Supervised Deep Sparse Coding Networks:Research

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Summary:

This paper describes a deep sparse coding network, a novel deep network that extends the network learning capacity of typical sparse coding networks. This work was developed by Sun, Nasarabadi and Tran who developed the network thru use of bottleneck modules.

Related Works: This model was develop using based of prior work of four approaches: (i) Approaches [12,13,14] are wide networks en-cooperated in order to take advantage the high dimensional latent features.(ii) Bottleneck shaped neural networks [10,14] are employed to reduce the dimensions of the incoming signal in order to reduce an over-fitting caused by the network.(iii) Multi-layered networks are implemented with the purpose of training the reconstructive dictionaries of each layer in a greedily layer-wise fashion[7,18].(iv)Finally, Supervised Dictionary Learning methods were relied on in order to apply a fixed point differentiation and bi-level optimization, a supervised learning scheme for shallow sparse coding(23,24)

Data Sets: Experiments The proposed network was tested using the CIFAR-10, CIFAR-100.The proposed network, SCN-4, reported a classification error of 5.81% for the CIFAR-10 data-set, and 19.93% for CIFAR-100 data-set.Comparative models such as the NOMP, reported a classification error 18.60% for CIFAR-10 and 39.92% for CIFAR-100. Additionally, the SCN-4 networks has comparable results to the ResNet and SwapOut for both CIFAR-10 and CIFAR-100 datasets while using less layers. The ResNet-29 models,which has 29 layers reported a classification error of 3.58% respectively for CIFAR-10 an error of 17.31% for CIFAR-100.