CC-LOSS: CHANNEL CORRELATION LOSS FOR IMAGE CLASSIFICATION

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Motivation





Related Work



[1]Yandong Wen, Kaipeng Zhang, Zhifeng Li, and Yu Qiao, "A discriminative feature learning approach for deep face recognition," in ECCV, 2016.

[2]Weiyang Liu, Yandong Wen, Zhiding Yu, Ming Li, Bhiksha Raj, and Le Song, "Sphereface: Deep hyper- sphere embedding for face recognition," in CVPR, 2017.

[3]Hao Wang, Yitong Wang, Zheng Zhou, Xing Ji, Dihong Gong, Jingchao Zhou, Zhifeng Li, and Wei Liu, "Cos- face: Large margin cosine loss for deep face recogni- tion," in CVPR, 2018.

[4] Jiankang Deng, Jia Guo, Niannan Xue, and Stefanos Zafeiriou, "Arcface: Additive angular margin loss for deep face recognition," in CVPR, 2019.

[5] Le Hui, Xiang Li, Chen Gong, Meng Fang, Joey Tianyi Zhou, and Jian Yang, "Inter-Class Angular Loss for Convolutional Neural Networks," in AAAI, 2019.

[6]Xinran Wei, Dongliang Chang, Jiyang Xie, Yixiao Zheng, Chen Gong, Chuang Zhang, and Zhanyu Ma, "FICAL: Focal Inter-Class Angular Loss for Image Classification," in VCIP, 2019.

[7]Tsung-YiLin, PriyaGoyal, RossGirshick, KaimingHe, and Piotr Dolla ´r, "Focal loss for dense object detection," in *ICCV*, 2017.

Proposed Method





Experiment Results

Loss Function	Backbone Model	MNIST	CIFAR-100	Cars-196
CE Loss	VGG16/ResNet18	97.43/97.52	74.49/77.38	88.02/85.77
Focal Loss	VGG16/ResNet18	97.64/97.68	74.46/77.63	88.21/85.98
A-softmax Loss	VGG16/ResNet18	98.10/98.32	74.55/77.78	90.02/87.22
MC Loss	VGG16/ResNet18	$98.20/\underline{98.45}$	72.51/70.18	92.80/-
ICAL	VGG16/ResNet18	97.83/98.21	74.79/77.71	89.32/86.67
FICAL	VGG16/ResNet18	<u>98.22</u> /98.40	$\underline{74.98}/\underline{78.18}$	89.70/ <u>87.38</u>
CC-Loss	VGG16 + CAM/ResNet18 + CAM	$98.32 \pm 0.08 / 98.52 \pm 0.09$	$\textbf{75.49} \pm \textbf{0.15} / \textbf{78.23} \pm \textbf{0.07}$	$\underline{91.46} \pm \underline{0.09}$ /88.41 \pm 0.06



Cross Entropy Loss

Conclusions

- Dynamic channel selection for each class
- Maximize intra-class compactness and inter-class separability
- Improvement on three datasets and two backbones



Thanks!



