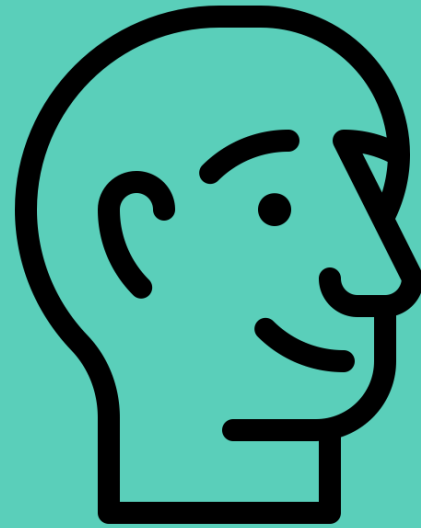
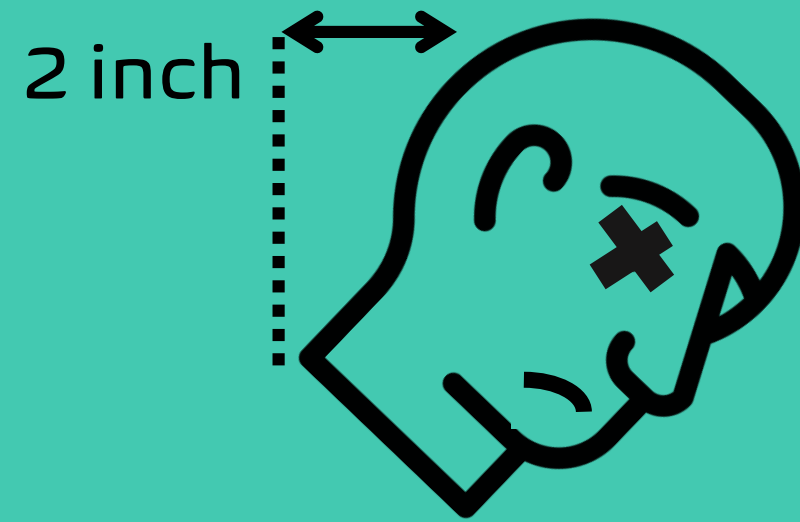


Sit-Up!

The personalized **AI** posture practitioner



10 pounds
(4.5 kg)



≈



PROBLEM INTRODUCTION

How bad posture can affect you ?

Main Health Effects

- Back, Neck, and Shoulder Pain
- Poor Circulation
- Increased Stress
- Fatigue and Low productivity

80%

of adults are suffering back pain caused by bad posture

86bil.

of low-back pain cost in US each year

\$30,000

is spent on posture-related injuries per patient

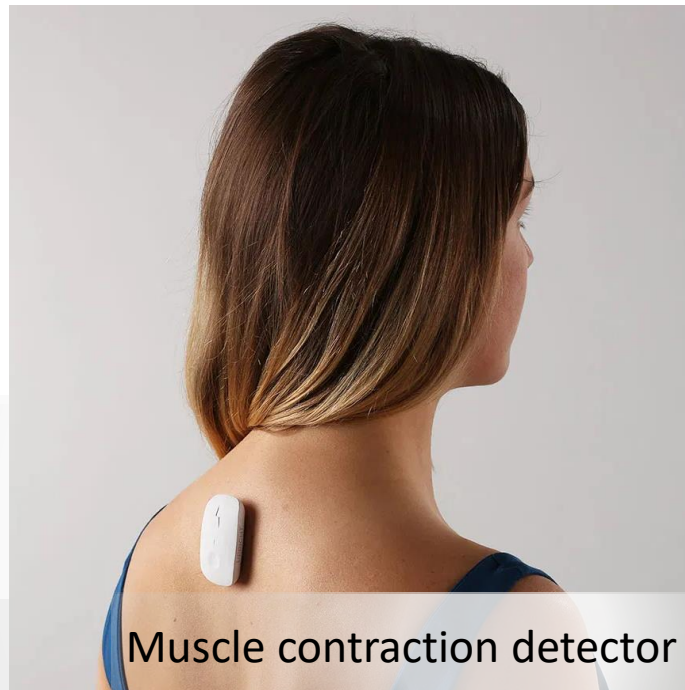
33% of work injuries are posture-related

CURRENT SOLUTIONS FOR POSTURE CORRECTION

The current products are still not effective to solve posture problems



Back brace



Muscle contraction detector



Ergonomics furniture

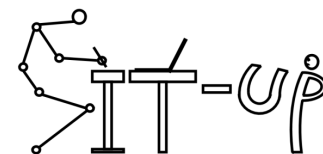
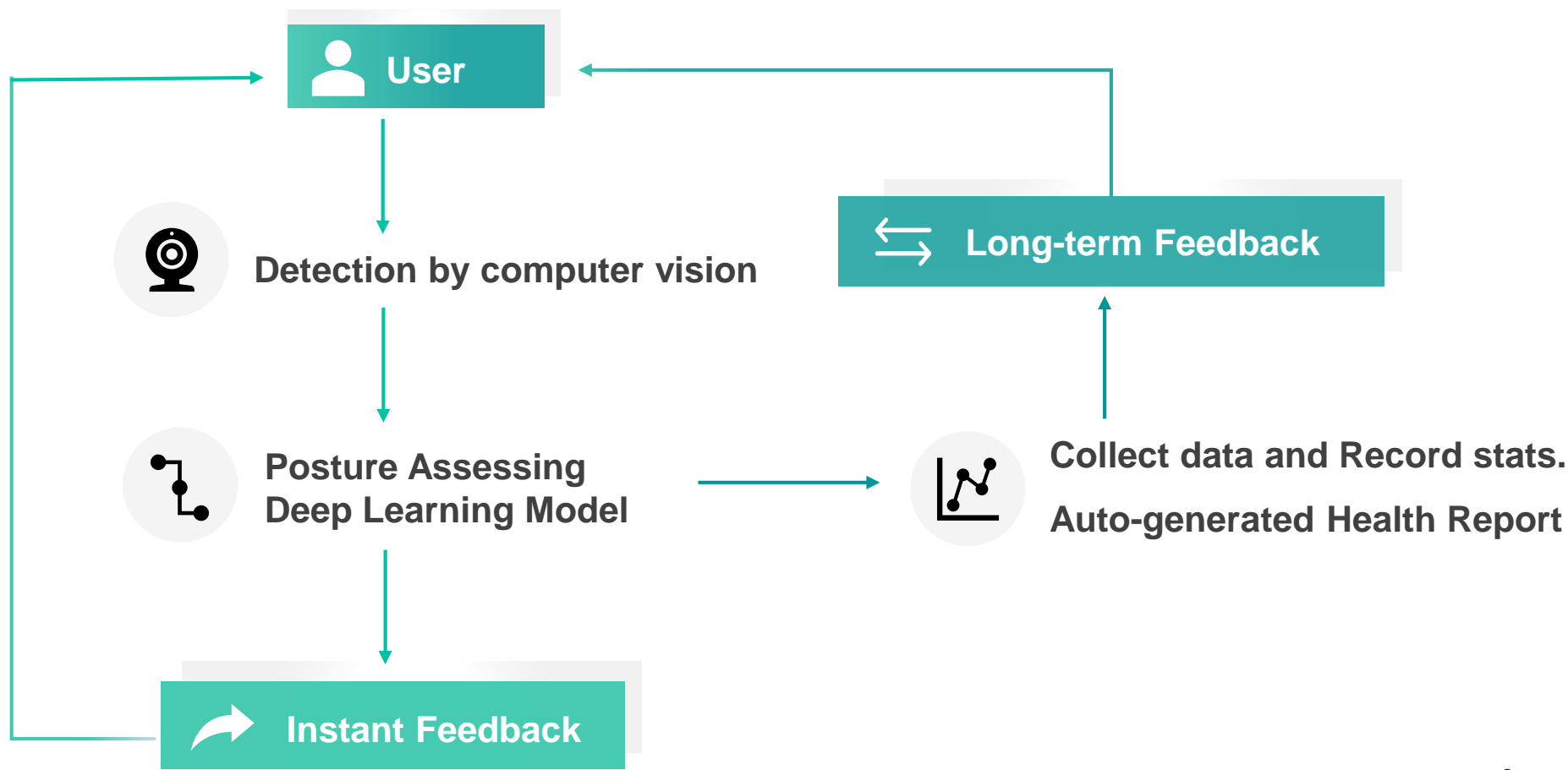
Sit-Up!

The personalized AI posture practitioner



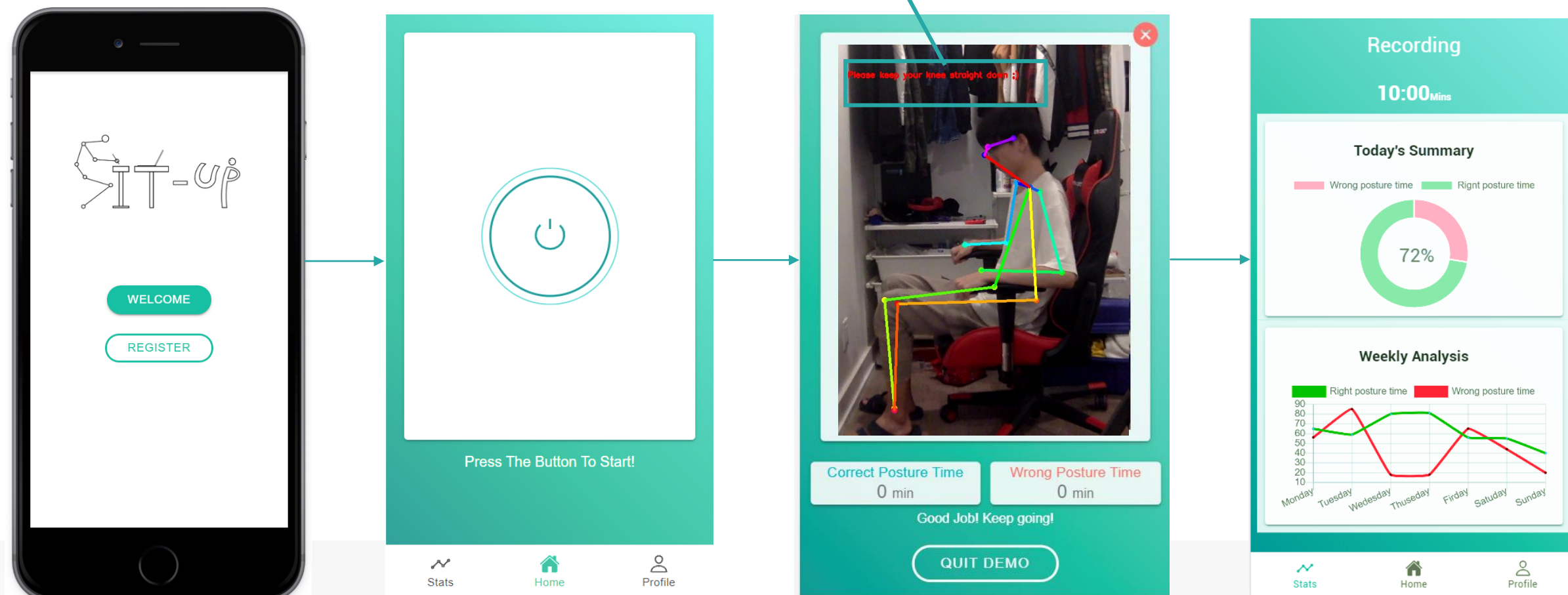
THE PROCESS OF USE

Sit-Up! – How it works?



THE PROCESS OF USE

Sit-Up! – Frontend Interface



Please keep your knee straight down :)

Please keep your knee straight down :)

Recording

10:00 Mins

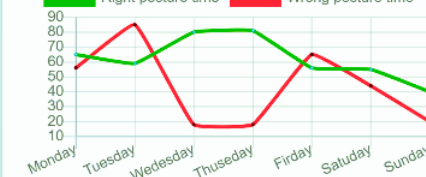
Today's Summary

Wrong posture time Right posture time

72%

Weekly Analysis

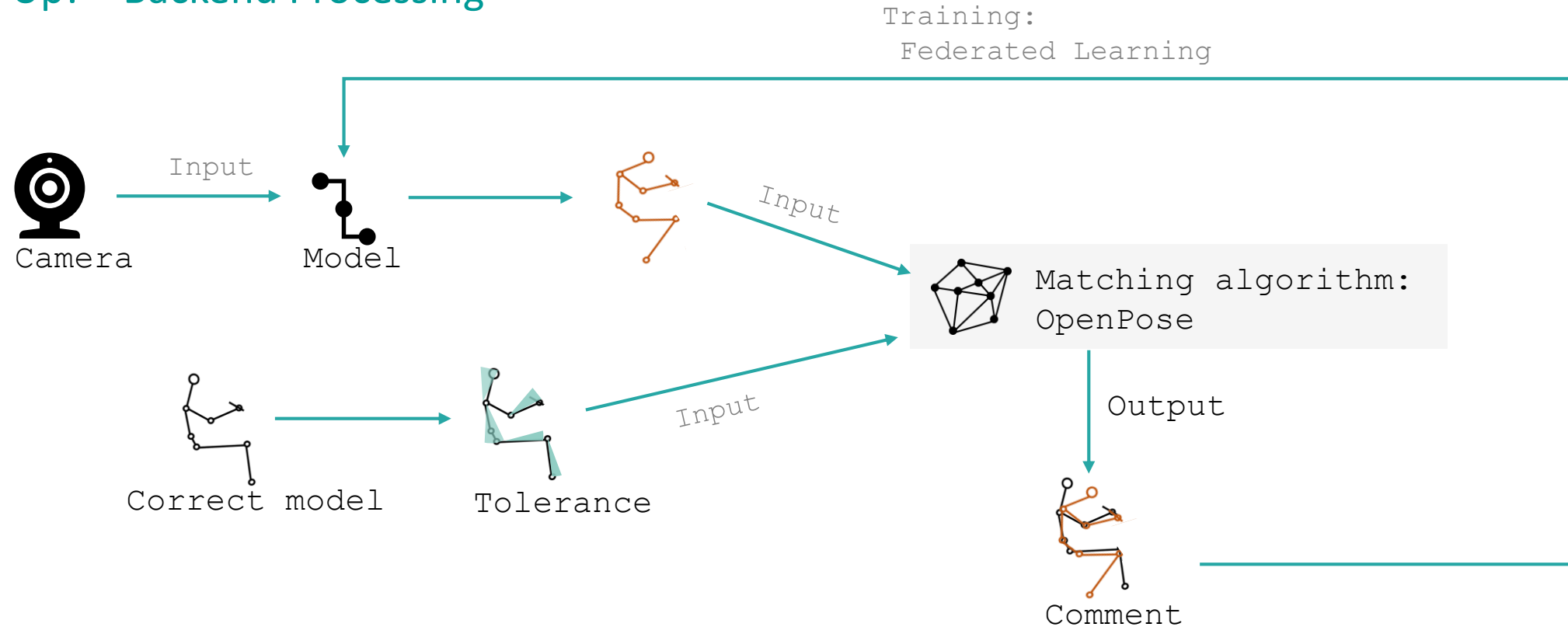
Right posture time Wrong posture time



Cross-platform Frontend Tool: Ionic

THE PROCESS OF USE

Sit-Up! – Backend Processing



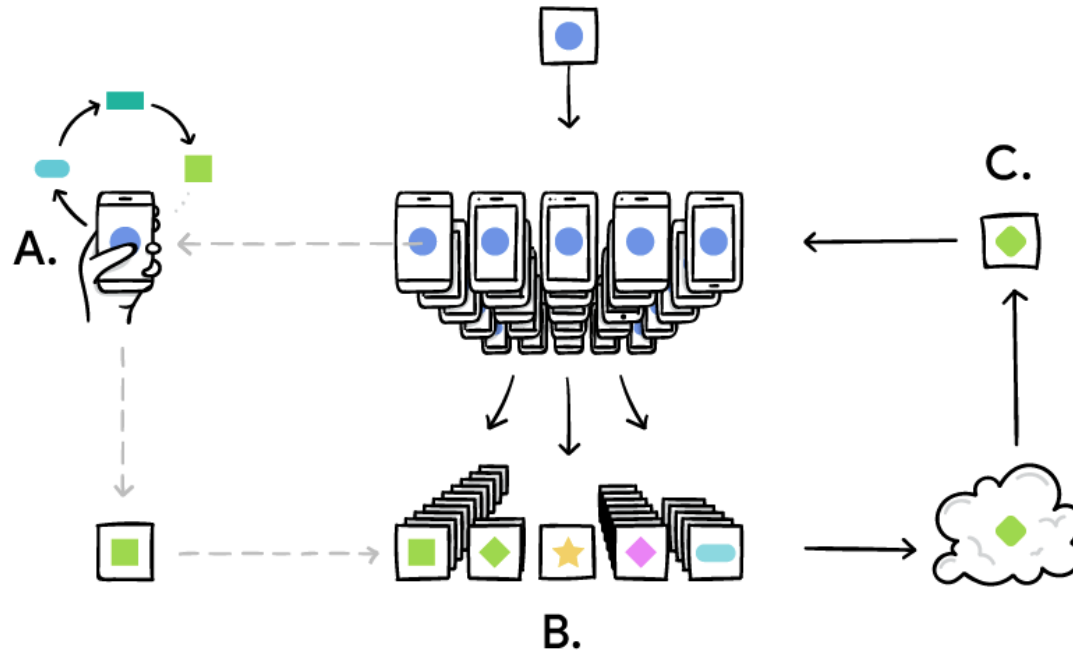
Dataset: COCO dataset

Algorithm: OpenPose

Accuracy: 80+% for each individual joint

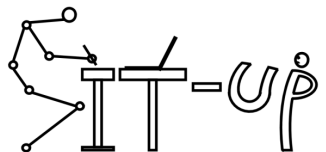
COUNTERING SURVEILLANCE CRISIS

Federated Learning ensures Security and Privacy



Algorithm:

Federated Stochastic Gradient Descent (FedSGD)



PRODUCT ADVANTAGE

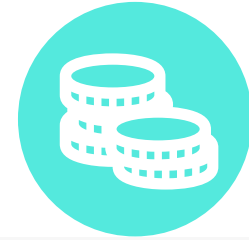
Sit-Up! - The AI-powered device can achieve:



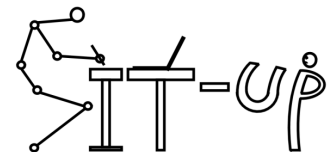
**Simple
&
Flexible**



**Robust
&
Accurate**



Cost-effective



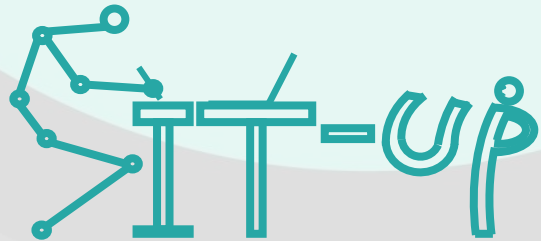
DEMO

Sit-Up! – Presenting





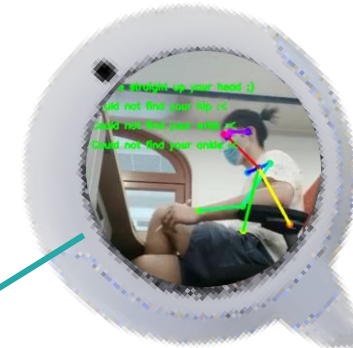
Q&A



Not Just Demo! Checkout our FULLY functional product at:
<https://github.com/yAya-yns/Sit-up.git>

APPENDIX

- Real Product



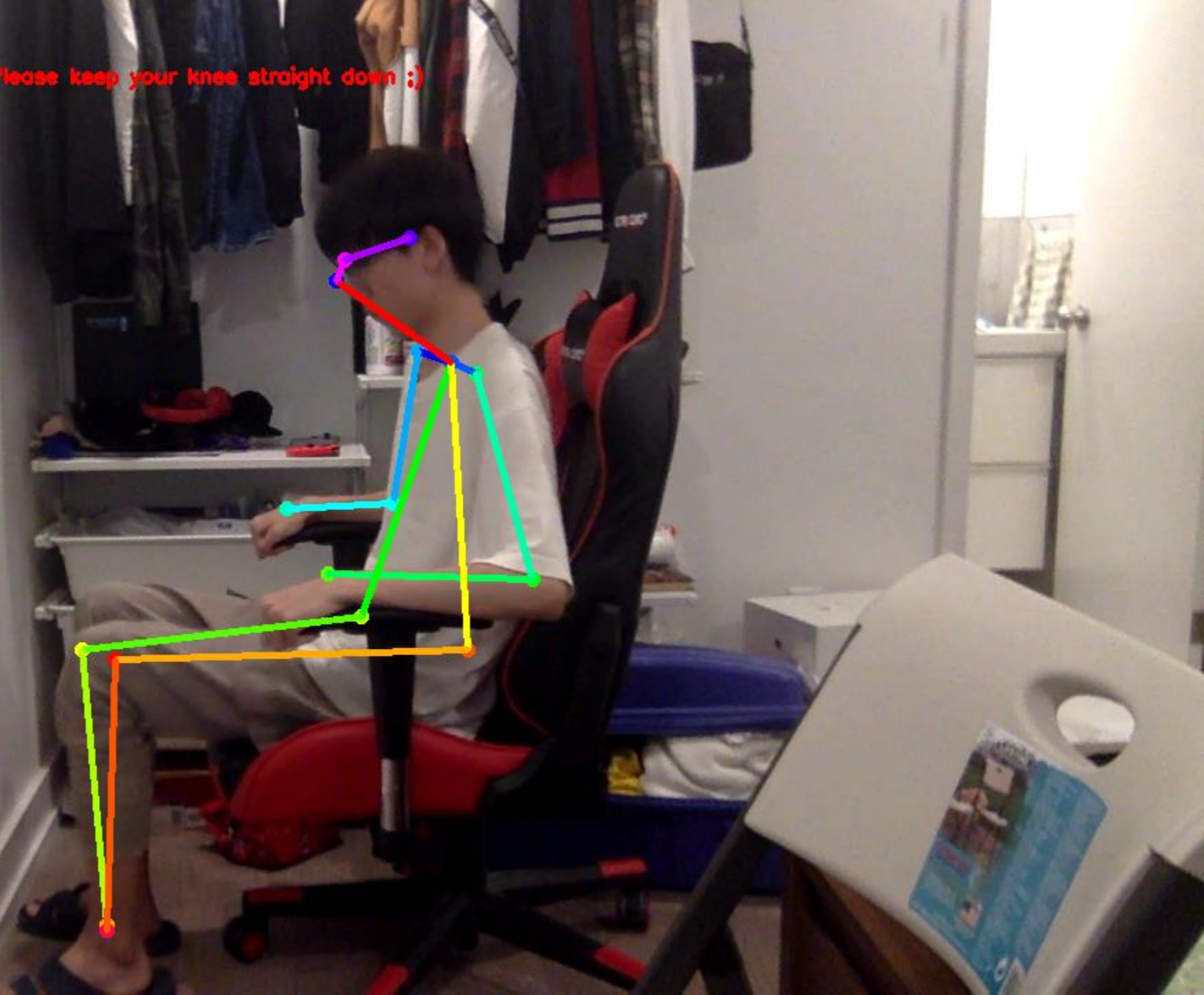
Flexible with Rotation, Round screen design and auto-calibration algorithm allows it to face up no matter how you orient it



APPENDIX

- Error Posture

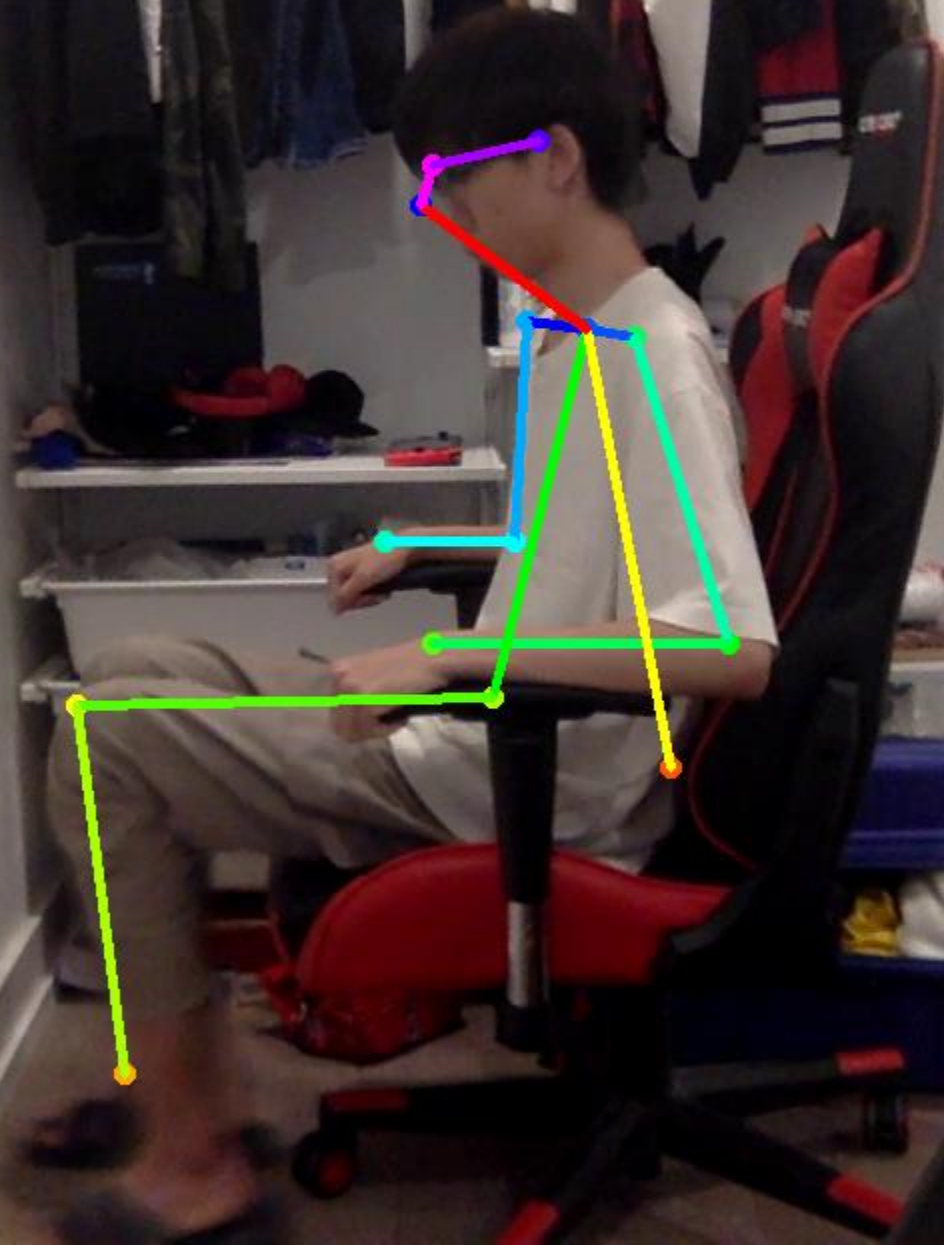
Please keep your knee straight down :)



APPENDIX

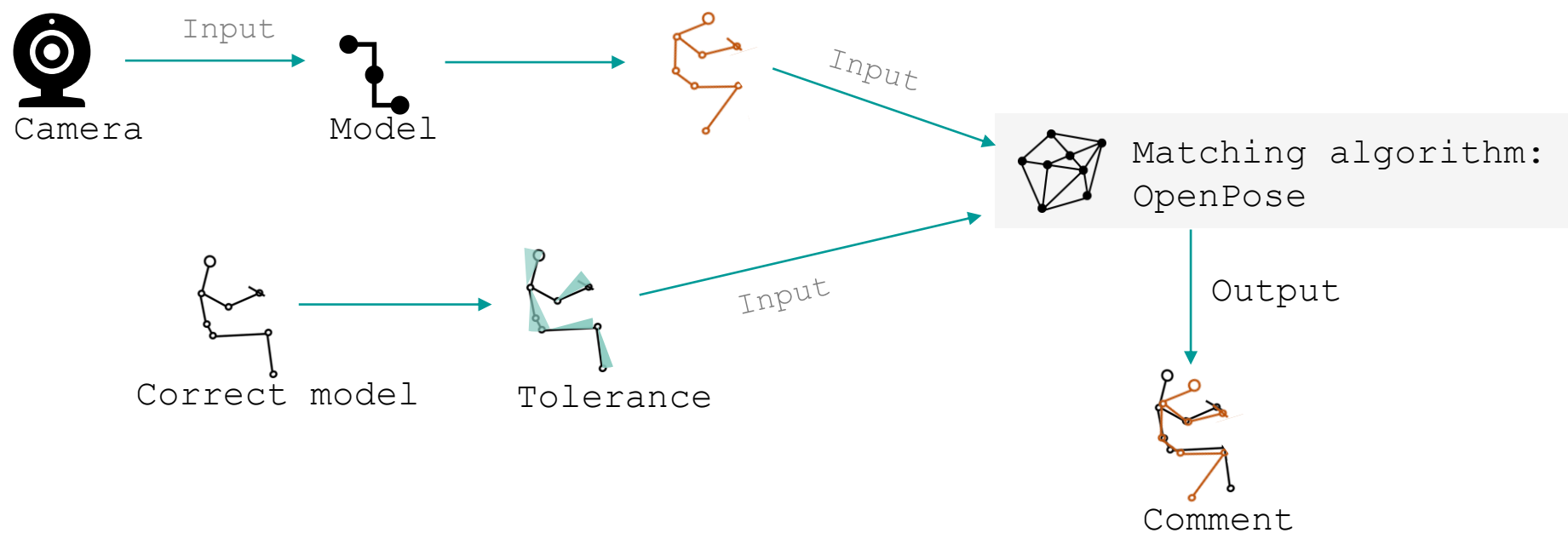
- Correct Posture

NICE SIT !!! KEEP IT UP :)



APPENDIX

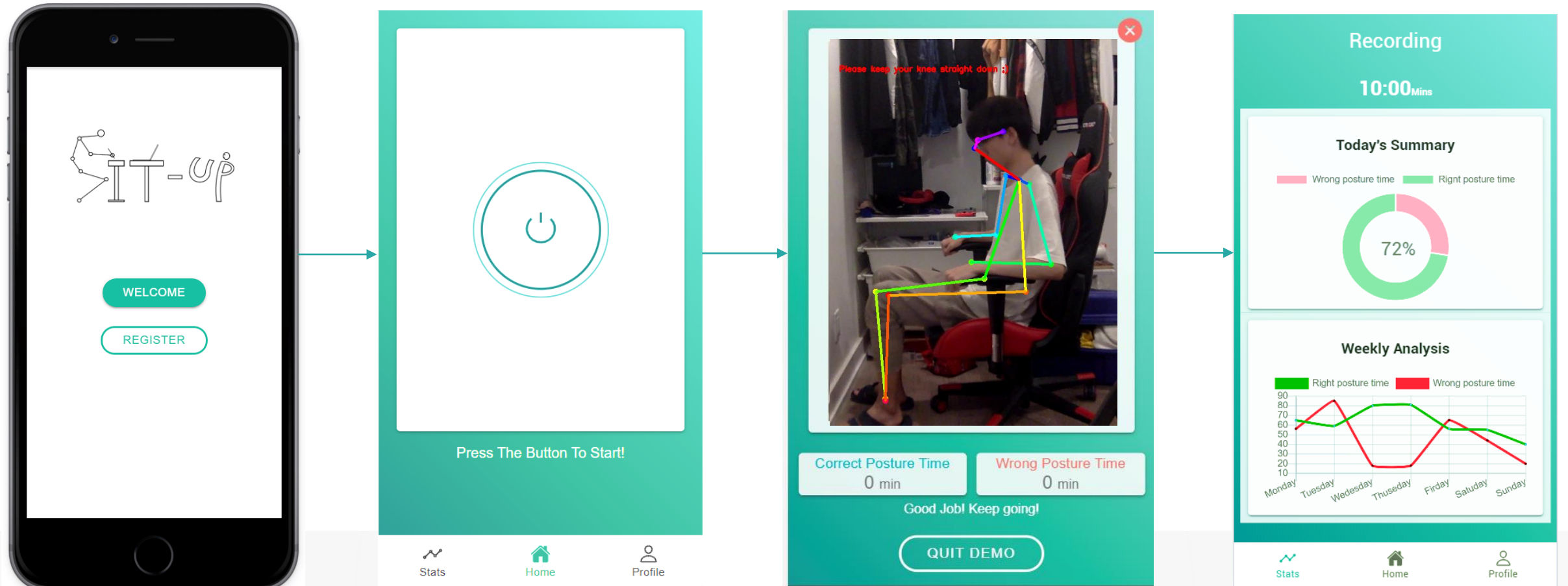
- Backend Process



Dataset: COCOdataset
Algorithm: OpenPose
Accuracy: 80+%

APPENDIX

- Demo app interface



APPENDIX

- Training Data

What is COCO?



COCO is a large-scale object detection, segmentation, and captioning dataset. COCO has several features:

- ✓ Object segmentation
- ✓ Recognition in context
- ✓ Superpixel stuff segmentation
- ✓ 330K images (>200K labeled)
- ✓ 1.5 million object instances
- ✓ 80 object categories
- ✓ 91 stuff categories
- ✓ 5 captions per image
- ✓ 250,000 people with keypoints



REFERENCE

Presentation

- <https://www.health24.com/Medical/Backache/Good-posture/Slouching-a-real-back-breaker-20120721>
- <https://www.mensjournal.com/health-fitness/4-reasons-stop-slouching/>
- <https://www.thegoodbody.com/back-pain-statistics/>
- <https://www.acatoday.org/Patients/What-is-Chiropractic/Back-Pain-Facts-and-Statistics>
- <https://www.therooststand.com/blogs/the-roost-blog/12381213-the-cost-of-poor-posture>
- <https://www2.deloitte.com/us/en/insights/industry/technology/technology-media-and-telecom-predictions/2020/ai-chips.html>
- <https://www.techinsights.com/blog/apple-iphone-5s-teardown>
- <https://ai.googleblog.com/2017/04/federated-learning-collaborative.html>
- <https://towardsdatascience.com/federated-learning-and-privacy-preserving-ai-fcddb426c5>

Backend

- https://cmu-perceptual-computing-lab.github.io/foot_keypoint_dataset/
- <https://arxiv.org/abs/1812.08008>
- <https://github.com/CMU-Perceptual-Computing-Lab/openpose>