Doctoral School of Information and Biomedical Technologies Polish Academy of Sciences (TIB PAN)

SUBJECT: Anatomical and behavioral silhouette biometrics for age and activity determination with application to detection of illegal internet contents.

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DESCRIPTION: Silhouette biometrics has multiple applications in human recognition with applications in various tasks related to human behavior, from forensics surveillance and border control to elderly assistance. We propose to analyze static and dynamic silhouette properties by using both deep neural networks and long-short time memory networks to model skeleton properties. We thus recognize the age and certain human activities to aid in detection of certain internet contents. In particular, this may be applied to recognition of NSFW (non-suitable for work) material and illegal contents, in particular CSAM (child sexual abuse material).

BIBLIOGRAPHY: Selected references

Rashmi M., Guddeti R.M. (2022). Human identification system using 3D skeleton-based gait features and LSTM model. J. of Visual Communication and Image Representation 82, 103416

Hoang V.-N., e.a. (2019), 3D skeleton-based action recognition with convolutional neural networks. 2019 Int. Conf. on Multimedia Analysis and Pattern Recognition MAPR, pp. 1-6

B., Han e.a. (2019), A real-time and hardware-efficient processor for skeleton-based action recognition with lightweight convolutional neural network. IEEE Trans. Circuits Syst. II Express Briefs, 66 (12), pp. 2052-2056

Wan C., Wang L., Phoha V.V. (2018), A survey on gait recognition. ACM Comput. Surv. 51 (5)

D. Kastaniotis e.a. (2013), Gait-based gender recognition using pose information for real time applications. 2013 18th Intern. Conf. on Digital Signal Processing, DSP, pp. 1–6.

Inoue M., Inoue S., Nishida T. (2018), Deep recurrent neural network for mobile human activity recognition with high throughput. Artif. Life Robot 23(2):173–185

Li C. e.a. (2017), Skeleton-based action recognition using lstm and cnn. In: 2017 IEEE Intern. Conf. on multimedia & expo workshops (ICMEW). IEEE, pp. 585–590

Zhang X e.a (2019), Graph edge convolutional neural networks for skeleton-based action recognition. IEEE Trans. Neural Network Learning Systems 31:3047–3060

Xiaofei Qin e.a. (2022), An efficient self-attention network for skeleton-based action recognition. <u>Scientific</u> <u>Reports</u> 12, Art 4111

J. Ren e.a. (2018), An Investigation of Skeleton-Based Optical Flow-Guided Features for 3D Action Recognition Using a Multi-Stream CNN Model. *2018 IEEE 3rd Int. Conf. on Image, Vision and Computing (ICIVC)*, pp. 199-203