


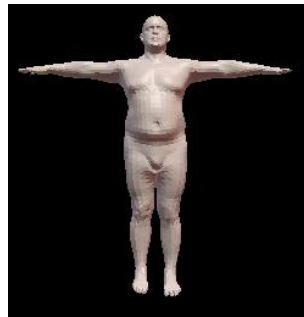
Biweekly Research Progress Report

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Period	:	Week 4~5	
WBS	:	AI모델 테스트	

Research Results in This Biweek

Conv_BodiEs AI 모델 학습:

데이터:



예시) 학습 및 시험 데이터/smpl

- 원천 데이터: 5만개/male
- 학습 데이터: 4만개
- 학습률: 10^{-4}
- 손실함수: L1loss
 $(L_1 = \sum_{i=1}^n |y_i - f(x_i)|)$
- 활성화함수: Relu
- Epoch: 300

Conv_BodiEs 아키텍처 code:

```
1 class Conv_BoDiEs(nn.Module):
2     def __init__(self):
3         super(Conv_BoDiEs, self).__init__()
4
5         self.conv1 = nn.Sequential(
6             nn.Conv2d(1, 256, kernel_size=5, padding=2),
7             nn.ReLU(),
8             nn.MaxPool2d(kernel_size=2, stride=2)
9         )
10
11        self.conv2 = nn.Sequential(
12            nn.Conv2d(256, 128, kernel_size=5, padding=2),
13            nn.ReLU(),
14            nn.MaxPool2d(kernel_size=2, stride=2)
15        )
16
17        self.conv3 = nn.Sequential(
18            nn.Conv2d(128, 64, kernel_size=5, padding=2),
19            nn.ReLU(),
20            nn.MaxPool2d(kernel_size=2, stride=2)
21        )
22
23        self.conv4 = nn.Sequential(
24            nn.Conv2d(64, 32, kernel_size=3, padding=1),
25            nn.ReLU(),
26            nn.MaxPool2d(kernel_size=2, stride=2)
27        )
28
29        self.flatten = nn.Flatten()
30
31        # Calculate the flattened size
32        # Input size is (b, 32, 12, 12) after conv4 and maxpool
33        flattened_size = 32 * 12 * 12
34
35        self.fc1 = nn.Sequential(
36            nn.Linear(flattened_size, 128),
37            nn.ReLU()
38        )
39
40        self.fc2 = nn.Linear(128, 16)
41
42    def forward(self, x):
43        x = self.conv1(x)
44        x = self.conv2(x)
45        x = self.conv3(x)
46        x = self.conv4(x)
47        x = self.flatten(x)
48        x = self.fc1(x)
49        x = self.fc2(x)
50        return x
```

결과:

Body part	Actual_1	Prediction_1	Actual_2	Prediction_2	MAE [cm]
chest circ	97.47406	97.33069	94.35966	93.44046	0.9335
waist circ	84.55708	83.57465	78.13094	76.31371	0.8838
pelvis circ	99.24985	98.75048	91.51127	92.60078	0.9297
neck circ	38.61728	39.38307	36.35854	37.51544	0.5879
bicep circ	27.19982	27.43615	25.92331	25.7939	0.4698
thigh circ	48.74472	49.19843	45.94247	46.90691	0.8427
knee circ	36.97505	37.03225	34.04455	34.10705	0.5327
arm length	54.18272	54.04683	52.36208	52.30029	0.2533
leg length	79.19997	79.56876	80.32672	80.92329	0.3774
calf length	41.19234	41.46789	41.76435	42.01006	0.2493
head circ	56.97601	56.76243	54.04915	54.59078	0.4121
wrist circ	16.61359	16.69334	17.1047	16.97884	0.3043
arm span	183.7779	183.1149	180.8999	180.5461	0.4449
shoulders width	38.8159	38.61305	36.8861	36.91258	0.3134
torso length	50.0706	50.60609	49.7317	49.828	0.4467
inner leg	75.3142	74.15987	75.1163	76.38044	0.8783
MAE(total)					5.537[mm]

Research Items in Next Biweek

- 3D 모델 프로그램을 위한 하드웨어설계 및 제품 구매
 - Conv_BoDiEs AI 모델 실제 데이터 TEST
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Issues and Overall Progress

- WBS progress : 30%
- 스마트 미러 제작 필요/필름 붙이기
