Supplementary Material for Deep Graph Matching via Blackbox Differentiation of Combinatorial Solvers

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Ablation Studies

To isolate the impact of single components of our architecture, we conduct various ablation studies. The results on Pascal VOC are summarized in Tab. S1 where large performance differences are highlighted.

Global Features / Fixed Affinity Influence of the global feature vector is removed. In (8), we use a single learnable vector a instead of one-layer NN of g.

VGG Fine-Tuning / Frozen VGG VGG pretrained on ImageNet [16] is used without fine-tuning. This ablation is in particular important for a fair comparison with DGMC [23] where not fine-tuning is applied as well.

Quadratic Costs / Unary Costs The matching instances consist only of unary costs c^v. The quadratic costs c^e are set to zero.

Comparison to Sinkhorn We use Sinkhorn normalization [1, 47] instead of the solver. We only obtained good performance after increasing an internal constant ε (intended to prevent division by zero) (from 10^{-8} to 10^{-4}). We believe this is connected to issues with "vanishing gradient" that were also reported in [23, 63].

Table S1: Ablations of BB-GM on Pascal VOC. Large performance differences are highlighted. Statistics is over 5 restarts.

Ablation																				Mean
Unmodified	62.0	77.0	76.4	75.9	89.1	93.7	88.6	80.0	56.6	78.2	81.3	79.0	77.1	77.6	64.3	97.0	78.3	78.4	97.9	94.6	80.1 ± 0.3
Fixed Affinity	59.1	73.9	75.6	73.7	87.2	88.4	86.4	77.7	55.2	76.2	74.7	77.4	78.1	77.1	62.7	96.3	75.2	73.1	96.3	94.4	77.9 ± 0.7
Frozen VGG	57.8	73.5	75.2	77.5	87.2	92.4	87.1	79.0	59.1	77.8	77.4	77.9	77.0	77.4	63.0	96.9	75.8	72.7	97.5	94.6	78.9 ± 0.5
Unary Costs	60.7	74.4	77.2	78.0	87.0	92.3	89.6	80.4	55.5	77.3	65.2	79.0	79.2	77.2	63.0	97.0	75.8	73.3	96.0	93.6	78.6 ± 0.4
Sinkhorn	62.5	73.9	74.3	75.3	88.3	94.3	88.9	76.9	51.6	75.8	68.8	77.0	75.3	78.3	60.2	97.7	75.8	71.3	97.8	94.6	77.9 ± 0.5