Semantic segmentation with deep convolutional networks

Project topic and short description

Convolutional networks showed great performances in many different fields, and especially in image processing. Motivated by [1, 2] in this project we will be doing semantic segmentation with deep convolutional networks. The goal of semantic segmentation is to assign a category/class to each pixel in an image. Semantic segmentation is going to have an essential role in autonomous driving and intelligent transportation systems as well as in other automation tasks where semantic information is important. First we will be working with the Stanford Background Dataset [3], and later, if enough time left, we will also try our model on Cityscapes Dataset [4]. At the end, we hope to get performances comparable to those presented in the original scientific papers.

Project breakdown into tasks

The tasks that should be completed are:
1. Research
2. Learning about TensorFlow
3. Creating a deep convolutional model
4. Training the model
5. Evaluation of the model

Project results and deliverables

The result of the project should be a working system for semantic segmentation based on a deep convolutional network. Result of our work will be presented on the project presentation in the end of the semester.

Team member assignments and tentative time schedule

	Research (due 23.10.)	Learning about TensorFlow (due 30.10.)	Creating a deep convolutional model (due 25.11.)	Training and fine tuning of the model (due 10.12.)	Evaluation of the model (due 15.01.)	Writing the technical report (due 24.01.)
Ivan Grubišić	✔		✔	✔	✔	✔
Annie Kovač	✔	✔	✔		✔	✔
Josip Šarić	✔	✔	✔	✔		✔

References

[1] J. Long, E. Shelhamer, and T. Darrell, "Fully convolutional networks for semantic segmentation," in *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, 2015, pp. 3431–3440. URL: https://www.cv-foundation.org/openaccess/content_cvpr_2015/html/Long_Fully_Convolutional_Networks_2015_CVPR_paper.html

[2] A. Chaurasia and E. Culurciello, "LinkNet: Exploiting Encoder Representations for Efficient Semantic Segmentation," *arXiv:1707.03718 [cs]*, Jun. 2017. URL: https://arxiv.org/abs/1707.03718

[3] "DAGS - Daphne Koller's Research Group." URL: http://dags.stanford.edu/projects/scenedataset.html.

[4] M. Cordts *et al.*, "The Cityscapes Dataset for Semantic Urban Scene Understanding," *arXiv:1604.01685 [cs]*, Apr. 2016. URL: https://arxiv.org/abs/1604.01685