

Introduction to Biometrics

# Progress Presentation

## Disentangled Representation Learning in Face Recognition

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İpek Erdoğan

# Outline

- ❖ Problem definition
- ❖ Methodology
- ❖ Datasets
- ❖ Preliminary Results

# What is the problem?

The result gets affected from the redundant attributes of subjects.

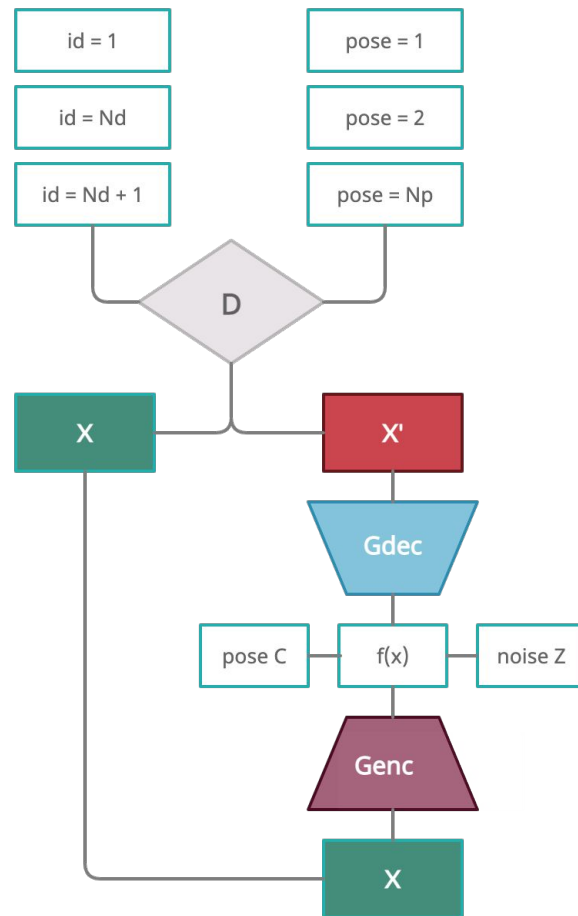
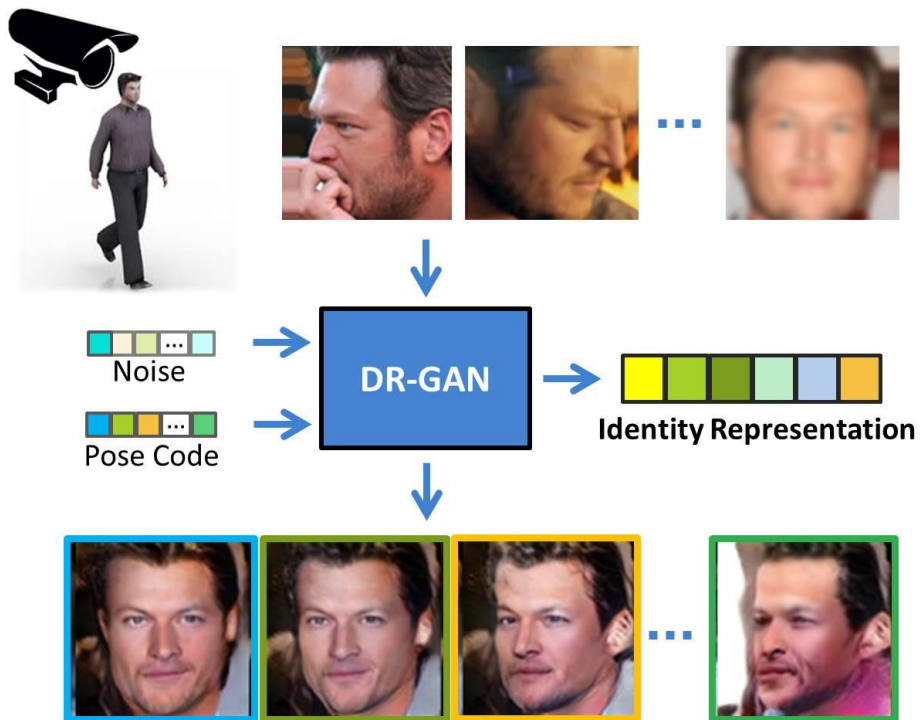
“Focusing on the wrong side”

Solution: Learning representations in more specific ways for specific tasks.

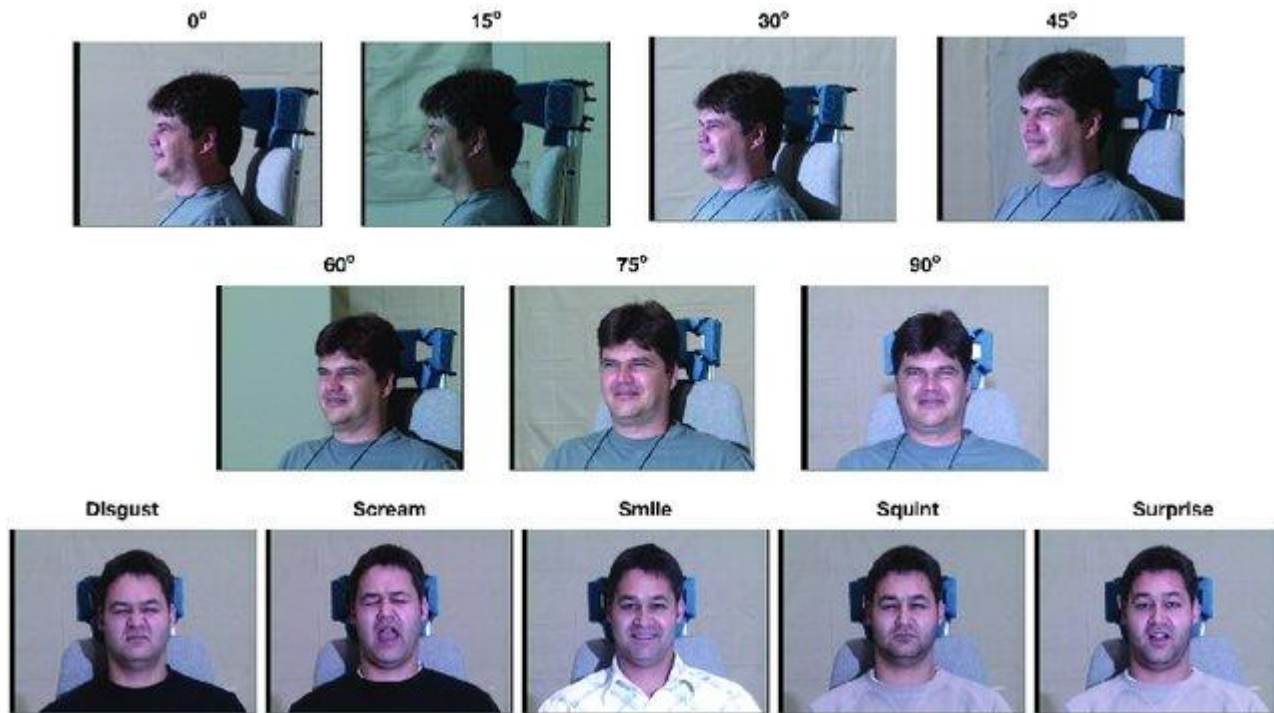
- ❖ View invariant pose estimation
- ❖ Identity invariant action recognition
- ❖ Appearance invariant gait recognition
- ❖ **Pose invariant face recognition**

**“Disentangled Representation Learning GAN for Pose-Invariant Face Recognition”**

# Method



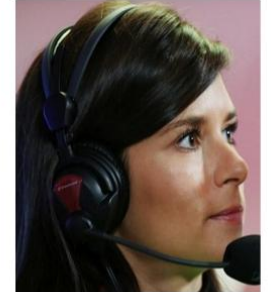
# Dataset (Training) (Multi-PIE)



# Dataset (Training) (CASIA-WebFace)



# Dataset (Testing) (Celebrities in Frontal-Profile in the Wild)





# Dataset (Testing) (IJB-A)





# Preliminary Results (Qualitative)



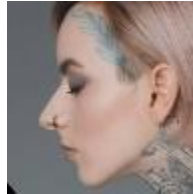
**Original Input**



**Cropped**



**Frontalized**



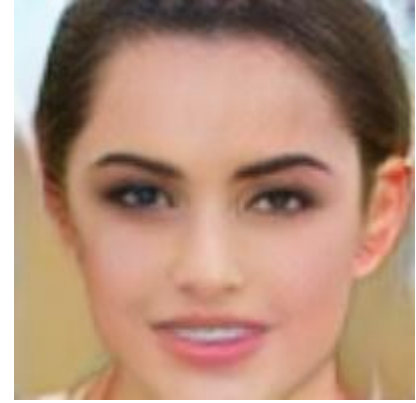
# Preliminary Results (Qualitative)



**Original Input**



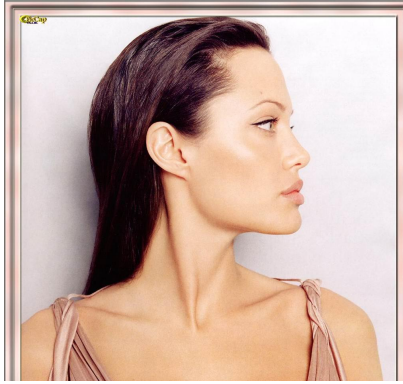
**Cropped**



**Frontalized**



# Preliminary Results (Qualitative)



**Original Input**



**Cropped**



**Frontalized**



# Preliminary Results (Qualitative)



**Original Input**



**Cropped**



**Frontalized**



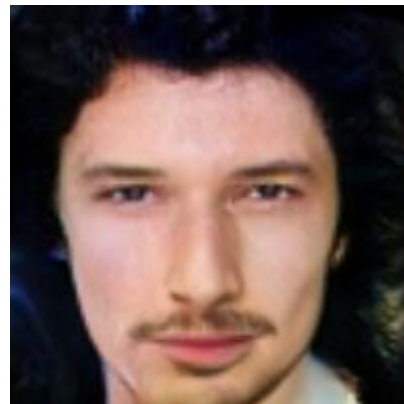
# Preliminary Results (Qualitative)



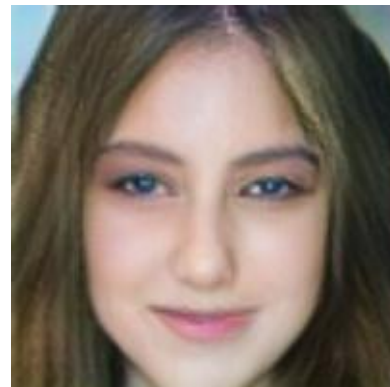
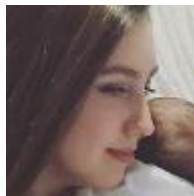
**Original Input**



**Cropped**



**Frontalized**



# References

- [1] L. Tran, X. Yin and X. Liu, "Disentangled Representation Learning GAN for Pose-Invariant Face Recognition," 2017 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2017, pp. 1283-1292, doi: 10.1109/CVPR.2017.141.
- [2] Gross, R., Matthews, I., Cohn, J., Kanade, T., & Baker, S. (2010). Multi-PIE. Proceedings of the ... International Conference on Automatic Face and Gesture Recognition. IEEE International Conference on Automatic Face & Gesture Recognition, 28(5), 807–813. <https://doi.org/10.1016/j.imavis.2009.08.002>
- [3] Yi, D., Lei, Z., Liao, S., & Li, S. (2014). Learning Face Representation from Scratch. ArXiv, abs/1411.7923.
- [4] S. Sengupta, J.C. Cheng, C.D. Castillo, V.M. Patel, R. Chellappa, D.W. Jacobs, Frontal to Profile Face Verification in the Wild, IEEE Conference on Applications of Computer Vision, 2016.
- [5] B. F. Klare et al., "Pushing the frontiers of unconstrained face detection and recognition: IARPA Janus Benchmark A," 2015 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2015, pp. 1931-1939, doi: 10.1109/CVPR.2015.7298803.