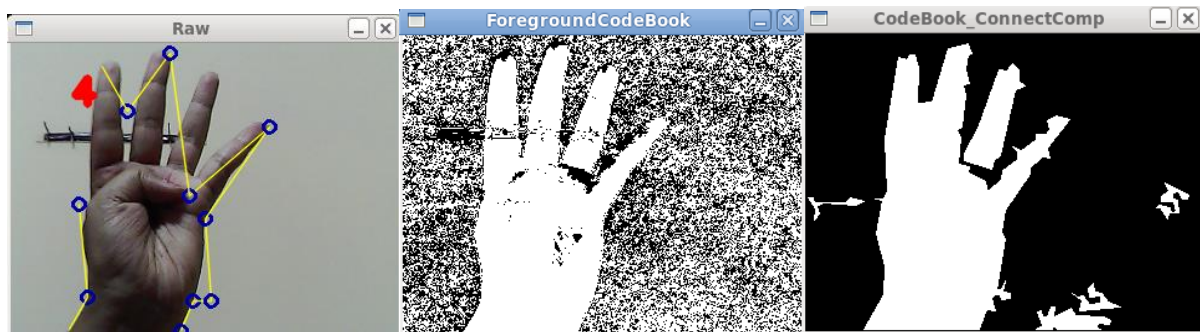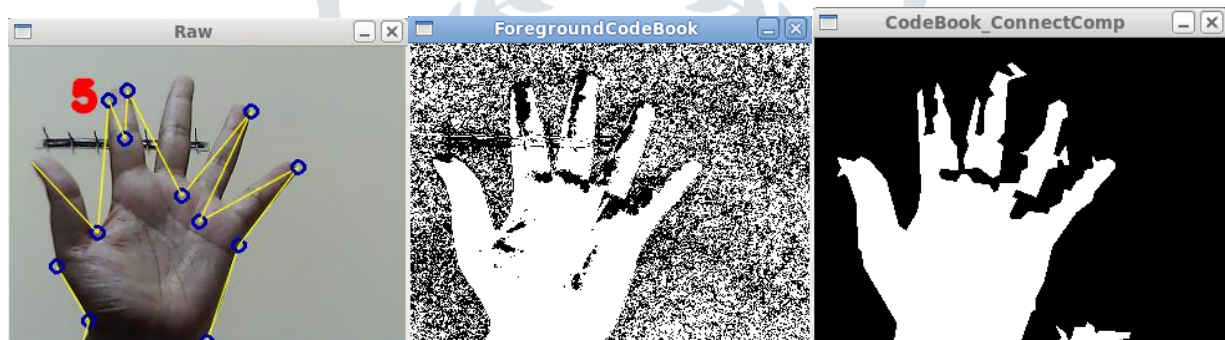Figure 3. Count 1

Figure 3. Count 2

Figure 4. Count 3

Figure 5. Count 4

Figure 6. Count 5

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