

Doctoral School of Information and Biomedical Technologies Polish Academy of Sciences

Domain: IT

Research area: Image segmentation – combining neural and semantic approaches

Supervisor(s), contact(s): Marcin Paprzycki/Maria Ganzha
{marcin.paprzycki,maria.ganzha}@ibspan.waw.pl

Assistant supervisor(s), contact(s): TBD

Place of research: Systems Research Institute Polish Academy of Sciences

Recruitment & Selection: Interview

Number of positions: 1

Research Area Description:

Current developments in the area of, broadly understood, neural networks find them to be relatively successful in the task of image segmentation (for any domain where such segmentation is needed). Frequently, neural networks, such as R-CNN [1], SegNet or U-Net [2] are used in this context. However, nowadays, it becomes clear that using neural networks alone will not bring about the needed breakthroughs. Hence, the idea of combining neural and semantic technologies.

Doctoral research will follow ideas outlined in [3], where an initial attempt at application of semantic technologies to image processing has been outlined. The expected final result will be a working hybrid neuro-semantic system for image processing.

References:

- [1] He K, Gkioxari G, Dollar P, Girshick R. Mask R-CNN. In: IEEE International Conference on Computer Vision; 22-29 Oct. 2017; Venice, Italy: IEEE, 2980-2988.
- [2] Chen L.C, Zhu Y, Papandreou , Schroff F, Adam H. Encoder-Decoder with Atrous Separable Convolution for Semantic Image Segmentation. In: 15th European Conference on Computer Vision ECCV; 8-14 Sep. 2018,; Munich, Germany: Springer, 833-851.
- [3] Combining semantic technologies with a content-based image retrieval system – Preliminary considerations, October 2017, AIP Conference Proceedings 1895(1):100001, DOI: 10.1063/1.5007405
- [4] Jaworska T. Object extraction as a basic process for content-based image retrieval (CBIR) system. Opto-Electronics Review. 2007 Dec., 184-195.
- [5] Rhu M, Gimelshein N, Clemons J, Zulfiqar A, Keckler S.W. Virtualized Deep Neural Networks for Scalable, Memory-Efficient Neural Network Design. In: the 49th IEEE/ACM International Symposium on Microarchitecture (MICRO-49); 15-19, Oct. 2016; Taipei, Taiwan: IEEE/ACM, 1-13.

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