Meta-learning Implicit Neural Representation for Sparse Time Series Functional Data Analysis

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1 Introduction

2 Related works

2.1 Functional Data

properties: differ from multidimensional data

what we care: derivatives, smoothness

difficulty for Sparse data: previous baseline

application: medicine

2.2 Implicit Neural Representation

SIREN for time series: advantage...

2.3 Meta-learning

different architecture: MAML / SNAIL

3 Method

advantage

4 Experiments

4.1 Synthetic data

4.1.1 what meta-learning learned in timeseries

1. periodicity

2. differential equations: No?
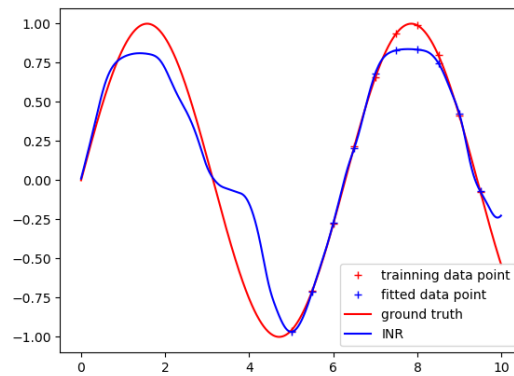
3. average phenomenon for meta prior model
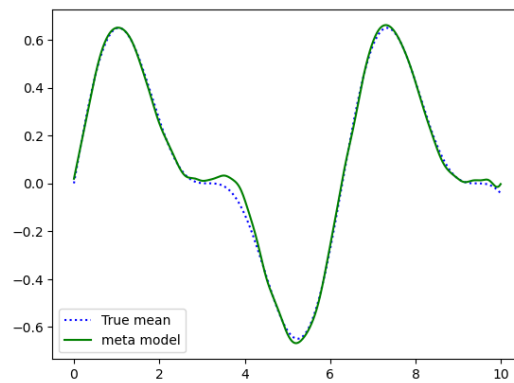
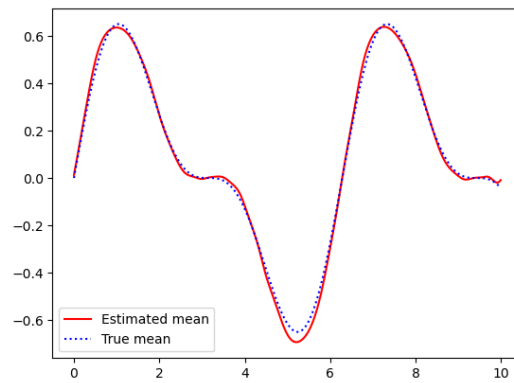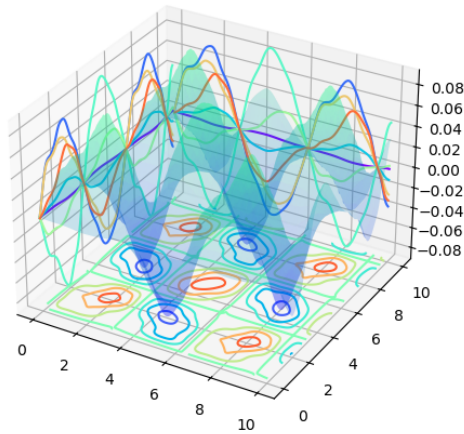Figure 1: Learning periodicity

Figure 2: Learning mean
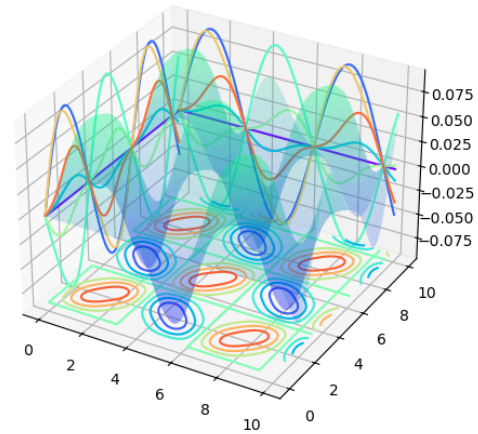

Figure 3: Mean estimation

Figure 4: Covariance estimation
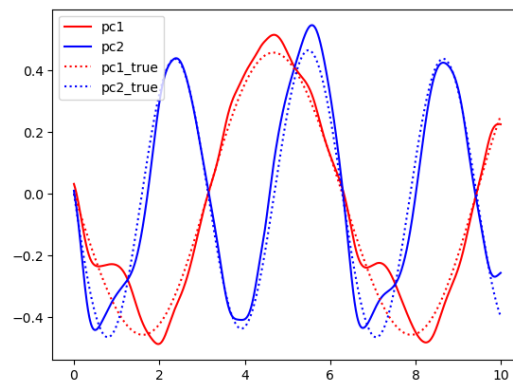

Figure 5: FPCA

4.1.2   Mean estimation

4.1.3   Covariance estimation

4.1.4   fPCA

4.1.5   Registration

4.2   Real-world data

5   Conclusion

6   Appendix

6.1   Traditional FDA for sparse functional data

6.2   Brief introduciton to SIREN