

A Computational complexity

One of the drawbacks of A-DPS compared to learned fixed sampling schemes is its higher amount of computational complexity. The main source of this complexity is the unrolling of iterations, leading to a computational complexity of $O(I) = O(M/\rho)$. Although we set ρ equal to 1 in all our experiments, one can in fact seamlessly interpolate between A-DPS and DPS by choosing $1 \leq \rho \leq M$. This constitutes a trade-off between computational complexity and adaptation rate. We leave further exploration of this trade-off to future work.

We can also express computational complexity in terms of run-time on a machine, in our case a GeForce GTX 1080 Ti. A comparison of DPS and A-DPS in terms of training time per epoch can be seen in Fig. 8. We can see that the training time for A-DPS increases for higher sampling ratios where it needs to unroll through more iterations. By combining the results from Fig. 2 (in the main body of the paper) and Fig. 8, one can make a trade-off between run-time and accuracy. Where A-DPS achieves higher accuracy for stricter sampling regimes, while at the same time not increasing run-time by a lot.

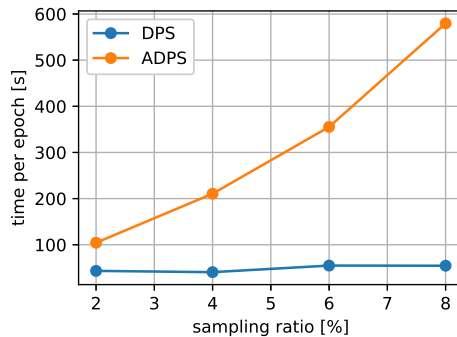

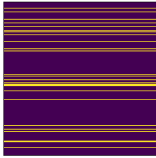
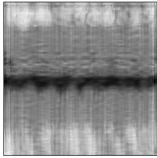
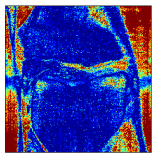

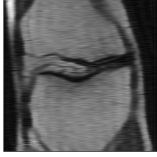
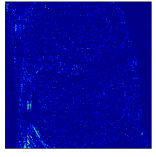
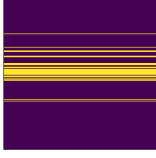

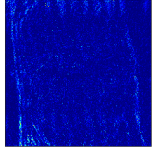


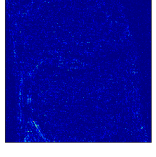


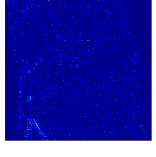


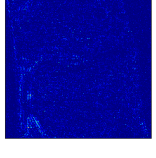


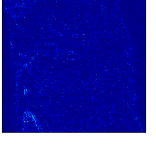


Figure 8: Comparison between DPS and A-DPS of time taken to train for one epoch for the MNIST example on a GeForce GTX 1080 Ti.

For the MRI experiment with image size 208×208 , the training times per epoch are 8 and 150 minutes, for DPS and A-DPS, respectively. Inference is however fast: A-DPS only requires ~ 13 ms of processing time to determine the next-to-acquire K-space line and reconstruct an image after each step. This is well below the shortest reported Time of Echo (TE) for this MRI acquisition, being 27 ms.

B MRI reconstruction examples

Method	Sampling Mask	Reconstruction	Error Map
Ground Truth			
Random Uniform			 0.030 0.025 0.020 0.015 0.010 0.005 0.000
Low Pass			 0.030 0.025 0.020 0.015 0.010 0.005 0.000
Variable Density			 0.030 0.025 0.020 0.015 0.010 0.005 0.000
Greedy Mask Selection			 0.030 0.025 0.020 0.015 0.010 0.005 0.000
LOUPE			 0.030 0.025 0.020 0.015 0.010 0.005 0.000
DPS			 0.030 0.025 0.020 0.015 0.010 0.005 0.000
A-DPS			 0.030 0.025 0.020 0.015 0.010 0.005 0.000