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A survey on a mobilized automatic 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-ically from 2D pictures presents a fast and smooth technique to acquire anthropometric information.By evaluating the dif-ference 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 emerge as increasingly important with the growing demand for for my part tailor-made mer-chandise. 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 severa 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 short-comings 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%.

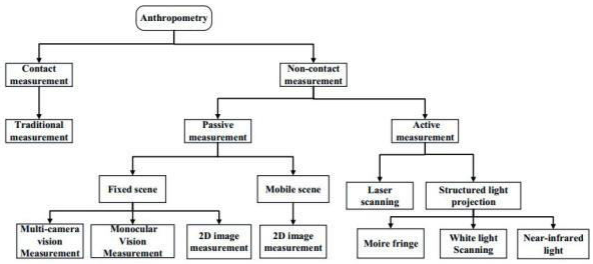

Fig. 1. Top-down techniques for anthropometry [6]

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 method 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	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. 4. Model Structure [4]

IV. 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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