Additional Materials for TpopT: Efficient Trainable Template Optimization on Low-Dimensional Manifolds

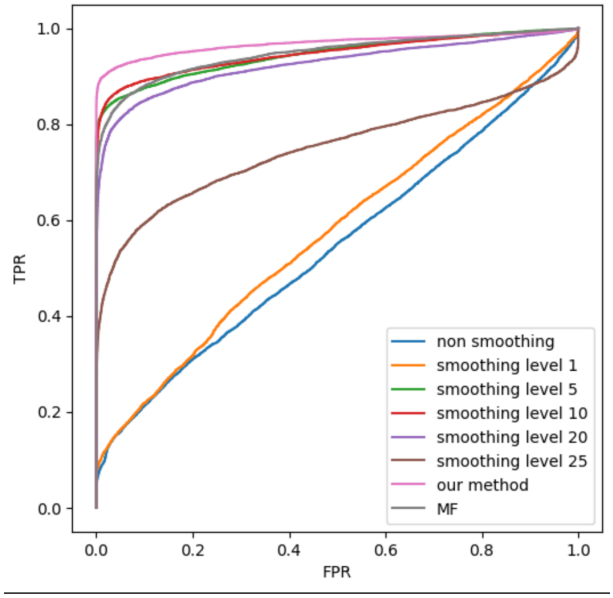

Figure 1: Role of Smoothing: This figure shows the Receiver Operating Characteristic (ROC) curve for the problem of gravitational wave detection, comparing the detection performance across different levels of signal smoothing. The results indicate that performance is poorest without any smoothing, improves with moderate smoothing, and then deteriorates again with excessive smoothing. Notably, our multi-level smoothing approach yields the best performance.

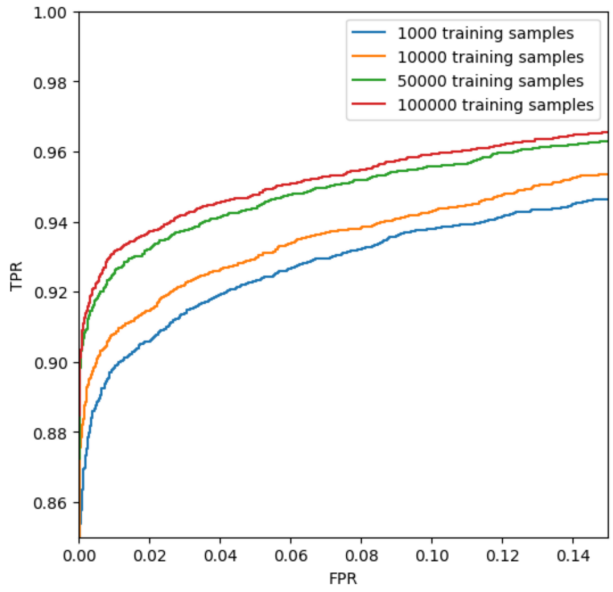

Figure 2: Role of Training Samples: This figure illustrates the Receiver Operating Characteristic (ROC) curve for gravitational wave detection, focusing on the performance of the unrolling method with varying numbers of training samples. The data clearly indicate improved performance as the quantity of training samples increases.

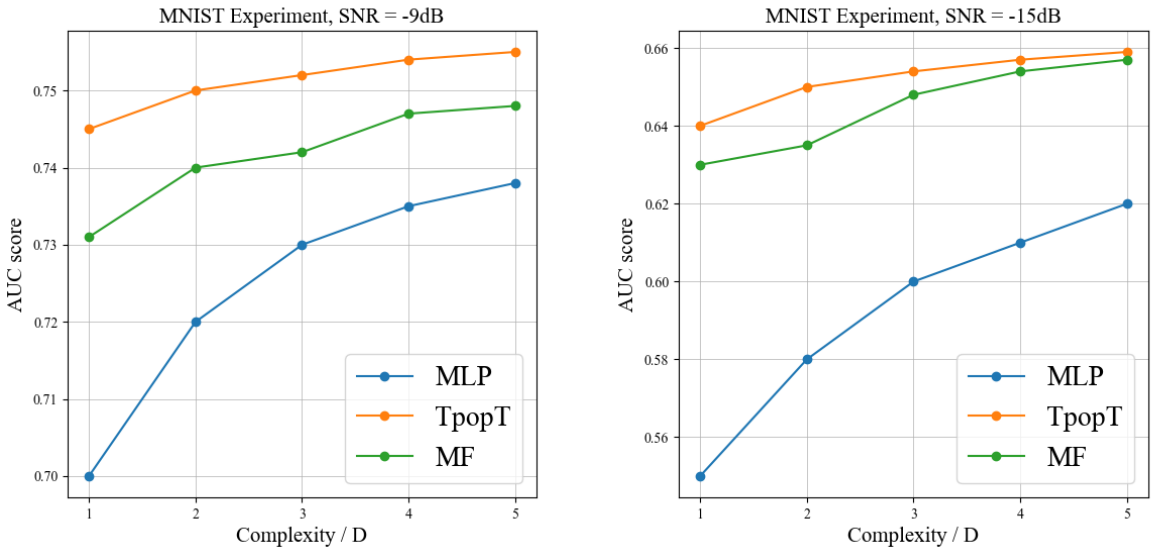

Figure 3: Experiment with different levels of noise in the MNIST recognition setup. The left figure shows performance of trained TpopT, an MLP, and Matched Filtering when the Signal to Noise Ratio (SNR) is -9 dB and the right depicts performance when SNR is -15 dB

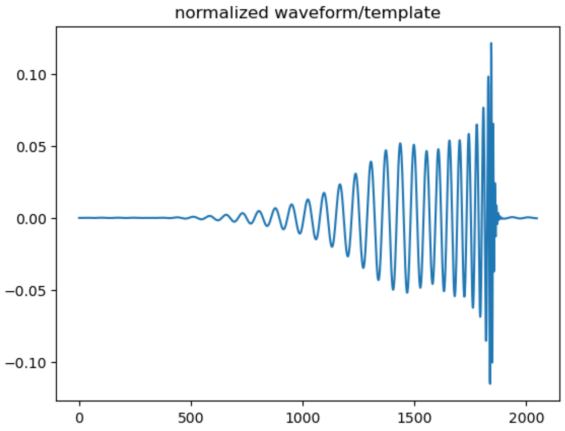

Figure 4: This figure displays the normalized waveform/template. As a result of the normalization process, its magnitude is relatively small, with a maximum value close to 0.1.

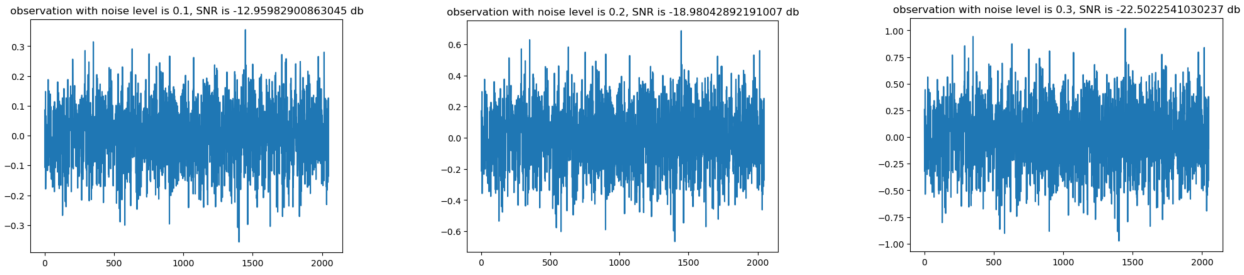

Figure 5: Observation with different noise levels