

# Project Proposal - Bayesian SegNet

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## 1 Proposal

Recently, Deep Learning has gained a high amount of attention Computer Vision community. Deep Learning based methods achieve state-of-the-art results in many problems like classification, segmentation, object detection etc. Many recent papers show that these applications benefits from Multi-Task learning, although at an expense of tuning one more hyper-parameter, i.e. relative weights of these tasks, as the final performance highly correlates with these task specific weights. In a recent paper by Kendall et al. ([1]), authors show that these task specific weights can be learned directly by an optimization. They correlate this weight learning process in a multiple task learning problem with the homoscedastic uncertainty of each task, and show that the weights learned using this methods gives better performance than manually-tuned task weights. They experiment on CityScape Dataset for tasks of per-pixel depth regression, semantic and instance segmentation from a monocular input image.

In this project, we will try to re-produce some results of this paper. Specifically, Table-1 from the paper in which experiments where performed on tiny-CityScape dataset (downsampled by factor of 8). We will not be able to reproduce Table-2 from the paper, which uses full-scale CityScape dataset as Training time for that is 5 days on four NVIDIA 1080Ti GPUs.

## References

1. Kendall, A., Gal, Y. and Cipolla, R., 2018. Multi-task learning using uncertainty to weigh losses for scene geometry and semantics. In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (pp. 7482-7491).