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Online Tailoring System with Mobilized human body measurement system

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Abstract—This paper is the review of the current automatic human body measuring systems. The latest research published was "A mobilized automatic human body measure system using neural network" in 2018. This paper also include existing systems that are working on automatic human body measuring system using mobile like devices.

Index Terms—Anthropometry, Neural network, Mobile device, Silhouette detection, Feature point extraction, Segmentation.

I. Introduction

Digital cameras are becoming increasingly famous to seize pictures and therefore many applications are based on 2D photographs. Extracting human body measurements automat-icily from 2D pictures presents a fast and smooth technique to acquire anthropometric information. By evaluating the difference between the coding collection, feature factors can be diagnosed. A variety of intelligent vision systems have been applied to the apparel industry. Among them, few current systems were applied immediately for the purpose of custom tailoring. Human body records have emerged as increasingly important with the growing demand for my part tailor-made merchandise. Anthropometry can commonly be categorized as contact and non-contact as illustrated in Fig. 1. [6]. The former is a bodily approach that requires a measurer to measure a topic body with a tape. It is straightforward, convenient, less expensive, and correct. The drawbacks are the complex size procedure, which calls for standardized criteria for size gear and measurers, and unsuitability of the technique for several measurements with massive size differences. Moreover, physical measurement is inconvenient for E-trade because of the absence of touch and measurer in the environment. Regardless of those drawbacks, anthropometry results are nevertheless considered floor reality for non-contact methods. Unfortunately, the existing systems for anthropometry are available in the IOS platform only, not in the Android platform. Moreover, although these systems can achieve accurate results, they cannot intelligently calculate results (prediction) and perform error correction. [6]

The goal of our survey is to find out the strengths and shortcomings of all the proposed systems. Our survey on manual body measurement and automated body measurement system has exposed their short comings, strengths and approaches toward dealing with anthropometry.

Our results states that getting the exact measurement from a 2D image of a human body is more efficient than manual process and it may gain profits to the tailoring industry up to 50%.

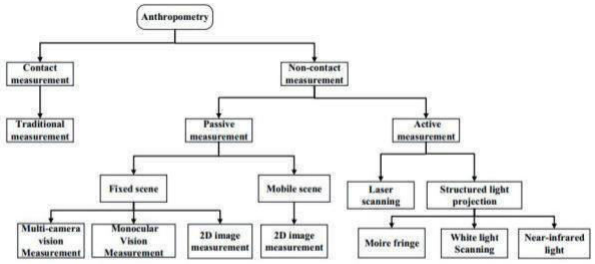

Fig. 1. Top-down techniques for anthropometry [6]

II. Related Work

A whole study of the existing system have been done. The factors that may affect the integrity of the measurements can be lack of user knowledge or any environmental circumstances.

The work can be performed better if AI techniques are implemented in the existing systems. Adding more layers to the existing neural network may guarantee the accuracy of the data.

Developing a fully automatic human body segmentation without any interaction between the user and mobile device can be achieved by creating a frame on the mobile screen and addressing user to fit into that frame by standing at specific distance. The frame can be made in the manner given below. [6]

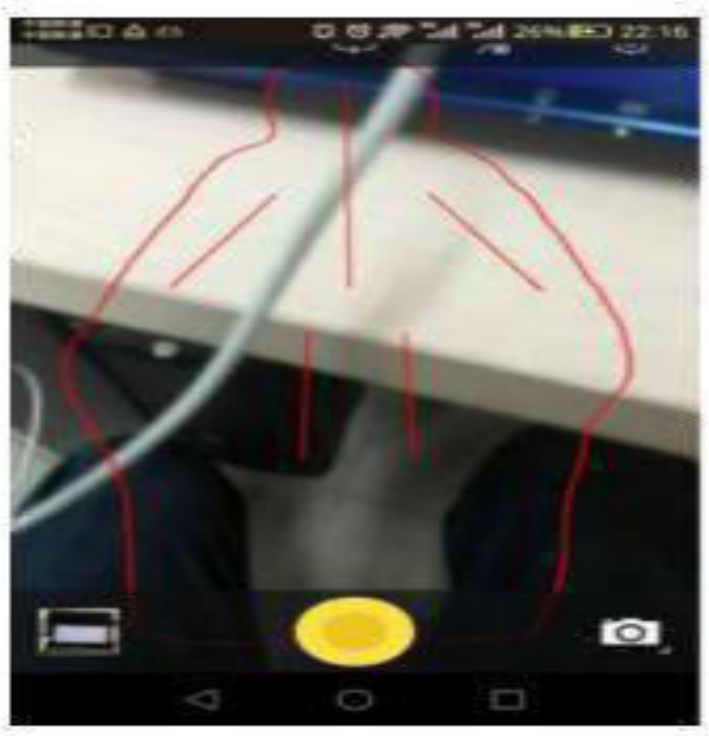

Fig. 2. Proposed structure of the framework [6]

The next section shows the comparison between the methods implemented in the existing systems for extracting the outline of the image so that there will be no background and foreground distraction. The methods implemented for image segmentation were Grab Cut, One Cut and Saliency Cut. The comparison table shows that One Cut performs better than any other methods that have been tested. So One Cut will be chosen for the image segmentation purposes.

III. Comparison

A. Methods for image segmentation method

Method	Speed (s)	Accuracy (%)	Sensitivity (%)	Specificity (%)
OneCut	1.61	98.81	97.66	99.01
GrabCut	15.68	83.94	98.81	80.75
Saliency Cut	1.39	92.35	81.57	94.08

Fig. 3. Methods for Image Segmentation [6]

The comparison table shows that One Cut performs better than any other methods that have been tested. So One Cut will be chosen for the image segmentation purposes.

B. Model Structure

The model structure of BPNN technique was considered to be most efficient than GRNN so, BPNN was chosen for training th system.

Model type	Input units	Output units	Hidden layer	Hidden units	Smooth factor (*Spread*)
BPNN	8	6	1	7	–
GRNN	8	6	–	–	0.8

Fig. 3. Model Structure [4]

IV. *SYSTEM* SETUP

Below figure 5. At the entrance the display panel will be there to make the decision. Next to it the scanner will be placed where a person can easily provide his body measures through the scanner. The fabric will be automatically sent to the cutting machine. Then the pieces need to attach button will be sent to the button machine whereas at the same time the other fabric pieces will be sent to the sewing machine. While the sewing machine attaches the main parts, the button machine will join the button and sent those pieces to the sewing machine. The sewing machine altogether will join and prepare the entire dress.

The dress will be forwarded to the iron machine where the machine will iron and fold the dress. If the user wants to have any alter then he will move to the alter machine will be at a distance from the other machines and provide the measures to the alter machine to alter the dress as per his requirement

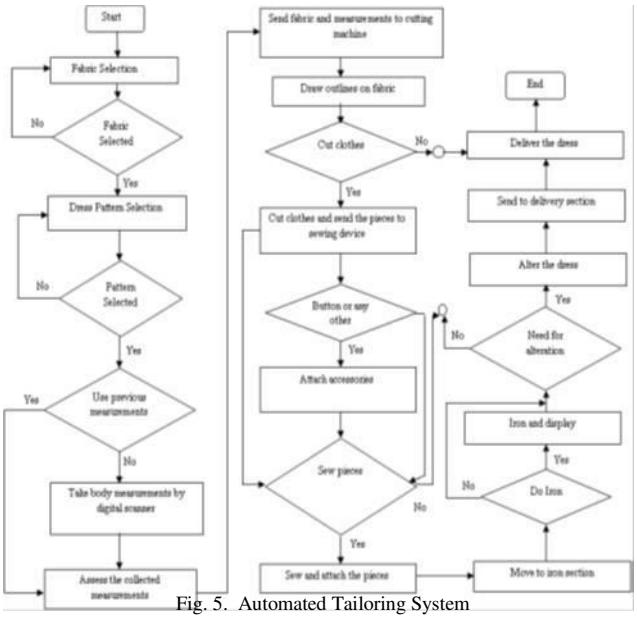

Fig. 5. Automated Tailoring System

V. Feature point Extraction

When standing on the ground plane, the height is the vertical distance from the top of the head to the ground. Projection transform projection of the height to the image plane, the image of the top of the head and the image of the foot point and the vertical vanishing point in a straight line[7]. Analysis of walking in the process, when the height of one leg support when the actual height of the closest, and when the two legs away from the actual height to be lower, after the entire walking process, when the feet closed and standing height is The correct height, it is the highest measurement height[6].

According to this geometric relationship, this paper proposes algorithm to solve:

- Calculate the vertical distance between the vertical vanishing point v and the outline of the human body. Select the point with the minimum vertical distance as the vertex t and the point with the maximum vertical distance as the foot feature point $m1$.
- the connector vertex t and vertical vanishing point v vand prolong the straight line y to determine whether the foot drop point b is on the straight line y , if yes, then confirm point $m1$ is the foot drop point b , the three-point connection, and the extraction ends; If not, continue to the next step.
- A point $m1$ for the vertical line y , to pay a straight line at the point y $m2$, that is, to confirm the point m_Z foot point b , the end of the algorithm.

VI. CONCLUSION

The common obstacles faced by all automatic human body measure systems are high cost, lack of predictability, and complex installation processes. The existing systems do not provide accurate measurements for the female body as the tests carried out are majorly on male body. The implementation of automatic human body measurement system can make a huge change in various industries. There are various factors affecting the integrity of automatic human measuring systems. Due to this many industries hesitate to make their process automated.

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