

SUPPLEMENTARY MATERIALS

Structure-Preserving Deep Neural Network-based
Dimensionality Reduction Scheme for Data
Visualization

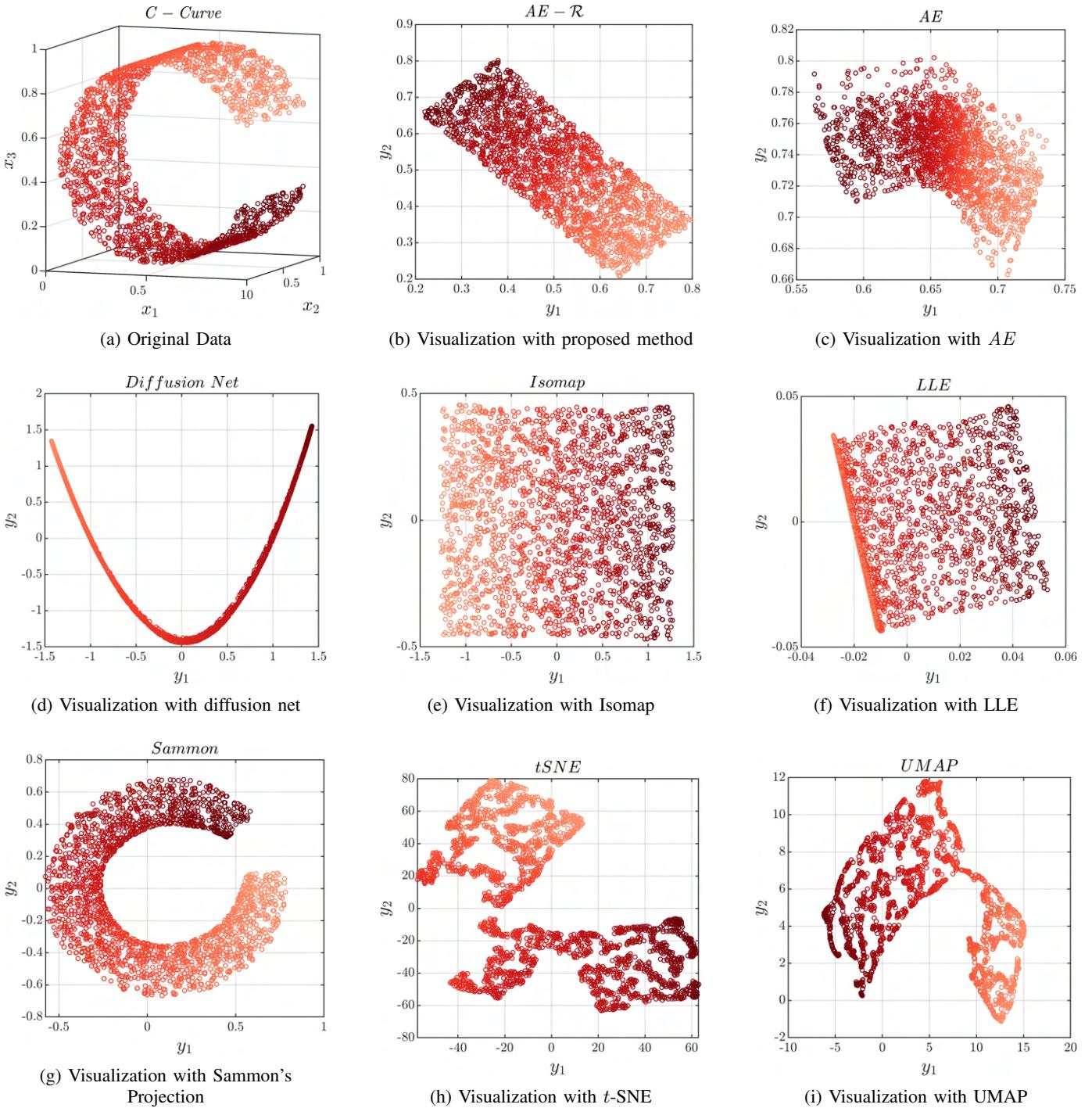


Fig. S-1: C-Curve: Original data and visualization with various methods

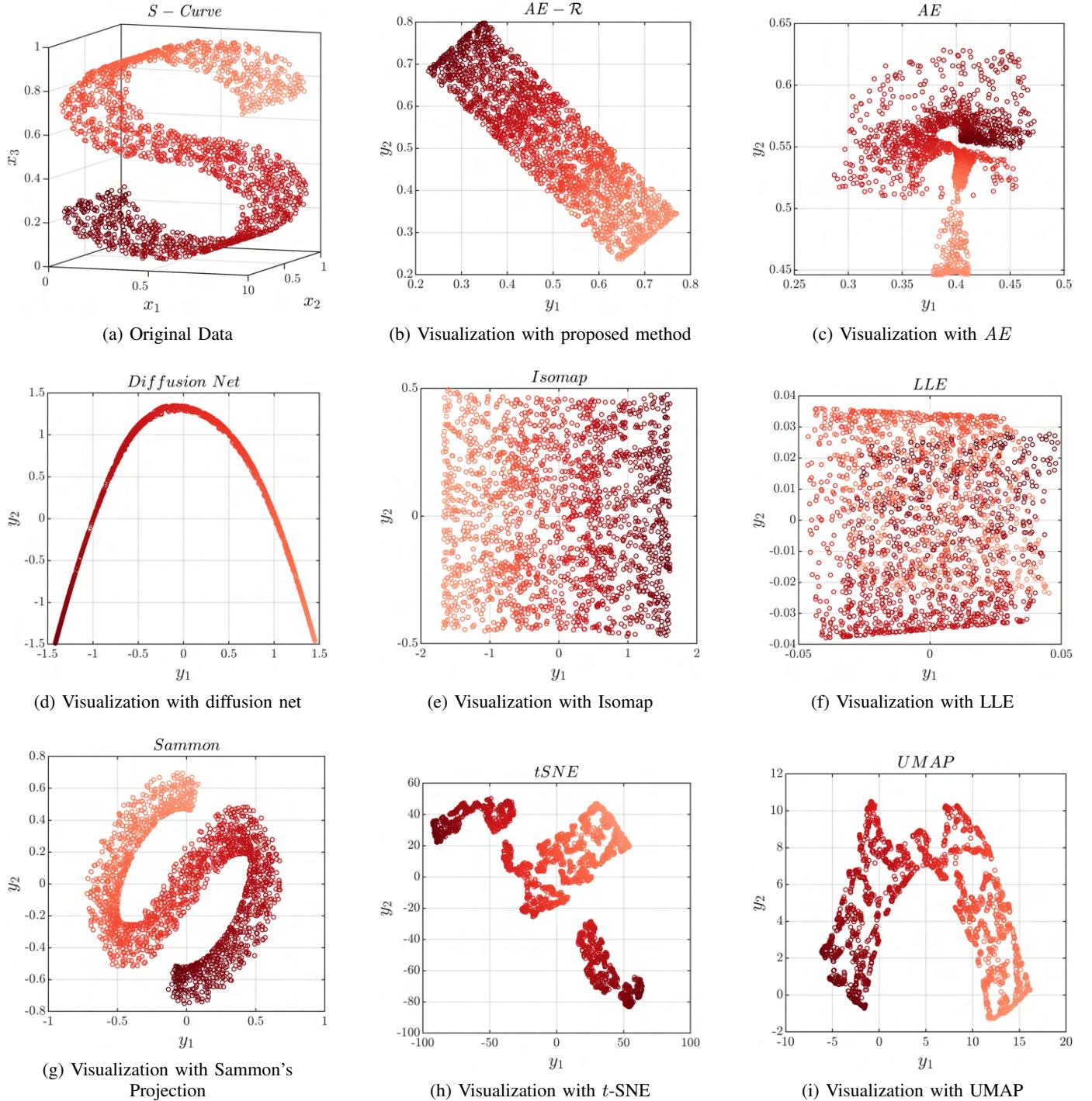


Fig. S-2: S-Curve: Original data and visualization with various methods

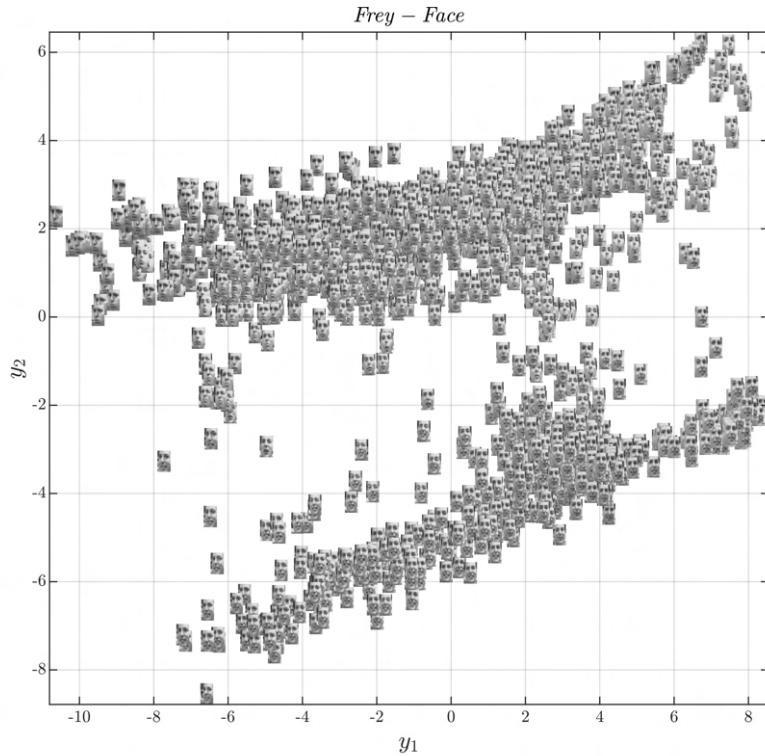


Fig. S-3: Visualization of Frey Face with Isomap

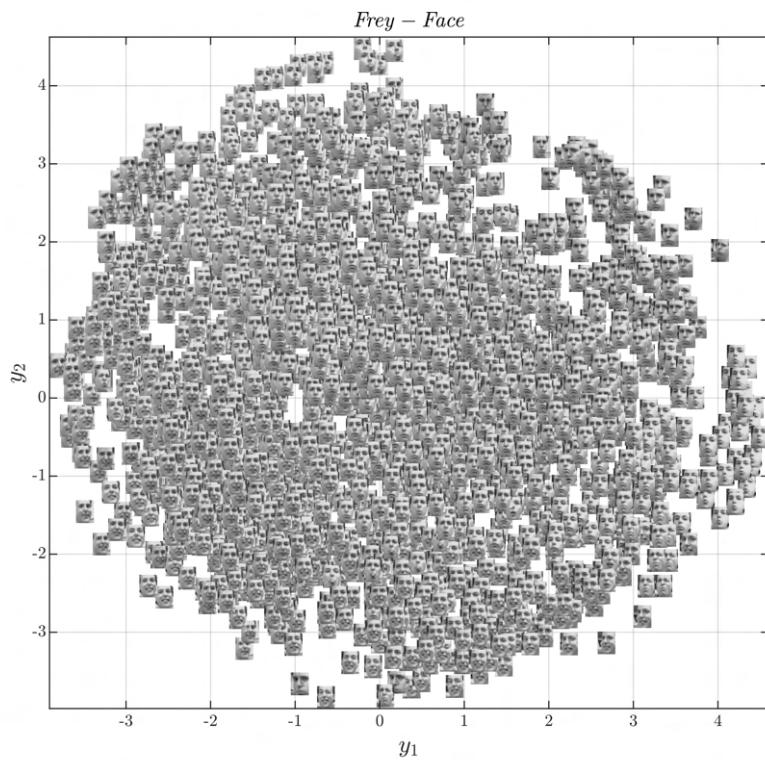


Fig. S-4: Visualization of Frey Face with Sammon

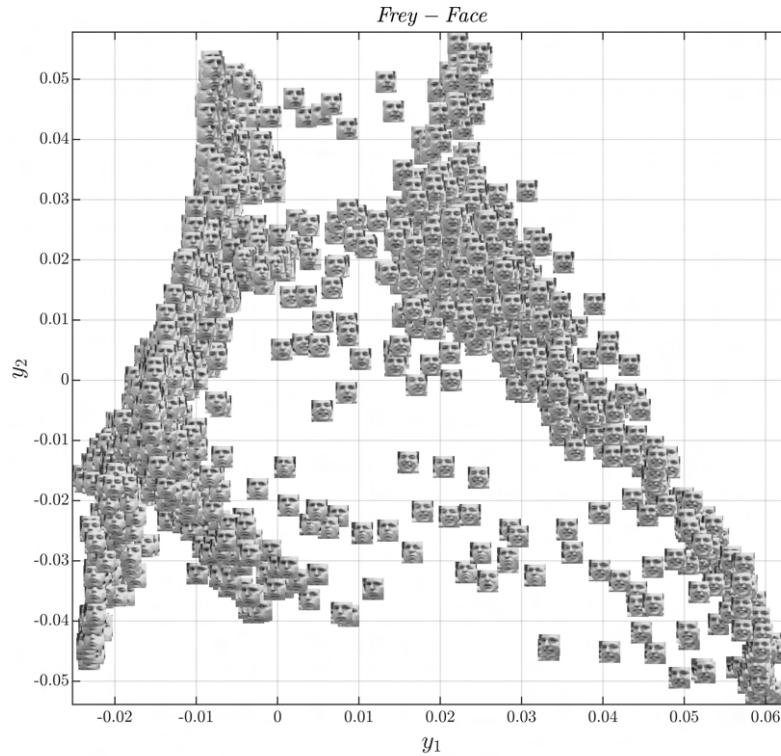


Fig. S-5: Visualization of Frey Face with LLE

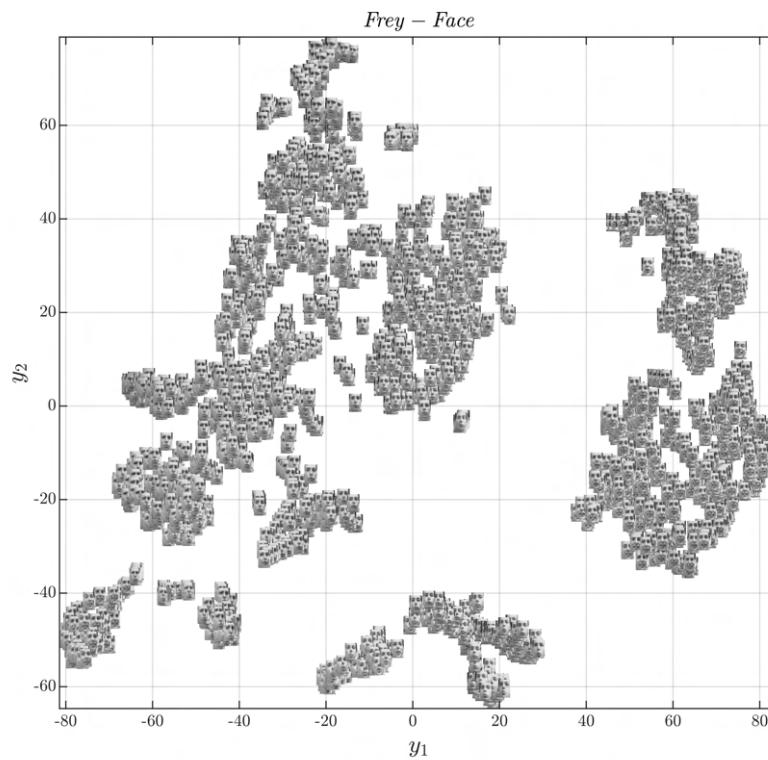


Fig. S-6: Visualization of Frey Face with t -SNE

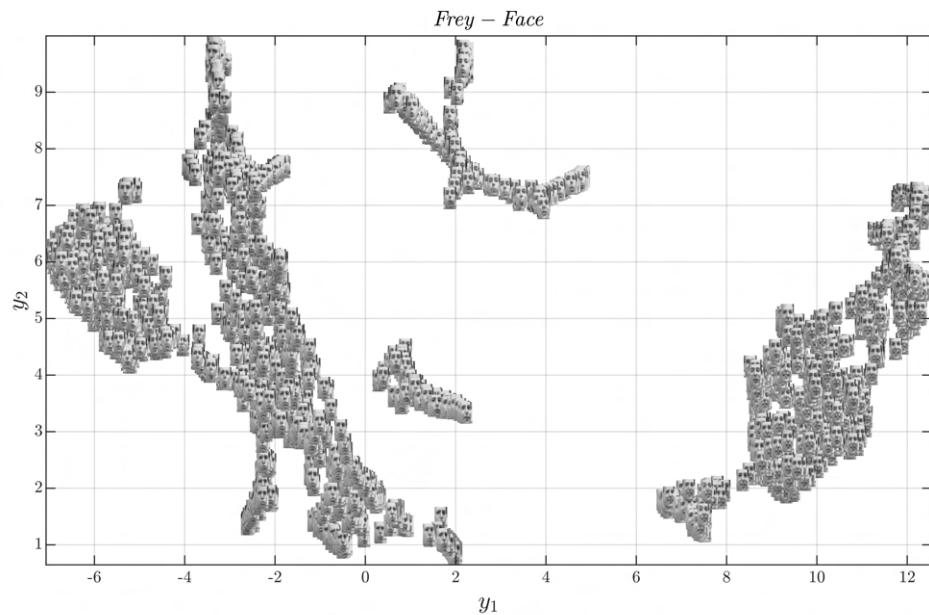


Fig. S-7: Visualization of Frey Face with UMAP

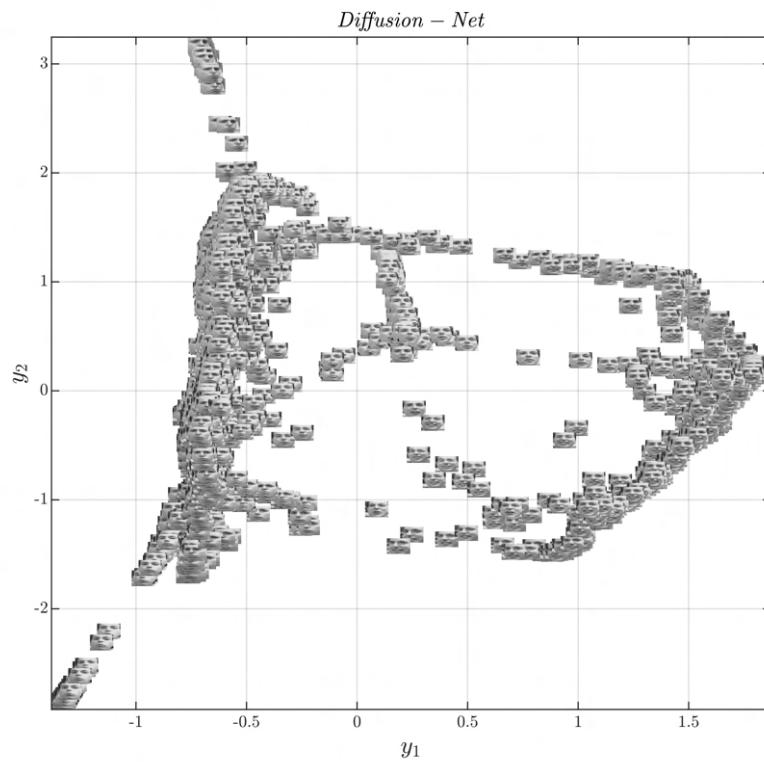


Fig. S-8: Visualization of Frey Face with diffusion net

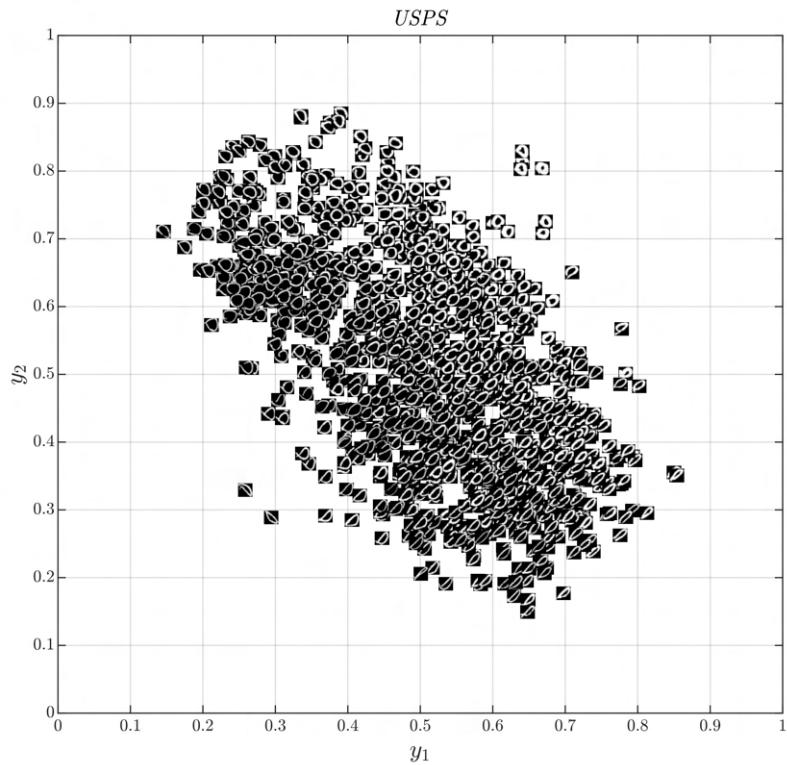


Fig. S-9: Visualization of USPS with proposed method

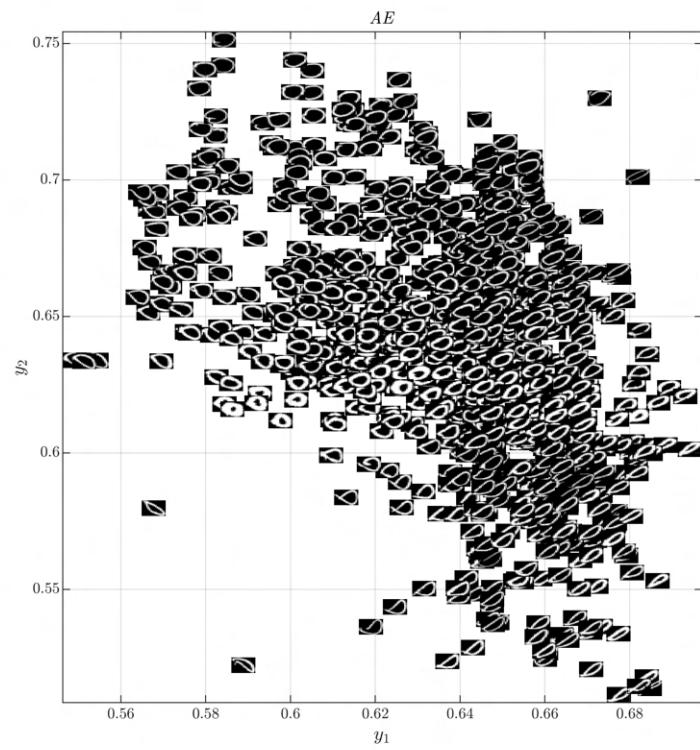


Fig. S-10: Visualization of USPS with AE

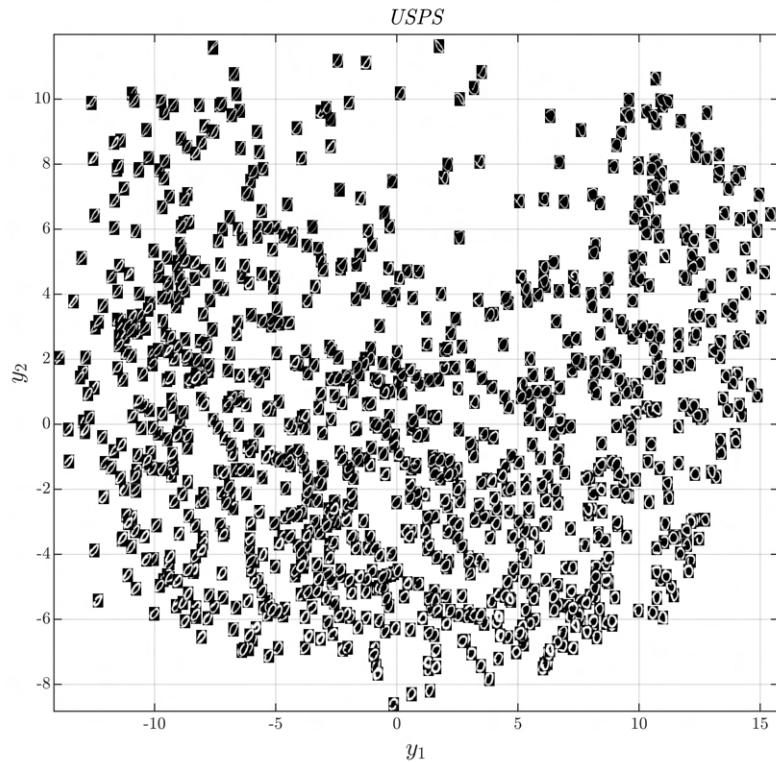


Fig. S-11: Visualization of USPS with Isomap

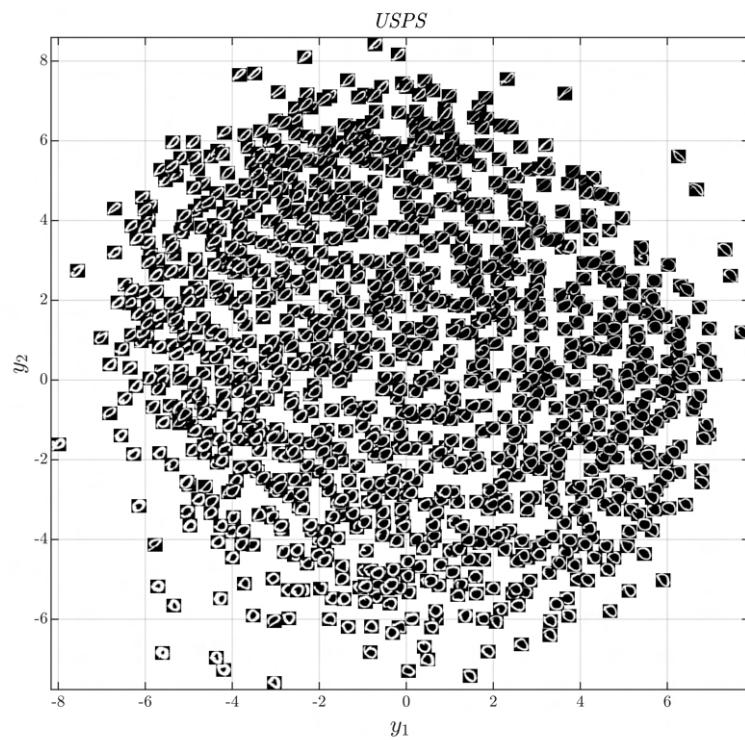


Fig. S-12: Visualization of USPS with Sammon's Projection

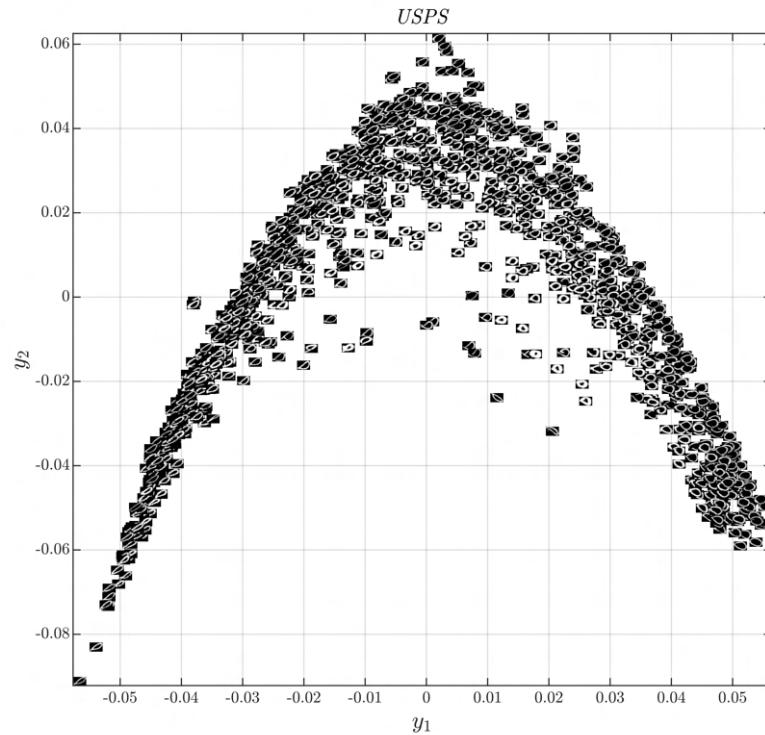


Fig. S-13: Visualization of USPS with LLE

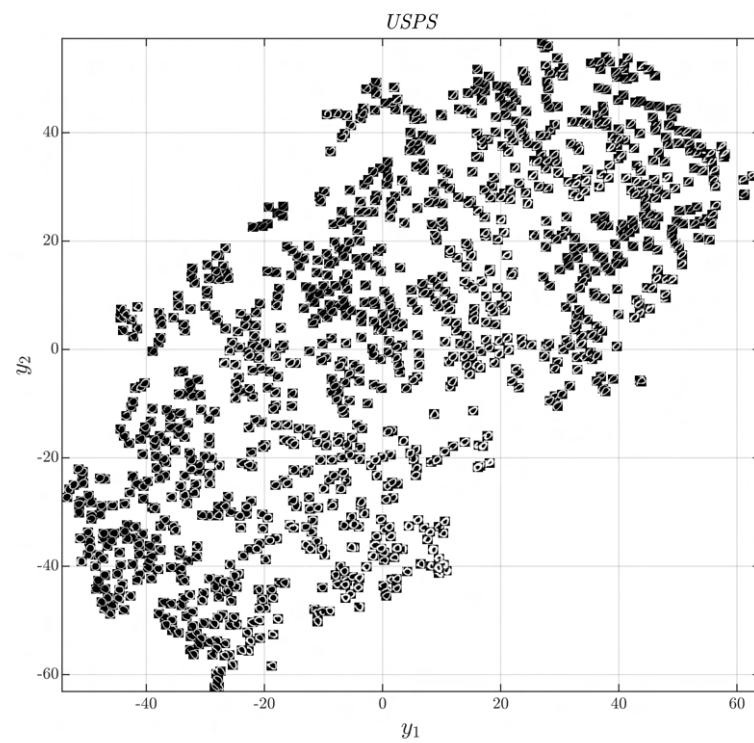


Fig. S-14: Visualization of USPS with t-SNE

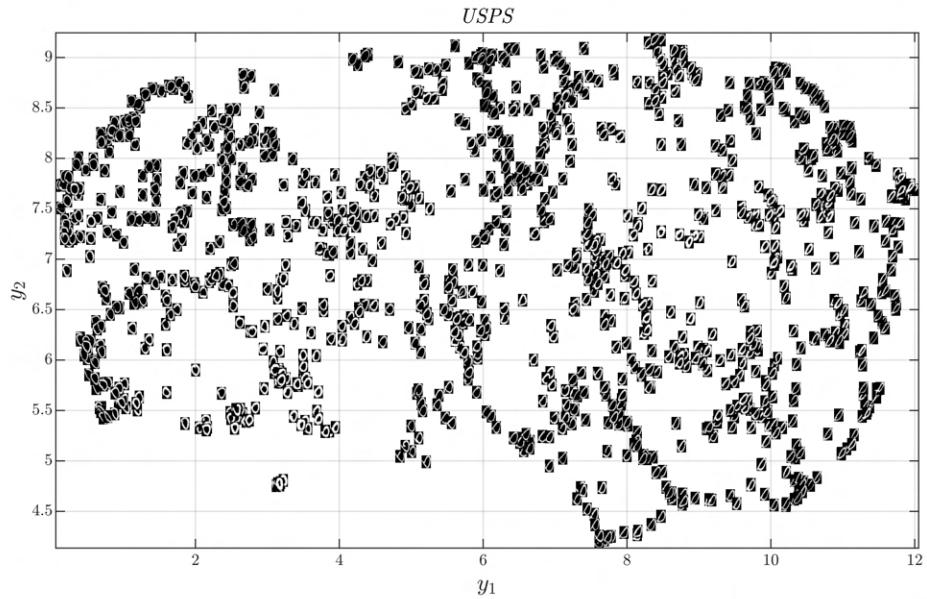


Fig. S-15: Visualization of USPS with UMAP

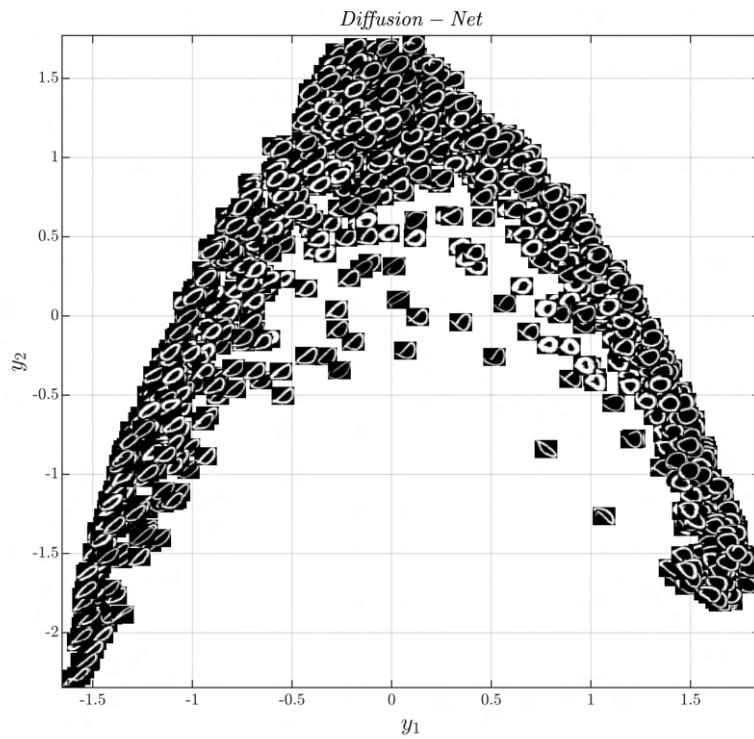


Fig. S-16: Visualization of USPS with diffusion net

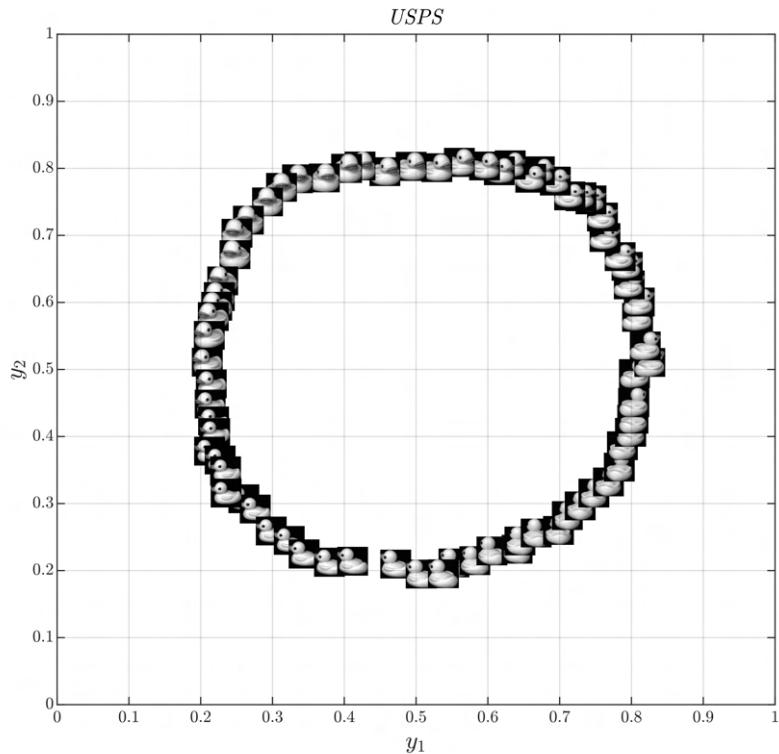


Fig. S-17: Visualization of COIL with proposed method

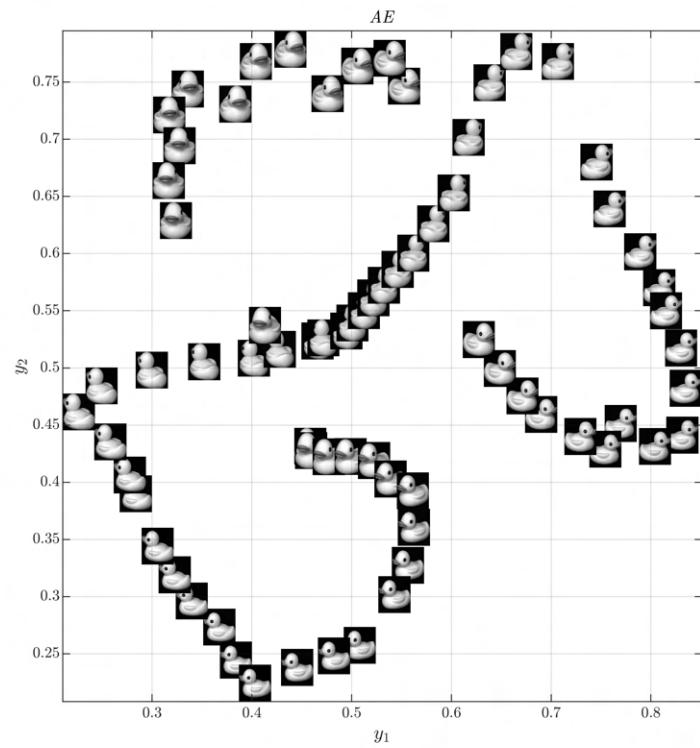


Fig. S-18: Visualization of COIL with *AE*

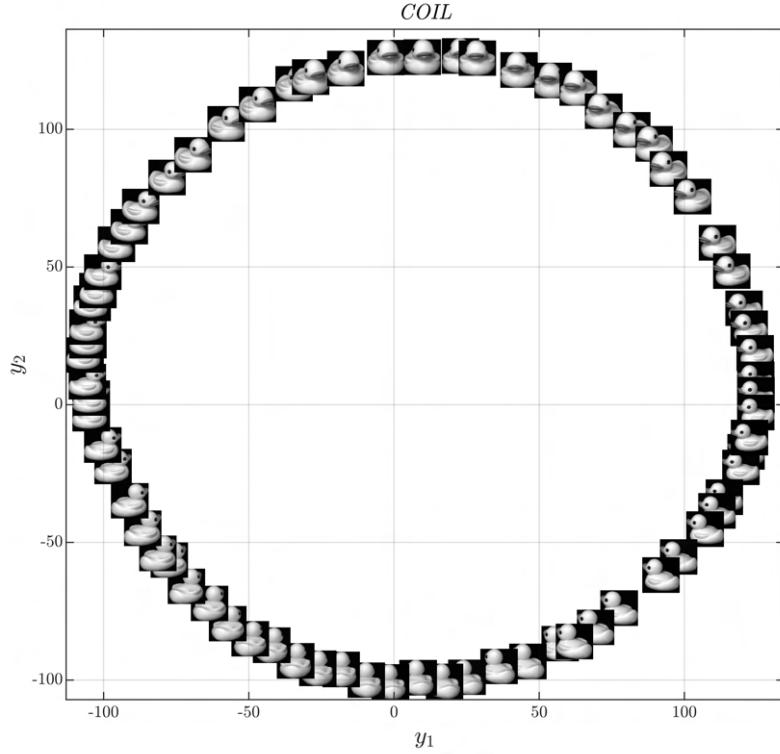


Fig. S-19: Visualization of COIL with Isomap

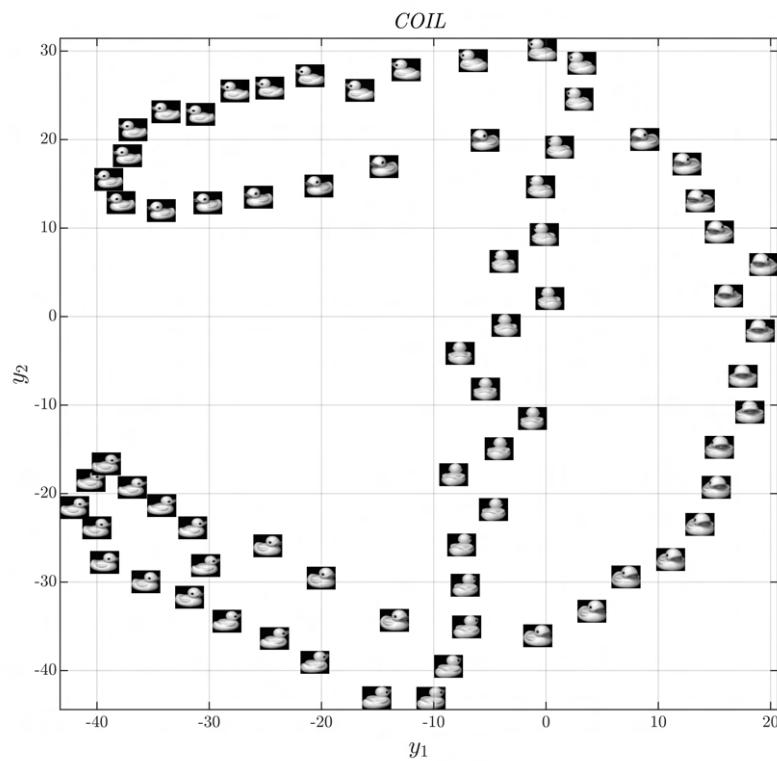


Fig. S-20: Visualization of COIL with Sammon's Projection

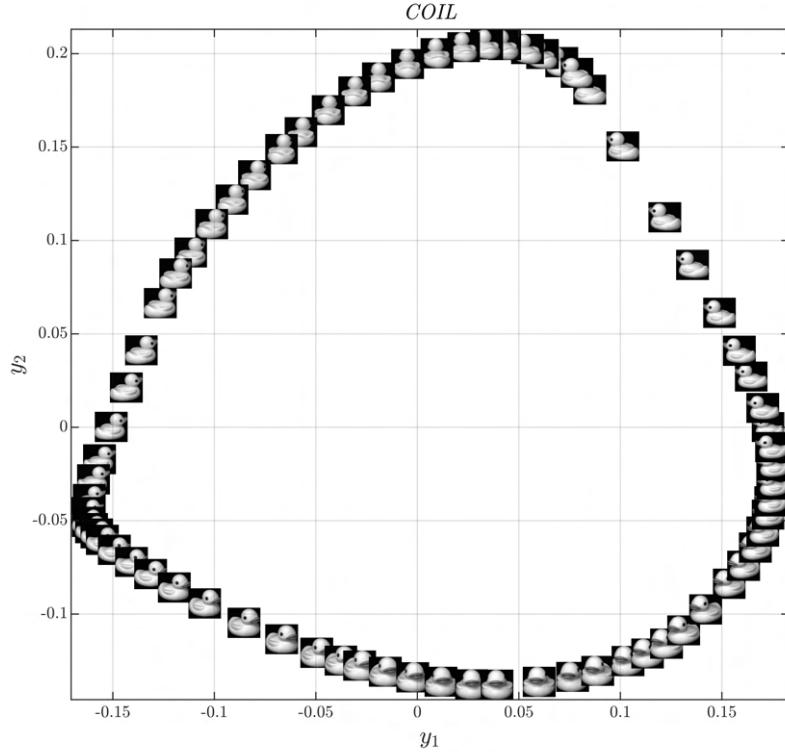


Fig. S-21: Visualization of COIL with LLE

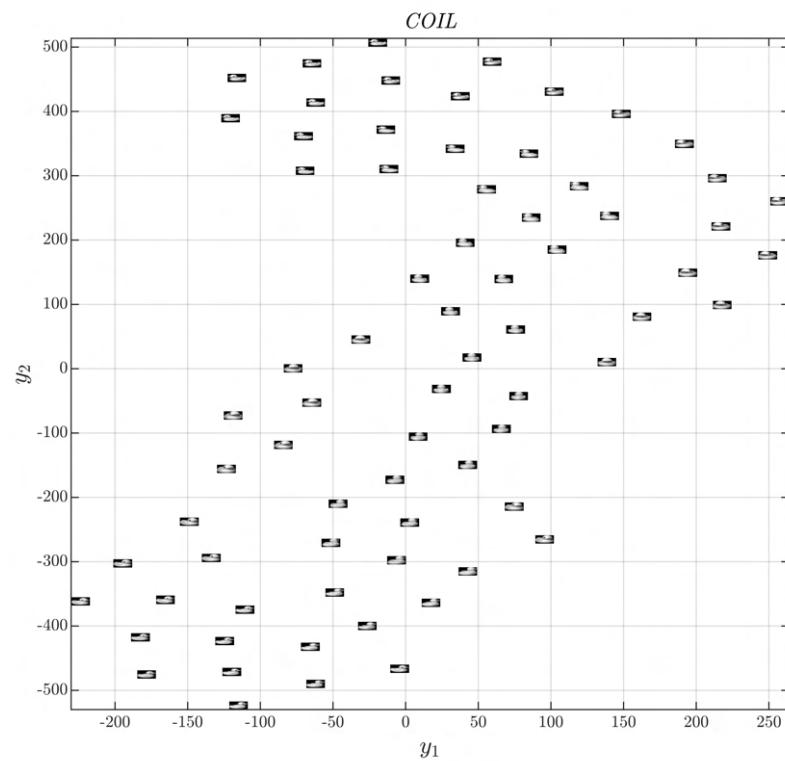


Fig. S-22: Visualization of COIL with t -SNE

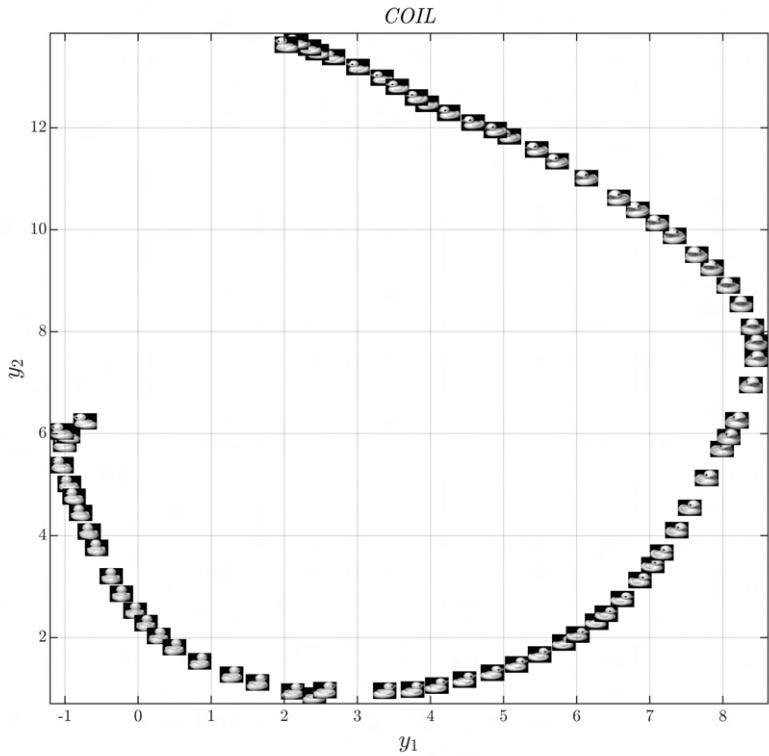


Fig. S-23: Visualization of COIL with UMAP

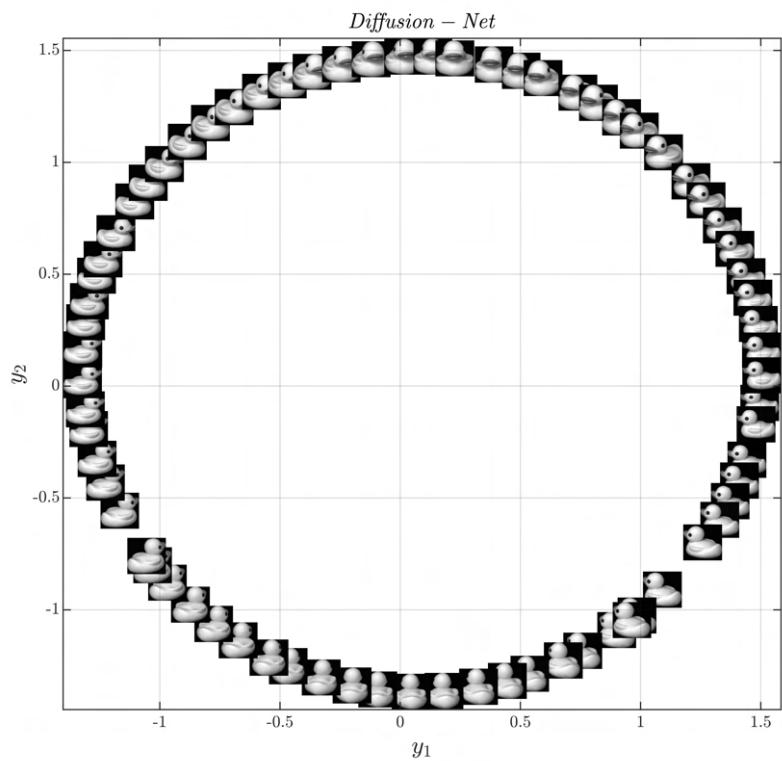
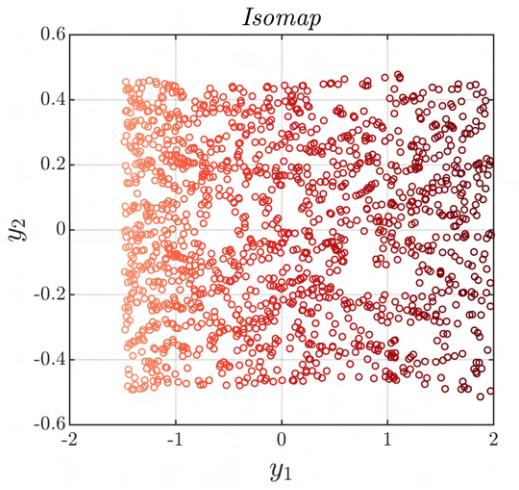
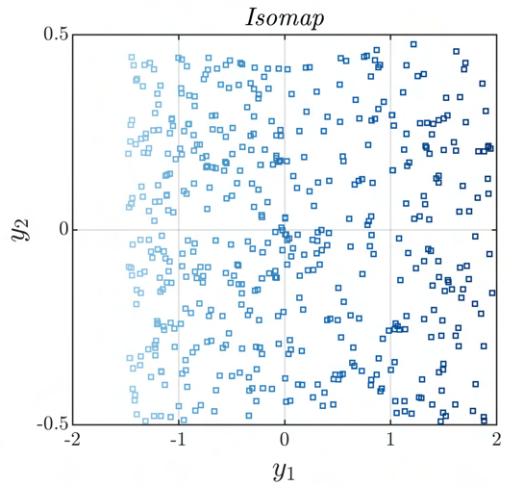


Fig. S-24: Visualization of COIL with diffusion net

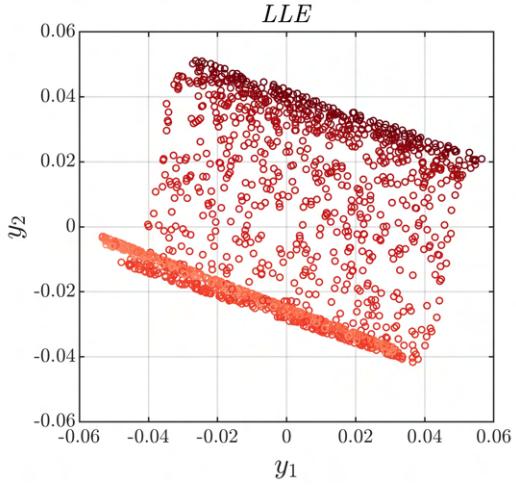


(a) Visualization with Isomap for train data

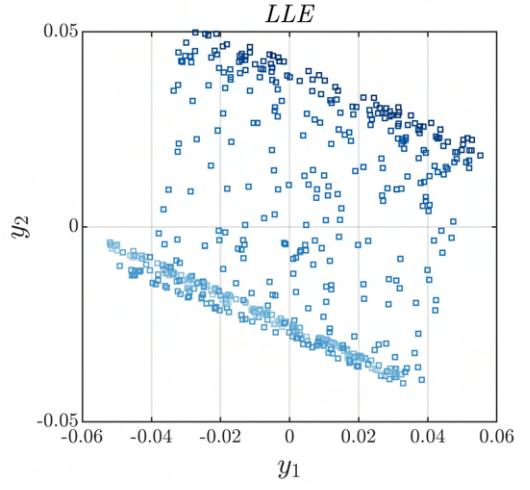


(b) Visualization with Isomap for test set

Fig. S-25: For experiment 1 on the validation of predictability with the Swiss Roll data.

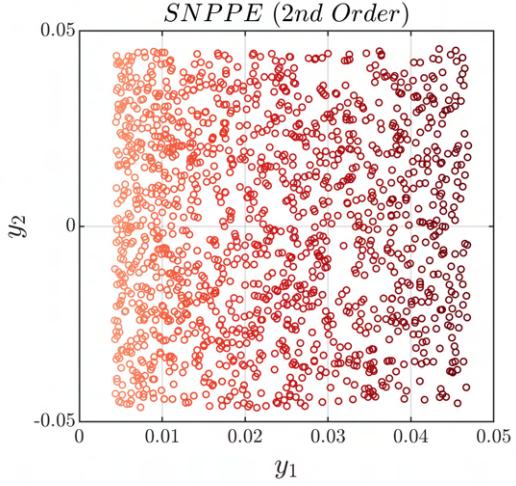


(a) Visualization with LLE for train set

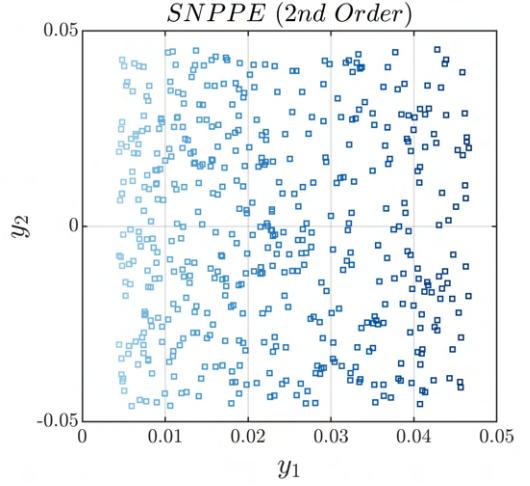


(b) Visualization with LLE for test set

Fig. S-26: For experiment 1 on the validation of predictability with the Swiss Roll data.

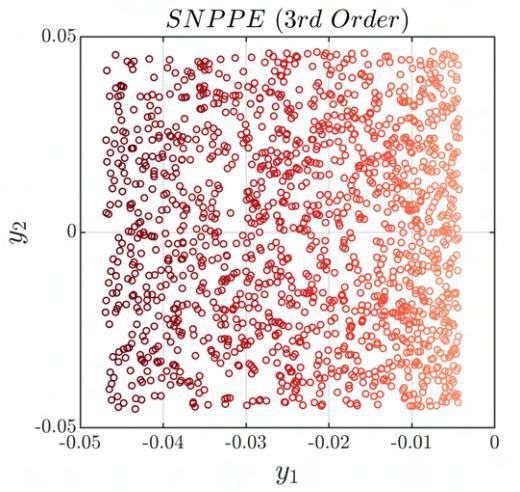


(a) Visualization with 2nd Order SNPPE for train set

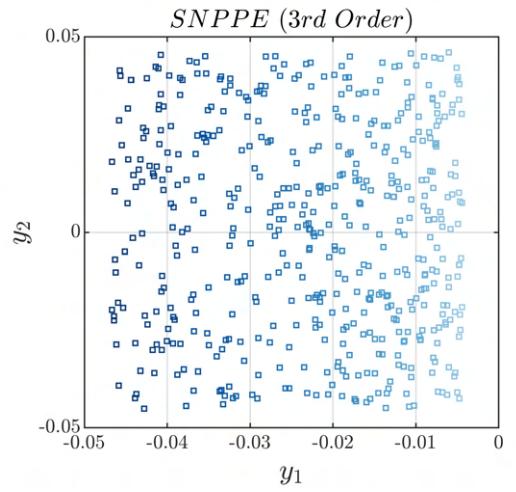


(b) Visualization with 2nd Order SNPPE for test set

Fig. S-27: For experiment 1 on the validation of predictability with the Swiss Roll data.



(a) Visualization with 3rd Order SNPPE for train set



(b) Visualization with 3rd Order SNPPE for test set

Fig. S-28: For experiment 1 on the validation of predictability with the Swiss Roll data.

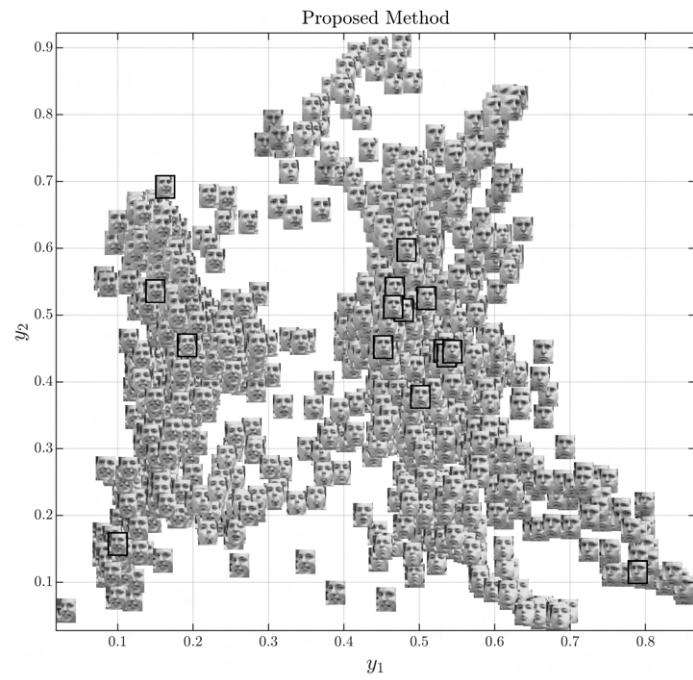


Fig. S-29: Visualization of train and test set (black rectangle borders) for Frey Face data set with proposed method

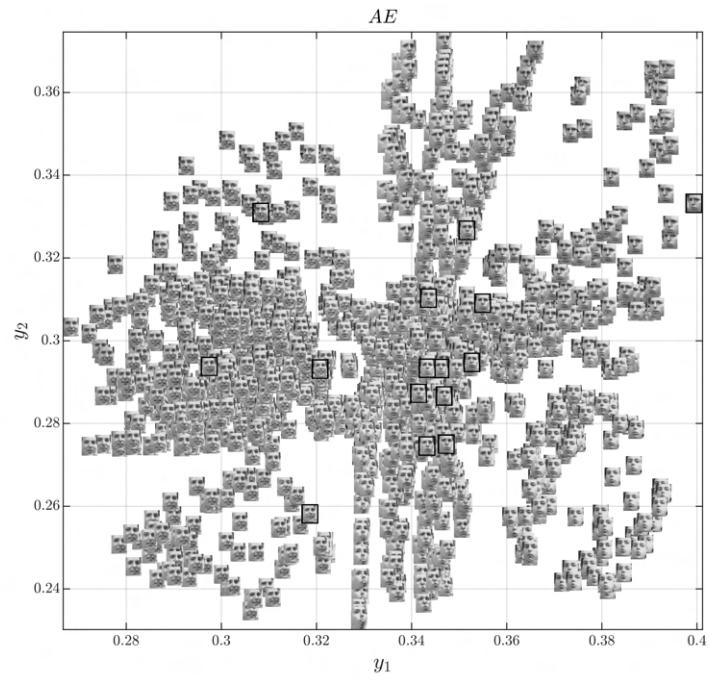


Fig. S-30: Visualization of the train and test set (black rectangle borders) for Frey Face data set with *AE*

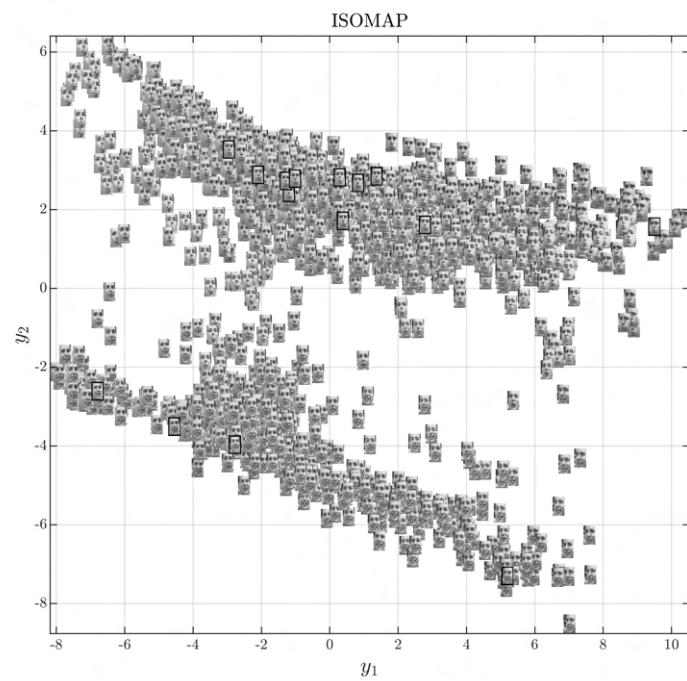


Fig. S-31: Visualization of train and test set (black rectangle borders) for Frey Face data set with Isomap

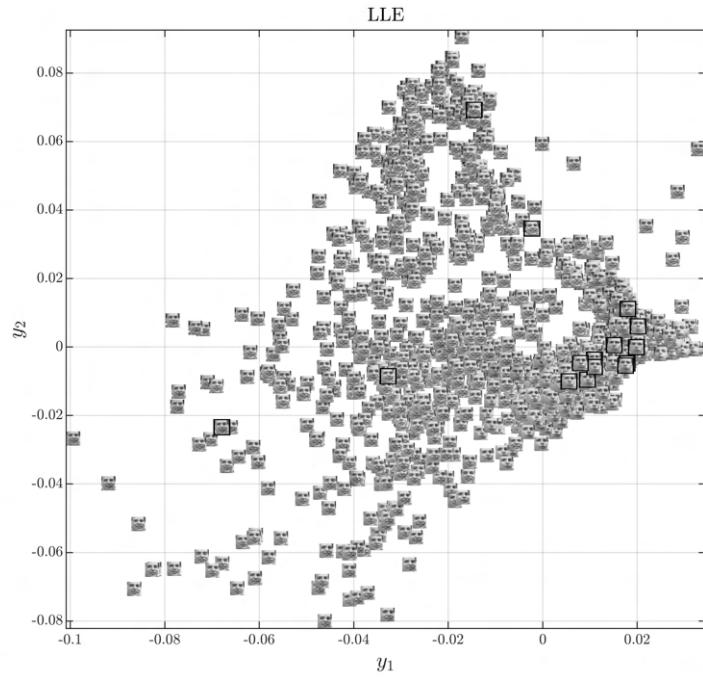


Fig. S-32: Visualization of the train and test set (black rectangle borders) for Frey Face data set with LLE

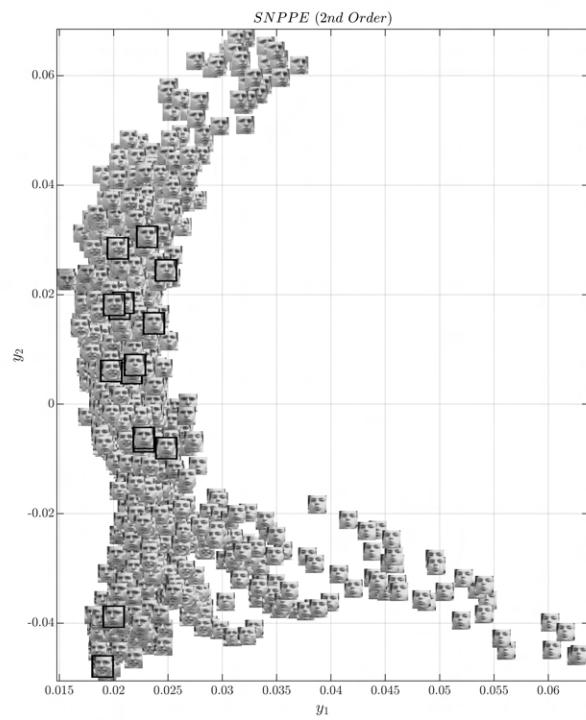


Fig. S-33: Visualization of train and test set (black rectangle borders) for Frey Face data set with 2nd Order SNPPE

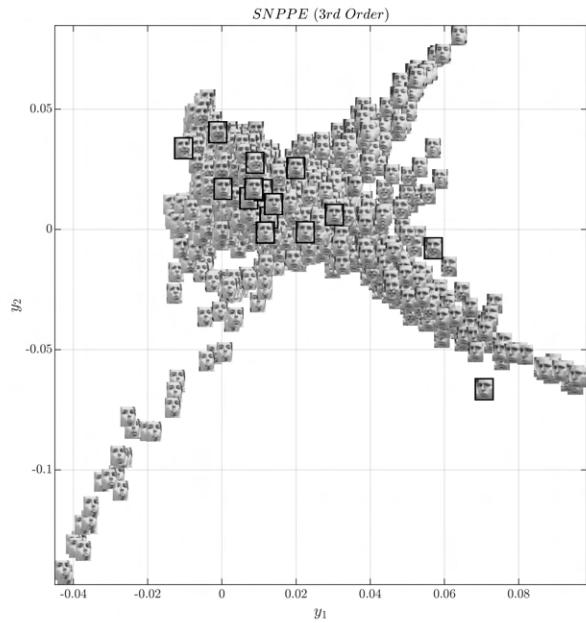
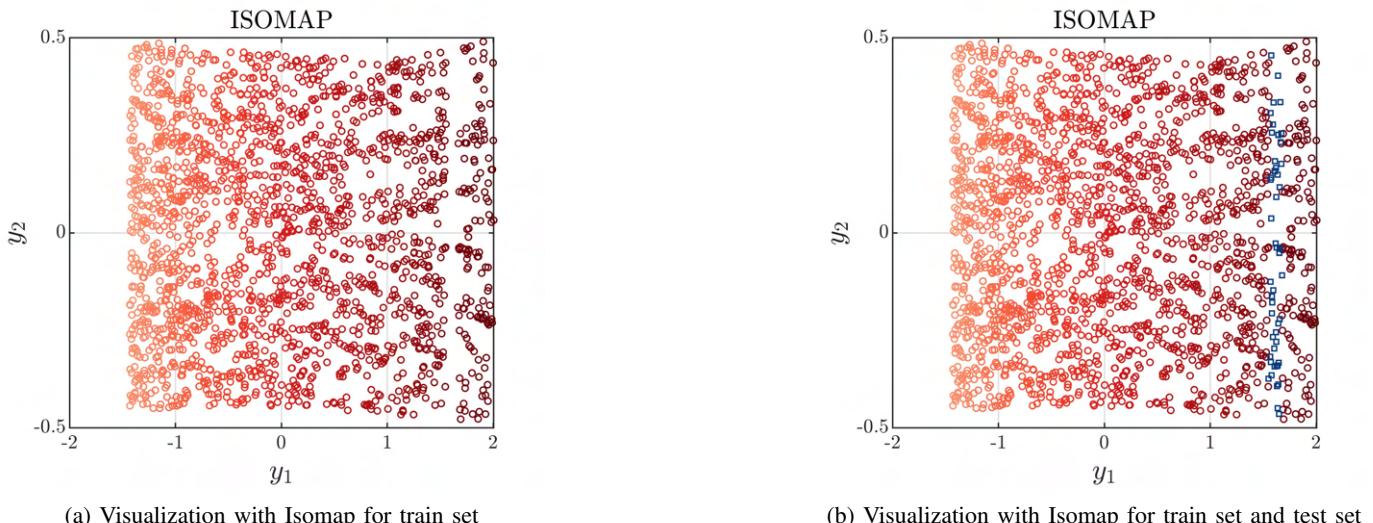


Fig. S-34: Visualization of the train and test set (black rectangle borders) for Frey Face data set with 3rd Order SNPPE



(a) Visualization with Isomap for train set

(b) Visualization with Isomap for train set and test set

Fig. S-35: For experiment 2 on the validation of predictability with the Swiss Roll data.

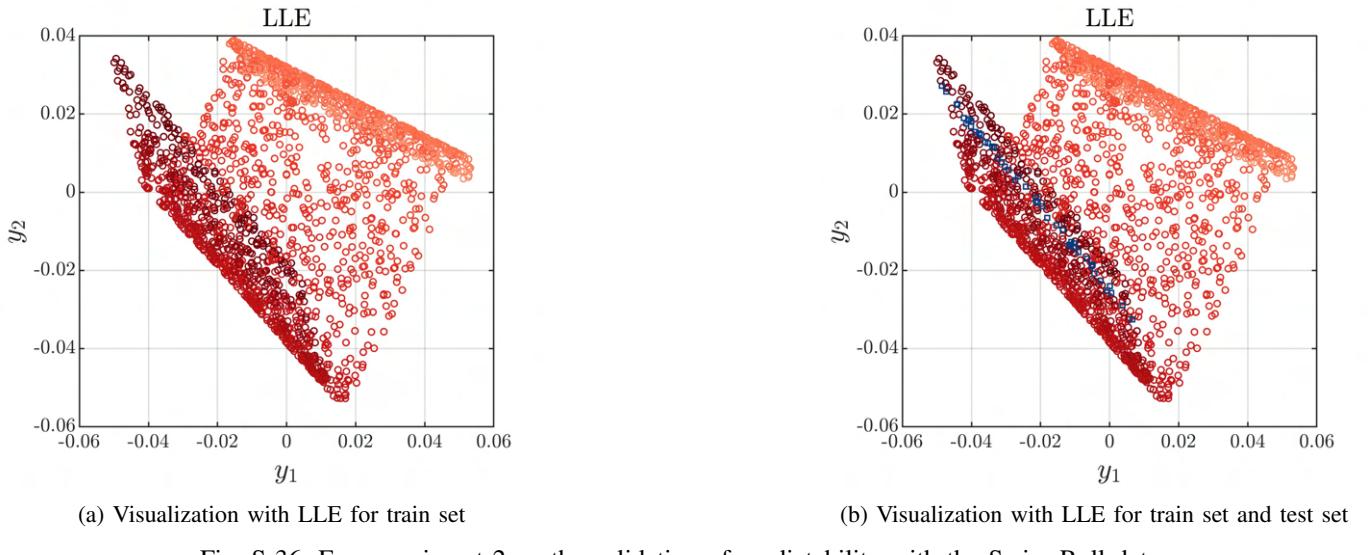


Fig. S-36: For experiment 2 on the validation of predictability with the Swiss Roll data.

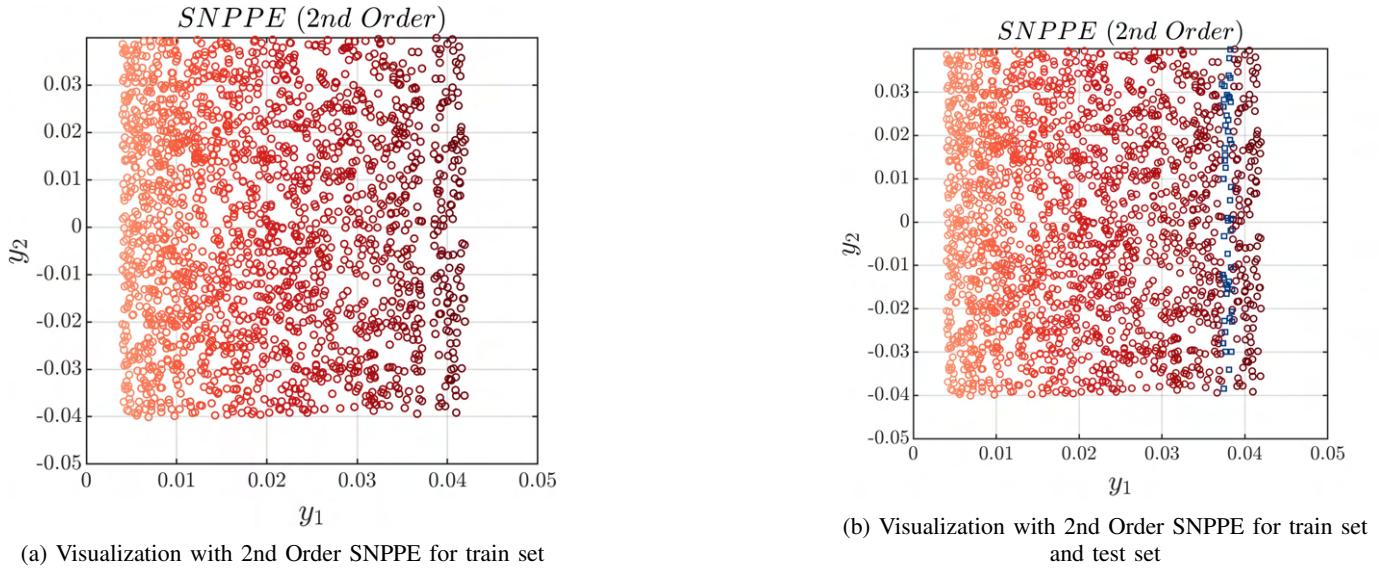
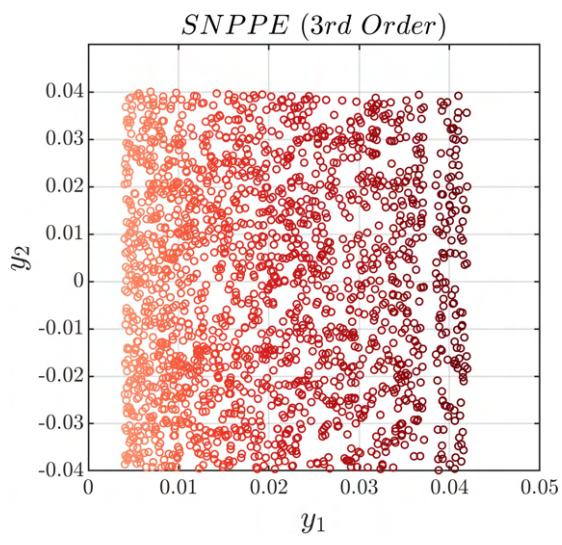
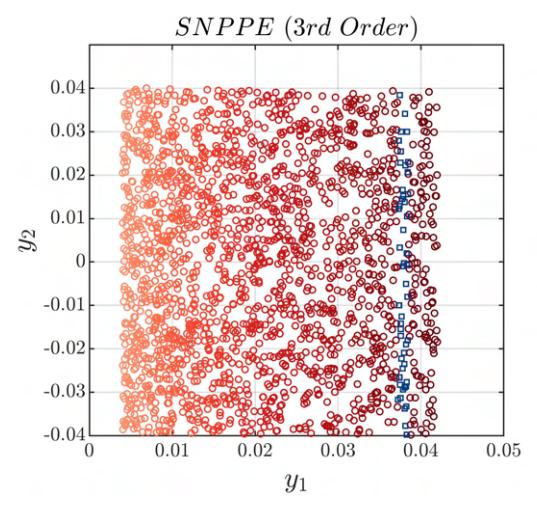


Fig. S-37: For experiment 2 on the validation of predictability with the Swiss Roll data.



(a) Visualization with 3rd Order SNPPE for train set



(b) Visualization with 3rd Order SNPPE for train set and test set

Fig. S-38: For experiment 2 on the validation of predictability with the Swiss Roll data.

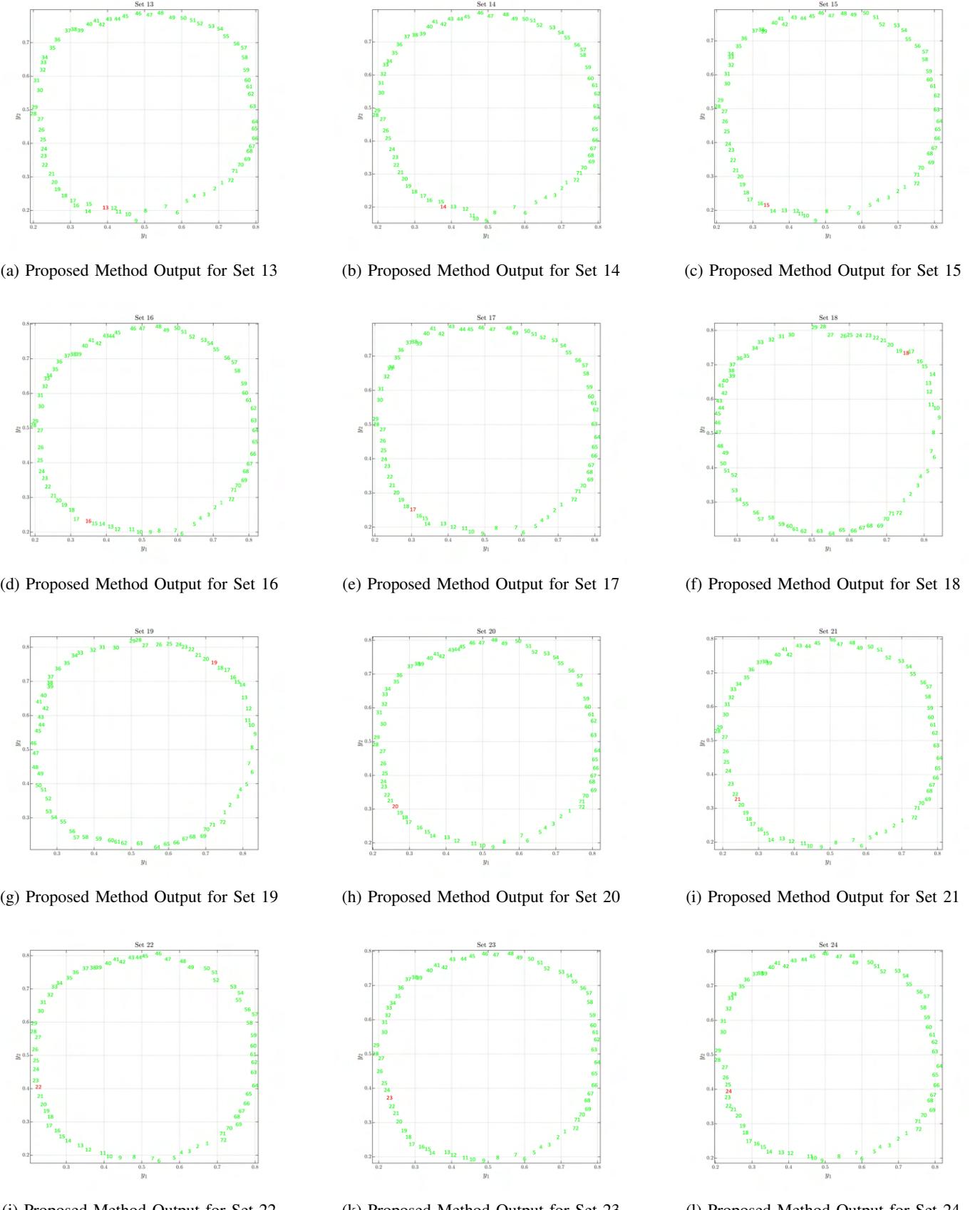


Fig. S-39: For experiment 3 on validation of predictability with leave one out sets composed of the first object of the COIL data set.

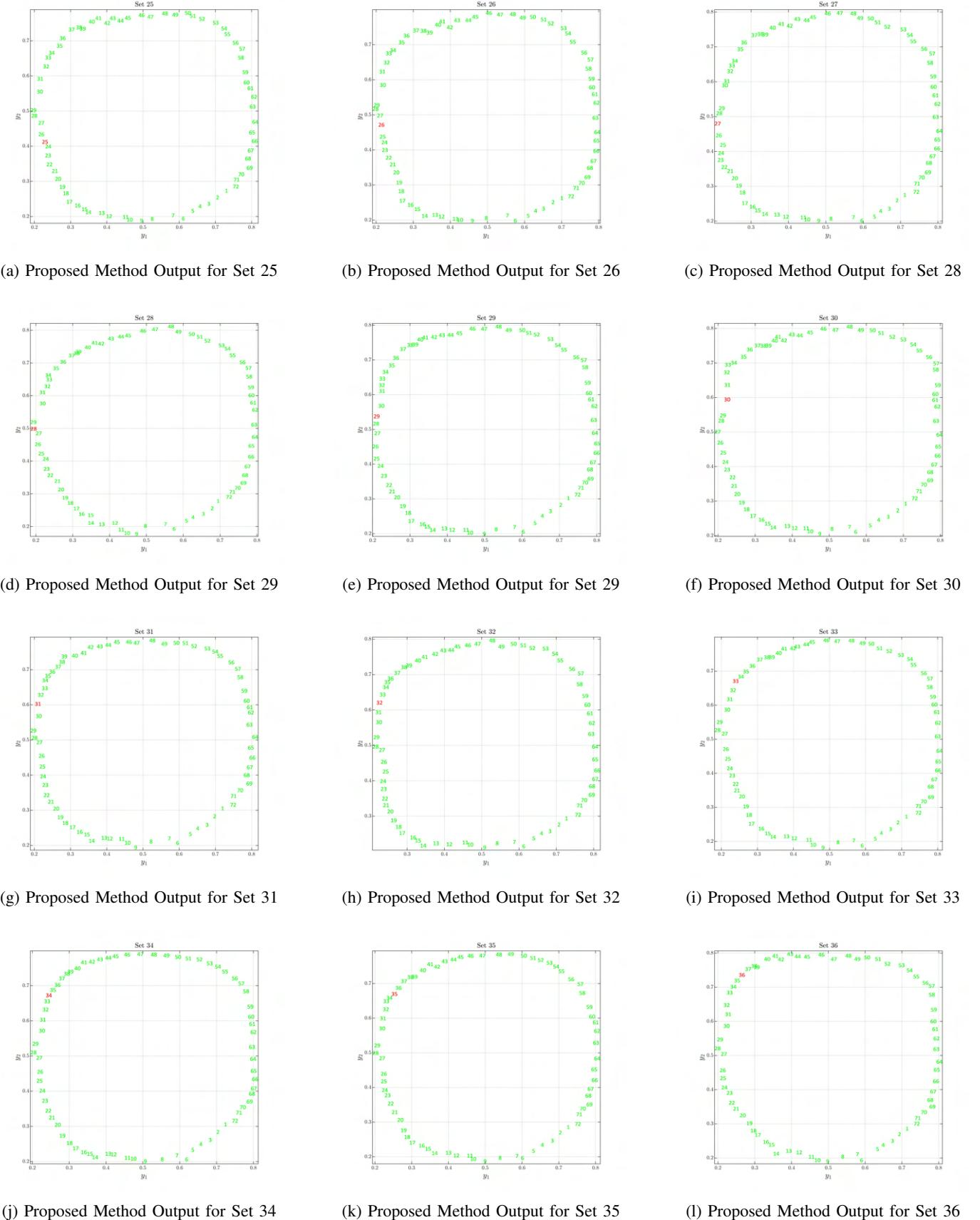


Fig. S-40: For experiment 3 on validation of predictability with leave one out sets composed of the first object of the COIL data set.

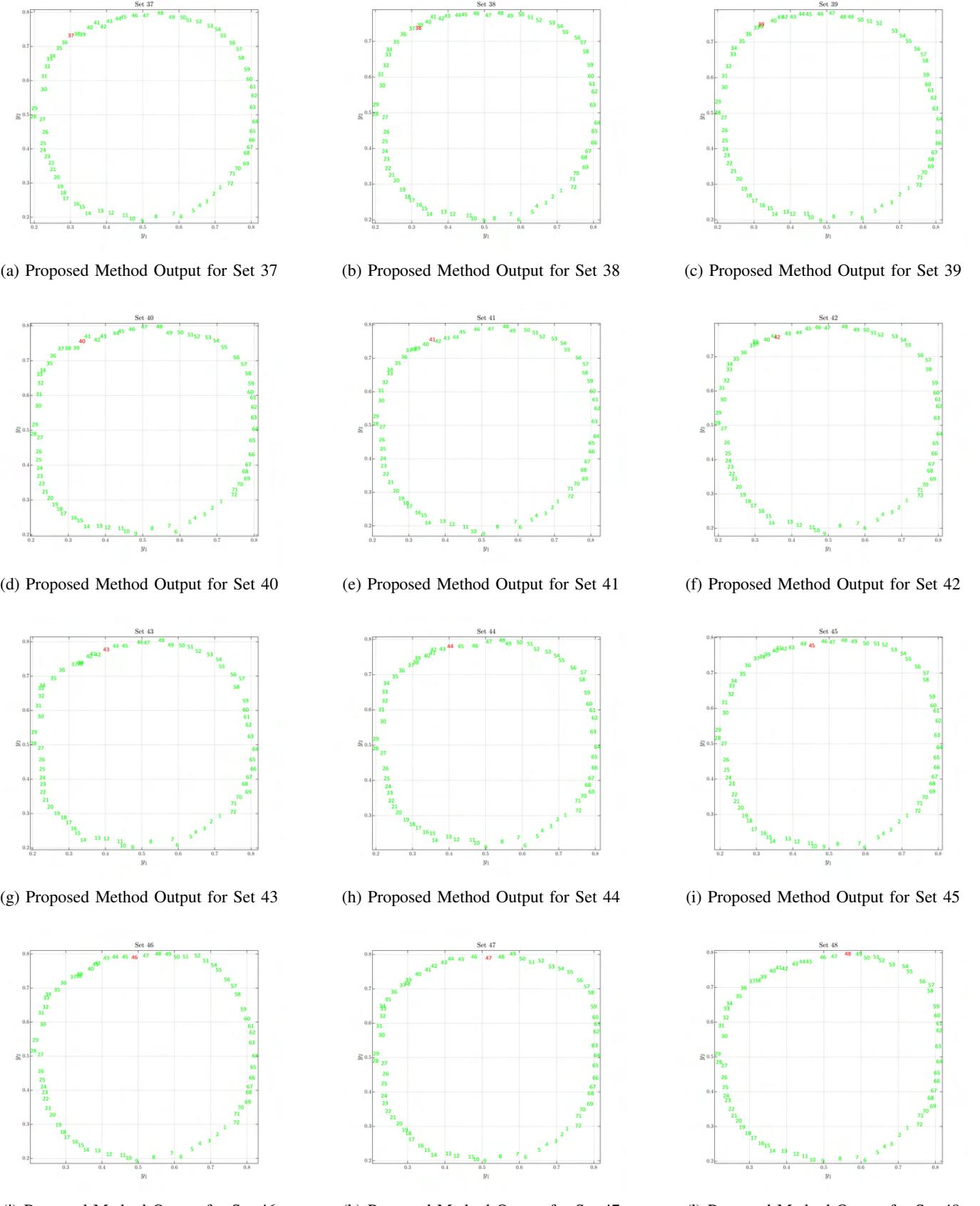


Fig. S-41: For experiment 3 on validation of predictability with leave one out sets composed of the first object of the COIL data set.

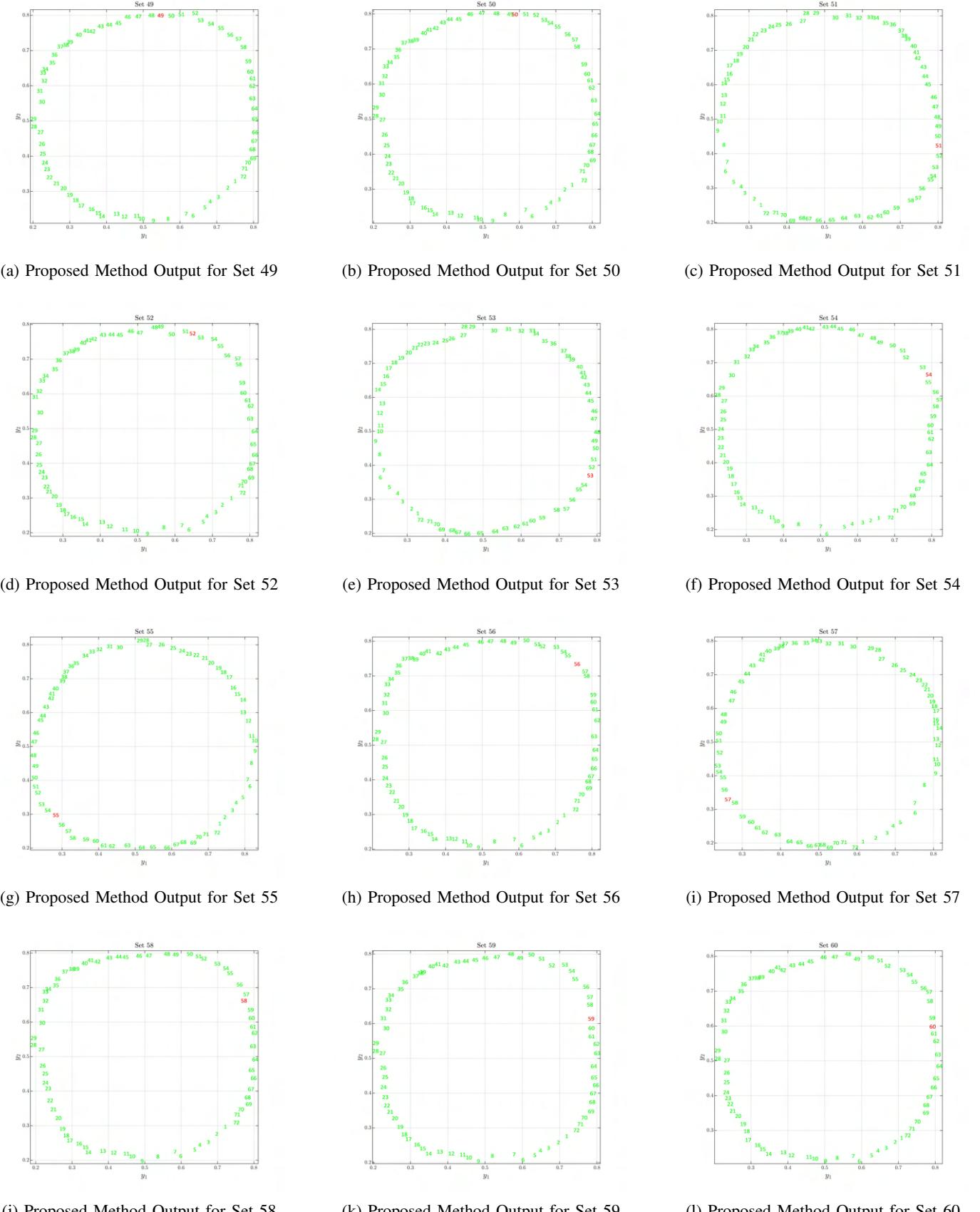


Fig. S-42: For experiment 3 on validation of predictability with leave one out sets composed of the first object of the COIL data set.

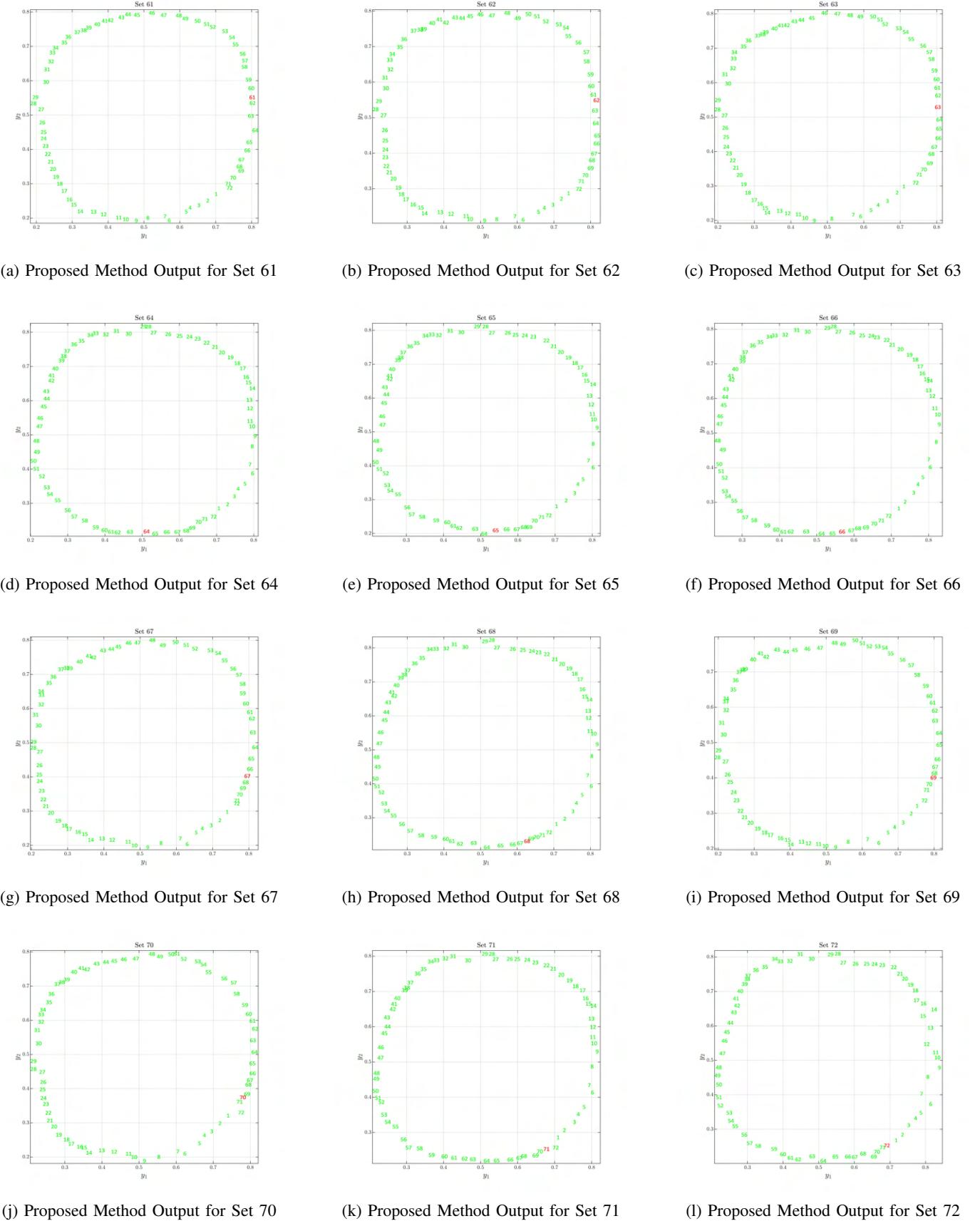


Fig. S-43: For experiment 3 on validation of predictability with leave one out sets composed of the first object of the COIL data set.