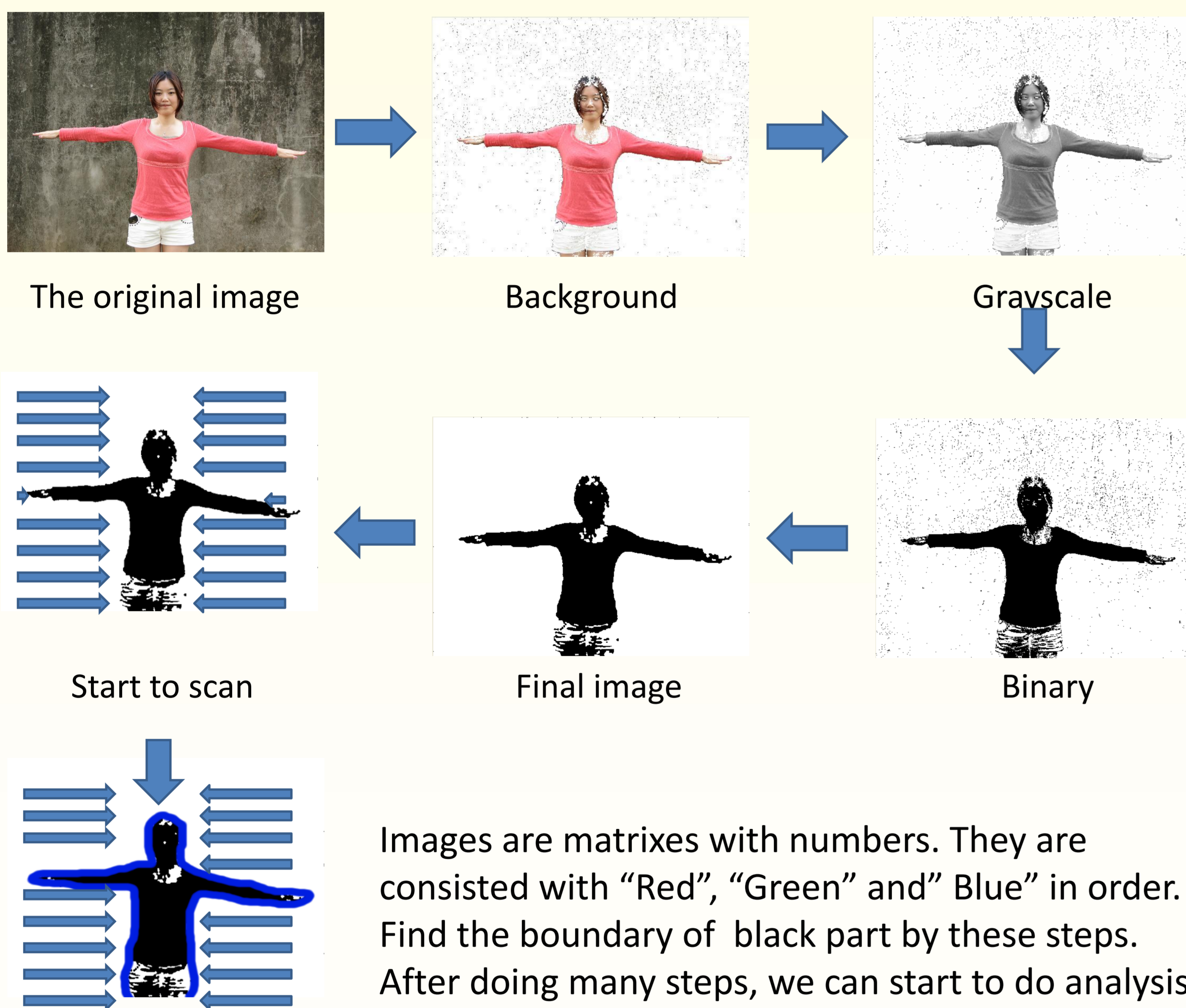# "Automatic Measurement" of Body Figure

**Researchers: Tzu-Ching Chien, Chung-Chun Hsiao , Chih-Fan, Hsu**
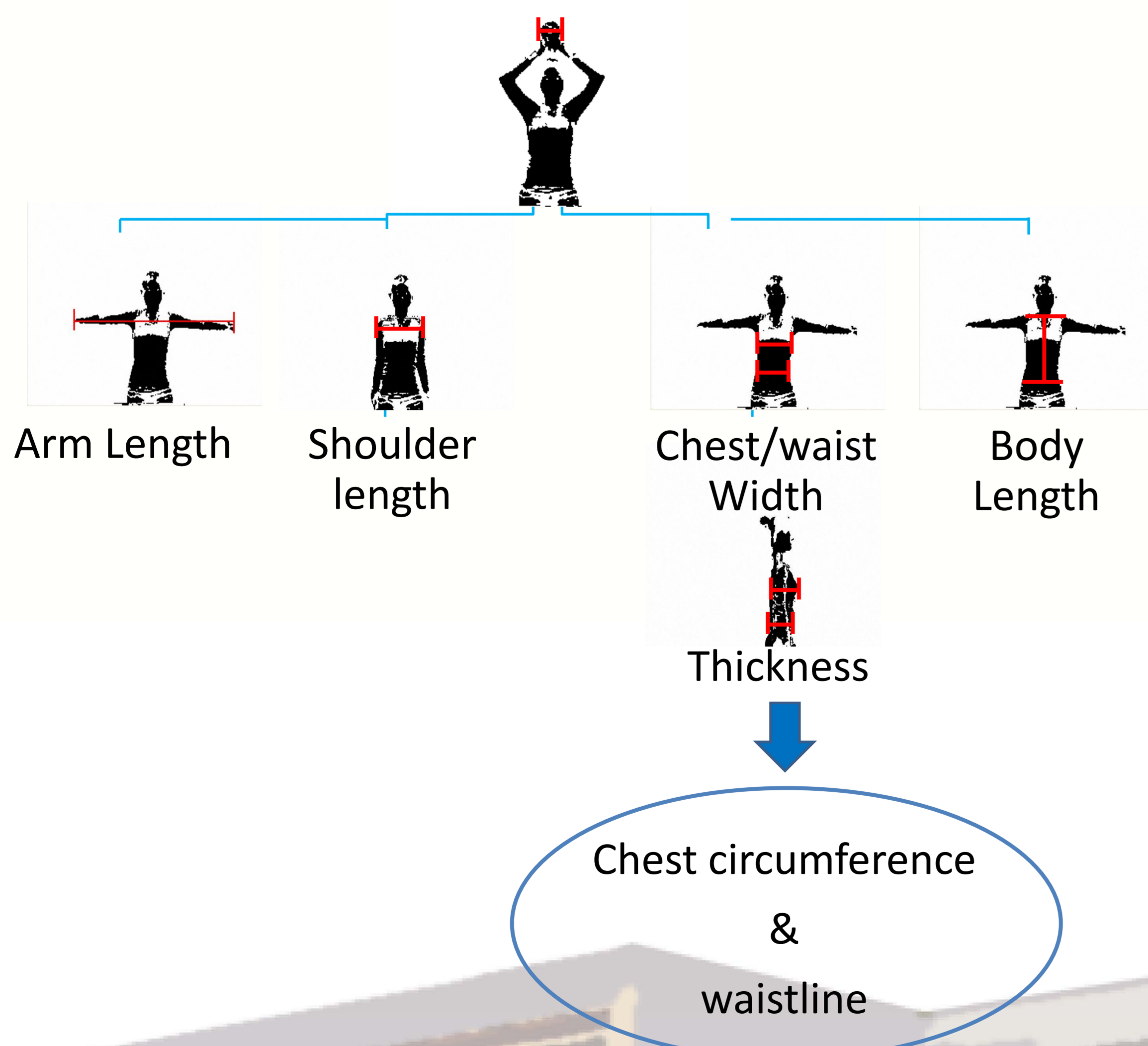**Advisor: Yean-Ren Hwang**

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## Ⅰ Motivation

We can make the measuring process easier and reduce labor and time cost by using Automatic Measurement. We hope to create a set of software tools so that we can measure our body size by ourselves while shopping for the clothes on the web. It's vey convenient.

## Ⅱ Research Steps



The original image → Background → Grayscale

Start to scan ← Final image ← Binary

Images are matrixes with numbers. They are consisted with "Red", "Green" and" Blue" in order. Find the boundary of black part by these steps. After doing many steps, we can start to do analysis.

## Ⅲ Analysis



Arm Length — Shoulder length — Chest/waist Width — Body Length

Thickness

Chest circumference & waistline

At first, we use CD-ROM as a scale . The reasons are diameter in every CD-ROM is 12centimeter, and it's easy to obtain for everyone. The purpose here is to transform pixels into centimeter.

Second, search for the minimum of the left and the maximum of right to get the difference between them for the sake of finding arm length.

Third, introduce the slope concept and choose the maximum around the boundary. The position of shoulder is where the maximum of the slope happened.

Forth, define the distance from the top of head to shoulder is the length, L. The position of waist is at $2.55 \times L$ . The multiple is chosen after doing many experiments on people. Also, we're able to give the definition for the position of chest is approximately $1.506 \times L$.

Then, we use two pictures to find the values around chest and waist in different angles of view in the cause of substituting them into ellipse circumference formula.

Finally, get the body length between shoulder and waist to finish the analysis.

## Ⅳ Results



Figure 5. Results showed in reality

First, open these four photos and a pure background to process these images by using of background removal and other functions mentioned earlier. Therefore, the final images will show at above with only body figure in black without noise. Afterwards , the most significant step is in progress by automatic measurement—analyze the pictures.

The results are gained from analysis and showed all the measure in centimeters at the top of the window.

Also, Apply on others, users must do the specific pose in order.



| Name | Arm length (cm) | Shoulder length (cm) | Chest circumference (cm) | Waistline (cm) | Body length (cm) | Scale |
|------|------|------|------|------|------|------|
| A | 110.3 | 34.44 | 78.39 | 73.22 | 46.9 | 0.218 |
| B | 139.03 | 42.22 | 92.8 | 87 | 44.07 | 0.20689 |
| C | 136.89 | 43.9 | 105.8 | 102.9 | 49.08 | 0.2727 |

Figure 6.Different subjects and results          Table 1.Informations in detail

## Ⅴ Future Works

➤ Enhance the function of background removal
➤ Apply on more people to find a range of errors
➤ More accurate
➤ Add the function of measuring the values below the waist