슬라이드 1

Hello Everyone, We are the team "An Yang Gym". The research topic is Exercise Posture Assistance System. Listen carefully

슬라이드 2

I will give you an overview of what we have done with this research, what algorithms we've implemented, and what are the ways to make it better in the current situation. We will loot at the demo video.'

슬라이드 3

First, let me tell you the background of the study. These days, interest in health is increasing due to COVID-19, and interest in health is naturally growing. Also, as I become more interested in health, various YouTube contents come out, and people exercise together while watching the YouTube video. However, if you exercise alone, it is difficult to recognize whether you are exercising in the correct posture, and it is likely to cause muscle imbalance. It is important to exercise in an accurate posture because even a single group of muscle imbalances breaks down the balance of the entire body.

슬라이드 4

To solve this problem, we have established a posture assistance system using Deep Learning. Here we used pre-trained MoveNet. MoveNet is a single pose estimation deep learning model based on MobileNet V2 and pre-trained with COCO Dataset. This model allows you to obtain positions for each of the 17 joints in Real-Time.

슬라이드 5

This is model structure and keypoint mAP of COCO dateset

슬라이드 6

First, enter the number of exercises you do before exercising. Then, get starting posture correction in real time and give feedback to correct starting posture. If you're in the right startubg posture, you start exercising. Measure the balance in real time when exercising and measure the number of exercises in good posture and bad posture based on the balance. When the number of exercises in the correct posture is filled, the results of the exercise are displayed. Finally, show the best and worst posture, and show correct, incorrect number of exercises. If the user wants to lower their hand or change the exercising number, they will reset it.

슬라이드 7

The FlowChart for this algorithm is as follows: Get the pre-trained MoveNet model after receiving the user's purpose number. Then read the video source and get the position for each joint according to the prediction from the model. If both wrists are above the elbow, perform the processing below, otherwise return to the beginning. And adjust the starting position through the slope between the shoulder and wrist joints on both sides. After that, when exercise begins, the balance is calculated in real time as a relative ratio to both wrist positions, and feedback on the posture is given in real time. Measure the number of exercises for good posture and bad posture using the flag according to the position between both Elbow and Shoulder. If the number of exercises in a good posture reaches the purpose number, the results are printed.

슬라이드 8

We analyzed the possibility of development while implementing this algorithm. First, the MoveNet is a single pose estimation model, so it is difficult to analyze when there are several people in the video. This can be resolved using the Multiple pose estimation model. Second, it needs to be processed when not recognizing the user's joint. We corrected it through the number of frames, but if we pre-process it in a more sophisticated way, it will be a better application. Finally, we only deal with one movement called lat-pull-down, and we can increase versatility by processing various movements.

슬라이드 9

This is Demo Video

슬라이드 10

And this is result of exercise

Thank you