Errata and Addenda For My Articles

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Contents

1   Uncertainty in Real-Time Semantic Segmentation on Embedded Systems

Corrected in arXiv version of paper

Eq.6 $p(\mathbf{w}|\mathbf{X}, \mathbf{Y}, \theta) \propto \left[\prod_{i=0}^{N-1} \mathcal{N}\left(\mathbf{y}|f(\mathbf{x}_i; \theta)\mathbf{w}, \sigma^2 \right) \right] p(\mathbf{w})$.

Eq.10 and 12 should read $\sigma_N^2(\hat{\mathbf{x}}) = \sigma^2 + \Phi(\hat{\mathbf{x}})^T \Sigma_\pi \Phi(\hat{\mathbf{x}})$ and $\sigma_N^2(\hat{\mathbf{x}}) \approx \sigma^2 + \Phi(\hat{\mathbf{x}})^T \Sigma_{\text{diag}} \Phi(\hat{\mathbf{x}})$

Eq. 15: The approximation from ref [34] in the paper provides the Taylor Series approximation of $\mathcal{N}\left(\frac{\mu_j}{\mu_d}, \frac{\mu_j^2}{\mu_d^2}\left(\sigma_j^2/\mu_j^2 + \sigma_d^2/\mu_d^2 \right) \right)$. The issue with this is the square of the μ_d terms, as this is at risk of numerical overflow in single-point precision. Instead we use $\sigma^2 \approx \mu_j/\mu_d \sqrt{\sigma_j^2 + \sigma_d^2}$, which emperically follwed a similar trend and was less of a risk for numerical overflow (though not immune).

In Table 1, predictive performance metrics for PIDNet used the pre-trained weights from the official repo for the testing set of CityScapes, which appears to have included the validation data during training. The mIOU for PIDNet and Bayes-PIDNet with the weights for the validation set are 0.761 and 0.758 respectively.

2   Piecewise Deterministic Markov Processes for Bayesian Neural Networks

Corrected in arXiv version of paper

Eq. 11: $t_i = -b_i/a_i + \sqrt{b_i^2 + a_i^2 t_{i-1}^2 + 2a_i b_i t_{i-1} - 2a_i log(1 - U)})/a_i$

Bug: When preparing my thesis, I found a bug in the code where gradients were not being appropriately scaled by the mini-batch and dataset size. Experiments rerun with results on arXiv. I also added some clarification to the event rate sampling algorithm which clarifies some of the results of how thinning work. This is captured by the R term in Algorithm 2, and we explore this more in Appendix A. Code updated on Github as well.

3   Bayesian Neural Networks: An Introduction and Survey

Corrected on arXiv

For the α divergence on page 31, the limits to relate to forward/reverse KL divergence and Hellinger distance were not correct. It should be, $KL(q|p) : \alpha \to 0, KL(p|q) : \alpha \to 1$, Hellinger: $\alpha \to 0.5$.