

2D 영상 기반 신체 측정 시스템

산학 캡스톤 연구

한동대학교 기계제어공학부
임순호
지도교수: 김영근

2024/12/16

목차

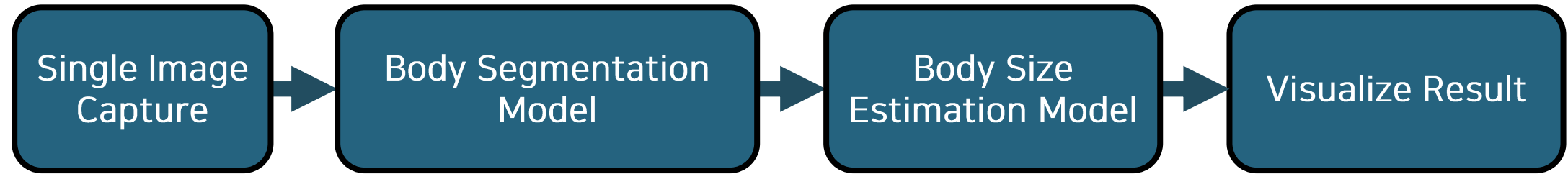
table of contents

- 1 Goal of the Project
- 2 Proposed System
- 3 Result
- 4 Future Work



“신체 스펙” 을 한눈에 보기 쉽고
개인이 편하게 사용 할 수 있는 시스템

Part 2 Proposed System



1. Single Image Capture



Fig 1. Capturing Image

- Captures front T pose image through the camera.
- User can watch his or her own pose status through LCD panel.

2. Body Segmentation Model

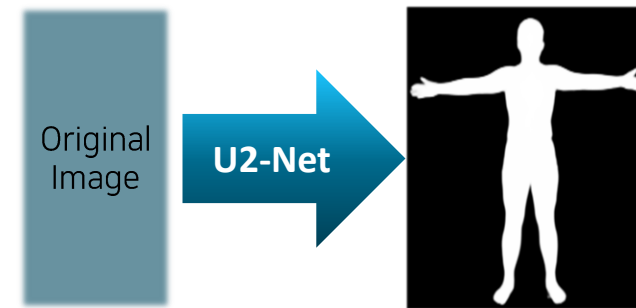
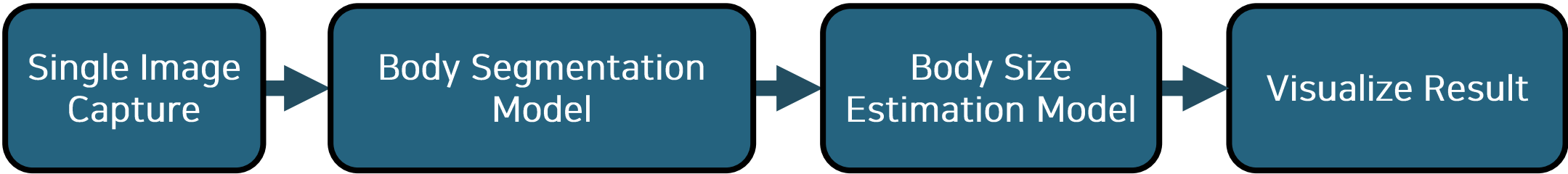


Fig 2. Segmentation with U2-Net

- “U2-Net” highly accurate background segmentation model used for image processing.
- Pretrained model: `u2net_human_seg.pth`

Part 2

Proposed System



3. Body Size Estimation Model



Fig 3. Capturing Image

Model	Conv_BoDiEs
Input	Front T pose image
Output	Size of 16 body parts

- The model relies on a single 2D image for estimation, which simplifies implementation

4. Visualization Result

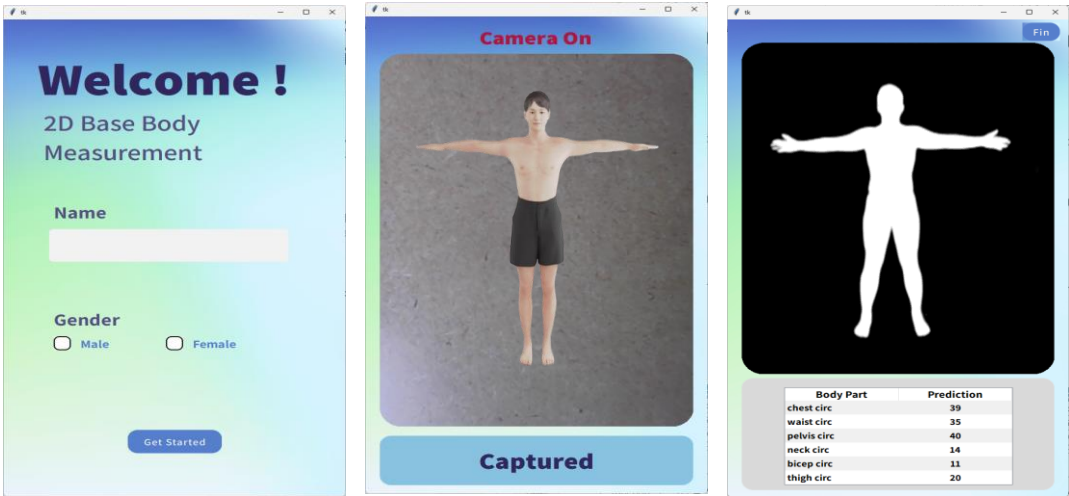


Fig 4. GUI

1. Type name for user result storage
2. Select gender for appropriate "trained model"
3. Results visualized in segmented image with table

Part 2 Proposed System

Hardware

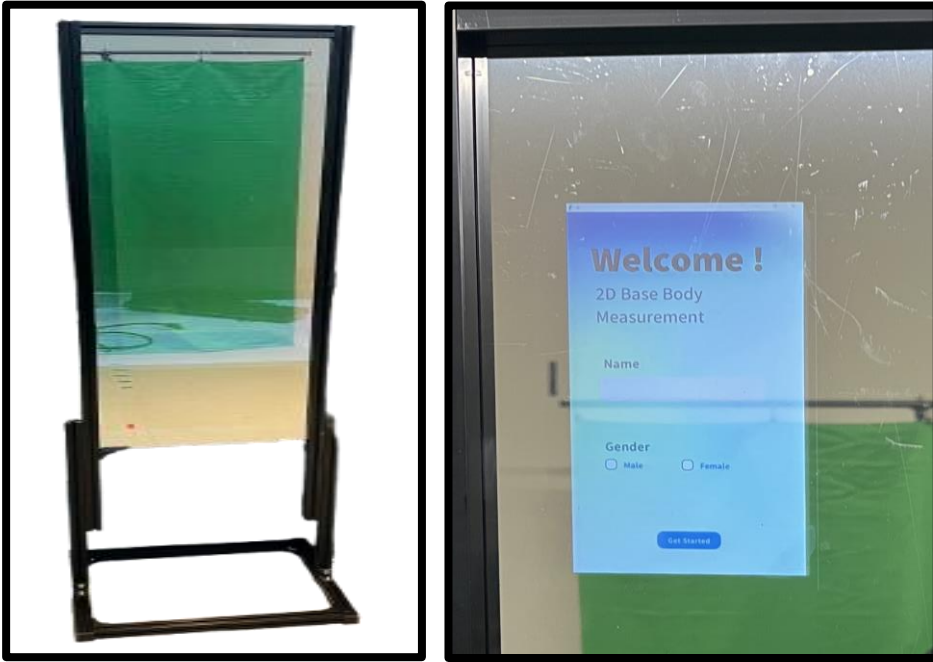


Fig 5. Smart Mirror & LCD Display

- Hardware Specification
Size: 175x54x40[cm]
LCD panel: 7inch (600x1024)
Camera: 1090P web cam
Mirror: 120x40[cm]

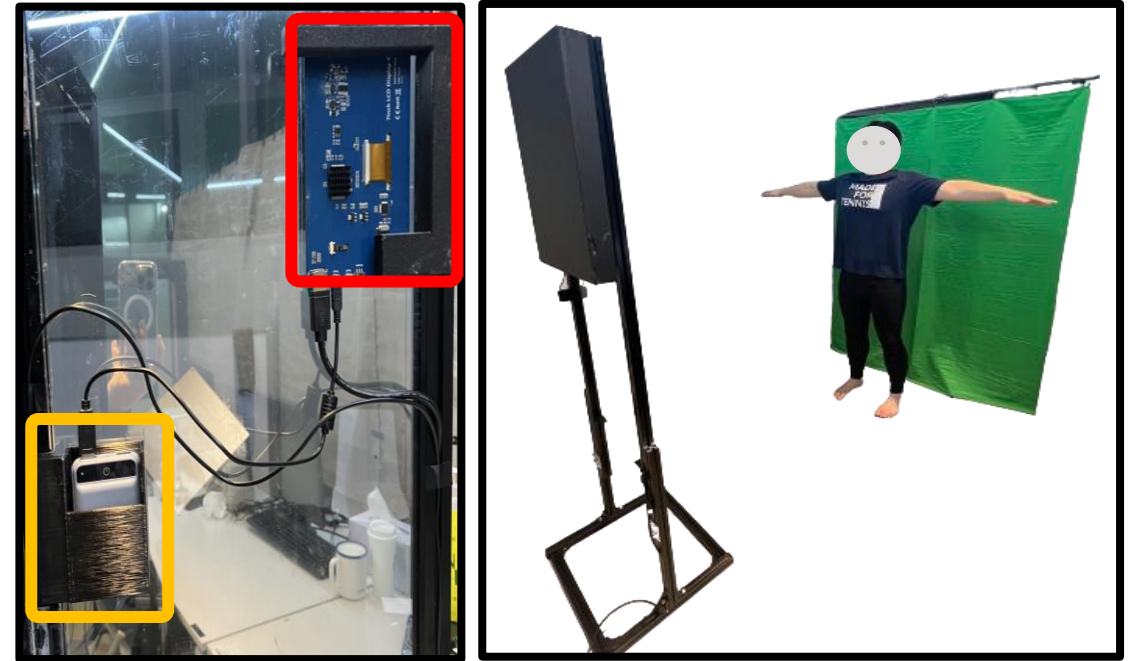


Fig 6. Inner Part & Overall Layout

- Red Box:
LCD pannel with 3D printed holder
- Orange Box:
Barttery with 3D printed holder

Part 3 Result

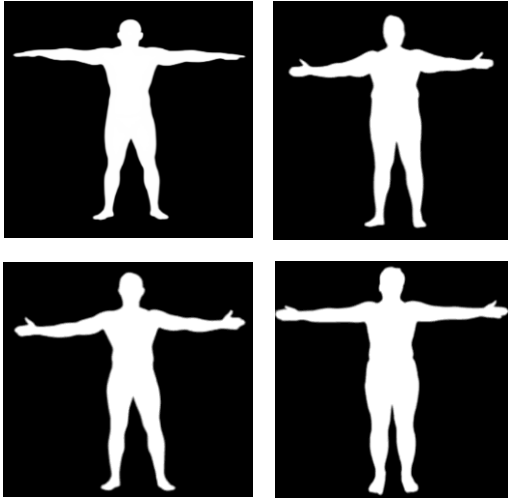


Fig 7. 4 Sample of Test Participant

- Test participants
10 male
- Distance with camera
190[cm]

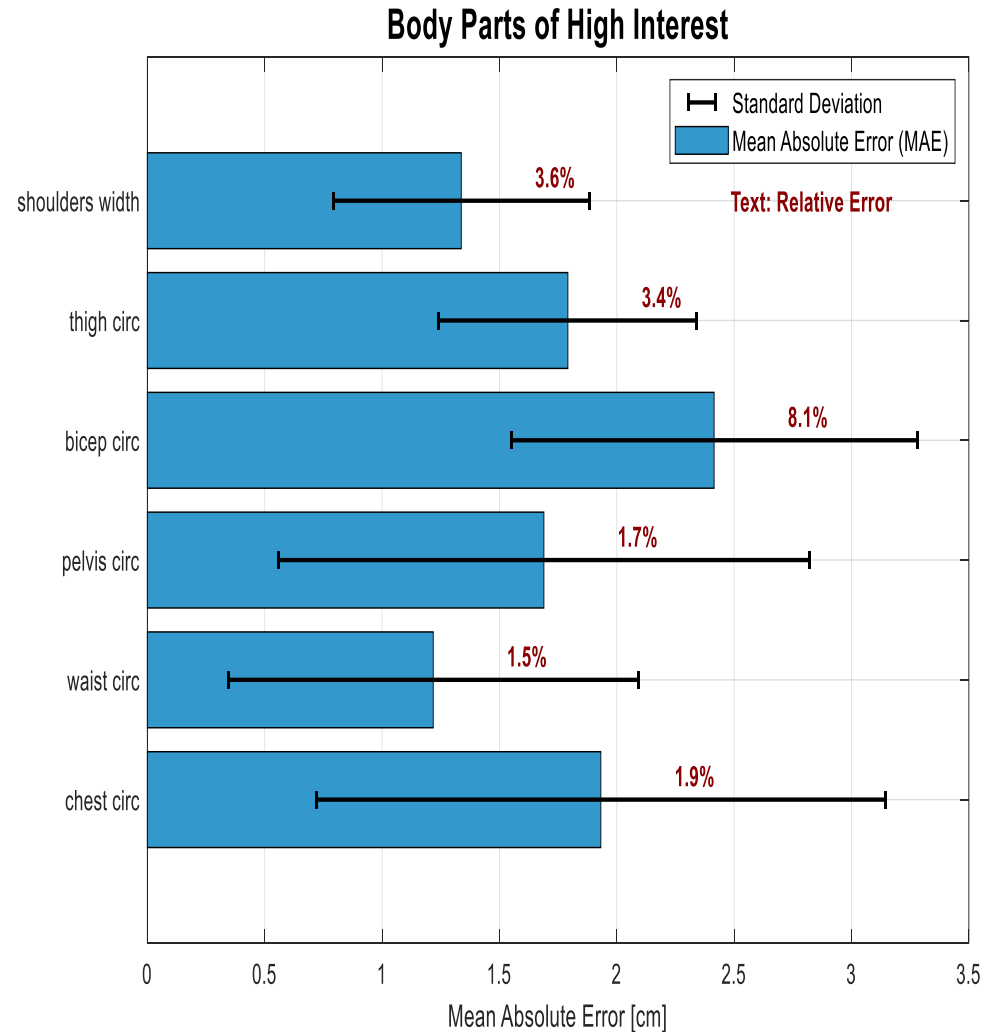
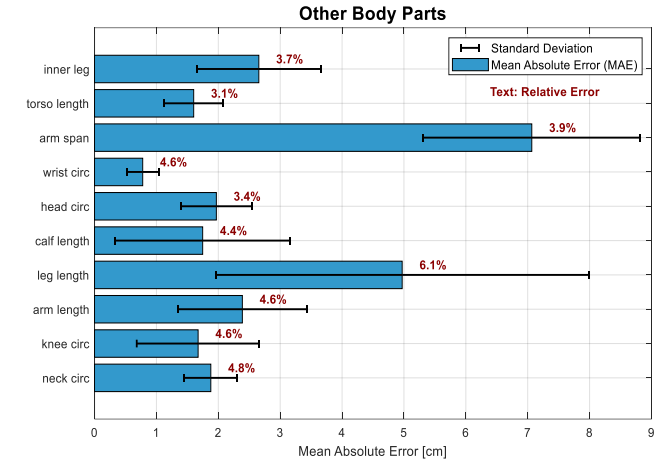


Fig 8. Result of High Interest Body Parts



- Result
Overall MAE: 2.3[cm]
- Future Research:
Enhancement of Accuracy
Visualizing in 3D model

Part 3 Future Work

1. Accuracy improvement
2. Visualization in 3D mesh



Fig 9. simplify-x

감사합니다
