What Face and Body Shapes Can Tell Us About Height

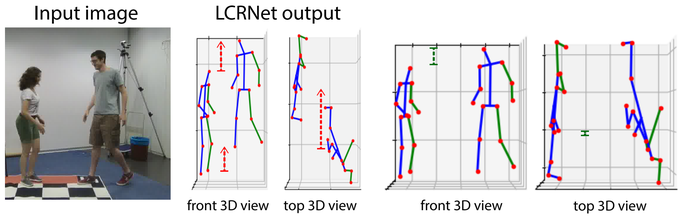
Semih Günel[1], Helge Rhodin[1,2] and Pascal Fua[1]

[1]Computer Vision Lab, EPFL, Lausanne, Switzerland

[2]UBC, Vancouver, Canada

Problem

- 3D Pose estimation methods not do not recover the **correct scales** (marked in red). Correct scales are shown in green.



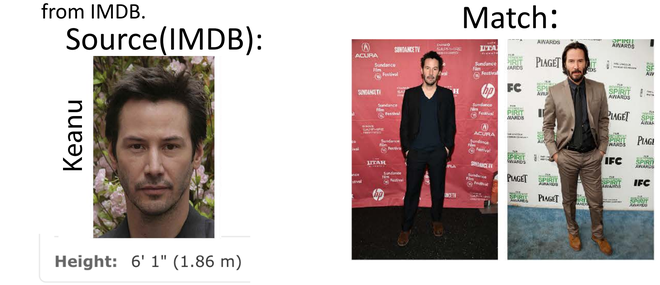
- Current datasets do have enough subject variability with known height to generalize on height (or scale) prediction task.

Dataset	H3.6M	HumanEva	MPII-INF-3DHP	IMDB-100K (Ours)
# Subjects	11	4	8	12,104

- The field needs a better dataset with more subjects with known heights. **We provide IMDB-273K dataset to the community.**

Dataset Collection (IMDB)

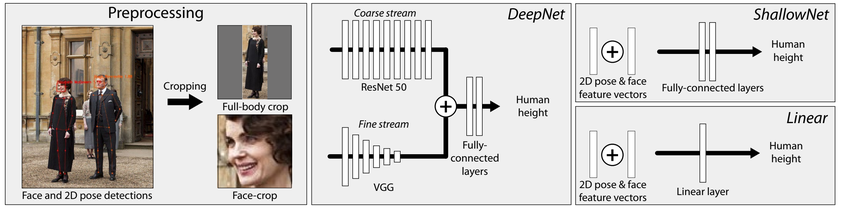
- Identity matching using SOTA face recognition using IMDB profile image. Matching propagates the height information, which is taken from IMDB.



Dataset

- Includes **12,104 subjects** with known height. This is **three magnitudes larger** than current datasets!
- **273K images** with at least a person with known height!
- Calculated pose, identities and bounding boxes for **1,000,000 images.**

Network



Evaluation *(ground-truth/prediction)*

Results

- **Larger datasets improve the results** (Figure 2).
- However, **scale-depth ambiguity continues in the age of deep learning** (Figures 1&3).
- Future work: combine shape and segmentation tasks into height prediction.

Method	*IMDB-100K* all	*IMDB-100K* women	*IMDB-100K* men	*Lab-test* all
ConstantMean	8.25	7.46	9.22	11.0
GenderPred	6.61	6.28	7.12	9.26
PoseNet [20]	-	-	-	10.65
DeepNet (ours)	**6.14**	**5.88**	**6.40**	**9.13**
GenderMean	5.91	5.63	6.23	8.66
DeepNet (gender-specific)	**5.56**	**5.23**	**6.03**	**8.53**

(a)

Input features	Regression type: Linear	*ShallowNet*	*DeepNet*
Body crop only	7.56 / 11.10	7.10 / 10.40	6.40 / 9.43
Face crop only	6.49 / 10.25	6.31 / 9.99	6.25 / **8.87**
Body and Face	6.40 / 10.2	6.29 / 9.92	**6.14** / 9.13

(b)

Figure 1

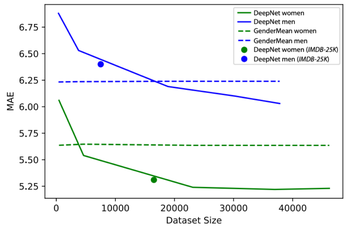


Figure 2

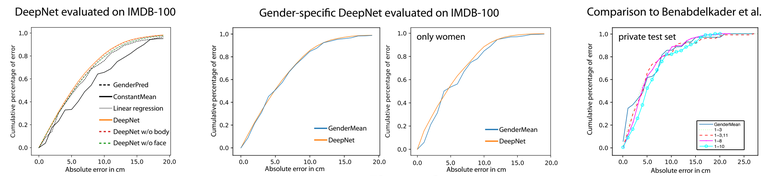


Figure 3

Dataset is available upon request: semih.gunel@epfl.ch