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Implementation of Real Time Dress-Up System Based on Image Processing

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ABSTRACT: The real time virtual dress-up system has been proposed. The proposed system consists of multiple tasks including extraction of different corner points of human body and few morphological operations along with Eucledian distance to calculate the dress size of human. The coexistence of different clothing and cluttering backgrounds is the main difficulty for accurate body extraction in image.

A selected dress is scaled and rendered to fit with the subject's body even they move around. Some preprocessing and post processing techniques are used to make outputs more accurate and realistic.

With the help of all these methods it results in virtual dress up system, women can see how the dresses chosen by them look when they wear it on themselves. And have an option to change without wasting more time in shopping.

Finally by all these we conclude that virtual dress up system that we are trying to implement help in many ways for humans like it make their shopping easy, saves time, easy to select etc.., they don't have to go in search of many clothes and they don't have to try more clothes in trail rooms and waste their time unnecessary.

I. INTRODUCTION

Recently, retailers have encountered great difficulties while attempting to sell clothing items via the Internet. Although consumers would like to benefit from the savings and convenience of shopping online, they are unable to determine how the clothes will fit. Businesses would similarly like to increase the proportion of their online sales, which would necessitate fewer physical stores and diminish the possibility of losing profits due to local competitors and returned goods. Our goal is to provide a concept for real time system in details that is able to effortlessly try on countless pieces of clothing, without leaving the comfort of their own homes. Moreover, people can also try to wear good looking dress when they wanted to go out from their home to party or other places. People use mirrors everyday to see how they look and choose clothes they will put on for a day before leaving home. Also in clothing stores, many mirrors are located to help customers for making their decision to buy dress fitting well and looking dresses. In this sense, detail concepts for real time dress up system can answer your questions about dress up as well as the size-fitness of dress without physical don and doff time. The needs for the real time virtual dress up system are obvious. Firstly, benefits for customers are to save don and doff time and estimate their body measurements easily for made-to- measure dress. Customers commonly try on many items and spend lots of time to don and doff to purchase dress. It is very inconvenient for them to take dress items they want to try on, go to a dressing room, take off and put on whenever they find attracting dress. Secondly, shop owners can save costs, because they do not need dressing rooms any more. Additionally, wasting clothes tried on by customers will be reduced.

Classification of sizes mainly has three stages viz., segmentation, few morphological operations andclassification. Segmentation subdivides the image into its constituent objects. The goal is to do object recognition. Since the object of our interest is some part in the image and it is combined with other regions, segmentation is carried out to get the object of our interest and discard the background[7]. Humans are often surrounded by different objects in the background. So segmentation is carried out to get the human region which is only the region of our interest in it. Different morphological operations [2] is been carried out for complete segmentation of dress with that of human image and is converted to binary image . Once the human interested region is extracted from the image the next step is silhouette extraction and use extracted silhouette for corner

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detection where corner detection default algorithm is Harris corner detection algorithm which is been used in our work.

II. LITREATURE SURVEY

In [1] . The technique of Virtual Dressing Room for the virtual fitting of clothes to a person involves the recognition of human from the background with respect to light variations and with least disturbance of other objects. This is to be followed by detecting contour of both upper and lower body, which is done by taking laplacian filter and then edge detection. After then, feature points are extracted based on the basic structure of human. With these points as reference the sample shirt is warped to fit for the person perfectly. In[2] . This proposed system presents a strategic approach for rapid detection and annotation of partially occluded face. Partially Occluded Face Detection (POFD) problem is addressed by using a combination of feature-based and part based face detection methods with the help of face part dictionary. In this approach, the devised algorithm aims to automatically detect face components individually and it starts from mostly un-occluded face component called Nose.

In[3]. This proposed system involves two steps and the first step aims to recognize the position of the cloth content and lows the influence of the background. After the first step of k-means, we reconstruct the image as the clustering data for the second step of mean shift. This experiment shows that the two-steps k-means and mean shift of color recognition is improved. In[4]. In this work, a new methodology for detecting the torso portion of the human body is introduced. In this approach, a face detection algorithm is used to identify the face region as a priori and then the trunk region is extracted by effectively combined the input image segments and the foreground detection algorithm along with the detected face. The result of face detection is used to identify the face region of human in photos. The torso portion of the human body is close to the head, which means it is under the head. Then the input image is segmented using Normalized Cuts .segmentation algorithm and then the foreground region is detected to constrain the segment grouping in to torso region. Then the torso portion of the human body is obtained by combined the face detection algorithm along with the normalized cuts segments and the thresholded image. In[5] . In this paper, they present a novel efficient automatic human-height measurement scheme using a single camera. Our proposed new scheme is very robust so that the heights of multiple persons within the scene can be estimated automatically and simultaneously.

In [6] . In this work, they have introduced a virtual dressing room application using Microsoft Kinect sensor. They have used the modules for locations of the joints for positioning, scaling and rotation in order to align the 2D cloth models with the user. Then, we apply skin color detection on video to handle the unwanted occlusions of the user and the model. Finally, the model is superimposed on the user in real time .In[7]

. In this paper we propose an algorithm to automatically detect the torso in an image of a preterm infant during non-invasive respiratory monitoring. The algorithm uses normalised cut to segment each image into clusters, followed by two fuzzy inference systems to detect the nappy and torso. The algorithm was based on the traditional image processing framework for object recognition, comprising segmentation, post-processing and object recognition. Image segmentation was performed using the normalised cut algorithm .In[8] . .This paper uses a mathematical technique which compares real world coordinates of facial feature points with that of 2D points obtained from an image or live video using a projection matrix and Levenberg-Marquardt optimizationto determine the Euler angles of the face. Further, this technique is used to find the best set of facial landmarks which give the maximum range of detection. The preliminary steps of the face orientation technique are face detection and facial landmark detection. For face detection,the Haar Cascade and Deep Neural Network techniques are experimented. Based on the analysis it is concluded that DNN is more robust, accurate and optimal. Facial landmarks are extracted by passing an image or video frame through acascade of pre-trained regression trees.

In [9]. In this paper in an outdoor scene human is detected using Histogram of Oriented Gradients (HOG) and Cascade adaboost classifier. Further the detected human is parsed into regions like head, torso, leg and further subdivided into neck,left-right elbow, left-right shoulder, left-right wrist, left-right hip, left-right ankle and left-right knee. Each distinct part was trained and classified using Histogram of Oriented Gradients(HOG) and Support Vector Machine (SVM) classifier. The proposed method was evaluated using Leeds Sports Pose (LSP)dataset.In[10] . This paper presents the methodology for extracting different colors from an RGB image. RGB image have different colors with different values of color contents for each pixel. As red, Green and blue are the fundamental colors for every color formation and these can be extracted by simply using MATLAB commands. But in real life

applications like face detection or skin detection or some applications in floriculture, detection of different fruits of vegetables etc. other colors have to be detected. So this pa paper presents the dignified approach to extract the concerned color from an image. In[11] . This method consists of four steps: image acquisition, template matching, background subtraction and human height measurement. First, human gait is captured. Square template is fixed on floor. Second, template matching is used to detect square template position. Third, background subtraction is used to extract human. Finally, based on human position relating to square template, a size of pixel is used to compute human height .In[13] . This paper dicusses the multi-colour recognition using the min-max colour threshold for outdoor robot navigation. All colours used in this project are RGB orthogonal colour space in order to see how much of each primary colour between min and max that can be observed in the colour to be recognized. The white colour value in the colour space is set as the object for which the target colour to be recognized belongs, while the black colour value is set as the object background. The recognition process is done by summing up first the values of the red, green and blue in each colour to obtain the RGB sum value, which is then divided by the individual colour element to obtain the colour threshold. This threshold is compared to the originally colour threshold for the recognition.

In [14]. The proposed system consists of including extraction of different body parts, torso detection, resizing input dress images and dress up using blending and re-blending techniques over the subject. e. Haar classifier is applied for detecting face from input frames and geometrical information is used to extract different parts of a body according to the face position in a frame. Due to the variability in human body, it is complicated to extract accurately. A novel dominant colours based segmentation methods is proposed to tackle this problem. In[17]. In this proposed method which is based on ADI Blankfin533 DSP processor, a system was designed that could choose clothes and display the dressing effect automatically. First, capture a customer's frontal and side photo, then, extract the silhouette of the customer through image processing. Based on the silhouette, the head top point and shoulder outmost points could be located, then the waist width, shoulder width and other size could be estimated through curvature analysis. Comparing the customer's data got from the estimating with those in the database, the user could select the cloth image he or she likes to overide the customer's photo, at the same time they can get the dressing effect displayed on the LCD of the system. In[19] . For implementing virtual dressing room, we need to recognize the user in the image and superimposed it with selected dress model. To identify the user, we are using face detection algorithm. Face detection is done by using haar classifier. Haar classifier is used for object detection. It is pre-trained classifier in OpenCV. It is very efficient and easy to use. After face detection, we need to detect the lower body for superimpose the selected model on it. This can be done by lower body detection using haar classifier again. Euclidian distance technique is used to detect the distance between user and camera. By using this distance, the dress model is scaled. In[20] . Our approach concentrate on how the selected garment fitted the user's body and how it will be appear as if he/she in real world. This was carried out by identifying critical points on garment and user's body dimensions using image processing techniques. In this paper, an application for mitigating the virtual dressing room was designed, implemented and tested.

III. PROPOSED SYSTEM

In the proposed method the input human image is been preprocessed through various preprocessing techniques and dress from the human picture is been extracted with the help of Harris corner detection algorithm and with the help of Euclidean distance measurement is been taken from the extraction of dress and classification is made based on different sizes.

1. Image pre-processing

In this stage the main aim is to prepare the data ready for separation of dress from that of human image and corner is detected for the dress which is separated from human image calculating the distance between the points. Here the color image considered and is resized and converted to binary image. The first method involves in resizing of the image to particular standard size and next it involves number of morphological operations and the background is been removed and later we converted image to binary format and used bwareaopen command to remove small obstacles in that binary image and use different morphological operations like fill which For binary images, imfill changes connected background pixels (0's) to foreground pixels (1's), stopping when it reaches object boundaries. This operation can be useful in removing irrelevant artifacts from images.The fill operation is used to fills holes in the input binary image. A hole is a set of background pixels that cannot be reached by filling in the background from

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the edge of the image and strel with disk operation which is a structuring element is a matrix that identifies the pixel in the image being processed and defines the neighborhood used in the processing of each pixel and dilate operation is adds pixels to the boundaries of objects in an image boundaries. The number of pixels added or removed from the objects in an image depends on the size and shape of the structuring element used to process the image and later we again use fill operation for final extraction of dress from human image.

Fig 1. Original image

Fig 2.bwareopen image

Fig 3. Fill operation

Fig 4. Dilate operation

2. Corner Detection

Corner detection is an approach used within computer vision systems to extract certain kinds of features and infer the contents of an image. One of the corner detection method involves Harry Corner Detection algorithm . Harris Corner Detector is a corner detection operator that is commonly used in computer vision algorithms to extract corners and infer features of an image. Harris' corner detector takes the differential of the corner score into account with reference to direction directly, instead of using shifting patches for every 45-degree angles, and has been proved to be more accurate in distinguishing between edges and corners. We use Harry corner detection method to detect corners of a human in the image and then calculating process is done .In the below corner detected image red stars shows that all the corners of silhouette`te is been detected and should be overlapped with that of dress.

Fig 5. Corner detection

3. Classification

In our work , we mainly classified the size of the dress from the human dataset and for classification we used Euclidean distance in order to calculate the distance between the corner detected points and based on the distance calculation we decide whether that size is small or medium or large and Euclidean is straight-line distance between two points in Euclidean space.. The Euclidean distance is the distance between two points in euclidean space. The two points P and Q in two dimensional euclidean spaces and P with the coordinates (p1, p2), Q with the coordinates (q1, q2). The line segment with the endpoints of P and Q will form the hypotenuse of a right angled triangle. The distance between two points p and q is defined as the square root of the sum of the squares of the differences between the corresponding coordinates of the points.

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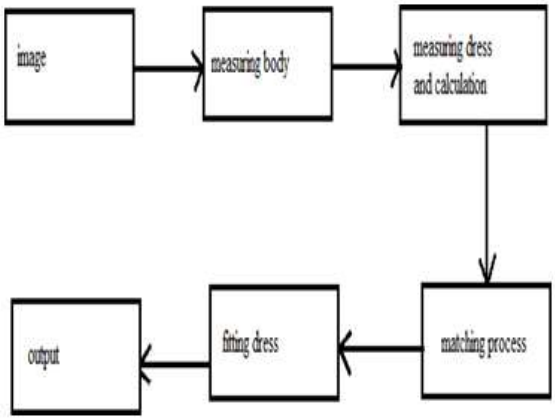

Fig 6. System Architecture

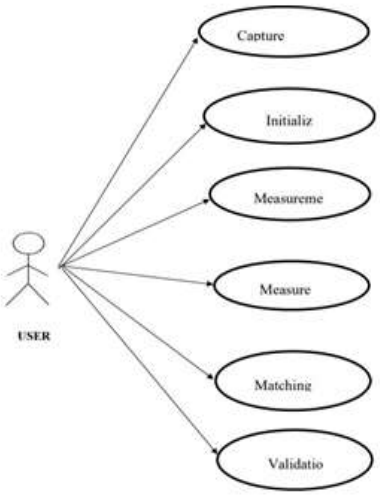

Fig 7.Use case model

IV. RESULTS

In our work , we proposed a real time dress up system where we first took the input from human dataset for which dress has to be changed and through various morphological operations the human silhouette is been extracted and been measured and classified according to their size of the dress as small , medium or large and finally we took dress from dress dataset to their particular size and overlapped on them to give real dress trial up look.

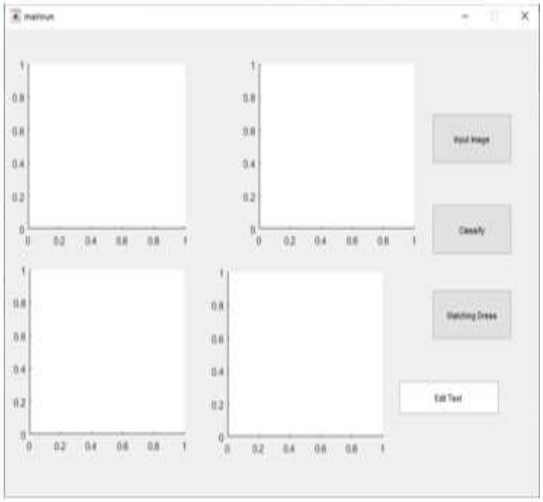

Fig 2. GUI

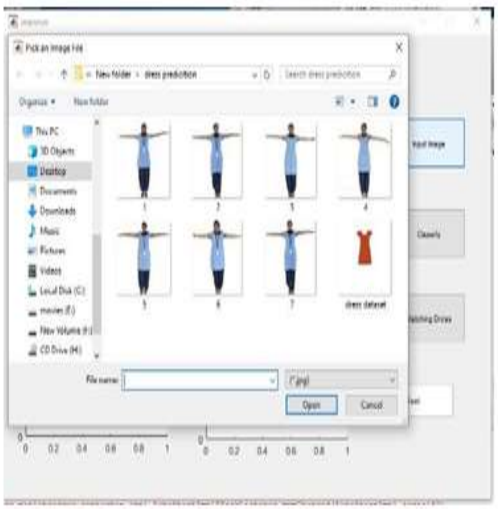

Fig 3. BROWSER SELECTION

Fig 4. INPUT IMAGE

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Fig 5. SIZE DETECTION

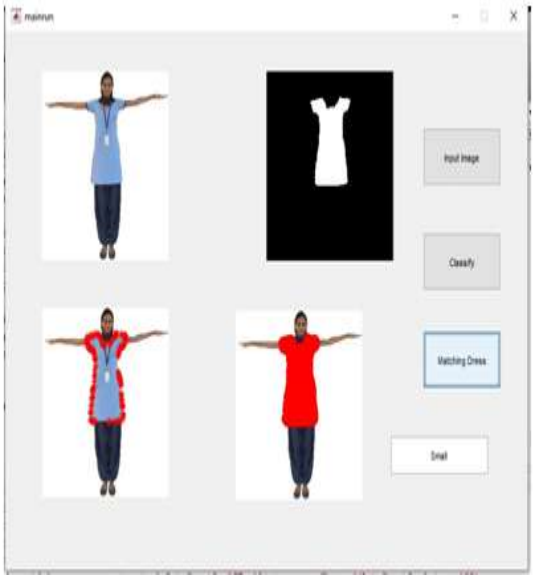

Fig 6. DRESS MATCHING

Here we implement using Matlab R2017a tool. Mat-lab is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notations. Mat-lab stands for matrix-laboratory.

V. FUTURE ENHANCEMENT

This proposed work uses a limited number of dataset and in the view of future enhancement the algorithm can be tested with significantly huge number of datasets and check for better accuracy. The proposed work considers only the dataset where people keeping their hands in particular position which can be enhanced to the images where people can stand in different positions and this system is only helpful for selection of different tops which later can be enhanced for selection of different bottom dresses also.

VI. CONCLUSION

In this project , we have proposed a system which helps for ladies to select their dress without actually wearing it and this is done with help of around 50 datasets that is with 50 different different human pictures and those pictures has to be in particular position in order to calculate the length of their body to predict their sizes and then fit their choosen dress upon them based on their sizes which minimizes their time of selecting different types of dresses and in this proposed system we use Harris corner detection algorithm to detect the corners of the human body in the image and converting the image to binary image and extacting only the top part of their dress and few morphological operations is done to classify the sizes like small, medium and large and further dress based on their size is chosen and overlapping on human image is done .

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