Supplemental Applications

This section presents extended application examples demonstrating the practical utility of our optimization framework across diverse domains, complementing the case studies in Section **??**.

S4.1 Machine Learning Applications

S4.1.1 Neural Network Training

We applied our optimization framework to train deep neural networks for image classification, following the methodology described in [**?**]. The results demonstrate significant improvements over standard optimizers:

Optimizer	**Training Accuracy**	**Test Accuracy**	**Epochs to Conv**
Our Method	0.987	0.942	45
Adam	0.982	0.938	62
SGD	0.975	0.935	78
RMSProp	0.978	0.936	71

Table 1: Neural network training performance comparison