A DETAILED DESCRIPTION OF DATASETS AND PREPROCESSING

A.1 Datasets for Evaluation

Detailed descriptions of the eight used datasets are listed below. An overview of the datasets' general information is presented in Table 2.

A.1.1 Air Quality Datasets.

- **BeijingAir**[2] **[90]**: BeijingAir dataset includes hourly air pollutants data from 12 nationally-controlled air-quality monitoring sites from March 2013 to February 2017. The dataset contains 11 continuous variables at multiple sites in Beijing. We aggregate these variables from all sites together so this dataset has 12*11=132 features.
- **ItalyAir**[3] **[11]**: ItalyAir dataset contains 9358 instances of hourly averaged responses of 5 metal oxides from chemical sensors, along with hourly averaged concentrations of 7 pollutants from certified analyzers, from March 2004 to February 2005.

A.1.2 Traffic Datasets.

- **PeMS**[4]: The PeMS is a collection of hourly data from the California Department of Transportation, which describes the road occupancy rates measured by different sensors on San Francisco Bay area freeways.
- **Pedestrian**[5] [62]: The City of Melbourne, Australia has developed an automated pedestrian counting system to better understand pedestrian activity within the municipality, The data of a specific region is from the whole year of 2017.

A.1.3 Electricity Datasets.

- **Electricity**[6]: The Electricity Load Diagrams dataset contains hourly electricity consumption (kWh) for 370 clients over the period from January 2011 to December 2014.
- **ETT**[7] [92]: The ETT dataset, collected from power transformers, includes preprocessed data on power load and oil temperature from July 2016 to July 2018. In the experiments, we use ETT_h1 included in ETT.

A.1.4 Healthcare Datasets.

- **PhysioNet2012**[8] [60]: The PhysioNet/Computing in Cardiology Challenge 2012 dataset includes 12,000 ICU patient records from the MIMIC II Clinical database, version 2.6 [56], focusing on patient-specific prediction of in-hospital mortality using data from the first 48 hours of ICU admission. Not all variables are available in all cases, hence about 80% values are missing in this dataset. The whole dataset has three subsets, and we only use the subset A in our experiments.
- **PhysioNet2019**[9] [54]: The PhysioNet Challenge 2019 dataset includes clinical data from ICU patients across three hospitals, with a total of 40,336 patient records and 40 clinical and physiological variables for each patient. Note that this dataset has two subsets, and we only use the subset A in our setting.

A.2 Datasets Preprocessing Details

BeijingAir, ItalyAir, PeMS, Electricity, and ETT_h1 are all long-time series continuously collected from certain sources. Therefore, to generate them into the train, validation, and test sets and to avoid data leakage, we should first split them according to the time period. In BeijingAir, the first 28 months (2013/03 - 2015/06) of data are taken for training, the following 10 months (2015/07 - 2016/04) are for validation, and the left 10 months (2016/05 - 2017/02) are for test. In PeMS, the training set tasks the first 15 months (2016/07 - 2017/09) of data, and the validation set and test set take the following 4 months (2017/10 - 2018/01) and 6 months (2018/02 - 2018/07) respectively. Electricity uses the first 10 months (2011/01 - 2011/10) as the test set, the following 10 months (2011/11 - 2012/08) for validation, and the last 28 months (2012/09 - 2014/12) for training. The training, validation, and test sets of ETT_h1 separately take the first 14 months (2016/07 - 2017/08), the following 5 months (2017/09 - 2018/01), and the last 5 months (2018/02 - 2018/06). ItalyAir is split into 60%, 20%, and 20% for training, validation, and test. The sliding window function is applied to these five datasets to produce data samples. The window size of ItalyAir is 12, and 24 for BeijingAir and PeMS, 48 for ETT_h1, and 96 for Electricity. The sliding length is kept the same as the window size to guarantee there is no overlap between generated samples.

Dataset Pedestrian is offered with the split training set and test set, hence we separate 20% from the training set to form the validation set. Data samples in PhysioNet2012 share the same length, i.e. 48 steps. While samples in PhysioNet2019 have different lengths, hence we only keep samples with lengths larger than 48 and truncate the excess part to ensure samples all have 48 steps as well. For both PhysioNet2012 and PhysioNet2019, samples are firstly split into the training set and the test set according to 80% and 20%, then 20% of samples are taken from the training set as the validation set.

Note that standardization is applied in the preprocessing of all datasets.

[2] https://archive.ics.uci.edu/dataset/501/beijing+multi+site+air+quality+data
[3] https://archive.ics.uci.edu/dataset/360/air+quality
[4] https://PeMS.dot.ca.gov
[5] https://www.timeseriesclassification.com/description.php?Dataset=MelbournePedestrian
[6] https://archive.ics.uci.edu/dataset/321/electricityloaddiagrams20112014
[7] https://github.com/zhouhaoyi/ETDataset
[8] https://physionet.org/content/challenge-2012/1.0.0/
[9] https://physionet.org/content/challenge-2019/1.0.0/

B DETAILED DESCRIPTION OF MODELS IN TSI-BENCH

B.1 Transformer-based Models

- **iTransformer [33]**: iTransformer repurposes the Transformer architecture by applying attention and feed-forward networks to inverted dimensions, embedding time points into variate tokens to better capture multivariate correlations and nonlinear representations, achieving state-of-the-art performance in time series forecasting.
- **SAITS [13]**: SAITS (Self-Attention-based Imputation for Time Series) is a self-attention imputation transformer with a weighted combination of two diagonally-masked self-attention (DMSA) blocks. It is designed to handle missing data in time series, ensuring robust and accurate data imputation.
- **Nonstationary [37]**: Nonstationary (short for Nonstationary Transformer) addresses the challenge of non-stationarity in time series sequences by incorporating adaptive components that adjust to varying statistical properties over time.
- **ETSformer [73]**: ETSformer integrates exponential smoothing methods with Transformer models, aiming to provide accurate time series forecasting by combining statistical and deep learning approaches.
- **PatchTST [50]**: PatchTST uses a patching strategy combined with a Transformer architecture to enhance the time series forecasting task by capturing both local and global patterns effectively.
- **Crossformer [91]**: Crossformer leverages cross-dimensional attention to model intricate dependencies within multivariate time series data, achieving good performance in complex forecasting application scenarios.
- **Informer [92]**: Informer enhances efficiency in long-time series forecasting by employing a self-attention distillation mechanism, which reduces redundant information while maintaining forecasting accuracy.
- **Autoformer [75]**: Autoformer introduces a novel decomposition architecture with an auto-correlation mechanism, effectively capturing both seasonal and trend patterns in time series forecasting tasks.
- **Pyraformer [32]**: Pyraformer is designed for long-term time series forecasting, utilizing a pyramid attention structure that efficiently captures temporal dependencies at multiple scales.
- **Transformer [66]**: Transformer introduces the self-attention mechanism, which enables the processing of sequential data by attending to different positions within the sequence simultaneously, leading to significant advancements in natural language processing and time series fields.

B.2 RNN-based Models

- **BRITS [5]**: BRITS (Bidirectional Recurrent Imputation for Time Series) employs a bidirectional recurrent imputation strategy to handle missing values in time series, improving forecasting accuracy through iterative refinement.
- **MRNN [84]**: The Multi-directional Recurrent Neural Network (MRNN) is designed for estimating missing values in spatiotemporal data and time series by leveraging temporal dependencies and multi-directional information sequence.
- **GRUD [7]**: GRUD (Gated Recurrent Unit for Decay) enhances the Gated Recurrent Unit (GRU) by incorporating decay mechanisms that model the impact of missing values over time, offering robust time series analysis.

B.3 CNN-based Models

- **TimesNet [74]**: TimesNet is designed to efficiently model temporal patterns in time series data by incorporating multi-scale temporal convolutions and attention mechanisms. It can be used for short- and long-term forecasting, imputation, classification, and anomaly detection tasks.
- **MICN [67]**: MICN (Multi-scale Inception Convolutional Network) is a convolutional network architecture that captures multi-scale temporal features and combines local and global context for more accurate time series forecasting.
- **SCINet [30]**: SCINet introduces a novel recursive downsample-convolve-interact architecture for time series forecasting, leveraging multiple convolutional filters to extract and aggregate valuable temporal features from downsampled sub-sequences, improving forecasting accuracy over existing models.

B.4 GNN-based Models

- **StemGNN [4]**: StemGNN (Spectral Temporal Graph Neural Network) introduces an approach for time series forecasting by jointly capturing inter-series correlations and temporal dependencies in the spectral domain using Graph Fourier Transform (GFT) and Discrete Fourier Transform (DFT), eliminating the need for pre-defined priors.

B.5 MLP-based Models

- **FreTS [83]**: FreTS uses MLPs in the frequency domain for time series forecasting, leveraging global view and energy compaction properties to enhance forecasting performance by transforming time-domain signals and learning frequency components.
- **Koopa [35]**: Koopa introduces a novel Koopman forecaster that disentangles time-variant and time-invariant components using Fourier Filter and employs Koopman operators for linear dynamics portrayal, achieving end-to-end forecasting with significant improvements in training time and memory efficiency.

- **DLinear [87]**: DLinear introduces LTSF-Linear, a set of simple one-layer linear models, which outperform complex Transformer-based models in long-term time series forecasting by effectively preserving temporal information that Transformers inherently lose due to their permutation-invariant self-attention mechanism.
- **FiLM [93]**: FiLM (Frequency improved Legendre Memory) introduces a novel approach by using Legendre Polynomials for historical information approximation, Fourier projection for noise reduction, and a low-rank approximation for computational efficiency, resulting in significant improvements in long-term forecasting accuracy.

B.6 Generative Models

- **CSDI [63]**: CSDI (Conditional Score-based Diffusion Imputation) leverages conditional score-based diffusion models for accurate imputation and generation of missing values in time series applications.
- **US-GAN [46]**: US-GAN integrates a classifier in a semi-supervised generative adversarial network to enhance its imputation of missing values in multivariate time series, leveraging both observed data and label information. Also, it introduces a temporal matrix to improve the discriminator's ability to differentiate between observed and imputed components.
- **GP-VAE [17]**: GP-VAE (Gaussian Process Variational Autoencoder) proposes a novel deep sequential latent variable model that combines VAE with a structured variational approximation to achieve non-linear dimensionality reduction and imputation, providing interpretable uncertainty estimates and improved imputation smoothness.

B.7 Traditional Methods

- **Mean**: The mean imputation method fills in missing values by calculating the mean (average) of the available values in the time series. This method is simple and quick to implement but may not be suitable for data with trends or seasonality, as it does not consider the temporal structure of the data.
- **Median**: Median imputation replaces missing values with the median value of the observed data points. The median is the middle value when the data points are ordered, making this method robust to outliers. It is particularly useful for skewed distributions or data with significant outliers.
- **LOCF**: LOCF (Last Observation Carried Forward) fills in missing values by carrying forward the last observed value. This method assumes that the value remains constant until the next observation is recorded. LOCF is straightforward and works well for short gaps in data, but it can introduce bias if the missing data spans a long period or if the data has a trend.
- **Linear**: Linear interpolation fills in missing values by connecting the last observed value before the missing data and the first observed value after the missing data with a straight line. This method assumes a linear trend between the two points and is useful for data with a relatively stable and linear pattern. However, it may not perform well with data that exhibit non-linear trends or seasonality.

C FULL EXPERIMENTAL RESULTS

In the process of constructing the TSI-Bench, to analyse the imputation and downstream task performance of various imputation algorithms on different datasets and obtain valuable insights, we conduct extensive experiments. Specifically, we explore the imputation effects of 28 algorithms under 5 missing patterns and evaluate the performance of downstream tasks after imputation. It should be noted that, as PhysioNet2012 and PhysioNet2019 inherently contain a high proportion of missing data, these two datasets are not included in the experiments with 50% or 90% missing rates.

Note that MICN fails on Pedestrian because the official implementation of its backbone cannot accept univariate time series as input.

C.1 10% Point Missing

Table 7 shows The details of the datasets involved in the experiments under the 10% missing setting. Table 12 shows the experimental results of the evaluated methods under the 10% missing setting, including size, the results of the three evaluation metrics previously mentioned, and inference time.

C.2 50% Point Missing

The details of the datasets involved are shown in Table 8, and Table 13 shows the experimental results of imputation with 50% point missing which is more challenging than with 10% point missing.

C.3 90% Point Missing

The relative details of the datasets are shown in Table 9, and able 14 shows the imputation performance with 90% point missing. This is a relatively extreme scenario and brings difficulties in estimating the missing values.

Table 7: Details of the preprocessed datasets with 10% point missingness.

Dataset	Air		Traffic		Electricity		Healthcare	
	BeijingAir	ItalyAir	PeMS	Pedestrian	ETT_h1	Electricity	PhysioNet2012	PhysioNet2019
# of Total Samples	1458	774	727	3633	358	1457	3997	4927
# of Variables	132	13	862	1	7	370	35	33
Sample Sequence Length	24	12	24	24	48	96	48	48
Time Interval	1H	1H	1H	1H	1H	15Min	1H	1H
Original Missing Rate	1.60%	0%	0%	0%	0%	0%	79.30%	73.90%
Train Missing Rate	11.69%	10.14%	10.01%	9.79%	9.96%	9.99%	80.50%	78.45%
Validation Missing Rate	10.85%	9.77%	9.99%	10.13%	10.24%	10.00%	82.66%	80.30%
Test Missing Rate	11.19%	9.94%	10.04%	9.93%	10.06%	9.99%	82.35%	80.48%
Train Dataset Length	851	466	455	955	212	851	2557	3152
Validation Dataset Length	304	154	122	239	75	304	640	789
Test Dataset Length	303	154	150	2439	71	302	800	986

Table 8: Details of the preprocessed datasets with 50% point missing.

Dataset	Air		Traffic		Electricity	
	BeijingAir	ItalyAir	PeMS	Pedestrian	ETT_h1	Electricity
# of Total Samples	1458	774	727	3633	358	1457
# of Variables	132	13	862	1	7	370
Sample Sequence Length	24	12	24	24	48	96
Time Interval	1H	1H	1H	1H	1H	15Min
Original Missing Rate	1.60%	0%	0%	0%	0%	0%
Train Missing Rate	50.98%	50.38%	50.02%	49.60%	50.11%	49.99%
Validation Missing Rate	50.52%	49.70%	50.02%	50.49%	49.49%	50.03%
Test Missing Rate	50.70%	49.96%	50.03%	49.78%	49.97%	49.97%
Train Dataset Length	851	466	455	955	212	851
Validation Dataset Length	304	154	122	239	75	304
Test Dataset Length	303	154	150	2439	71	302

Table 9: Details of the preprocessed datasets with 90% point missing.

Dataset	Air		Traffic		Electricity	
	BeijingAir	ItalyAir	PeMS	Pedestrian	ETT_h1	Electricity
# of Total Samples	1458	774	727	3633	358	1457
# of Variables	132	13	862	1	7	370
Sample Sequence Length	24	12	24	24	48	96
Time Interval	1H	1H	1H	1H	1H	15Min
Original Missing Rate	1.60%	0%	0%	0%	0%	0%
Train Missing Rate	90.21%	90.07%	90.00%	90.37%	90.11%	90.00%
Validation Missing Rate	90.12%	89.81%	90.01%	90.17%	89.77%	90.02%
Test Missing Rate	90.21%	89.94%	90.00%	89.74%	90.34%	90.00%
Train Dataset Length	851	466	455	955	212	851
Validation Dataset Length	304	154	122	239	75	304
Test Dataset Length	303	154	150	2439	71	302

C.4 50% Subsequence Missing

The details of the preprocessed datasets in this setting are shown as Table 10, and table 15 shows the imputation results with 50% subsequence missing. It could be observed that the imputation error is generally higher than that with 50% point missing. In this condition, the missing values in the subsequence cannot be easily estimated from their adjacent observed data.

Table 10: Details of the preprocessed datasets with 50% subsequence missing.

Dataset	Air		Traffic		Electricity	
	BeijingAir	ItalyAir	PeMS	Pedestrian	ETT_h1	Electricity
# of Total Samples	1458	774	727	3633	358	1457
# of Variables	132	13	862	1	7	370
Sample Sequence Length	24	12	24	24	48	96
Time Interval	1H	1H	1H	1H	1H	15Min
Original Missing Rate	1.60%	0%	0%	0%	0%	0%
Train Missing Rate	50.92%	50.01%	50.00%	50.03%	50.03%	50.00%
Validation Missing Rate	50.45%	50.02%	50.00%	50.21%	50.00%	50.00%
Test Missing Rate	50.61%	50.02%	50.00%	50.00%	50.10%	50.00%
Train Dataset Length	851	466	455	955	212	851
Validation Dataset Length	304	154	122	239	75	304
Test Dataset Length	303	154	150	2439	71	302

Table 11: Details of the preprocessed datasets with 50% block missing. The values of Pedestrian are the same as those in Table 10 because this dataset has only 1 feature that makes subsequence missing and block missing identical.

Dataset	Air		Traffic		Electricity	
	BeijingAir	ItalyAir	PeMS	Pedestrian	ETT_h1	Electricity
# of Total Samples	1458	774	727	3633	358	1457
# of Variables	132	13	862	1	7	370
Sample Sequence Length	24	12	24	24	48	96
Time Interval	1H	1H	1H	1H	1H	15Min
Original Missing Rate	1.60%	0%	0%	0%	0%	0%
Train Missing Rate	51.19%	50.82%	49.96%	50.03%	49.11%	50.73%
Validation Missing Rate	50.83%	50.97%	50.03%	50.21%	50.42%	50.75%
Test Missing Rate	50.92%	50.28%	50.03%	50.00%	49.58%	50.73%
Train Dataset Length	851	466	455	955	212	851
Validation Dataset Length	304	154	122	239	75	304
Test Dataset Length	303	154	150	2439	71	302

C.5 50% Block Missing

Table 11 shows the relative dataset details, and table 16 shows the imputation results under the scenario of 50% block missing. This missing pattern includes missing data across multiple dimensions at the same time points and consecutive missing data at multiple time points, thus presenting challenges for imputation.

C.6 Visualization of Imputation Performance

We provide the visualization of the imputation examples by different imputation methods on the ETT_h1 and Electricity datasets. Hereby, we display only the imputation results of SAITS in Figures 6 and 9. Results from other imputation algorithms are available under the folder "Imputation comparison" of supplementary material.

C.7 Visualization of Time Intervals

We conducted a detailed statistical analysis and visualization of the time intervals in the PhysioNet2012 dataset, as shown in Figures 10. It is crucial to emphasize that the uneven time intervals in medical data represent a significant and common issue. As the figure illustrates, features such as heart rate (HR) and diastolic arterial blood pressure (DiasABP) tend to have shorter time intervals, while features like white blood cell count (WBC) and sodium levels (Na) have much longer intervals. This discrepancy arises from the nature of these measurements—vital signs like heart rate can be continuously monitored by instruments, whereas blood tests are inherently spaced out due to the invasive nature of the procedures.

Furthermore, different types of features, such as continuous variables (e.g., HR, DiasABP) versus categorical variables (e.g., Glasgow Coma Scale [GCS]), exhibit significant variability in their measurement intervals. Existing methods like BRITS and GRU-D attempt to address

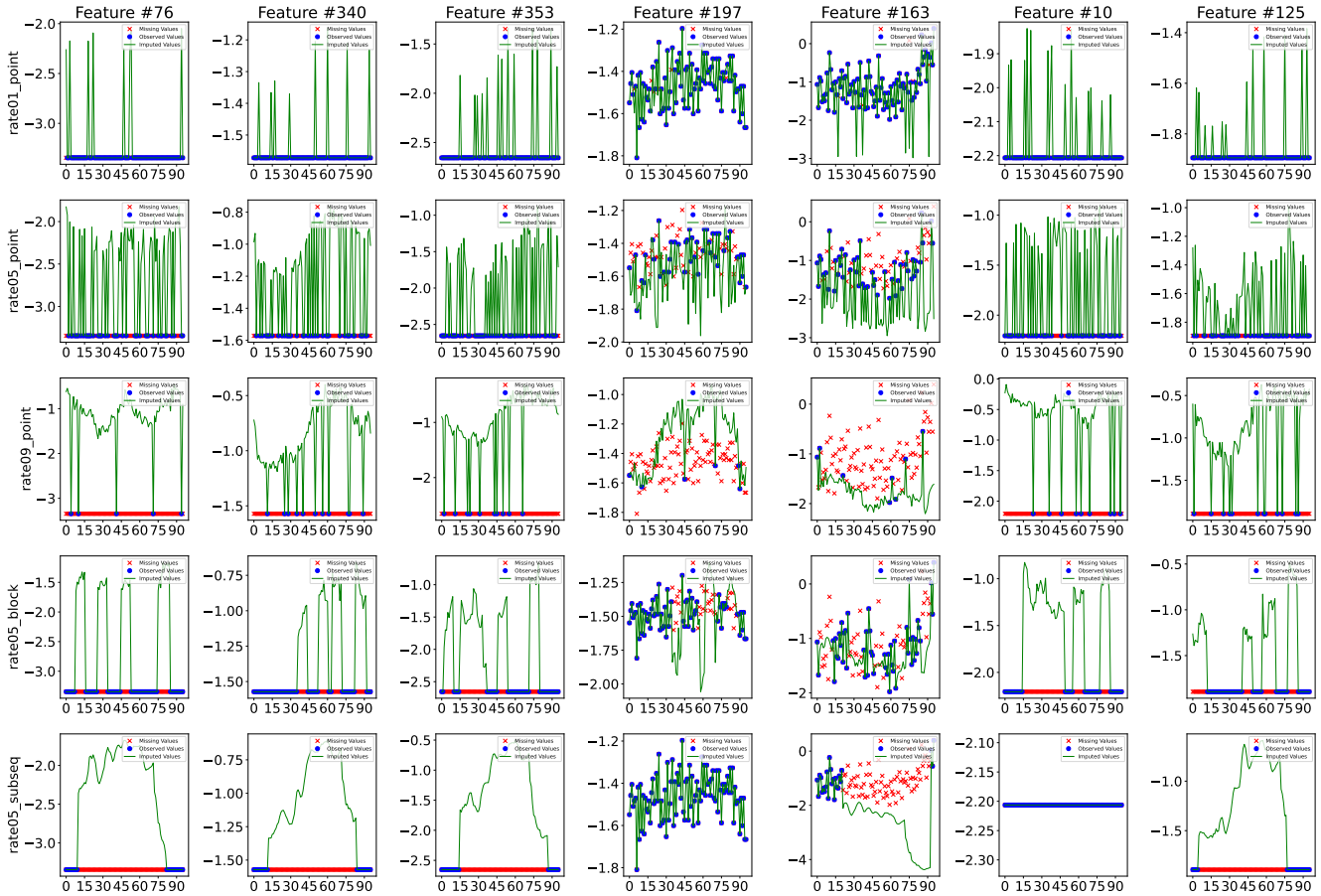

Figure 9: Visualization of imputation performance by SAITS on the Electricity dataset.

this by incorporating decay mechanisms, where the influence of an observation decreases as the time interval increases. However, these approaches often overlook the inherent regularity of certain medical measurements. Handling unequal time intervals in healthcare time series is not just about filling in the gaps, but about the need to understand the context in data collection and ensuring that imputation methods respect the temporal dynamics of the data.

C.8 Experiments on Downstream Tasks

C.8.1 Classification. Table 17 and 18 show the classification performance without and with imputation. In general, the classification performance can be improved after an imputation process for time series with missing values. This observation is particularly evident when using XGBoost as the classification method on the PhysioNet2012 dataset with a missing rate of 10%.

C.8.2 Regression. Table 19, 20 and 21 show the regression performance without and with imputation under 3 different missing patterns. It can be found that when XGBoost is used as the regression model, using advanced algorithms to impute missing values can improve the regression performance overall. However, for some simple methods (such as Mean), the regression effect after imputation may not improve or may become worse, which also shows to some extent that it is meaningful and valuable to research the missing value imputation in time series.

C.8.3 Forecasting. Table 22, 23 and 24 show the forecasting performance without or with imputation under different missing patterns and show the same phenomenon when regression is the downstream task, that is, using advanced algorithms to impute missing values can improve the performance of downstream tasks, while using simple methods like Mean may not have a positive impact on forecasting performance.

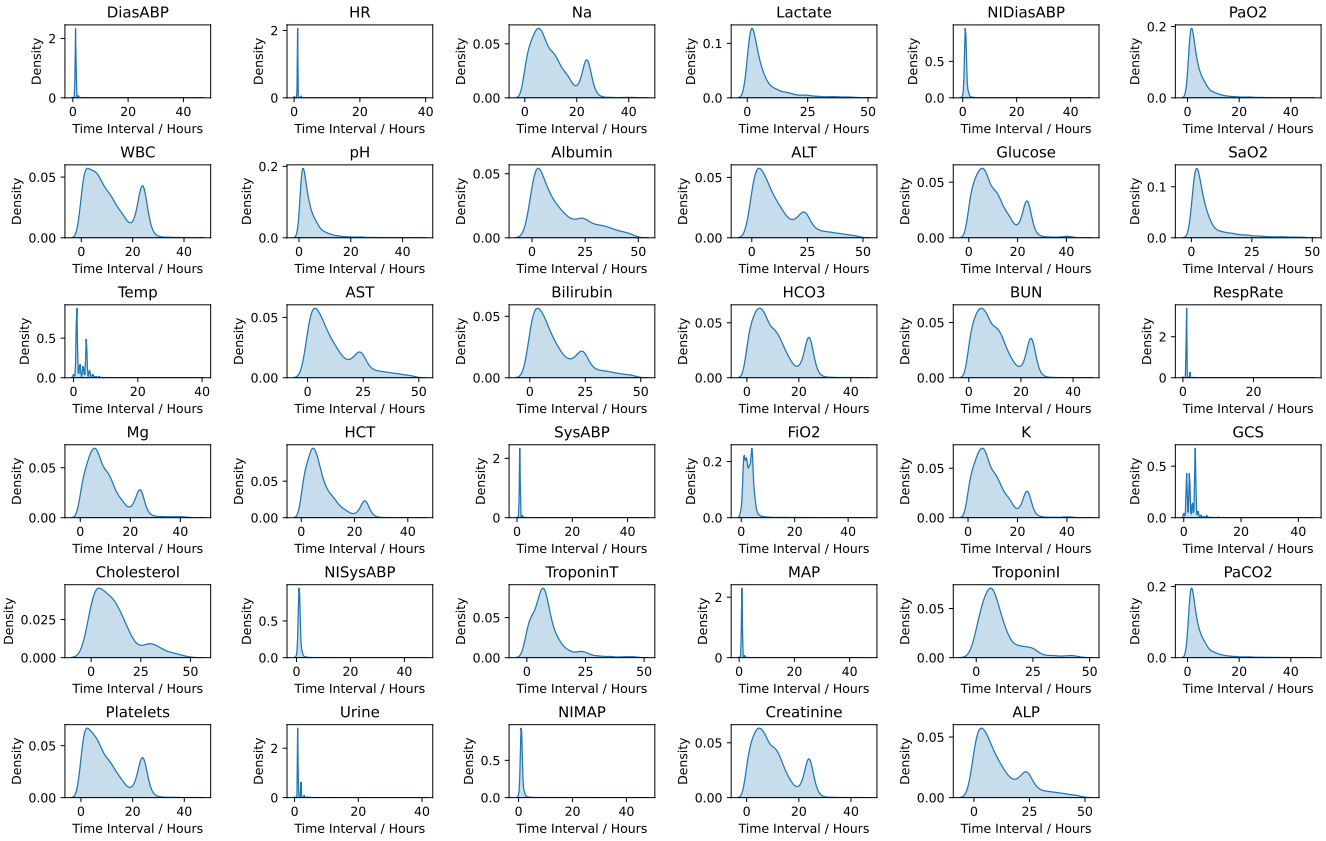

Figure 10: Density distribution of time intervals across features in PhysioNet2012 dataset.

C.9 The Total Number of Experiments

We conduct a total of 34,804 experiments across 28 algorithms and 8 datasets, focusing on 3 angles (i.e., on the data level, the model level, and the downstream tasks) for a comprehensive and fair evaluation and analysis through the experiments. Note that duplicated experiments for obtaining the final stable results are not included here.

HPO experiments. For 24 neural networks, we run 100 HPO trials for each of them on each dataset, with $24 * 100 * 8 = 19,200$ experiments.

Imputation experiments. For 24 neural network models, we run 5 rounds on 8 datasets with 10% point missing, 6 datasets with 50% point missing, 6 datasets with 90% point missing, 6 datasets with 50% subsequence missing, and 5 datasets with 50% block missing, with $24 * 5 * (8 + 6 + 6 + 6 + 5) = 3,720$ experiments. We also conduct $4 * (8 + 6 + 6 + 6 + 5) = 124$ experiments for 4 naive imputation methods.

Downstream experiments. Experiments on the downstream tasks are performed in 5 rounds with 4 algorithms on each dataset imputed by 28 methods. The classification task is on PhysioNet2012 with 10% point missing in the evaluation sets and Pedestrian with 10%, 50%, and 90% point missing, and 50% subsequence missing. The regression and forecasting tasks are on ETT_h1 and PeMS with 10% and 50% points missing, 50% subsequence missing and block missing. So the total number of downstream tasks is $5*4*28*(1+4)+5*4*28*(4+4)+5*4*28*(4+4) = 11,760$ experiments.

Table 12: Performance comparison in 8 datasets with 10% point missing.

	BeijingAir					ItalyAir					PeMS					Pedestrian				
	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time
iTransformer	8,286,232	0.123 (0.005)	0.127 (0.003)	0.163 (0.007)	0.37	18,932,236	0.223 (0.014)	0.174 (0.007)	0.300 (0.019)	0.2	1,854,744	0.226 (0.001)	0.394 (0.007)	0.281 (0.001)	0.24	2,913,304	0.148 (0.005)	0.080 (0.004)	0.202 (0.007)	0.06
SAITS	7,153,808	0.155 (0.004)	0.124 (0.004)	0.206 (0.005)	0.23	16,628,642	0.185 (0.010)	0.099 (0.006)	0.250 (0.013)	0.09	78,229,072	0.287 (0.001)	0.579 (0.003)	0.355 (0.001)	0.12	133,406	0.131 (0.006)	0.080 (0.006)	0.179 (0.008)	0.15
Nonstationary	6,978,068	0.209 (0.002)	0.242 (0.014)	0.278 (0.002)	0.37	8,441,077	0.266 (0.007)	0.239 (0.011)	0.359 (0.010)	0.21	346,318	0.331 (0.017)	0.544 (0.010)	0.410 (0.021)	0.12	6338,833	0.453 (0.024)	0.481 (0.078)	0.619 (0.033)	0.13
ETSformer	7,928,510	0.187 (0.002)	0.130 (0.002)	0.248 (0.003)	1.75	8,009,937	0.259 (0.004)	0.190 (0.005)	0.349 (0.005)	0.43	5,962,188	0.347 (0.006)	0.505 (0.005)	0.431 (0.007)	0.1	530,457	0.207 (0.011)	0.141 (0.010)	0.283 (0.015)	0.32
PatchTST	30,342,300	0.198 (0.011)	0.131 (0.005)	0.264 (0.015)	4.7	5,077,145	0.274 (0.026)	0.189 (0.025)	0.370 (0.034)	0.5	3,045,238	0.330 (0.013)	0.600 (0.035)	0.409 (0.016)	0.21	106,905	0.126 (0.003)	0.072 (0.003)	0.173 (0.005)	0.09
Crossformer	52,933,788	0.184 (0.004)	0.127 (0.004)	0.245 (0.006)	6.77	2,908,185	0.246 (0.011)	0.172 (0.009)	0.332 (0.015)	0.11	12,645,238	0.337 (0.007)	0.565 (0.007)	0.418 (0.009)	0.26	202,905	0.119 (0.005)	0.069 (0.004)	0.163 (0.008)	0.16
Informer	6,706,308	0.148 (0.002)	0.122 (0.002)	0.198 (0.003)	0.67	10,540,045	0.205 (0.008)	0.111 (0.006)	0.277 (0.010)	0.49	13,149,022	0.302 (0.003)	0.572 (0.003)	0.374 (0.004)	0.17	446,785	0.154 (0.010)	0.094 (0.007)	0.211 (0.013)	0.23
Autoformer	6,700,164	0.257 (0.012)	0.272 (0.014)	0.342 (0.016)	0.26	993,805	0.295 (0.008)	0.288 (0.015)	0.398 (0.011)	0.11	608,926	0.598 (0.074)	1.233 (0.196)	0.742 (0.091)	0.17	246,145	0.197 (0.008)	0.151 (0.013)	0.270 (0.011)	0.32
Pyraformer	3,230,212	0.178 (0.004)	0.150 (0.012)	0.237 (0.005)	0.31	11,355,917	0.217 (0.006)	0.117 (0.005)	0.292 (0.008)	0.1	4,048,606	0.285 (0.003)	0.564 (0.003)	0.353 (0.003)	0.1	957,057	0.153 (0.012)	0.094 (0.009)	0.210 (0.017)	0.18
Transformer	203,038,852	0.142 (0.001)	0.109 (0.001)	0.190 (0.001)	0.38	4,749,837	0.191 (0.010)	0.101 (0.004)	0.258 (0.013)	0.07	23,135,326	0.294 (0.002)	0.555 (0.001)	0.364 (0.002)	0.05	13,787,649	0.136 (0.009)	0.074 (0.012)	0.186 (0.013)	0.19
BRITS	3,598,496	0.127 (0.001)	0.101 (0.002)	0.169 (0.001)	17.04	596,912	0.235 (0.007)	0.146 (0.007)	0.317 (0.010)	0.41	32,012,048	0.271 (0.000)	0.517 (0.001)	0.336 (0.000)	4.06	8,427,536	0.149 (0.005)	0.086 (0.004)	0.203 (0.007)	3.47
MRNN	96,585	0.568 (0.002)	0.671 (0.002)	0.756 (0.003)	2.77	402,111	0.638 (0.003)	1.177 (0.012)	0.862 (0.004)	0.52	3,076,301	0.624 (0.000)	1.049 (0.001)	0.773 (0.000)	1.37	401,415	0.735 (0.001)	0.921 (0.000)	1.004 (0.001)	1.21
GRUD	7,397,656	0.233 (0.002)	0.217 (0.002)	0.309 (0.002)	1.05	112,707	0.368 (0.012)	0.315 (0.013)	0.497 (0.016)	0.4	14,104,896	0.355 (0.002)	0.578 (0.003)	0.440 (0.002)	0.31	100,227	0.204 (0.008)	0.150 (0.010)	0.279 (0.011)	0.89
TimesNet	87,063,940	0.230 (0.010)	0.158 (0.010)	0.306 (0.013)	0.66	22,051,853	0.280 (0.004)	0.189 (0.007)	0.378 (0.006)	0.11	91,622,238	0.312 (0.001)	0.501 (0.002)	0.387 (0.001)	0.11	10,816,385	0.157 (0.008)	0.084 (0.007)	0.214 (0.011)	0.35
MICN	57,048,200	0.203 (0.001)	0.150 (0.001)	0.270 (0.001)	0.04	695,569	0.283 (0.004)	0.244 (0.006)	0.382 (0.005)	0.03	15,490,402	0.281 (0.003)	0.366 (0.007)	0.348 (0.003)	0.15	/	/	/	/	/
SCINet	26,833,140	0.191 (0.011)	0.140 (0.027)	0.254 (0.015)	0.29	263,517	0.288 (0.010)	0.216 (0.010)	0.388 (0.014)	0.1	1,143,027,230	0.487 (0.101)	0.824 (0.237)	0.604 (0.125)	0.3	43,783	0.149 (0.012)	0.074 (0.009)	0.204 (0.016)	0.31
StemGNN	2,645,628	0.161 (0.002)	0.162 (0.003)	0.214 (0.003)	0.45	926,737	0.260 (0.008)	0.192 (0.007)	0.351 (0.010)	0.18	2,386,294	0.493 (0.079)	0.991 (0.168)	0.611 (0.097)	0.21	1,638,337	0.127 (0.006)	0.071 (0.004)	0.173 (0.008)	0.98
FreTS	909,852	0.211 (0.008)	0.146 (0.005)	0.281 (0.011)	0.2	668,313	0.273 (0.008)	0.213 (0.023)	0.369 (0.011)	0.11	1,715,958	0.396 (0.027)	0.647 (0.032)	0.491 (0.033)	0.05	116,825	0.138 (0.004)	0.057 (0.002)	0.188 (0.005)	0.07
Koopa	563,692	0.363 (0.108)	0.359 (0.132)	0.483 (0.144)	0.33	1,403,525	0.307 (0.041)	0.280 (0.080)	0.414 (0.056)	0.06	13,306,214	0.532 (0.122)	0.847 (0.215)	0.660 (0.151)	0.19	124,711	0.173 (0.020)	0.089 (0.021)	0.237 (0.027)	0.27
DLinear	204,728	0.215 (0.016)	0.143 (0.008)	0.286 (0.021)	0.17	5,458	0.242 (0.009)	0.176 (0.007)	0.327 (0.012)	0.05	5,301,100	0.362 (0.009)	0.537 (0.019)	0.449 (0.011)	0.05	3,250	0.179 (0.004)	0.099 (0.002)	0.244 (0.005)	0.06
FiLM	408,807	0.318 (0.010)	0.323 (0.012)	0.423 (0.013)	0.49	43,072	0.340 (0.011)	0.314 (0.021)	0.459 (0.015)	0.13	2,652,097	0.784 (0.064)	1.528 (0.136)	0.972 (0.079)	0.1	6,244	0.413 (0.010)	0.382 (0.015)	0.565 (0.014)	0.21
CSDI	244,833	0.102 (0.010)	0.507 (0.235)	0.135 (0.014)	417.52	933,161	0.539 (0.418)	23.503 (35.685)	0.728 (0.564)	12.39	207,873	0.238 (0.047)	1.604 (1.279)	0.295 (0.058)	277.12	325,473	0.231 (0.064)	2.629 (2.822)	0.315 (0.088)	69.09
US-GAN	6,123,812	0.137 (0.002)	0.100 (0.006)	0.182 (0.003)	0.51	3,913,149	0.264 (0.012)	0.144 (0.011)	0.356 (0.017)	0.21	50,674,286	0.296 (0.001)	0.488 (0.002)	0.367 (0.001)	0.29	14,745,617	0.151 (0.016)	0.074 (0.009)	0.206 (0.022)	3.79
GP-VAE	1,013,913	0.240 (0.006)	0.187 (0.007)	0.320 (0.008)	1.37	130,594	0.369 (0.012)	0.314 (0.016)	0.498 (0.016)	0.39	2,396,536	0.341 (0.007)	0.626 (0.006)	0.422 (0.009)	5.85	284,676	0.319 (0.010)	0.235 (0.018)	0.436 (0.013)	1.13
Mean	/	0.721	1.035	0.959	/	/	0.574	1.034	0.775	/	/	0.798	1.423	0.99	/	/	0.728	0.92	0.995	/
Median	/	0.681	1.093	0.905	/	/	0.518	1.045	0.699	/	/	0.778	1.492	0.965	/	/	0.667	1.024	0.911	/
LOCF	/	0.188	0.243	0.25	/	/	0.233	0.22	0.315	/	/	0.375	0.6	0.465	/	/	0.257	0.224	0.351	/
Linear	/	0.112	0.114	0.149	/	/	0.135	0.106	0.182	/	/	0.211	0.24	0.262	/	/	0.167	0.082	0.228	/

	ETT_h1					Electricity					PhysioNet2012					PhysioNet2019				
	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time
iTransformer	23,723,056	0.263 (0.004)	0.143 (0.002)	0.311 (0.004)	0.03	12,989,024	0.571 (0.178)	1.246 (0.294)	0.306 (0.095)	0.79	6,853,936	0.379 (0.002)	0.411 (0.003)	0.534 (0.002)	0.47	25,289,776	0.462 (0.006)	0.445 (0.008)	0.607 (0.008)	0.87
SAITS	88,235,470	0.144 (0.006)	0.047 (0.002)	0.170 (0.007)	0.13	63,624,720	1.377 (0.026)	3.809 (0.114)	0.737 (0.014)	0.94	44,295,342	0.257 (0.019)	0.276 (0.018)	0.362 (0.027)	1.02	8,716,598	0.352 (0.005)	0.303 (0.007)	0.462 (0.007)	0.85
Nonstationary	589,927	0.359 (0.013)	0.247 (0.018)	0.424 (0.015)	0.02	24,811,090	0.213 (0.014)	0.178 (0.018)	0.114 (0.007)	0.61	1,613,155	0.410 (0.002)	0.454 (0.005)	0.579 (0.002)	0.72	1,421,505	0.458 (0.001)	0.429 (0.003)	0.601 (0.002)	0.68
ETSformer	809,057	0.227 (0.007)	0.107 (0.007)	0.268 (0.008)	0.04	10,518,266	0.412 (0.005)	0.347 (0.009)	0.221 (0.003)	0.56	9,785,804	0.373 (0.003)	0.408 (0.004)	0.526 (0.004)	2.32	12,913,109	0.451 (0.005)	0.453 (0.007)	0.592 (0.006)	2.39
PatchTST	72,247	0.240 (0.013)	0.115 (0.011)	0.283 (0.015)	0.01	4,419,410	0.550 (0.039)	0.606 (0.085)	0.294 (0.021)	3.78	644,051	0.301 (0.011)	0.332 (0.009)	0.424 (0.016)	0.95	1,165,393	0.420 (0.007)	0.402 (0.008)	0.551 (0.009)	0.95
Crossformer	223,479	0.232 (0.008)	0.113 (0.005)	0.274 (0.009)	0.03	9,967,314	0.540 (0.034)	0.581 (0.070)	0.289 (0.018)	1.55	1,215,059	0.525 (0.202)	0.717 (0.336)	0.740 (0.285)	0.77	414,929	0.378 (0.007)	0.340 (0.008)	0.496 (0.010)	0.64
Informer	1,058,311	0.167 (0.006)	0.064 (0.004)	0.197 (0.007)	0.05	15,311,986	1.291 (0.031)	3.224 (0.252)	0.691 (0.017)	0.64	4,256,803	0.297 (0.003)	0.340 (0.003)	0.419 (0.004)	1.57	4,780,065	0.403 (0.002)	0.405 (0.005)	0.528 (0.002)	2.62
Autoformer	166,919	0.267 (0.008)	0.143 (0.007)	0.316 (0.009)	0.05	7,431,538	0.748 (0.027)	1.580 (0.071)	0.400 (0.015)	0.37	14,266,403	0.417 (0.009)	0.545 (0.017)	0.588 (0.013)	1.56	340,769	0.476 (0.002)	0.549 (0.003)	0.625 (0.002)	0.75
Pyraformer	15,262,215	0.182 (0.008)	0.072 (0.005)	0.215 (0.010)	0.14	15,940,914	1.096 (0.033)	2.278 (0.173)	0.586 (0.018)	1	3,704,931	0.296 (0.009)	0.327 (0.010)	0.417 (0.013)	1.07	2,475,489	0.387 (0.004)	0.374 (0.006)	0.508 (0.005)	0.99
Transformer	5,800,199	0.178 (0.015)	0.066 (0.009)	0.210 (0.018)	0.01	155,610,482	1.316 (0.036)	3.240 (0.145)	0.704 (0.019)	0.87	13,695,011	0.259 (0.006)	0.284 (0.009)	0.366 (0.009)	0.66	88,352,801	0.341 (0.002)	0.294 (0.005)	0.448 (0.002)	1.48
BRITS	2,178,496	0.145 (0.002)	0.064 (0.001)	0.171 (0.002)	0.73	17,082,800	0.971 (0.016)	2.194 (0.066)	0.520 (0.009)	25.41	9,133,920	0.297 (0.001)	0.338 (0.001)	0.418 (0.002)	20.06	2,453,264	0.355 (0.001)	0.320 (0.000)	0.466 (0.001)	22.18
MRNN	2,259	0.789 (0.019)	1.192 (0.031)	0.932 (0.022)	0.19	949,749	1.824 (0.005)	5.781 (0.008)	0.976 (0.003)	22.36	1,594,219	0.708 (0.029)	0.921 (0.044)	0.999 (0.041)	10.93	1,593,671	0.778 (0.015)	1.009 (0.025)	1.022 (0.020)	4.28
GRUD	409,407	0.325 (0.004)	0.225 (0.004)	0.383 (0.004)	0.14	9,467,304	0.976 (0.015)	1.854 (0.026)	0.522 (0.008)	2.14	136,335	0.450 (0.004)	0.492 (0.006)	0.634 (0.006)	4.78	15,971	0.471 (0.001)	0.452 (0.001)	0.618 (0.001)	4.53
TimesNet	5,510,663	0.254 (0.008)	0.120 (0.005)	0.299 (0.009)	0.08	45,569,394	1.011 (0.016)	2.038 (0.073)	0.541 (0.009)	0.71	64,908,707	0.353 (0.003)	0.355 (0.004)	0.498 (0.005)	2.81	519,137,825	0.394 (0.003)	0.339 (0.003)	0.517 (0.003)	2.91
MICN	3,153,163	0.267 (0.010)	0.150 (0.011)	0.315 (0.012)	0.14	5,457,910	0.392 (0.006)	0.357 (0.006)	0.210 (0.003)	0.4	226,656,295	0.378 (0.013)	0.447 (0.015)	0.533 (0.019)	1.03	37,818,405	0.461 (0.007)	0.468 (0.009)	0.606 (0.009)	0.82
SCINet	79,493	0.246 (0.019)	0.117 (0.015)	0.290 (0.023)	0.05	421,053,386	0.581 (0.015)	0.579 (0.029)	0.311 (0.008)	1.1	5,677,529	0.350 (0.007)	0.376 (0.010)	0.494 (0.009)	0.97	26,908,459	0.427 (0.002)	0.401 (0.003)	0.561 (0.003)	1.89
StemGNN	6,397,975	0.248 (0.012)	0.126 (0.011)	0.293 (0.015)	0.21	16,863,634	1.360 (0.078)	3.674 (0.405)	0.728 (0.042)	1.48	1,804,403	0.331 (0.001)	0.352 (0.002)	0.467 (0.001)	0.57	3,989,553	0.416 (0.002)	0.380 (0.003)	0.546 (0.002)	1.92
FreTS	465,271	0.262 (0.029)	0.130 (0.027)	0.309 (0.034)	0.02	3,706,194	0.718 (0.043)	0.868 (0.089)	0.384 (0.023)	0.39	1,869,523	0.315 (0.008)	0.345 (0.010)	0.444 (0.011)	0.92	3,447,121	0.406 (0.017)	0.376 (0.018)	0.532 (0.022)	0.85
Koopa	465,389	0.435 (0.132)	0.442 (0.274)	0.513 (0.156)	0.02	2,680,114	1.309 (0.531)	4.861 (3.052)	0.701 (0.284)	0.54	168,457	0.413 (0.007)	0.468 (0.012)	0.583 (0.009)	0.63	641,887	0.451 (0.019)	0.428 (0.035)	0.592 (0.025)	0.45
DLinear	7,534	0.227 (0.006)	0.103 (0.003)	0.268 (0.007)	0.01	2,294,692	0.519 (0.008)	0.455 (0.015)	0.278 (0.004)	0.19	221,862	0.370 (0.000)	0.419 (0.001)	0.522 (0.001)	0.36	209,570	0.432 (0.001)	0.426 (0.002)	0.568 (0.002)	0.21
FiLM	12,490	0.583 (0.008)	0.805 (0.009)	0.688 (0.009)	0.05	570,613	0.834 (0.031)	1.302 (0.075)	0.446 (0.017)	0.37	7,142	0.458 (0.001)	0.536 (0.002)	0.646 (0.002)	1.19	6,756	0.494 (0.003)	0.508 (0.005)	0.649 (0.004)	1.29
CSDI	1,194,993	0.151 (0.008)	0.057 (0.005)	0.178 (0.010)	10.71	43,185	1.483 (0.459)	117.914 (59.845)	0.793 (0.245)	1025.88	1,528,729	0.252 (0.004)	0.313 (0.039)	0.355 (0.005)	491.35	321,585	0.408 (0.019)	0.896 (0.382)	0.536 (0.024)	221.69
US-GAN	3,807,687	0.458 (0.590)	1.405 (2.683)	0.541 (0.696)	0.27	11,224,866	0.938 (0.009)	1.742 (0.021)	0.501 (0.005)	2.24	4,304,771	0.310 (0.003)	0.318 (0.005)	0.437 (0.004)	2.45	4,268,849	0.358 (0.002)	0.296 (0.002)	0.470 (0.002)	2.48
GP-VAE	384,796	0.329 (0.017)	0.202 (0.017)	0.388 (0.020)	0.11	1,825,022	1.152 (0.074)	2.778 (0.196)	0.616 (0.039)	14.87	501,650	0.445 (0.006)	0.499 (0.011)	0.628 (0.008)	10.59	948,999	0.562 (0.004)	0.604 (0.007)	0.737 (0.006)	11.4
Mean	/	0.737	0.99	0.87	/	/	0.422	0.579	0.226	/	/	0.708	0.967	0.999	/	/	0.762	1.03	0.999	/
Median	/	0.71	1.044	0.838	/	/	0.408	0.625	0.218	/	/	0.69	1	0.973	/	/	0.747	1.056	0.979	/
LOCF	/	0.315	0.277	0.372	/	/	0.104	0.106	0.056	/	/	0.449	0.604	0.633	/	/	0.478	0.63	0.627	/
Linear	/	0.197	0.106	0.233	/	/	0.065	0.022	0.035	/	/	0.366	0.425	0.516	/	/	0.387	0.41	0.507	/

Table 13: Performance comparison in 6 datasets with 50% point missing.

	BeijingAir					ItalyAir					PeMS				
	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time
iTransformer	8,286,232	0.163 (0.003)	0.233 (0.004)	0.215 (0.004)	0.34	18,932,236	0.321 (0.007)	0.327 (0.011)	0.419 (0.009)	0.18	1,854,744	0.295 (0.007)	0.539 (0.016)	0.366 (0.009)	0.46
SAITS	7,153,808	0.194 (0.003)	0.193 (0.007)	0.257 (0.004)	0.24	16,628,642	0.285 (0.010)	0.236 (0.014)	0.372 (0.013)	0.07	78,229,072	0.302 (0.001)	0.595 (0.003)	0.375 (0.001)	0.17
Nonstationary	6,978,068	0.231 (0.001)	0.271 (0.007)	0.306 (0.002)	0.39	8,441,077	0.314 (0.005)	0.361 (0.010)	0.410 (0.007)	0.23	346,318	0.394 (0.013)	0.688 (0.016)	0.488 (0.016)	0.24
ETSformer	7,928,510	0.249 (0.004)	0.261 (0.009)	0.331 (0.005)	1.62	8,009,937	0.401 (0.007)	0.421 (0.011)	0.524 (0.009)	0.22	5,962,188	0.386 (0.007)	0.586 (0.009)	0.479 (0.008)	0.97
PatchTST	30,342,300	0.210 (0.009)	0.206 (0.007)	0.279 (0.012)	4.51	5,077,145	0.345 (0.011)	0.313 (0.010)	0.451 (0.015)	0.48	3,045,238	0.348 (0.006)	0.609 (0.008)	0.431 (0.007)	0.38
Crossformer	52,933,788	0.215 (0.007)	0.224 (0.004)	0.285 (0.009)	6.83	2,908,185	0.325 (0.009)	0.293 (0.009)	0.425 (0.012)	0.13	12,645,238	0.357 (0.003)	0.607 (0.008)	0.443 (0.004)	0.32
Informer	6,706,308	0.184 (0.005)	0.213 (0.003)	0.244 (0.006)	0.66	10,540,045	0.304 (0.007)	0.247 (0.015)	0.397 (0.009)	0.42	13,149,022	0.330 (0.005)	0.600 (0.009)	0.409 (0.006)	0.81
Autoformer	6,700,164	0.898 (0.001)	1.554 (0.003)	1.190 (0.001)	0.35	993,805	0.833 (0.017)	1.880 (0.044)	1.089 (0.023)	0.23	608,926	0.602 (0.068)	1.242 (0.173)	0.747 (0.084)	0.22
Pyraformer	3,230,212	0.198 (0.005)	0.223 (0.011)	0.263 (0.006)	0.33	11,355,917	0.312 (0.012)	0.254 (0.018)	0.408 (0.015)	0.11	4,048,606	0.305 (0.002)	0.580 (0.004)	0.379 (0.003)	0.21
Transformer	203,038,852	0.185 (0.003)	0.192 (0.005)	0.245 (0.004)	0.47	4,749,837	0.279 (0.011)	0.230 (0.017)	0.365 (0.014)	0.07	23,135,326	0.316 (0.004)	0.588 (0.005)	0.392 (0.005)	0.13
BRITS	3,598,496	0.169 (0.001)	0.194 (0.003)	0.224 (0.001)	26.96	596,912	0.321 (0.005)	0.283 (0.007)	0.420 (0.007)	0.62	32,012,048	0.287 (0.001)	0.561 (0.002)	0.357 (0.001)	5.44
MRNN	96,585	0.603 (0.006)	0.775 (0.006)	0.799 (0.007)	2.85	402,111	0.724 (0.003)	1.391 (0.006)	0.947 (0.004)	0.62	3,076,301	0.645 (0.001)	1.072 (0.003)	0.800 (0.001)	1.57
GRUD	7,397,656	0.279 (0.001)	0.303 (0.000)	0.370 (0.001)	1.1	112,707	0.476 (0.009)	0.539 (0.011)	0.622 (0.012)	0.41	14,104,896	0.372 (0.002)	0.619 (0.002)	0.462 (0.002)	0.82
TimesNet	87,063,940	0.265 (0.005)	0.233 (0.002)	0.351 (0.007)	0.64	22,051,853	0.370 (0.010)	0.323 (0.012)	0.484 (0.014)	0.08	91,622,238	0.348 (0.002)	0.567 (0.001)	0.432 (0.003)	0.37
MICN	57,048,200	0.456 (0.006)	0.553 (0.013)	0.604 (0.008)	0.09	695,569	0.548 (0.003)	0.852 (0.012)	0.717 (0.004)	0.05	15,490,402	0.392 (0.006)	0.608 (0.010)	0.486 (0.007)	0.17
SCINet	26,833,140	0.222 (0.012)	0.230 (0.036)	0.294 (0.016)	0.31	263,517	0.337 (0.008)	0.319 (0.006)	0.441 (0.010)	0.09	1,143,027,230	0.500 (0.093)	0.849 (0.193)	0.621 (0.115)	0.41
StemGNN	2,645,628	0.186 (0.004)	0.263 (0.005)	0.246 (0.005)	0.41	926,737	0.307 (0.014)	0.280 (0.019)	0.401 (0.018)	0.18	2,386,294	0.446 (0.021)	0.862 (0.064)	0.553 (0.026)	0.27
FreTS	909,852	0.235 (0.015)	0.246 (0.010)	0.311 (0.019)	0.19	668,313	0.349 (0.015)	0.345 (0.053)	0.457 (0.020)	0.07	1,715,958	0.422 (0.019)	0.686 (0.027)	0.524 (0.024)	0.16
Koopa	563,692	0.373 (0.079)	0.445 (0.119)	0.494 (0.105)	0.44	1,403,525	0.345 (0.032)	0.359 (0.056)	0.452 (0.042)	0.07	13,306,214	0.506 (0.114)	0.855 (0.184)	0.628 (0.141)	0.32
DLinear	204,728	0.245 (0.005)	0.242 (0.006)	0.324 (0.006)	0.19	5,458	0.340 (0.004)	0.337 (0.005)	0.445 (0.005)	0.05	5,301,100	0.389 (0.013)	0.604 (0.020)	0.483 (0.017)	0.13
FiLM	408,807	0.331 (0.009)	0.409 (0.009)	0.439 (0.012)	0.5	43,072	0.402 (0.018)	0.468 (0.052)	0.525 (0.023)	0.12	2,652,097	0.781 (0.059)	1.499 (0.124)	0.969 (0.073)	0.26
CSDI	244,833	0.144 (0.007)	0.472 (0.155)	0.192 (0.009)	390.62	933,161	0.958 (0.551)	29.266 (31.183)	1.253 (0.720)	12.62	207,873	0.288 (0.040)	0.651 (0.090)	0.358 (0.049)	265.37
US-GAN	6,123,812	0.192 (0.001)	0.187 (0.005)	0.255 (0.001)	0.51	3,913,149	0.357 (0.009)	0.278 (0.011)	0.467 (0.012)	0.18	50,674,286	0.330 (0.001)	0.566 (0.001)	0.409 (0.001)	0.32
GP-VAE	1,013,913	0.258 (0.004)	0.234 (0.008)	0.343 (0.005)	1.38	130,594	0.453 (0.014)	0.495 (0.022)	0.592 (0.018)	0.47	2,396,536	0.346 (0.015)	0.617 (0.015)	0.430 (0.019)	9.52
Mean	/	0.708	1.078	0.964	/	/	0.588	1.096	0.769	/	/	0.799	1.416	0.991	/
Median	/	0.677	1.143	0.922	/	/	0.533	1.116	0.697	/	/	0.777	1.476	0.965	/
LOCF	/	0.264	0.429	0.36	/	/	0.346	0.511	0.452	/	/	0.547	1.094	0.679	/
Linear	/	0.165	0.231	0.224	/	/	0.214	0.252	0.279	/	/	0.343	0.539	0.426	/
	ETT_h1					**Electricity**					**Pedestrian**				
	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time
iTransformer	23,723,056	0.348 (0.002)	0.233 (0.003)	0.412 (0.002)	0.07	12,989,024	0.893 (0.085)	1.884 (0.160)	0.478 (0.046)	1.03	2,913,304	0.200 (0.006)	0.343 (0.006)	0.264 (0.008)	0.61
SAITS	88,235,470	0.223 (0.007)	0.107 (0.005)	0.264 (0.008)	0.18	63,624,720	1.399 (0.069)	3.837 (0.316)	0.749 (0.037)	1.11	133,406	0.205 (0.011)	0.392 (0.027)	0.270 (0.015)	1.79
Nonstationary	589,927	0.382 (0.004)	0.292 (0.006)	0.452 (0.005)	0.06	24,811,090	0.217 (0.031)	0.191 (0.048)	0.116 (0.016)	0.83	6,338,833	0.487 (0.033)	0.859 (0.098)	0.641 (0.043)	1.4
ETSformer	809,057	0.364 (0.013)	0.269 (0.022)	0.431 (0.015)	0.14	10,518,266	0.878 (0.008)	1.687 (0.024)	0.470 (0.004)	1.84	530,457	0.320 (0.004)	0.519 (0.010)	0.421 (0.006)	2.13
PatchTST	72,247	0.275 (0.023)	0.149 (0.017)	0.326 (0.027)	0.04	4,419,410	0.856 (0.044)	1.573 (0.141)	0.459 (0.024)	4.33	106,905	0.198 (0.003)	0.351 (0.005)	0.260 (0.003)	0.65
Crossformer	223,479	0.270 (0.021)	0.146 (0.017)	0.319 (0.025)	0.04	9,967,314	0.980 (0.344)	2.255 (1.656)	0.525 (0.184)	1.7	202,905	0.191 (0.008)	0.356 (0.014)	0.251 (0.010)	1.12
Informer	1,058,311	0.279 (0.008)	0.162 (0.007)	0.330 (0.009)	0.11	15,311,986	1.277 (0.028)	3.239 (0.080)	0.684 (0.015)	1	446,785	0.210 (0.006)	0.378 (0.021)	0.277 (0.007)	1.66
Autoformer	166,919	0.984 (0.008)	1.553 (0.025)	1.164 (0.010)	0.13	7,431,538	2.164 (0.001)	8.092 (0.010)	1.159 (0.001)	0.54	246,145	1.033 (0.015)	2.273 (0.082)	1.359 (0.020)	3.14
Pyraformer	15,262,215	0.291 (0.026)	0.167 (0.021)	0.345 (0.031)	0.21	15,940,914	1.131 (0.036)	2.711 (0.079)	0.606 (0.019)	1.36	957,057	0.202 (0.006)	0.381 (0.007)	0.266 (0.007)	1.71
Transformer	5,800,199	0.274 (0.012)	0.162 (0.017)	0.325 (0.014)	0.08	155,610,482	1.365 (0.034)	3.554 (0.085)	0.731 (0.018)	1.91	13,787,649	0.194 (0.014)	0.342 (0.033)	0.255 (0.018)	1.53
BRITS	2,178,496	0.238 (0.006)	0.127 (0.004)	0.281 (0.007)	0.71	17,082,800	1.124 (0.010)	2.828 (0.023)	0.602 (0.005)	39.21	8,427,536	0.259 (0.017)	0.433 (0.021)	0.341 (0.022)	10.86
MRNN	2,259	0.816 (0.006)	1.219 (0.013)	0.965 (0.007)	0.49	949,749	1.810 (0.004)	5.793 (0.011)	0.969 (0.002)	12.76	401,415	0.773 (0.001)	1.258 (0.000)	1.017 (0.001)	11.24
GRUD	409,407	0.417 (0.008)	0.337 (0.014)	0.493 (0.010)	0.42	9,467,304	1.087 (0.011)	2.458 (0.034)	0.582 (0.006)	3.43	100,227	0.307 (0.005)	0.507 (0.007)	0.404 (0.006)	6.86
TimesNet	5,510,663	0.339 (0.004)	0.210 (0.008)	0.401 (0.005)	0.2	45,569,394	1.131 (0.017)	2.644 (0.077)	0.606 (0.009)	1.59	10,816,385	0.269 (0.016)	0.392 (0.017)	0.354 (0.021)	3.02
MICN	3,153,163	0.606 (0.073)	0.688 (0.152)	0.717 (0.086)	0.15	5,457,910	0.965 (0.008)	2.018 (0.032)	0.516 (0.004)	0.47	/	/	/	/	/
SCINet	79,493	0.326 (0.014)	0.194 (0.013)	0.386 (0.016)	0.09	421,053,386	0.778 (0.023)	1.162 (0.115)	0.417 (0.012)	1.48	43,783	0.251 (0.005)	0.391 (0.015)	0.331 (0.007)	1.98
StemGNN	6,397,975	0.325 (0.019)	0.200 (0.025)	0.385 (0.023)	0.26	16,863,634	1.362 (0.187)	3.803 (0.920)	0.729 (0.100)	1.69	1,638,337	0.200 (0.009)	0.343 (0.014)	0.263 (0.011)	2.99
FreTS	465,271	0.319 (0.025)	0.195 (0.030)	0.378 (0.029)	0.05	3,706,194	0.871 (0.084)	1.320 (0.275)	0.466 (0.045)	0.54	116,825	0.224 (0.004)	0.314 (0.016)	0.294 (0.005)	0.84
Koopa	465,389	0.515 (0.159)	0.577 (0.351)	0.610 (0.188)	0.02	2,680,114	1.755 (0.250)	7.390 (1.677)	0.940 (0.134)	0.61	124,711	0.246 (0.017)	0.330 (0.030)	0.324 (0.023)	0.85
DLinear	7,534	0.311 (0.003)	0.186 (0.003)	0.368 (0.004)	0.03	2,294,692	0.734 (0.011)	0.988 (0.038)	0.393 (0.006)	0.27	3,250	0.310 (0.002)	0.455 (0.006)	0.408 (0.002)	0.82
FiLM	12,490	0.589 (0.005)	0.793 (0.003)	0.697 (0.005)	0.11	570,613	0.907 (0.024)	1.434 (0.078)	0.485 (0.013)	0.62	6,244	0.453 (0.007)	0.664 (0.008)	0.596 (0.009)	1.67
CSDI	1,194,993	0.318 (0.016)	0.207 (0.011)	0.376 (0.019)	10.99	43,185	0.798 (0.455)	21.850 (22.140)	0.427 (0.244)	986.19	325,473	0.351 (0.074)	1.117 (0.220)	0.462 (0.098)	139.12
US-GAN	3,807,687	0.755 (0.973)	2.119 (3.955)	0.893 (1.151)	0.27	11,224,866	1.119 (0.007)	2.610 (0.018)	0.599 (0.004)	2.22	14,745,617	0.233 (0.005)	0.328 (0.007)	0.307 (0.007)	3.75
GP-VAE	384,796	0.414 (0.013)	0.301 (0.011)	0.490 (0.015)	0.23	1,825,022	1.099 (0.032)	2.973 (0.040)	0.588 (0.017)	16.73	284,676	0.451 (0.022)	0.677 (0.031)	0.594 (0.029)	2.01
Mean	/	0.738	0.971	0.873	/	/	0.423	0.581	0.227	/	/	0.763	1.258	1.004	/
Median	/	0.708	1.022	0.837	/	/	0.408	0.627	0.219	/	/	0.705	1.386	0.928	/
LOCF	/	0.425	0.491	0.502	/	/	0.14	0.181	0.075	/	/	0.365	0.636	0.481	/
Linear	/	0.267	0.178	0.316	/	/	0.078	0.035	0.042	/	/	0.247	0.279	0.326	/

Table 14: Performance comparison in 6 datasets with 90% point missing.

	BeijingAir					ItalyAir					PeMS				
	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time
iTransformer	8,286,232	0.352 (0.005)	0.514 (0.008)	0.468 (0.007)	0.34	18,932,236	0.574 (0.002)	0.836 (0.016)	0.755 (0.003)	0.17	1,854,744	0.450 (0.007)	0.875 (0.015)	0.558 (0.009)	0.49
SAITS	7,153,808	0.331 (0.024)	0.444 (0.034)	0.439 (0.031)	0.25	16,628,642	0.483 (0.012)	0.590 (0.021)	0.635 (0.016)	0.07	78,229,072	0.353 (0.001)	0.692 (0.003)	0.438 (0.002)	0.2
Nonstationary	6,978,068	0.357 (0.002)	0.531 (0.011)	0.473 (0.002)	0.47	8,441,077	0.489 (0.008)	0.755 (0.021)	0.643 (0.011)	0.2	346,318	0.736 (0.003)	1.589 (0.013)	0.913 (0.003)	0.27
ETSformer	7,928,510	0.371 (0.011)	0.495 (0.020)	0.492 (0.015)	1.82	8,009,937	0.682 (0.012)	1.419 (0.028)	0.896 (0.015)	0.45	5,962,188	0.474 (0.009)	0.778 (0.014)	0.589 (0.012)	0.99
PatchTST	30,342,300	0.299 (0.005)	0.372 (0.003)	0.396 (0.006)	4.73	5,077,145	0.577 (0.093)	0.996 (0.367)	0.758 (0.122)	0.55	3,045,238	0.440 (0.057)	0.793 (0.107)	0.546 (0.071)	0.34
Crossformer	52,933,788	0.274 (0.003)	0.355 (0.003)	0.364 (0.004)	6.89	2,908,185	0.458 (0.005)	0.523 (0.010)	0.602 (0.007)	0.1	12,645,238	0.399 (0.007)	0.733 (0.004)	0.495 (0.008)	0.32
Informer	6,706,308	0.258 (0.010)	0.335 (0.011)	0.342 (0.013)	0.65	10,540,045	0.491 (0.005)	0.613 (0.010)	0.645 (0.007)	0.45	13,149,022	0.376 (0.001)	0.708 (0.008)	0.467 (0.002)	0.74
Autoformer	6,700,164	0.806 (0.002)	1.375 (0.001)	1.069 (0.002)	0.26	993,805	0.806 (0.007)	1.766 (0.015)	1.059 (0.010)	0.2	608,926	0.773 (0.099)	1.488 (0.170)	0.959 (0.123)	0.25
Pyraformer	3,230,212	0.274 (0.005)	0.372 (0.008)	0.364 (0.007)	0.32	11,355,917	0.517 (0.013)	0.602 (0.027)	0.679 (0.017)	0.12	4,048,606	0.374 (0.001)	0.707 (0.010)	0.464 (0.001)	0.22
Transformer	203,038,852	0.277 (0.005)	0.333 (0.004)	0.368 (0.007)	0.4	4,749,837	0.459 (0.010)	0.552 (0.033)	0.604 (0.013)	0.07	23,135,326	0.376 (0.002)	0.711 (0.007)	0.466 (0.003)	0.14
BRITS	3,598,496	0.316 (0.003)	0.419 (0.007)	0.420 (0.005)	22.45	596,912	0.522 (0.007)	0.656 (0.013)	0.687 (0.009)	0.84	32,012,048	0.351 (0.002)	0.705 (0.004)	0.436 (0.003)	5.48
MRNN	96,585	0.759 (0.005)	1.121 (0.004)	1.007 (0.006)	2.99	402,111	0.758 (0.001)	1.495 (0.002)	0.996 (0.002)	0.37	3,076,301	0.747 (0.002)	1.317 (0.001)	0.927 (0.002)	4.06
GRUD	7,397,656	0.373 (0.003)	0.461 (0.004)	0.495 (0.004)	1.1	112,707	0.677 (0.020)	0.976 (0.055)	0.890 (0.026)	0.42	14,104,896	0.417 (0.002)	0.710 (0.001)	0.517 (0.003)	0.81
TimesNet	87,063,940	0.337 (0.009)	0.375 (0.008)	0.447 (0.011)	0.62	22,051,853	0.587 (0.021)	0.670 (0.037)	0.771 (0.027)	0.11	91,622,238	0.412 (0.002)	0.712 (0.002)	0.511 (0.003)	0.37
MICN	57,048,200	0.685 (0.005)	1.090 (0.010)	0.909 (0.006)	0.04	695,569	0.685 (0.009)	1.372 (0.019)	0.900 (0.012)	0.02	15,490,402	0.498 (0.005)	0.934 (0.010)	0.618 (0.006)	0.16
SCINet	26,833,140	0.300 (0.008)	0.371 (0.020)	0.398 (0.010)	0.31	263,517	0.532 (0.021)	0.746 (0.081)	0.699 (0.027)	0.1	1,143,027,230	0.538 (0.066)	0.947 (0.124)	0.667 (0.082)	0.37
StemGNN	2,645,628	0.267 (0.008)	0.367 (0.006)	0.355 (0.011)	0.44	926,737	0.454 (0.012)	0.513 (0.025)	0.597 (0.016)	0.18	2,386,294	0.430 (0.007)	0.833 (0.015)	0.534 (0.008)	0.23
FreTS	909,852	0.271 (0.023)	0.367 (0.014)	0.359 (0.030)	0.17	668,313	0.491 (0.014)	0.641 (0.031)	0.646 (0.018)	0.08	1,715,958	0.462 (0.013)	0.791 (0.021)	0.574 (0.017)	0.18
Koopa	563,692	0.299 (0.018)	0.376 (0.056)	0.397 (0.024)	0.22	1,403,525	0.525 (0.060)	0.758 (0.128)	0.690 (0.079)	0.04	13,306,214	0.485 (0.025)	0.901 (0.064)	0.602 (0.032)	0.21
DLinear	204,728	0.319 (0.005)	0.399 (0.005)	0.424 (0.007)	0.18	5,458	0.494 (0.006)	0.682 (0.019)	0.650 (0.007)	0.07	5,301,100	0.437 (0.011)	0.736 (0.015)	0.542 (0.013)	0.14
FiLM	408,807	0.367 (0.008)	0.473 (0.008)	0.487 (0.010)	0.47	43,072	0.509 (0.022)	0.724 (0.066)	0.670 (0.029)	0.15	2,652,097	0.753 (0.032)	1.428 (0.038)	0.934 (0.039)	0.26
CSDI	244,833	0.423 (0.135)	1.170 (0.634)	0.561 (0.179)	409.7	933,161	4.492 (1.464)	221.583 (113.387)	5.903 (1.924)	13.44	207,873	0.507 (0.093)	0.921 (0.141)	0.629 (0.115)	265.49
US-GAN	6,123,812	0.292 (0.001)	0.352 (0.003)	0.388 (0.001)	0.52	3,913,149	0.603 (0.019)	0.771 (0.040)	0.792 (0.025)	0.2	50,674,286	0.373 (0.003)	0.667 (0.003)	0.462 (0.004)	0.82
GP-VAE	1,013,913	0.351 (0.007)	0.432 (0.010)	0.466 (0.009)	1.4	130,594	0.571 (0.038)	0.779 (0.134)	0.750 (0.049)	0.44	2,396,536	0.358 (0.013)	0.651 (0.010)	0.445 (0.016)	8.21
Mean	/	0.716	1.099	0.964	/	/	0.598	1.125	0.785	/	/	0.8	1.425	0.992	/
Median	/	0.68	1.165	0.915	/	/	0.533	1.151	0.701	/	/	0.779	1.487	0.967	/
LOCF	/	0.5	0.835	0.673	/	/	0.614	1.11	0.807	/	/	0.899	1.939	1.115	/
Linear	/	0.366	0.608	0.493	/	/	0.481	0.75	0.632	/	/	0.834	1.944	1.035	/
	ETT_h1					**Electricity**					**Pedestrian**				
	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time
iTransformer	23,723,056	0.636 (0.003)	0.788 (0.006)	0.748 (0.003)	0.05	12,989,024	1.506 (0.161)	4.123 (0.675)	0.806 (0.086)	1.11	2,913,304	0.511 (0.005)	0.871 (0.023)	0.675 (0.006)	0.77
SAITS	88,235,470	0.507 (0.016)	0.498 (0.038)	0.597 (0.019)	0.07	63,624,720	1.435 (0.012)	4.196 (0.025)	0.768 (0.006)	1.15	133,406	0.492 (0.016)	0.902 (0.065)	0.650 (0.021)	1.88
Nonstationary	589,927	0.526 (0.005)	0.624 (0.013)	0.619 (0.006)	0.08	24,811,090	0.253 (0.016)	0.259 (0.029)	0.135 (0.008)	0.86	6,338,833	0.563 (0.017)	0.954 (0.067)	0.743 (0.022)	1.33
ETSformer	809,057	0.722 (0.008)	1.001 (0.020)	0.850 (0.009)	0.17	10,518,266	1.404 (0.005)	4.374 (0.044)	0.752 (0.003)	1.7	530,457	0.598 (0.023)	1.095 (0.083)	0.789 (0.031)	3.21
PatchTST	72,247	0.517 (0.009)	0.516 (0.017)	0.609 (0.010)	0.04	4,419,410	1.003 (0.032)	2.472 (0.060)	0.537 (0.017)	4.45	106,905	0.468 (0.005)	0.810 (0.016)	0.617 (0.006)	0.77
Crossformer	223,479	0.645 (0.117)	0.782 (0.291)	0.759 (0.137)	0.08	9,967,314	1.025 (0.018)	2.524 (0.069)	0.549 (0.010)	1.77	202,905	0.470 (0.007)	0.790 (0.016)	0.620 (0.009)	1.52
Informer	1,058,311	0.621 (0.022)	0.757 (0.067)	0.731 (0.026)	0.12	15,311,986	1.357 (0.007)	4.048 (0.083)	0.727 (0.004)	1.38	446,785	0.492 (0.010)	0.883 (0.038)	0.650 (0.013)	3.23
Autoformer	166,919	0.884 (0.001)	1.398 (0.003)	1.041 (0.001)	0.12	7,431,538	1.905 (0.003)	6.333 (0.010)	1.020 (0.001)	0.53	246,145	0.800 (0.003)	1.548 (0.020)	1.056 (0.004)	2.61
Pyraformer	15,262,215	0.635 (0.018)	0.797 (0.032)	0.747 (0.021)	0.18	15,940,914	1.305 (0.025)	3.828 (0.088)	0.699 (0.013)	1.38	957,057	0.491 (0.013)	0.880 (0.048)	0.648 (0.017)	2.01
Transformer	5,800,199	0.696 (0.034)	0.971 (0.047)	0.820 (0.040)	0.04	155,610,482	1.383 (0.029)	4.234 (0.069)	0.741 (0.016)	1.93	13,787,649	0.487 (0.011)	0.887 (0.027)	0.642 (0.014)	1.57
BRITS	2,178,496	0.609 (0.010)	0.667 (0.025)	0.716 (0.012)	0.73	17,082,800	1.513 (0.030)	4.459 (0.136)	0.810 (0.016)	40.25	8,427,536	0.580 (0.013)	1.015 (0.035)	0.766 (0.017)	17.36
MRNN	2,259	0.859 (0.003)	1.321 (0.013)	1.010 (0.004)	0.42	949,749	1.904 (0.002)	6.100 (0.012)	1.019 (0.001)	20.78	401,415	0.774 (0.001)	1.216 (0.000)	1.022 (0.001)	9.88
GRUD	409,407	0.757 (0.056)	0.985 (0.107)	0.891 (0.066)	0.37	9,467,304	1.150 (0.015)	3.148 (0.069)	0.615 (0.008)	3.27	100,227	0.605 (0.006)	0.968 (0.013)	0.798 (0.008)	6.22
TimesNet	5,510,663	0.622 (0.020)	0.694 (0.049)	0.732 (0.024)	0.16	45,569,394	1.315 (0.005)	3.876 (0.053)	0.704 (0.003)	1.61	10,816,385	0.533 (0.021)	0.833 (0.013)	0.704 (0.027)	2.64
MICN	3,153,163	0.836 (0.004)	1.261 (0.010)	0.984 (0.004)	0.1	5,457,910	1.517 (0.006)	4.817 (0.039)	0.812 (0.003)	0.5	/	/	/	/	/
SCINet	79,493	0.650 (0.062)	0.780 (0.156)	0.765 (0.073)	0.08	421,053,386	1.140 (0.086)	2.824 (0.290)	0.610 (0.046)	1.24	43,783	0.593 (0.076)	1.100 (0.200)	0.783 (0.101)	2.06
StemGNN	6,397,975	0.545 (0.014)	0.553 (0.029)	0.642 (0.017)	0.18	16,863,634	1.294 (0.088)	3.710 (0.368)	0.693 (0.047)	1.69	1,638,337	0.465 (0.009)	0.813 (0.018)	0.614 (0.012)	2.88
FreTS	465,271	0.573 (0.003)	0.607 (0.005)	0.675 (0.004)	0.06	3,706,194	1.477 (0.396)	4.593 (2.641)	0.791 (0.212)	0.7	116,825	0.488 (0.010)	0.827 (0.029)	0.644 (0.013)	0.8
Koopa	465,389	0.610 (0.072)	0.720 (0.193)	0.717 (0.084)	0.02	2,680,114	1.805 (0.264)	7.352 (1.769)	0.966 (0.141)	0.55	124,711	0.546 (0.082)	0.949 (0.212)	0.721 (0.108)	1.12
DLinear	7,534	0.624 (0.010)	0.754 (0.028)	0.735 (0.012)	0.03	2,294,692	0.891 (0.023)	1.696 (0.062)	0.477 (0.012)	0.3	3,250	0.587 (0.020)	0.986 (0.033)	0.774 (0.026)	0.83
FiLM	12,490	0.697 (0.009)	0.967 (0.013)	0.821 (0.010)	0.12	570,613	1.049 (0.027)	1.932 (0.078)	0.561 (0.014)	0.34	6,244	0.553 (0.006)	0.897 (0.012)	0.731 (0.008)	1.9
CSDI	1,194,993	0.640 (0.053)	0.886 (0.169)	0.753 (0.062)	9.86	43,185	1.832 (1.531)	34.306 (34.776)	0.981 (0.819)	947.14	325,473	1.296 (0.659)	16.656 (16.700)	1.711 (0.871)	108.39
US-GAN	3,807,687	0.623 (0.006)	0.679 (0.015)	0.733 (0.007)	0.27	11,224,866	1.369 (0.018)	3.922 (0.053)	0.733 (0.009)	2.23	14,745,617	0.587 (0.062)	0.956 (0.117)	0.775 (0.082)	3.83
GP-VAE	384,796	0.762 (0.029)	1.085 (0.087)	0.896 (0.034)	0.2	1,825,022	1.238 (0.027)	3.527 (0.096)	0.663 (0.014)	12.46	284,676	0.757 (0.001)	1.215 (0.000)	1.000 (0.002)	2.18
Mean	/	0.739	0.992	0.87	/	/	0.423	0.581	0.226	/	/	0.76	1.215	1.003	/
Median	/	0.715	1.052	0.841	/	/	0.408	0.626	0.219	/	/	0.702	1.341	0.927	/
LOCF	/	0.763	1.337	0.898	/	/	0.39	0.846	0.209	/	/	0.601	1.092	0.793	/
Linear	/	0.616	1.014	0.726	/	/	0.161	0.156	0.086	/	/	0.517	0.797	0.682	/

Table 15: Performance comparison in 6 datasets with 50% subsequence missing.

	BeijingAir					ItalyAir					PeMS				
	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time
iTransformer	8,286,232	0.629 (0.004)	0.902 (0.010)	0.836 (0.006)	0.4	18,932,236	0.577 (0.007)	0.767 (0.037)	0.739 (0.009)	0.19	1,854,744	0.643 (0.006)	1.392 (0.007)	0.760 (0.007)	0.56
SAITS	7,153,808	0.223 (0.005)	0.262 (0.028)	0.296 (0.007)	0.23	16,628,642	0.386 (0.010)	0.350 (0.014)	0.494 (0.012)	0.1	78,229,072	0.346 (0.001)	0.772 (0.001)	0.409 (0.001)	0.2
Nonstationary	6,978,068	0.337 (0.002)	0.452 (0.005)	0.447 (0.002)	0.4	8,441,077	0.389 (0.008)	0.464 (0.015)	0.498 (0.010)	0.21	346,318	0.816 (0.011)	1.727 (0.022)	0.965 (0.014)	0.25
ETSformer	7,928,510	0.417 (0.025)	0.528 (0.030)	0.555 (0.033)	1.68	8,009,937	0.536 (0.010)	0.753 (0.031)	0.687 (0.012)	0.34	5,962,188	0.564 (0.096)	1.034 (0.186)	0.667 (0.114)	0.76
PatchTST	30,342,300	0.318 (0.003)	0.404 (0.006)	0.422 (0.004)	4.85	5,077,145	0.511 (0.005)	0.660 (0.015)	0.656 (0.007)	0.51	3,045,238	0.417 (0.016)	0.839 (0.035)	0.493 (0.019)	0.21
Crossformer	52,933,788	0.274 (0.003)	0.355 (0.005)	0.364 (0.003)	6.92	2,908,185	0.456 (0.023)	0.524 (0.052)	0.585 (0.029)	0.12	12,645,238	0.425 (0.005)	0.853 (0.008)	0.502 (0.006)	0.29
Informer	6,706,308	0.232 (0.013)	0.294 (0.013)	0.308 (0.018)	0.89	10,540,045	0.388 (0.011)	0.369 (0.021)	0.498 (0.015)	0.19	13,149,022	0.369 (0.002)	0.786 (0.003)	0.436 (0.003)	0.43
Autoformer	6,700,164	0.704 (0.004)	1.113 (0.006)	0.936 (0.006)	0.28	993,805	0.867 (0.008)	2.052 (0.032)	1.111 (0.010)	0.24	608,926	0.646 (0.057)	1.377 (0.132)	0.763 (0.068)	0.18
Pyraformer	3,230,212	0.227 (0.008)	0.290 (0.009)	0.301 (0.010)	0.34	11,355,917	0.412 (0.016)	0.386 (0.020)	0.529 (0.020)	0.11	4,048,606	0.352 (0.002)	0.764 (0.005)	0.416 (0.002)	0.21
Transformer	203,038,852	0.221 (0.009)	0.267 (0.011)	0.293 (0.012)	0.36	4,749,837	0.377 (0.007)	0.354 (0.018)	0.483 (0.009)	0.09	23,135,326	0.367 (0.002)	0.776 (0.004)	0.434 (0.002)	0.12
BRITS	3,598,496	0.193 (0.002)	0.265 (0.004)	0.256 (0.002)	19.26	596,912	0.409 (0.006)	0.396 (0.012)	0.524 (0.008)	1.35	32,012,048	0.334 (0.001)	0.747 (0.002)	0.394 (0.001)	5.45
MRNN	96,585	0.682 (0.007)	0.940 (0.018)	0.907 (0.009)	2.64	402,111	0.743 (0.002)	1.440 (0.006)	0.953 (0.003)	0.53	3,076,301	0.680 (0.002)	1.272 (0.004)	0.804 (0.002)	1.7
GRUD	7,397,656	0.337 (0.001)	0.434 (0.005)	0.448 (0.001)	1.08	112,707	0.594 (0.009)	0.769 (0.024)	0.761 (0.012)	0.37	14,104,896	0.403 (0.001)	0.795 (0.002)	0.476 (0.001)	0.81
TimesNet	87,063,940	0.307 (0.002)	0.331 (0.004)	0.408 (0.002)	0.64	22,051,853	0.536 (0.023)	0.564 (0.040)	0.687 (0.029)	0.11	91,622,238	0.407 (0.003)	0.800 (0.003)	0.481 (0.003)	0.39
MICN	57,048,200	0.559 (0.006)	0.758 (0.013)	0.742 (0.008)	0.26	695,569	0.655 (0.023)	1.085 (0.113)	0.840 (0.030)	0.09	15,490,402	0.671 (0.009)	1.302 (0.027)	0.793 (0.010)	0.17
SCINet	26,833,140	0.268 (0.010)	0.344 (0.015)	0.356 (0.013)	0.3	263,517	0.479 (0.011)	0.586 (0.022)	0.614 (0.014)	0.1	1,143,027,230	0.668 (0.051)	1.299 (0.110)	0.789 (0.060)	0.4
StemGNN	2,645,628	0.276 (0.002)	0.390 (0.004)	0.366 (0.003)	0.64	926,737	0.433 (0.018)	0.448 (0.038)	0.555 (0.023)	0.19	2,386,294	0.499 (0.073)	1.076 (0.168)	0.590 (0.086)	0.26
FreTS	909,852	0.297 (0.004)	0.384 (0.010)	0.395 (0.006)	0.19	668,313	0.499 (0.016)	0.619 (0.060)	0.640 (0.020)	0.11	1,715,958	0.496 (0.026)	0.953 (0.045)	0.587 (0.030)	0.2
Koopa	563,692	0.415 (0.066)	0.581 (0.103)	0.551 (0.088)	0.21	1,403,525	0.479 (0.009)	0.615 (0.019)	0.614 (0.012)	0.04	13,306,214	0.596 (0.184)	1.195 (0.387)	0.705 (0.218)	0.22
DLinear	204,728	0.310 (0.004)	0.379 (0.007)	0.412 (0.006)	0.19	5,458	0.509 (0.007)	0.719 (0.012)	0.652 (0.009)	0.08	5,301,100	0.459 (0.012)	0.876 (0.020)	0.542 (0.014)	0.11
FiLM	408,807	0.362 (0.015)	0.501 (0.014)	0.481 (0.020)	0.45	43,072	0.498 (0.015)	0.645 (0.026)	0.638 (0.019)	0.13	2,652,097	0.869 (0.068)	1.970 (0.183)	1.027 (0.080)	0.28
CSDI	244,833	0.211 (0.031)	0.512 (0.323)	0.280 (0.041)	286.71	933,161	0.477 (0.115)	2.273 (1.532)	0.612 (0.147)	12.48	207,873	0.620 (0.316)	1.413 (0.935)	0.732 (0.374)	277.65
US-GAN	6,123,812	0.233 (0.002)	0.269 (0.010)	0.310 (0.003)	0.51	3,913,149	0.446 (0.025)	0.406 (0.031)	0.572 (0.032)	0.13	50,674,286	0.439 (0.003)	0.839 (0.007)	0.518 (0.004)	0.77
GP-VAE	1,013,913	0.321 (0.005)	0.343 (0.013)	0.426 (0.007)	1.15	130,594	0.544 (0.018)	0.661 (0.038)	0.697 (0.023)	0.45	2,396,536	0.404 (0.011)	0.800 (0.009)	0.477 (0.013)	7.33
Mean	/	0.711	1.102	0.971	/	/	0.612	1.13	0.784	/	/	0.849	1.681	1.003	/
Median	/	0.676	1.155	0.923	/	/	0.549	1.151	0.704	/	/	0.886	1.877	1.047	/
LOCF	/	0.482	0.832	0.658	/	/	0.528	0.9	0.678	/	/	1.203	2.963	1.422	/
Linear	/	0.358	0.588	0.488	/	/	0.329	0.407	0.422	/	/	1	2.489	1.182	/
	ETT_h1					**Electricity**					**Pedestrian**				
	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time
iTransformer	23,723,056	0.810 (0.004)	1.237 (0.011)	0.912 (0.005)	0.07	12,989,024	1.497 (0.066)	4.043 (0.242)	0.794 (0.035)	0.91	2,913,304	0.638 (0.002)	0.808 (0.011)	0.833 (0.002)	0.84
SAITS	88,235,470	0.635 (0.032)	0.881 (0.062)	0.715 (0.036)	0.18	63,624,720	1.433 (0.033)	3.842 (0.114)	0.760 (0.018)	1.07	133,406	0.514 (0.022)	0.674 (0.045)	0.672 (0.029)	1.64
Nonstationary	589,927	0.612 (0.002)	0.917 (0.003)	0.690 (0.002)	0.05	24,811,090	0.602 (0.098)	1.252 (0.368)	0.319 (0.052)	0.85	6,338,833	0.615 (0.013)	1.186 (0.112)	0.803 (0.017)	1.4
ETSformer	809,057	0.684 (0.013)	1.002 (0.030)	0.770 (0.015)	0.19	10,518,266	1.081 (0.011)	2.151 (0.015)	0.574 (0.006)	2.39	530,457	0.648 (0.015)	0.910 (0.039)	0.847 (0.020)	2.67
PatchTST	72,247	0.755 (0.012)	1.146 (0.034)	0.850 (0.013)	0.05	4,419,410	1.177 (0.123)	3.142 (0.557)	0.624 (0.065)	4.63	106,905	0.622 (0.016)	0.826 (0.025)	0.812 (0.021)	1.06
Crossformer	223,479	0.718 (0.011)	1.052 (0.021)	0.808 (0.012)	0.08	9,967,314	1.152 (0.027)	2.950 (0.107)	0.611 (0.014)	1.63	202,905	0.614 (0.011)	0.797 (0.030)	0.802 (0.015)	1.55
Informer	1,058,311	0.571 (0.035)	0.731 (0.096)	0.643 (0.040)	0.09	15,311,986	1.376 (0.011)	3.966 (0.047)	0.730 (0.006)	1.23	446,785	0.547 (0.011)	0.676 (0.019)	0.714 (0.015)	2.4
Autoformer	166,919	0.877 (0.016)	1.421 (0.045)	0.988 (0.018)	0.1	7,431,538	1.821 (0.002)	5.734 (0.006)	0.966 (0.001)	0.49	246,145	0.877 (0.028)	1.788 (0.172)	1.146 (0.037)	2.76
Pyraformer	15,262,215	0.666 (0.063)	0.924 (0.128)	0.751 (0.071)	0.23	15,940,914	1.366 (0.013)	3.811 (0.039)	0.724 (0.007)	1.51	957,057	0.513 (0.008)	0.640 (0.018)	0.670 (0.010)	1.44
Transformer	5,800,199	0.629 (0.039)	0.850 (0.080)	0.708 (0.043)	0.11	155,610,482	1.431 (0.038)	3.964 (0.034)	0.759 (0.020)	1.67	13,787,649	0.526 (0.018)	0.694 (0.035)	0.686 (0.024)	1.61
BRITS	2,178,496	0.730 (0.027)	1.065 (0.064)	0.822 (0.030)	1.18	17,082,800	1.230 (0.006)	3.354 (0.031)	0.653 (0.003)	40.41	8,427,536	0.640 (0.006)	0.925 (0.011)	0.836 (0.007)	16.47
MRNN	2,259	0.879 (0.008)	1.472 (0.020)	0.990 (0.009)	0.45	949,749	1.871 (0.002)	5.935 (0.006)	0.993 (0.001)	15.88	401,415	0.768 (0.000)	0.992 (3.061e-05)	1.003 (0.001)	5.48
GRUD	409,407	0.760 (0.069)	1.087 (0.150)	0.857 (0.078)	0.33	9,467,304	1.238 (0.021)	3.214 (0.088)	0.657 (0.011)	3.73	100,227	0.695 (0.085)	0.856 (0.103)	0.908 (0.111)	6.04
TimesNet	5,510,663	0.732 (0.014)	1.043 (0.040)	0.825 (0.016)	0.17	45,569,394	1.385 (0.013)	3.836 (0.055)	0.734 (0.007)	1.61	10,816,385	0.713 (0.052)	0.838 (0.053)	0.931 (0.068)	2
MICN	3,153,163	0.851 (0.008)	1.342 (0.021)	0.959 (0.009)	0.11	5,457,910	1.744 (0.010)	5.395 (0.063)	0.925 (0.006)	0.44	/	/	/	/	/
SCINet	79,493	0.711 (0.018)	1.068 (0.041)	0.801 (0.020)	0.13	421,053,386	1.273 (0.081)	3.422 (0.320)	0.675 (0.043)	1.51	43,783	0.647 (0.023)	1.052 (0.215)	0.846 (0.030)	2.53
StemGNN	6,397,975	0.631 (0.029)	0.859 (0.073)	0.711 (0.032)	0.26	16,863,634	1.504 (0.086)	4.512 (0.420)	0.798 (0.046)	1.67	1,638,337	0.561 (0.022)	0.707 (0.026)	0.733 (0.029)	3.54
FreTS	465,271	0.751 (0.014)	1.161 (0.025)	0.846 (0.016)	0.06	3,706,194	1.375 (0.316)	4.184 (1.872)	0.729 (0.167)	0.68	116,825	0.630 (0.008)	0.853 (0.039)	0.823 (0.010)	0.85
Koopa	465,389	0.741 (0.098)	1.162 (0.224)	0.835 (0.111)	0.03	2,680,114	1.848 (0.350)	6.677 (1.972)	0.980 (0.185)	0.5	124,711	0.617 (0.021)	0.855 (0.060)	0.805 (0.028)	0.8
DLinear	7,534	0.756 (0.010)	1.158 (0.018)	0.851 (0.011)	0.04	2,294,692	1.205 (0.009)	3.232 (0.048)	0.639 (0.005)	0.32	3,250	0.660 (0.006)	0.953 (0.017)	0.862 (0.008)	0.82
FiLM	12,490	0.735 (0.007)	1.323 (0.013)	0.828 (0.007)	0.09	570,613	1.169 (0.267)	2.773 (1.369)	0.620 (0.142)	0.49	6,244	0.590 (0.005)	0.813 (0.022)	0.771 (0.006)	1.69
CSDI	1,194,993	0.558 (0.048)	0.783 (0.127)	0.628 (0.054)	9.83	43,185	0.922 (0.147)	6.614 (4.812)	0.489 (0.078)	875.36	325,473	0.693 (0.117)	4.141 (5.302)	0.905 (0.153)	105.95
US-GAN	3,807,687	0.670 (0.022)	0.901 (0.059)	0.754 (0.024)	0.27	11,224,866	1.291 (0.011)	3.491 (0.046)	0.685 (0.006)	2.23	14,745,617	0.664 (0.059)	0.761 (0.051)	0.867 (0.077)	3.81
GP-VAE	384,796	0.806 (0.055)	1.265 (0.147)	0.908 (0.062)	0.15	1,825,022	1.242 (0.030)	3.624 (0.141)	0.659 (0.016)	19.88	284,676	0.717 (0.025)	0.987 (0.018)	0.936 (0.033)	2.21
Mean	/	0.773	1.194	0.87	/	/	0.44	0.607	0.234	/	/	0.768	0.992	1.003	/
Median	/	0.784	1.337	0.883	/	/	0.411	0.577	0.218	/	/	0.714	1.108	0.933	/
LOCF	/	0.809	1.619	0.912	/	/	0.797	1.982	0.423	/	/	0.738	1.655	0.964	/
Linear	/	0.722	1.322	0.814	/	/	0.409	0.651	0.217	/	/	0.551	0.792	0.72	/

Table 16: Performance comparison in 6 datasets with 50% block missing.

	BeijingAir					ItalyAir					PeMS				
	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time
iTransformer	8,286,232	0.418 (0.081)	0.576 (0.112)	0.551 (0.106)	0.35	18,932,236	0.493 (0.006)	0.579 (0.017)	0.603 (0.007)	0.33	1,854,744	0.464 (0.007)	0.989 (0.017)	0.555 (0.008)	0.91
SAITS	7,153,808	0.212 (0.003)	0.226 (0.002)	0.279 (0.004)	0.2	16,628,642	0.416 (0.012)	0.391 (0.029)	0.508 (0.015)	0.29	78,229,072	0.331 (0.001)	0.726 (0.002)	0.397 (0.001)	0.44
Nonstationary	6,978,068	0.299 (0.001)	0.374 (0.007)	0.393 (0.002)	0.36	8,441,077	0.422 (0.005)	0.485 (0.010)	0.516 (0.006)	0.53	346,318	0.690 (0.004)	1.385 (0.017)	0.826 (0.005)	0.75
ETSformer	7,928,510	0.345 (0.010)	0.421 (0.014)	0.454 (0.013)	1.76	8,009,937	0.559 (0.012)	0.718 (0.021)	0.683 (0.014)	0.87	5,962,188	0.871 (0.588)	2.290 (2.491)	1.043 (0.704)	2.07
PatchTST	30,342,300	0.301 (0.002)	0.367 (0.005)	0.396 (0.002)	4.96	5,077,145	0.497 (0.003)	0.556 (0.008)	0.607 (0.004)	0.83	3,045,238	0.394 (0.020)	0.805 (0.047)	0.472 (0.024)	0.63
Crossformer	52,933,788	0.256 (0.004)	0.325 (0.004)	0.337 (0.005)	6.89	2,908,185	0.456 (0.019)	0.471 (0.026)	0.557 (0.023)	0.39	12,645,238	0.406 (0.008)	0.811 (0.006)	0.486 (0.009)	0.71
Informer	6,706,308	0.208 (0.003)	0.257 (0.007)	0.274 (0.004)	0.59	10,540,045	0.438 (0.013)	0.447 (0.026)	0.535 (0.016)	1.11	13,149,022	0.351 (0.002)	0.738 (0.006)	0.420 (0.003)	2.05
Autoformer	6,700,164	0.694 (0.001)	1.101 (0.002)	0.914 (0.002)	0.25	993,805	0.953 (0.009)	2.222 (0.034)	1.165 (0.011)	0.93	608,926	0.627 (0.027)	1.320 (0.067)	0.751 (0.033)	0.77
Pyraformer	3,230,212	0.224 (0.008)	0.275 (0.019)	0.294 (0.011)	0.31	11,355,917	0.464 (0.007)	0.452 (0.007)	0.567 (0.008)	0.5	4,048,606	0.334 (0.002)	0.713 (0.002)	0.400 (0.002)	0.57
Transformer	203,038,852	0.204 (0.002)	0.230 (0.004)	0.269 (0.003)	0.33	4,749,837	0.404 (0.014)	0.396 (0.041)	0.493 (0.018)	0.33	23,135,326	0.353 (0.003)	0.733 (0.003)	0.422 (0.004)	0.37
BRITS	3,598,496	0.189 (0.003)	0.244 (0.007)	0.249 (0.003)	24.07	596,912	0.452 (0.005)	0.451 (0.009)	0.552 (0.006)	1.07	32,012,048	0.320 (0.001)	0.697 (0.002)	0.383 (0.001)	6.47
MRNN	96,585	0.713 (0.002)	1.014 (0.006)	0.939 (0.003)	3.11	402,111	0.798 (0.002)	1.525 (0.005)	0.975 (0.002)	1.79	3,076,301	0.672 (0.005)	1.239 (0.012)	0.804 (0.005)	6.35
GRUD	7,397,656	0.303 (0.004)	0.362 (0.002)	0.398 (0.005)	1.07	112,707	0.604 (0.010)	0.778 (0.031)	0.738 (0.012)	1.17	14,104,896	0.392 (0.002)	0.751 (0.002)	0.470 (0.003)	2.5
TimesNet	87,063,940	0.281 (0.005)	0.288 (0.007)	0.370 (0.007)	0.66	22,051,853	0.536 (0.024)	0.582 (0.045)	0.655 (0.029)	0.58	91,622,238	0.391 (0.002)	0.742 (0.004)	0.468 (0.002)	1.15
MICN	57,048,200	0.492 (0.007)	0.632 (0.014)	0.647 (0.009)	0.18	695,569	0.725 (0.006)	1.284 (0.019)	0.885 (0.007)	0.46	15,490,402	0.598 (0.011)	1.120 (0.029)	0.716 (0.014)	0.5
SCINet	26,833,140	0.258 (0.004)	0.326 (0.003)	0.339 (0.006)	0.32	263,517	0.503 (0.010)	0.584 (0.021)	0.615 (0.012)	0.42	1,143,027,230	0.619 (0.034)	1.218 (0.078)	0.741 (0.040)	0.27
StemGNN	2,645,628	0.242 (0.003)	0.357 (0.003)	0.319 (0.003)	0.69	926,737	0.447 (0.011)	0.457 (0.017)	0.546 (0.013)	0.6	2,386,294	0.513 (0.069)	1.085 (0.179)	0.614 (0.082)	0.91
FreTS	909,852	0.264 (0.014)	0.323 (0.015)	0.347 (0.019)	0.18	668,313	0.491 (0.014)	0.541 (0.025)	0.600 (0.017)	0.35	1,715,958	0.452 (0.013)	0.841 (0.017)	0.541 (0.016)	0.39
Koopa	563,692	0.309 (0.028)	0.432 (0.054)	0.407 (0.037)	0.22	1,403,525	0.482 (0.020)	0.558 (0.071)	0.589 (0.025)	0.11	13,306,214	0.625 (0.149)	1.158 (0.253)	0.748 (0.179)	0.47
DLinear	204,728	0.301 (0.004)	0.349 (0.005)	0.396 (0.006)	0.19	5,458	0.510 (0.009)	0.614 (0.020)	0.623 (0.011)	0.37	5,301,100	0.454 (0.056)	0.852 (0.116)	0.544 (0.067)	0.33
FiLM	408,807	0.355 (0.008)	0.479 (0.007)	0.468 (0.010)	0.51	43,072	0.493 (0.008)	0.554 (0.011)	0.602 (0.010)	0.67	2,652,097	0.772 (0.035)	1.643 (0.090)	0.924 (0.042)	0.92
CSDI	244,833	0.181 (0.025)	0.399 (0.172)	0.238 (0.033)	283.28	933,161	0.675 (0.358)	7.791 (11.133)	0.825 (0.437)	24.11	207,873	1.132 (1.318)	14.906 (27.389)	1.356 (1.578)	309.66
US-GAN	6,123,812	0.216 (0.001)	0.233 (0.006)	0.285 (0.001)	0.52	3,913,149	0.484 (0.007)	0.451 (0.008)	0.592 (0.009)	1.38	50,674,286	0.387 (0.003)	0.739 (0.004)	0.464 (0.004)	8.5
GP-VAE	1,013,913	0.294 (0.009)	0.307 (0.021)	0.387 (0.011)	1.34	130,594	0.556 (0.012)	0.649 (0.044)	0.680 (0.014)	0.98	2,396,536	0.372 (0.013)	0.738 (0.013)	0.445 (0.016)	21.8
Mean	/	0.714	1.114	0.966	/	/	0.625	1.163	0.764	/	/	0.829	1.618	0.993	/
Median	/	0.682	1.175	0.921	/	/	0.589	1.192	0.72	/	/	0.856	1.79	1.025	/
LOCF	/	0.4	0.715	0.541	/	/	0.493	0.736	0.602	/	/	0.92	2.266	1.101	/
Linear	/	0.285	0.418	0.386	/	/	0.377	0.478	0.461	/	/	0.716	1.585	0.857	/
	ETT_h1					**Electricity**					**Pedestrian**				
	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time	Size	MAE	MSE	MRE	Time
iTransformer	23,723,056	0.509 (0.007)	0.525 (0.015)	0.633 (0.009)	0.16	12,989,024	1.014 (0.076)	2.383 (0.247)	0.545 (0.041)	0.98	2,913,304	0.638 (0.002)	0.808 (0.011)	0.833 (0.002)	0.84
SAITS	88,235,470	0.424 (0.034)	0.387 (0.049)	0.527 (0.042)	0.3	63,624,720	1.441 (0.032)	3.900 (0.119)	0.773 (0.017)	1.11	133,406	0.514 (0.022)	0.674 (0.045)	0.672 (0.029)	1.64
Nonstationary	589,927	0.510 (0.009)	0.541 (0.019)	0.633 (0.011)	0.22	24,811,090	0.350 (0.103)	0.478 (0.309)	0.188 (0.055)	0.87	6,338,833	0.615 (0.013)	1.186 (0.112)	0.803 (0.017)	1.4
ETSformer	809,057	0.646 (0.012)	0.852 (0.018)	0.802 (0.015)	1	10,518,266	1.065 (0.015)	2.414 (0.050)	0.572 (0.008)	2.48	530,457	0.648 (0.015)	0.910 (0.039)	0.847 (0.020)	2.67
PatchTST	72,247	0.558 (0.020)	0.633 (0.039)	0.694 (0.024)	0.28	4,419,410	1.201 (0.021)	2.996 (0.058)	0.645 (0.011)	4.42	106,905	0.622 (0.016)	0.826 (0.025)	0.812 (0.021)	1.06
Crossformer	223,479	0.515 (0.018)	0.559 (0.032)	0.640 (0.022)	0.29	9,967,314	1.211 (0.037)	2.975 (0.125)	0.650 (0.020)	1.56	202,905	0.614 (0.011)	0.797 (0.030)	0.802 (0.015)	1.55
Informer	1,058,311	0.460 (0.011)	0.493 (0.023)	0.572 (0.014)	0.55	15,311,986	1.331 (0.017)	3.586 (0.044)	0.714 (0.009)	1.02	446,785	0.547 (0.011)	0.676 (0.019)	0.714 (0.015)	2.4
Autoformer	166,919	1.111 (0.065)	2.026 (0.224)	1.380 (0.081)	0.44	7,431,538	1.757 (0.013)	5.433 (0.041)	0.943 (0.007)	0.49	246,145	0.877 (0.028)	1.788 (0.172)	1.146 (0.037)	2.76
Pyraformer	15,262,215	0.440 (0.026)	0.427 (0.047)	0.546 (0.033)	0.41	15,940,914	1.290 (0.017)	3.356 (0.059)	0.692 (0.009)	1.47	957,057	0.513 (0.008)	0.640 (0.018)	0.670 (0.010)	1.44
Transformer	5,800,199	0.440 (0.019)	0.408 (0.023)	0.547 (0.024)	0.18	155,610,482	1.424 (0.015)	3.808 (0.080)	0.764 (0.008)	1.55	13,787,649	0.526 (0.018)	0.694 (0.035)	0.686 (0.024)	1.61
BRITS	2,178,496	0.593 (0.020)	0.672 (0.037)	0.736 (0.025)	3.3	17,082,800	1.128 (0.024)	3.124 (0.066)	0.606 (0.013)	39.46	8,427,536	0.640 (0.006)	0.925 (0.011)	0.836 (0.007)	16.47
MRNN	2,259	0.801 (0.003)	1.214 (0.007)	0.994 (0.003)	1.35	949,749	1.858 (0.001)	5.877 (0.003)	0.998 (0.001)	22.17	401,415	0.768 (0.000)	0.992 (3.061e-05)	1.003 (0.001)	5.48
GRUD	409,407	0.570 (0.015)	0.696 (0.040)	0.708 (0.019)	0.98	9,467,304	1.276 (0.006)	3.402 (0.037)	0.685 (0.003)	3.66	100,227	0.695 (0.085)	0.856 (0.103)	0.908 (0.111)	6.04
TimesNet	5,510,663	0.570 (0.012)	0.647 (0.018)	0.708 (0.015)	0.45	45,569,394	1.496 (0.038)	4.271 (0.106)	0.803 (0.021)	1.61	10,816,385	0.713 (0.052)	0.838 (0.053)	0.931 (0.068)	2
MICN	3,153,163	0.706 (0.020)	0.950 (0.048)	0.877 (0.025)	0.3	5,457,910	1.542 (0.020)	4.476 (0.097)	0.828 (0.011)	0.49	/	/	/	/	/
SCINet	79,493	0.544 (0.017)	0.605 (0.037)	0.676 (0.021)	0.27	421,053,386	1.054 (0.019)	2.459 (0.054)	0.566 (0.010)	1.49	43,783	0.647 (0.023)	1.052 (0.215)	0.846 (0.030)	2.53
StemGNN	6,397,975	0.433 (0.011)	0.384 (0.017)	0.538 (0.014)	0.48	16,863,634	1.545 (0.181)	4.636 (1.007)	0.829 (0.097)	1.66	1,638,337	0.561 (0.022)	0.707 (0.026)	0.733 (0.029)	3.54
FreTS	465,271	0.496 (0.020)	0.510 (0.037)	0.616 (0.025)	0.23	3,706,194	1.000 (0.012)	2.091 (0.055)	0.537 (0.007)	0.54	116,825	0.630 (0.008)	0.853 (0.039)	0.823 (0.010)	0.85
Koopa	465,389	0.556 (0.111)	0.643 (0.280)	0.691 (0.137)	0.13	2,680,114	1.919 (0.520)	8.306 (3.409)	1.030 (0.279)	0.64	124,711	0.617 (0.021)	0.855 (0.060)	0.805 (0.028)	0.8
DLinear	7,534	0.567 (0.002)	0.661 (0.010)	0.704 (0.003)	0.15	2,294,692	0.964 (0.003)	2.199 (0.011)	0.517 (0.001)	0.31	3,250	0.660 (0.006)	0.953 (0.017)	0.862 (0.008)	0.82
FiLM	12,490	0.646 (0.002)	0.965 (0.010)	0.802 (0.003)	0.4	570,613	1.032 (0.157)	2.067 (0.662)	0.554 (0.084)	0.52	6,244	0.590 (0.005)	0.813 (0.022)	0.771 (0.006)	1.69
CSDI	1,194,993	0.401 (0.067)	0.340 (0.100)	0.497 (0.083)	20.91	43,185	1.056 (0.452)	49.497 (39.024)	0.567 (0.243)	948.55	325,473	0.693 (0.117)	4.141 (5.302)	0.905 (0.153)	105.95
US-GAN	3,807,687	0.815 (0.459)	1.549 (1.788)	1.012 (0.570)	1.51	11,224,866	1.251 (0.015)	3.323 (0.043)	0.672 (0.008)	2.25	14,745,617	0.664 (0.059)	0.761 (0.051)	0.867 (0.077)	3.81
GP-VAE	384,796	0.651 (0.077)	0.812 (0.169)	0.808 (0.096)	0.68	1,825,022	1.308 (0.033)	3.637 (0.071)	0.702 (0.017)	19.6	284,676	0.717 (0.025)	0.987 (0.018)	0.936 (0.033)	2.21
Mean	/	0.72	0.973	0.894	/	/	0.432	0.588	0.232	/	/	0.768	0.992	1.003	/
Median	/	0.712	1.079	0.884	/	/	0.406	0.598	0.218	/	/	0.714	1.108	0.933	/
LOCF	/	0.721	1.317	0.896	/	/	0.25	0.381	0.134	/	/	0.738	1.655	0.964	/
Linear	/	0.527	0.699	0.654	/	/	0.14	0.105	0.075	/	/	0.551	0.792	0.72	/

Table 17: Performance comparison for the classification task on PhysioNet2012 and Pedestrian datasets with 10% point missing.

	PhysioNet2012 (10% missing rate)							
	PR_AUC wt XGB	**PR_AUC w XGB**	**PR_AUC w RNN**	**PR_AUC w Transformer**	**ROC_AUC wt XGB**	**ROC_AUC w XGB**	**ROC_AUC w RNN**	**ROC_AUC w Transformer**
iTransformer		0.521 (0.000)	0.359 (0.049)	0.286 (0.040)		0.852 (0.000)	0.692 (0.073)	0.685 (0.032)
SAITS		0.490 (0.000)	0.274 (0.054)	0.277 (0.039)		0.851 (0.000)	0.658 (0.076)	0.668 (0.037)
Nonstationary		0.542 (0.000)	0.294 (0.029)	0.374 (0.061)		0.860 (0.000)	0.583 (0.078)	0.721 (0.049)
ETSformer		0.433 (0.000)	0.392 (0.035)	0.278 (0.013)		0.820 (0.000)	0.734 (0.030)	0.678 (0.013)
PatchTST		0.512 (0.000)	0.347 (0.038)	0.303 (0.067)		0.848 (0.000)	0.703 (0.064)	0.698 (0.061)
Crossformer		0.489 (0.000)	0.317 (0.029)	0.253 (0.032)		0.836 (0.000)	0.683 (0.051)	0.644 (0.026)
Informer		0.468 (0.000)	0.306 (0.046)	0.252 (0.032)		0.836 (0.000)	0.701 (0.021)	0.653 (0.029)
Autoformer		0.368 (0.000)	0.203 (0.008)	0.223 (0.009)		0.768 (0.000)	0.597 (0.009)	0.625 (0.008)
Pyraformer		0.461 (0.000)	0.381 (0.017)	0.250 (0.047)		0.829 (0.000)	0.739 (0.026)	0.654 (0.047)
Transformer		0.458 (0.000)	0.360 (0.034)	0.223 (0.024)		0.833 (0.000)	0.723 (0.036)	0.626 (0.036)
BRITS		0.455 (0.000)	0.315 (0.069)	0.270 (0.068)		0.841 (0.000)	0.667 (0.066)	0.646 (0.074)
MRNN		0.346 (0.000)	0.232 (0.013)	0.219 (0.012)		0.760 (0.000)	0.611 (0.008)	0.619 (0.015)
GRUD		0.423 (0.000)	0.373 (0.064)	0.392 (0.058)		0.840 (0.000)	0.721 (0.075)	0.745 (0.035)
TimesNet		0.432 (0.000)	0.332 (0.055)	0.344 (0.062)		0.823 (0.000)	0.687 (0.087)	0.710 (0.043)
MICN	0.388 (0.000)	0.410 (0.000)	0.316 (0.069)	0.295 (0.058)	0.771 (0.000)	0.824 (0.000)	0.700 (0.071)	0.686 (0.050)
SCINet		0.443 (0.000)	0.319 (0.071)	0.340 (0.052)		0.818 (0.000)	0.663 (0.055)	0.720 (0.034)
StemGNN		0.423 (0.000)	0.277 (0.074)	0.312 (0.024)		0.809 (0.000)	0.534 (0.124)	0.701 (0.025)
FreTS		0.471 (0.000)	0.333 (0.025)	0.275 (0.012)		0.840 (0.000)	0.693 (0.035)	0.674 (0.018)
Koopa		0.470 (0.000)	0.237 (0.056)	0.238 (0.039)		0.835 (0.000)	0.509 (0.113)	0.628 (0.036)
DLinear		0.486 (0.000)	0.323 (0.057)	0.230 (0.034)		0.851 (0.000)	0.689 (0.038)	0.611 (0.053)
FiLM		0.422 (0.000)	0.292 (0.058)	0.361 (0.066)		0.825 (0.000)	0.565 (0.095)	0.706 (0.046)
CSDI		0.459 (0.000)	0.291 (0.056)	0.438 (0.016)		0.853 (0.000)	0.553 (0.108)	0.762 (0.019)
US-GAN		0.492 (0.000)	0.333 (0.044)	0.223 (0.046)		0.839 (0.000)	0.708 (0.019)	0.610 (0.043)
GP-VAE		0.456 (0.000)	0.396 (0.036)	0.334 (0.072)		0.816 (0.000)	0.745 (0.056)	0.701 (0.041)
Mean		0.384 (0.000)	0.251 (0.022)	0.200 (0.016)		0.763 (0.000)	0.620 (0.017)	0.598 (0.025)
Median		0.361 (0.023)	0.236 (0.024)	0.206 (0.015)		0.772 (0.010)	0.619 (0.013)	0.605 (0.025)
LOCF		0.391 (0.045)	0.267 (0.073)	0.277 (0.102)		0.795 (0.033)	0.634 (0.074)	0.644 (0.061)
Linear		0.417 (0.060)	0.289 (0.078)	0.309 (0.111)		0.807 (0.036)	0.640 (0.076)	0.669 (0.069)
	Pedestrian (10% missing rate)							
	PR_AUC wt XGB	**PR_AUC w XGB**	**PR_AUC w RNN**	**PR_AUC w Transformer**	**ROC_AUC wt XGB**	**ROC_AUC w XGB**	**ROC_AUC w RNN**	**ROC_AUC w Transformer**
iTransformer		0.977 (0.000)	0.478 (0.079)	0.903 (0.011)		0.996 (0.000)	0.896 (0.026)	0.985 (0.001)
SAITS		0.982 (0.000)	0.458 (0.050)	0.926 (0.024)		0.997 (0.000)	0.890 (0.020)	0.989 (0.003)
Nonstationary		0.973 (0.000)	0.485 (0.060)	0.956 (0.000)		0.996 (0.000)	0.902 (0.020)	0.993 (0.000)
ETSformer		0.977 (0.000)	0.487 (0.057)	0.910 (0.035)		0.996 (0.000)	0.901 (0.020)	0.986 (0.005)
PatchTST		0.981 (0.000)	0.463 (0.058)	0.915 (0.029)		0.997 (0.000)	0.892 (0.019)	0.988 (0.004)
Crossformer		0.980 (0.000)	0.509 (0.054)	0.923 (0.036)		0.997 (0.000)	0.907 (0.016)	0.989 (0.005)
Informer		0.980 (0.000)	0.479 (0.049)	0.908 (0.026)		0.997 (0.000)	0.898 (0.015)	0.986 (0.004)
Autoformer		0.978 (0.000)	0.480 (0.086)	0.932 (0.027)		0.996 (0.000)	0.898 (0.025)	0.989 (0.004)
Pyraformer		0.978 (0.000)	0.506 (0.064)	0.939 (0.022)		0.997 (0.000)	0.908 (0.018)	0.991 (0.003)
Transformer		0.979 (0.000)	0.496 (0.051)	0.897 (0.019)		0.997 (0.000)	0.902 (0.015)	0.985 (0.003)
BRITS		0.981 (0.000)	0.462 (0.051)	0.938 (0.027)		0.997 (0.000)	0.898 (0.017)	0.991 (0.004)
MRNN		0.970 (0.000)	0.474 (0.051)	0.916 (0.011)		0.995 (0.000)	0.900 (0.017)	0.987 (0.002)
GRUD		0.977 (0.000)	0.493 (0.058)	0.916 (0.025)		0.997 (0.000)	0.899 (0.019)	0.988 (0.003)
TimesNet		0.978 (0.000)	0.503 (0.064)	0.910 (0.034)		0.997 (0.000)	0.906 (0.021)	0.987 (0.005)
MICN	0.972 (0.000)	/	/	/	0.996 (0.000)	/	/	/
SCINet		0.978 (0.000)	0.502 (0.051)	0.902 (0.022)		0.997 (0.000)	0.904 (0.017)	0.986 (0.003)
StemGNN		0.981 (0.000)	0.483 (0.034)	0.928 (0.038)		0.997 (0.000)	0.899 (0.009)	0.989 (0.005)
FreTS		0.982 (0.000)	0.474 (0.063)	0.902 (0.028)		0.997 (0.000)	0.895 (0.023)	0.985 (0.004)
Koopa		0.978 (0.000)	0.498 (0.047)	0.907 (0.050)		0.997 (0.000)	0.906 (0.014)	0.986 (0.006)
DLinear		0.981 (0.000)	0.520 (0.054)	0.904 (0.029)		0.997 (0.000)	0.912 (0.016)	0.986 (0.004)
FiLM		0.973 (0.000)	0.482 (0.020)	0.955 (0.007)		0.996 (0.000)	0.903 (0.007)	0.992 (0.001)
CSDI		0.978 (0.000)	0.511 (0.048)	0.924 (0.029)		0.996 (0.000)	0.907 (0.019)	0.989 (0.004)
US-GAN		0.979 (0.000)	0.498 (0.045)	0.941 (0.011)		0.997 (0.000)	0.905 (0.014)	0.991 (0.002)
GP-VAE		0.974 (0.000)	0.472 (0.065)	0.898 (0.003)		0.996 (0.000)	0.893 (0.020)	0.985 (0.001)
Mean		0.970 (0.000)	0.486 (0.050)	0.912 (0.018)		0.995 (0.000)	0.904 (0.019)	0.986 (0.003)
Median		0.968 (0.002)	0.498 (0.068)	0.900 (0.019)		0.995 (0.000)	0.906 (0.023)	0.984 (0.003)
LOCF		0.971 (0.004)	0.489 (0.063)	0.909 (0.023)		0.996 (0.001)	0.903 (0.021)	0.986 (0.004)
Linear		0.973 (0.005)	0.498 (0.059)	0.916 (0.025)		0.996 (0.001)	0.906 (0.019)	0.987 (0.004)

Table 18: Performance comparison for the classification task on Pedestrian datasets with 50% point missing, 90% point missing, and 50% subseqence missing.

	Pedestrian (50% point missing rate)							
	PR_AUC wt XGB	PR_AUC w XGB	PR_AUC w RNN	PR_AUC w Transformer	ROC_AUC wt XGB	ROC_AUC w XGB	ROC_AUC w RNN	ROC_AUC w Transformer
iTransformer		0.936 (0.000)	0.495 (0.070)	0.848 (0.011)		0.990 (0.000)	0.901 (0.022)	0.972 (0.003)
SAITS		0.944 (0.000)	0.486 (0.051)	0.823 (0.005)		0.991 (0.000)	0.900 (0.017)	0.970 (0.001)
Nonstationary		0.900 (0.000)	0.286 (0.097)	0.803 (0.016)		0.984 (0.000)	0.790 (0.074)	0.968 (0.002)
ETSformer		0.900 (0.000)	0.563 (0.038)	0.782 (0.034)		0.984 (0.000)	0.925 (0.010)	0.964 (0.006)
PatchTST		0.948 (0.000)	0.504 (0.077)	0.839 (0.010)		0.991 (0.000)	0.904 (0.023)	0.974 (0.001)
Crossformer		0.942 (0.000)	0.518 (0.080)	0.850 (0.021)		0.991 (0.000)	0.912 (0.025)	0.975 (0.003)
Informer		0.941 (0.000)	0.496 (0.034)	0.824 (0.005)		0.991 (0.000)	0.905 (0.010)	0.969 (0.003)
Autoformer		0.855 (0.000)	0.528 (0.021)	0.725 (0.017)		0.973 (0.000)	0.917 (0.005)	0.946 (0.002)
Pyraformer		0.941 (0.000)	0.498 (0.073)	0.850 (0.021)		0.991 (0.000)	0.902 (0.020)	0.973 (0.004)
Transformer		0.951 (0.000)	0.483 (0.059)	0.836 (0.009)		0.992 (0.000)	0.897 (0.017)	0.971 (0.003)
BRITS		0.929 (0.000)	0.470 (0.073)	0.846 (0.015)		0.989 (0.000)	0.895 (0.027)	0.974 (0.003)
MRNN		0.884 (0.000)	0.479 (0.130)	0.694 (0.018)		0.981 (0.000)	0.885 (0.070)	0.945 (0.003)
GRUD		0.932 (0.000)	0.579 (0.030)	0.817 (0.017)		0.989 (0.000)	0.928 (0.005)	0.969 (0.003)
TimesNet		0.897 (0.000)	0.460 (0.038)	0.835 (0.011)		0.983 (0.000)	0.894 (0.016)	0.970 (0.003)
MICN	0.912 (0.000)	/	/	/	0.986 (0.000)	/	/	/
SCINet		0.924 (0.000)	0.497 (0.064)	0.856 (0.008)		0.988 (0.000)	0.902 (0.021)	0.975 (0.002)
StemGNN		0.943 (0.000)	0.495 (0.086)	0.854 (0.025)		0.991 (0.000)	0.897 (0.024)	0.976 (0.004)
FreTS		0.935 (0.000)	0.474 (0.079)	0.829 (0.020)		0.990 (0.000)	0.896 (0.026)	0.972 (0.004)
Koopa		0.918 (0.000)	0.491 (0.069)	0.859 (0.011)		0.987 (0.000)	0.900 (0.021)	0.975 (0.002)
DLinear		0.882 (0.000)	0.550 (0.025)	0.798 (0.016)		0.981 (0.000)	0.918 (0.008)	0.967 (0.003)
FiLM		0.894 (0.000)	0.545 (0.048)	0.772 (0.019)		0.983 (0.000)	0.918 (0.011)	0.961 (0.004)
CSDI		0.921 (0.000)	0.409 (0.029)	0.857 (0.007)		0.987 (0.000)	0.869 (0.019)	0.975 (0.002)
US-GAN		0.924 (0.000)	0.466 (0.047)	0.826 (0.018)		0.988 (0.000)	0.896 (0.014)	0.970 (0.003)
GP-VAE		0.877 (0.000)	0.565 (0.020)	0.726 (0.021)		0.980 (0.000)	0.928 (0.005)	0.955 (0.003)
Mean		0.884 (0.000)	0.500 (0.035)	0.692 (0.005)		0.981 (0.000)	0.910 (0.008)	0.944 (0.002)
Median		0.881 (0.004)	0.481 (0.089)	0.717 (0.029)		0.981 (0.001)	0.896 (0.048)	0.948 (0.005)
LOCF		0.895 (0.020)	0.511 (0.086)	0.750 (0.052)		0.983 (0.003)	0.906 (0.042)	0.955 (0.011)
Linear		0.904 (0.024)	0.525 (0.081)	0.768 (0.056)		0.984 (0.004)	0.911 (0.038)	0.959 (0.012)
	Pedestrian (90% point missing rate)							
	PR_AUC wt XGB	PR_AUC w XGB	PR_AUC w RNN	PR_AUC w Transformer	ROC_AUC wt XGB	ROC_AUC w XGB	ROC_AUC w RNN	ROC_AUC w Transformer
iTransformer		0.392 (0.000)	0.254 (0.009)	0.332 (0.005)		0.845 (0.000)	0.784 (0.020)	0.835 (0.002)
SAITS		0.386 (0.000)	0.242 (0.027)	0.348 (0.011)		0.843 (0.000)	0.750 (0.045)	0.826 (0.003)
Nonstationary		0.366 (0.000)	0.179 (0.016)	0.310 (0.019)		0.828 (0.000)	0.659 (0.046)	0.800 (0.005)
ETSformer		0.329 (0.000)	0.232 (0.013)	0.340 (0.017)		0.809 (0.000)	0.756 (0.024)	0.834 (0.004)
PatchTST		0.391 (0.000)	0.197 (0.029)	0.383 (0.020)		0.846 (0.000)	0.680 (0.065)	0.846 (0.004)
Crossformer		0.389 (0.000)	0.263 (0.013)	0.387 (0.006)		0.848 (0.000)	0.797 (0.003)	0.855 (0.002)
Informer		0.361 (0.000)	0.228 (0.010)	0.319 (0.011)		0.833 (0.000)	0.739 (0.020)	0.809 (0.002)
Autoformer		0.327 (0.000)	0.234 (0.007)	0.265 (0.005)		0.801 (0.000)	0.760 (0.007)	0.796 (0.008)
Pyraformer		0.405 (0.000)	0.266 (0.009)	0.349 (0.021)		0.847 (0.000)	0.784 (0.022)	0.837 (0.003)
Transformer		0.400 (0.000)	0.237 (0.046)	0.347 (0.019)		0.842 (0.000)	0.710 (0.092)	0.819 (0.006)
BRITS		0.406 (0.000)	0.259 (0.011)	0.371 (0.019)		0.848 (0.000)	0.786 (0.009)	0.846 (0.007)
MRNN		0.434 (0.000)	0.259 (0.007)	0.339 (0.016)		0.841 (0.000)	0.778 (0.006)	0.840 (0.004)
GRUD		0.433 (0.000)	0.312 (0.005)	0.351 (0.009)		0.859 (0.000)	0.828 (0.002)	0.839 (0.002)
TimesNet		0.330 (0.000)	0.244 (0.006)	0.324 (0.018)		0.811 (0.000)	0.776 (0.004)	0.820 (0.004)
MICN	0.452 (0.000)	/	/	/	0.851 (0.000)	/	/	/
SCINet		0.380 (0.000)	0.210 (0.052)	0.326 (0.011)		0.841 (0.000)	0.687 (0.111)	0.818 (0.005)
StemGNN		0.394 (0.000)	0.193 (0.018)	0.357 (0.020)		0.846 (0.000)	0.693 (0.052)	0.836 (0.004)
FreTS		0.396 (0.000)	0.226 (0.032)	0.367 (0.010)		0.848 (0.000)	0.717 (0.076)	0.846 (0.001)
Koopa		0.376 (0.000)	0.238 (0.024)	0.383 (0.013)		0.836 (0.000)	0.753 (0.026)	0.855 (0.004)
DLinear		0.346 (0.000)	0.213 (0.069)	0.333 (0.021)		0.829 (0.000)	0.695 (0.168)	0.834 (0.011)
FiLM		0.323 (0.000)	0.257 (0.006)	0.316 (0.018)		0.818 (0.000)	0.792 (0.005)	0.806 (0.015)
CSDI		0.260 (0.000)	0.239 (0.002)	0.265 (0.019)		0.770 (0.000)	0.772 (0.003)	0.780 (0.013)
US-GAN		0.392 (0.000)	0.240 (0.039)	0.369 (0.017)		0.845 (0.000)	0.768 (0.056)	0.842 (0.004)
GP-VAE		0.420 (0.000)	0.237 (0.018)	0.300 (0.033)		0.847 (0.000)	0.749 (0.023)	0.820 (0.021)
Mean		0.413 (0.000)	0.217 (0.009)	0.291 (0.033)		0.830 (0.000)	0.728 (0.012)	0.814 (0.025)
Median		0.414 (0.002)	0.217 (0.007)	0.288 (0.029)		0.830 (0.000)	0.728 (0.009)	0.795 (0.027)
LOCF		0.432 (0.025)	0.246 (0.041)	0.303 (0.033)		0.841 (0.016)	0.758 (0.042)	0.808 (0.029)
Linear		0.425 (0.025)	0.255 (0.039)	0.310 (0.032)		0.841 (0.014)	0.769 (0.041)	0.809 (0.025)
	Pedestrian (50% subsequence missing rate)							
	PR_AUC wt XGB	PR_AUC w XGB	PR_AUC w RNN	PR_AUC w Transformer	ROC_AUC wt XGB	ROC_AUC w XGB	ROC_AUC w RNN	ROC_AUC w Transformer
iTransformer		0.750 (0.000)	0.201 (0.034)	0.553 (0.007)		0.952 (0.000)	0.676 (0.053)	0.920 (0.002)
SAITS		0.766 (0.000)	0.251 (0.086)	0.584 (0.024)		0.955 (0.000)	0.712 (0.131)	0.927 (0.004)
Nonstationary		0.729 (0.000)	0.217 (0.037)	0.499 (0.011)		0.946 (0.000)	0.733 (0.054)	0.911 (0.004)
ETSformer		0.743 (0.000)	0.223 (0.043)	0.544 (0.022)		0.950 (0.000)	0.715 (0.060)	0.920 (0.003)
PatchTST		0.747 (0.000)	0.213 (0.038)	0.532 (0.022)		0.952 (0.000)	0.652 (0.099)	0.917 (0.004)
Crossformer		0.745 (0.000)	0.187 (0.029)	0.538 (0.011)		0.951 (0.000)	0.613 (0.082)	0.920 (0.001)
Informer		0.755 (0.000)	0.236 (0.039)	0.557 (0.030)		0.953 (0.000)	0.737 (0.056)	0.926 (0.006)
Autoformer		0.755 (0.000)	0.203 (0.094)	0.562 (0.013)		0.953 (0.000)	0.627 (0.198)	0.924 (0.002)
Pyraformer		0.741 (0.000)	0.238 (0.067)	0.582 (0.028)		0.950 (0.000)	0.721 (0.079)	0.927 (0.005)
Transformer		0.762 (0.000)	0.255 (0.033)	0.519 (0.037)		0.954 (0.000)	0.758 (0.048)	0.915 (0.009)
BRITS		0.758 (0.000)	0.183 (0.035)	0.574 (0.018)		0.952 (0.000)	0.627 (0.077)	0.925 (0.005)
MRNN		0.728 (0.000)	0.232 (0.075)	0.485 (0.033)		0.947 (0.000)	0.694 (0.115)	0.902 (0.005)
GRUD		0.733 (0.000)	0.271 (0.082)	0.538 (0.021)		0.949 (0.000)	0.756 (0.089)	0.913 (0.004)
TimesNet		0.760 (0.000)	0.305 (0.072)	0.555 (0.025)		0.954 (0.000)	0.808 (0.059)	0.921 (0.006)
MICN	0.741 (0.000)	/	/	/	0.949 (0.000)	/	/	/
SCINet		0.754 (0.000)	0.211 (0.040)	0.584 (0.040)		0.952 (0.000)	0.658 (0.098)	0.927 (0.010)
StemGNN		0.743 (0.000)	0.259 (0.052)	0.565 (0.019)		0.950 (0.000)	0.751 (0.087)	0.923 (0.004)
FreTS		0.752 (0.000)	0.180 (0.027)	0.539 (0.024)		0.953 (0.000)	0.582 (0.053)	0.919 (0.004)
Koopa		0.743 (0.000)	0.212 (0.052)	0.572 (0.030)		0.951 (0.000)	0.686 (0.107)	0.923 (0.003)
DLinear		0.755 (0.000)	0.202 (0.035)	0.559 (0.020)		0.953 (0.000)	0.644 (0.081)	0.921 (0.005)
FiLM		0.730 (0.000)	0.296 (0.039)	0.530 (0.027)		0.948 (0.000)	0.815 (0.037)	0.917 (0.006)
CSDI		0.732 (0.000)	0.273 (0.083)	0.573 (0.025)		0.948 (0.000)	0.756 (0.091)	0.927 (0.006)
US-GAN		0.743 (0.000)	0.295 (0.091)	0.530 (0.025)		0.950 (0.000)	0.783 (0.103)	0.913 (0.005)
GP-VAE		0.734 (0.000)	0.258 (0.034)	0.534 (0.019)		0.948 (0.000)	0.779 (0.040)	0.915 (0.003)
Mean		0.724 (0.000)	0.215 (0.099)	0.475 (0.019)		0.945 (0.000)	0.642 (0.167)	0.900 (0.005)
Median		0.714 (0.010)	0.198 (0.076)	0.472 (0.023)		0.944 (0.002)	0.622 (0.142)	0.897 (0.007)
LOCF		0.717 (0.009)	0.209 (0.069)	0.474 (0.026)		0.944 (0.002)	0.664 (0.137)	0.900 (0.007)
Linear		0.727 (0.019)	0.225 (0.070)	0.487 (0.034)		0.946 (0.004)	0.696 (0.133)	0.903 (0.009)

Table 19: Performance comparison for the regression task on ETT_h1 datasets with 50% block missing and 50% subsequence missing.

	ETT_h1 (block_50%)											
	MAE wt XGB	MRE wt XGB	MSE wt XGB	MAE w XGB	MRE w XGB	MSE w XGB	MAE w RNN	MRE w RNN	MSE w RNN	MAE w Transformer	MRE w Transformer	MSE w Transformer
iTransformer	1.379 (0.000)	1.218 (0.000)	2.303 (0.000)	1.208 (0.000)	1.067 (0.000)	1.766 (0.000)	1.422 (0.075)	1.256 (0.067)	2.387 (0.199)	1.399 (0.080)	1.235 (0.070)	2.254 (0.234)
SAITS				1.168 (0.000)	1.032 (0.000)	1.625 (0.000)	1.363 (0.072)	1.203 (0.063)	2.223 (0.184)	1.385 (0.057)	1.223 (0.050)	2.200 (0.155)
Nonstationary				1.189 (0.000)	1.050 (0.000)	1.712 (0.000)	1.438 (0.059)	1.270 (0.052)	2.459 (0.152)	1.368 (0.055)	1.208 (0.048)	2.195 (0.142)
ETSformer				1.004 (0.000)	0.887 (0.000)	1.357 (0.000)	1.285 (0.064)	1.135 (0.056)	1.997 (0.139)	1.327 (0.096)	1.172 (0.084)	2.083 (0.247)
PatchTST				1.183 (0.000)	1.044 (0.000)	1.744 (0.000)	1.362 (0.078)	1.203 (0.069)	2.224 (0.191)	1.340 (0.074)	1.183 (0.066)	2.086 (0.185)
Crossformer				1.149 (0.000)	1.015 (0.000)	1.654 (0.000)	1.335 (0.070)	1.179 (0.062)	2.143 (0.163)	1.285 (0.081)	1.135 (0.072)	1.942 (0.192)
Informer				1.158 (0.000)	1.022 (0.000)	1.702 (0.000)	1.333 (0.080)	1.177 (0.070)	2.141 (0.202)	1.351 (0.055)	1.193 (0.049)	2.111 (0.155)
Autoformer				1.327 (0.000)	1.172 (0.000)	2.180 (0.000)	1.267 (0.047)	1.119 (0.042)	1.819 (0.136)	1.363 (0.204)	1.203 (0.180)	2.218 (0.582)
Pyraformer				1.071 (0.000)	0.945 (0.000)	1.357 (0.000)	1.328 (0.069)	1.173 (0.061)	2.115 (0.169)	1.330 (0.053)	1.174 (0.047)	2.046 (0.138)
Transformer				1.128 (0.000)	0.996 (0.000)	1.544 (0.000)	1.296 (0.064)	1.144 (0.057)	2.031 (0.140)	1.277 (0.077)	1.128 (0.068)	1.917 (0.172)
BRITS				0.826 (0.000)	0.729 (0.000)	0.917 (0.000)	1.024 (0.010)	0.905 (0.009)	1.337 (0.032)	1.000 (0.057)	0.883 (0.050)	1.240 (0.137)
MRNN				0.870 (0.000)	0.768 (0.000)	0.999 (0.000)	1.274 (0.078)	1.125 (0.069)	1.975 (0.207)	1.387 (0.053)	1.225 (0.047)	2.242 (0.140)
GRUD				1.043 (0.000)	0.921 (0.000)	1.343 (0.000)	1.286 (0.046)	1.135 (0.041)	1.996 (0.081)	1.211 (0.080)	1.069 (0.070)	1.744 (0.190)
TimesNet				1.064 (0.000)	0.939 (0.000)	1.451 (0.000)	1.316 (0.068)	1.162 (0.060)	2.082 (0.152)	1.294 (0.101)	1.143 (0.089)	1.989 (0.244)
MICN				1.145 (0.000)	1.011 (0.000)	1.585 (0.000)	1.338 (0.066)	1.181 (0.058)	2.138 (0.153)	1.344 (0.073)	1.187 (0.064)	2.122 (0.187)
SCINet				1.182 (0.000)	1.044 (0.000)	1.762 (0.000)	1.361 (0.075)	1.202 (0.066)	2.218 (0.180)	1.323 (0.065)	1.168 (0.057)	2.038 (0.162)
StemGNN				1.136 (0.000)	1.003 (0.000)	1.599 (0.000)	1.373 (0.064)	1.212 (0.057)	2.248 (0.159)	1.323 (0.052)	1.168 (0.046)	2.034 (0.129)
FreTS				1.163 (0.000)	1.027 (0.000)	1.703 (0.000)	1.356 (0.080)	1.197 (0.070)	2.214 (0.205)	1.355 (0.068)	1.196 (0.060)	2.124 (0.194)
Koopa				1.274 (0.000)	1.125 (0.000)	2.034 (0.000)	1.347 (0.063)	1.189 (0.056)	2.180 (0.154)	1.302 (0.052)	1.150 (0.046)	1.983 (0.128)
DLinear				1.166 (0.000)	1.029 (0.000)	1.642 (0.000)	1.368 (0.064)	1.208 (0.056)	2.222 (0.143)	1.359 (0.114)	1.200 (0.101)	2.170 (0.292)
FiLM				1.301 (0.000)	1.149 (0.000)	2.046 (0.000)	1.391 (0.057)	1.228 (0.050)	2.307 (0.144)	1.368 (0.060)	1.208 (0.053)	2.177 (0.165)
CSDI				1.202 (0.000)	1.062 (0.000)	1.728 (0.000)	1.355 (0.048)	1.197 (0.043)	2.197 (0.114)	1.362 (0.054)	1.203 (0.048)	2.162 (0.136)
US-GAN				0.951 (0.000)	0.840 (0.000)	1.151 (0.000)	1.174 (0.069)	1.036 (0.061)	1.731 (0.147)	1.098 (0.145)	0.969 (0.128)	1.492 (0.340)
GP-VAE				0.996 (0.000)	0.880 (0.000)	1.260 (0.000)	1.177 (0.061)	1.039 (0.054)	1.737 (0.121)	1.184 (0.077)	1.046 (0.068)	1.663 (0.192)
Mean				1.413 (0.000)	1.248 (0.000)	2.346 (0.000)	1.669 (0.083)	1.473 (0.074)	3.141 (0.266)	1.750 (0.043)	1.545 (0.038)	3.453 (0.173)
Median				1.496 (0.083)	1.321 (0.073)	2.648 (0.302)	1.688 (0.100)	1.490 (0.088)	3.228 (0.332)	1.736 (0.061)	1.533 (0.054)	3.385 (0.248)
LOCF				1.433 (0.112)	1.266 (0.099)	2.484 (0.339)	1.601 (0.150)	1.414 (0.133)	2.952 (0.479)	1.611 (0.188)	1.423 (0.166)	2.972 (0.626)
Linear				1.395 (0.118)	1.232 (0.104)	2.365 (0.358)	1.558 (0.151)	1.376 (0.134)	2.821 (0.477)	1.556 (0.191)	1.374 (0.169)	2.791 (0.633)
	ETT_h1 (subseq_50%)											
	MAE wt XGB	MRE wt XGB	MSE wt XGB	MAE w XGB	MRE w XGB	MSE w XGB	MAE w RNN	MRE w RNN	MSE w RNN	MAE w Transformer	MRE w Transformer	MSE w Transformer
iTransformer	1.489 (0.000)	1.315 (0.000)	2.781 (0.000)	1.170 (0.000)	1.033 (0.000)	1.768 (0.000)	1.434 (0.047)	1.266 (0.042)	2.429 (0.159)	1.470 (0.053)	1.298 (0.046)	2.499 (0.153)
SAITS				1.094 (0.000)	0.966 (0.000)	1.593 (0.000)	1.424 (0.077)	1.257 (0.068)	2.433 (0.203)	1.469 (0.054)	1.297 (0.048)	2.477 (0.162)
Nonstationary				1.284 (0.000)	1.134 (0.000)	2.090 (0.000)	1.448 (0.053)	1.278 (0.046)	2.471 (0.130)	1.469 (0.036)	1.297 (0.032)	2.471 (0.104)
ETSformer				1.187 (0.000)	1.048 (0.000)	1.804 (0.000)	1.407 (0.059)	1.243 (0.052)	2.358 (0.139)	1.433 (0.058)	1.265 (0.051)	2.367 (0.155)
PatchTST				1.253 (0.000)	1.106 (0.000)	1.993 (0.000)	1.476 (0.079)	1.303 (0.069)	2.595 (0.217)	1.502 (0.042)	1.326 (0.037)	2.569 (0.120)
Crossformer				1.145 (0.000)	1.011 (0.000)	1.730 (0.000)	1.449 (0.058)	1.280 (0.051)	2.506 (0.139)	1.474 (0.042)	1.301 (0.037)	2.495 (0.107)
Informer				1.196 (0.000)	1.056 (0.000)	1.764 (0.000)	1.423 (0.076)	1.256 (0.067)	2.426 (0.200)	1.442 (0.042)	1.273 (0.037)	2.395 (0.120)
Autoformer				1.364 (0.000)	1.205 (0.000)	2.281 (0.000)	1.471 (0.061)	1.299 (0.054)	2.545 (0.228)	1.538 (0.072)	1.358 (0.063)	2.728 (0.237)
Pyraformer				1.081 (0.000)	0.955 (0.000)	1.594 (0.000)	1.391 (0.077)	1.228 (0.068)	2.328 (0.200)	1.443 (0.042)	1.274 (0.037)	2.393 (0.126)
Transformer				1.074 (0.000)	0.948 (0.000)	1.399 (0.000)	1.391 (0.060)	1.228 (0.053)	2.320 (0.140)	1.350 (0.090)	1.192 (0.079)	2.138 (0.232)
BRITS				0.999 (0.000)	0.882 (0.000)	1.336 (0.000)	1.153 (0.042)	1.018 (0.037)	1.734 (0.056)	1.146 (0.036)	1.012 (0.031)	1.645 (0.093)
MRNN				1.111 (0.000)	0.982 (0.000)	1.619 (0.000)	1.362 (0.061)	1.202 (0.054)	2.211 (0.179)	1.483 (0.055)	1.310 (0.049)	2.521 (0.141)
GRUD				1.123 (0.000)	0.991 (0.000)	1.585 (0.000)	1.351 (0.058)	1.193 (0.051)	2.194 (0.146)	1.362 (0.044)	1.202 (0.039)	2.179 (0.117)
TimesNet				1.213 (0.000)	1.071 (0.000)	1.891 (0.000)	1.446 (0.058)	1.277 (0.051)	2.514 (0.139)	1.460 (0.041)	1.290 (0.036)	2.461 (0.108)
MICN				1.121 (0.000)	0.990 (0.000)	1.609 (0.000)	1.442 (0.052)	1.273 (0.046)	2.457 (0.185)	1.503 (0.060)	1.327 (0.053)	2.604 (0.186)
SCINet				1.181 (0.000)	1.043 (0.000)	1.767 (0.000)	1.450 (0.061)	1.280 (0.054)	2.514 (0.153)	1.446 (0.038)	1.277 (0.034)	2.414 (0.105)
StemGNN				1.211 (0.000)	1.069 (0.000)	1.810 (0.000)	1.391 (0.067)	1.228 (0.059)	2.313 (0.171)	1.439 (0.045)	1.270 (0.040)	2.378 (0.137)
FreTS				1.159 (0.000)	1.023 (0.000)	1.667 (0.000)	1.456 (0.079)	1.286 (0.070)	2.516 (0.217)	1.514 (0.045)	1.337 (0.040)	2.608 (0.132)
Koopa				1.233 (0.000)	1.089 (0.000)	1.961 (0.000)	1.446 (0.083)	1.277 (0.073)	2.486 (0.228)	1.509 (0.046)	1.333 (0.040)	2.594 (0.133)
DLinear				1.212 (0.000)	1.071 (0.000)	1.873 (0.000)	1.466 (0.058)	1.295 (0.051)	2.557 (0.144)	1.512 (0.044)	1.335 (0.038)	2.609 (0.114)
FiLM				1.422 (0.000)	1.255 (0.000)	2.469 (0.000)	1.389 (0.057)	1.226 (0.051)	2.278 (0.146)	1.455 (0.036)	1.285 (0.032)	2.417 (0.115)
CSDI				1.191 (0.000)	1.052 (0.000)	1.758 (0.000)	1.354 (0.049)	1.196 (0.043)	2.194 (0.115)	1.413 (0.041)	1.248 (0.036)	2.301 (0.115)
US-GAN				1.004 (0.000)	0.886 (0.000)	1.346 (0.000)	1.244 (0.052)	1.098 (0.046)	1.937 (0.091)	1.219 (0.079)	1.077 (0.069)	1.809 (0.205)
GP-VAE				1.138 (0.000)	1.005 (0.000)	1.692 (0.000)	1.310 (0.046)	1.157 (0.041)	2.129 (0.097)	1.354 (0.077)	1.195 (0.068)	2.160 (0.195)
Mean				1.430 (0.000)	1.263 (0.000)	2.526 (0.000)	1.859 (0.095)	1.642 (0.084)	3.821 (0.349)	1.779 (0.035)	1.571 (0.031)	3.478 (0.133)
Median				1.499 (0.069)	1.324 (0.061)	2.766 (0.240)	1.858 (0.089)	1.641 (0.079)	3.825 (0.328)	1.777 (0.034)	1.569 (0.030)	3.472 (0.133)
LOCF				1.446 (0.094)	1.277 (0.083)	2.619 (0.285)	1.699 (0.237)	1.500 (0.210)	3.293 (0.800)	1.651 (0.182)	1.458 (0.161)	3.055 (0.603)
Linear				1.423 (0.091)	1.256 (0.080)	2.540 (0.283)	1.610 (0.258)	1.422 (0.228)	3.010 (0.850)	1.588 (0.193)	1.402 (0.171)	2.858 (0.627)

Table 20: Performance comparison for the regression task on ETT_h1 datasets with 10% point missing and 50% point missing.

	ETT_h1 (point_10%)											
	MAE wt XGB	MRE wt XGB	MSE wt XGB	MAE w XGB	MRE w XGB	MSE w XGB	MAE w RNN	MRE w RNN	MSE w RNN	MAE w Transformer	MRE w Transformer	MSE w Transformer
iTransformer				1.194 (0.000)	1.054 (0.000)	1.773 (0.000)	1.403 (0.057)	1.239 (0.051)	2.352 (0.139)	1.401 (0.071)	1.237 (0.063)	2.260 (0.187)
SAITS				1.186 (0.000)	1.047 (0.000)	1.708 (0.000)	1.403 (0.058)	1.239 (0.051)	2.352 (0.141)	1.397 (0.073)	1.233 (0.065)	2.248 (0.193)
Nonstationary				1.161 (0.000)	1.025 (0.000)	1.664 (0.000)	1.424 (0.056)	1.258 (0.050)	2.417 (0.138)	1.399 (0.075)	1.236 (0.066)	2.260 (0.198)
ETSformer				1.151 (0.000)	1.016 (0.000)	1.617 (0.000)	1.400 (0.057)	1.236 (0.050)	2.344 (0.138)	1.393 (0.070)	1.230 (0.062)	2.238 (0.182)
PatchTST				1.166 (0.000)	1.029 (0.000)	1.672 (0.000)	1.406 (0.056)	1.242 (0.049)	2.360 (0.136)	1.390 (0.073)	1.228 (0.065)	2.229 (0.191)
Crossformer				1.152 (0.000)	1.018 (0.000)	1.637 (0.000)	1.403 (0.056)	1.239 (0.050)	2.351 (0.137)	1.393 (0.072)	1.230 (0.064)	2.239 (0.187)
Informer				1.155 (0.000)	1.020 (0.000)	1.648 (0.000)	1.401 (0.057)	1.238 (0.051)	2.347 (0.139)	1.399 (0.073)	1.235 (0.065)	2.253 (0.192)
Autoformer				1.159 (0.000)	1.023 (0.000)	1.636 (0.000)	1.401 (0.057)	1.237 (0.050)	2.344 (0.137)	1.390 (0.071)	1.228 (0.062)	2.228 (0.184)
Pyraformer				1.166 (0.000)	1.030 (0.000)	1.672 (0.000)	1.404 (0.056)	1.239 (0.050)	2.353 (0.137)	1.397 (0.072)	1.233 (0.064)	2.247 (0.189)
Transformer				1.144 (0.000)	1.010 (0.000)	1.589 (0.000)	1.401 (0.057)	1.237 (0.050)	2.346 (0.138)	1.395 (0.073)	1.232 (0.065)	2.241 (0.192)
BRITS				1.147 (0.000)	1.012 (0.000)	1.574 (0.000)	1.401 (0.057)	1.237 (0.051)	2.346 (0.139)	1.394 (0.073)	1.231 (0.065)	2.240 (0.192)
MRNN				1.157 (0.000)	1.022 (0.000)	1.639 (0.000)	1.374 (0.062)	1.213 (0.055)	2.268 (0.151)	1.387 (0.078)	1.225 (0.069)	2.221 (0.208)
GRUD				1.172 (0.000)	1.035 (0.000)	1.664 (0.000)	1.394 (0.057)	1.231 (0.051)	2.324 (0.139)	1.388 (0.071)	1.226 (0.063)	2.221 (0.185)
TimesNet				1.143 (0.000)	1.009 (0.000)	1.590 (0.000)	1.378 (0.054)	1.217 (0.048)	2.271 (0.128)	1.378 (0.068)	1.217 (0.060)	2.193 (0.174)
MICN	1.181 (0.000)	1.043 (0.000)	1.661 (0.000)	1.170 (0.000)	1.033 (0.000)	1.688 (0.000)	1.400 (0.058)	1.236 (0.051)	2.345 (0.142)	1.395 (0.071)	1.232 (0.063)	2.243 (0.188)
SCINet				1.166 (0.000)	1.030 (0.000)	1.660 (0.000)	1.404 (0.056)	1.240 (0.050)	2.355 (0.136)	1.392 (0.074)	1.230 (0.065)	2.237 (0.192)
StemGNN				1.166 (0.000)	1.030 (0.000)	1.671 (0.000)	1.401 (0.057)	1.237 (0.050)	2.345 (0.139)	1.394 (0.073)	1.231 (0.064)	2.239 (0.190)
FreTS				1.168 (0.000)	1.031 (0.000)	1.663 (0.000)	1.407 (0.056)	1.242 (0.049)	2.362 (0.136)	1.396 (0.073)	1.233 (0.065)	2.247 (0.191)
Koopa				1.193 (0.000)	1.053 (0.000)	1.716 (0.000)	1.394 (0.057)	1.231 (0.051)	2.325 (0.139)	1.395 (0.073)	1.232 (0.065)	2.244 (0.191)
DLinear				1.159 (0.000)	1.024 (0.000)	1.651 (0.000)	1.405 (0.056)	1.240 (0.049)	2.357 (0.136)	1.394 (0.072)	1.231 (0.063)	2.240 (0.186)
FiLM				1.208 (0.000)	1.067 (0.000)	1.784 (0.000)	1.398 (0.058)	1.235 (0.051)	2.340 (0.140)	1.399 (0.076)	1.236 (0.067)	2.260 (0.200)
CSDI				1.178 (0.000)	1.040 (0.000)	1.696 (0.000)	1.401 (0.057)	1.237 (0.050)	2.345 (0.138)	1.394 (0.074)	1.231 (0.066)	2.241 (0.196)
US-GAN				1.163 (0.000)	1.027 (0.000)	1.637 (0.000)	1.399 (0.058)	1.235 (0.051)	2.341 (0.141)	1.389 (0.080)	1.227 (0.071)	2.228 (0.213)
GP-VAE				1.159 (0.000)	1.024 (0.000)	1.652 (0.000)	1.403 (0.059)	1.239 (0.052)	2.355 (0.145)	1.397 (0.073)	1.234 (0.064)	2.249 (0.192)
Mean				1.209 (0.000)	1.067 (0.000)	1.716 (0.000)	1.424 (0.069)	1.258 (0.061)	2.416 (0.178)	1.445 (0.075)	1.276 (0.067)	2.390 (0.213)
Median				1.208 (0.001)	1.066 (0.001)	1.717 (0.001)	1.423 (0.069)	1.257 (0.061)	2.415 (0.176)	1.448 (0.072)	1.278 (0.063)	2.398 (0.202)
LOCF				1.194 (0.020)	1.054 (0.017)	1.682 (0.050)	1.417 (0.066)	1.251 (0.058)	2.395 (0.168)	1.430 (0.076)	1.263 (0.067)	2.346 (0.212)
Linear				1.188 (0.020)	1.049 (0.018)	1.677 (0.044)	1.414 (0.064)	1.248 (0.057)	2.385 (0.162)	1.422 (0.077)	1.256 (0.068)	2.321 (0.212)
	ETT_h1 (point_50%)											
	MAE wt XGB	MRE wt XGB	MSE wt XGB	MAE w XGB	MRE w XGB	MSE w XGB	MAE w RNN	MRE w RNN	MSE w RNN	MAE w Transformer	MRE w Transformer	MSE w Transformer
iTransformer				1.224 (0.000)	1.081 (0.000)	1.778 (0.000)	1.377 (0.062)	1.216 (0.055)	2.280 (0.151)	1.406 (0.069)	1.242 (0.061)	2.285 (0.185)
SAITS				1.175 (0.000)	1.038 (0.000)	1.654 (0.000)	1.402 (0.056)	1.238 (0.050)	2.349 (0.136)	1.401 (0.083)	1.237 (0.074)	2.262 (0.224)
Nonstationary				1.227 (0.000)	1.083 (0.000)	1.802 (0.000)	1.446 (0.061)	1.276 (0.054)	2.484 (0.154)	1.384 (0.087)	1.222 (0.076)	2.236 (0.202)
ETSformer				1.222 (0.000)	1.079 (0.000)	1.885 (0.000)	1.329 (0.060)	1.173 (0.053)	2.125 (0.138)	1.351 (0.061)	1.193 (0.054)	2.113 (0.153)
PatchTST				1.234 (0.000)	1.090 (0.000)	1.840 (0.000)	1.398 (0.059)	1.235 (0.052)	2.344 (0.143)	1.370 (0.074)	1.210 (0.066)	2.176 (0.192)
Crossformer				1.228 (0.000)	1.084 (0.000)	1.838 (0.000)	1.391 (0.058)	1.228 (0.051)	2.323 (0.141)	1.380 (0.070)	1.218 (0.062)	2.204 (0.181)
Informer				1.214 (0.000)	1.072 (0.000)	1.782 (0.000)	1.391 (0.059)	1.229 (0.052)	2.315 (0.142)	1.398 (0.076)	1.234 (0.068)	2.252 (0.205)
Autoformer				1.348 (0.000)	1.190 (0.000)	2.060 (0.000)	1.450 (0.108)	1.280 (0.095)	2.444 (0.368)	1.442 (0.155)	1.273 (0.137)	2.438 (0.520)
Pyraformer				1.169 (0.000)	1.032 (0.000)	1.640 (0.000)	1.366 (0.057)	1.206 (0.050)	2.235 (0.134)	1.373 (0.071)	1.212 (0.063)	2.176 (0.186)
Transformer				1.170 (0.000)	1.034 (0.000)	1.631 (0.000)	1.378 (0.056)	1.217 (0.049)	2.275 (0.133)	1.357 (0.081)	1.198 (0.072)	2.130 (0.213)
BRITS				1.177 (0.000)	1.039 (0.000)	1.680 (0.000)	1.371 (0.061)	1.210 (0.054)	2.259 (0.147)	1.364 (0.076)	1.205 (0.068)	2.155 (0.198)
MRNN				1.070 (0.000)	0.945 (0.000)	1.417 (0.000)	1.250 (0.076)	1.104 (0.067)	1.900 (0.190)	1.379 (0.058)	1.218 (0.051)	2.216 (0.142)
GRUD				1.205 (0.000)	1.064 (0.000)	1.870 (0.000)	1.339 (0.061)	1.182 (0.054)	2.154 (0.145)	1.326 (0.074)	1.171 (0.065)	2.043 (0.192)
TimesNet				1.127 (0.000)	0.995 (0.000)	1.513 (0.000)	1.333 (0.054)	1.177 (0.048)	2.149 (0.125)	1.316 (0.066)	1.162 (0.058)	2.027 (0.163)
MICN	1.287 (0.000)	1.137 (0.000)	1.950 (0.000)	1.163 (0.000)	1.027 (0.000)	1.611 (0.000)	1.305 (0.078)	1.152 (0.069)	2.049 (0.189)	1.379 (0.070)	1.218 (0.062)	2.185 (0.195)
SCINet				1.174 (0.000)	1.037 (0.000)	1.654 (0.000)	1.411 (0.055)	1.246 (0.049)	2.390 (0.134)	1.375 (0.080)	1.214 (0.070)	2.203 (0.209)
StemGNN				1.139 (0.000)	1.006 (0.000)	1.561 (0.000)	1.392 (0.057)	1.229 (0.051)	2.311 (0.139)	1.410 (0.078)	1.245 (0.069)	2.285 (0.212)
FreTS				1.207 (0.000)	1.066 (0.000)	1.764 (0.000)	1.406 (0.056)	1.242 (0.050)	2.361 (0.136)	1.397 (0.082)	1.233 (0.073)	2.252 (0.219)
Koopa				1.227 (0.000)	1.084 (0.000)	1.804 (0.000)	1.384 (0.064)	1.222 (0.056)	2.304 (0.153)	1.419 (0.062)	1.253 (0.055)	2.315 (0.169)
DLinear				1.216 (0.000)	1.074 (0.000)	1.808 (0.000)	1.380 (0.056)	1.219 (0.049)	2.283 (0.132)	1.397 (0.076)	1.234 (0.067)	2.254 (0.200)
FiLM				1.247 (0.000)	1.101 (0.000)	1.880 (0.000)	1.379 (0.057)	1.218 (0.051)	2.281 (0.137)	1.442 (0.048)	1.273 (0.042)	2.391 (0.134)
CSDI				1.136 (0.000)	1.003 (0.000)	1.550 (0.000)	1.373 (0.050)	1.212 (0.044)	2.256 (0.114)	1.393 (0.070)	1.230 (0.062)	2.245 (0.184)
US-GAN				1.155 (0.000)	1.019 (0.000)	1.691 (0.000)	1.299 (0.040)	1.147 (0.036)	2.022 (0.103)	1.283 (0.055)	1.133 (0.048)	1.944 (0.144)
GP-VAE				1.178 (0.000)	1.040 (0.000)	1.721 (0.000)	1.336 (0.066)	1.180 (0.058)	2.179 (0.156)	1.340 (0.076)	1.183 (0.068)	2.098 (0.203)
Mean				1.431 (0.000)	1.264 (0.000)	2.304 (0.000)	1.512 (0.120)	1.335 (0.106)	2.625 (0.351)	1.627 (0.072)	1.437 (0.064)	3.010 (0.233)
Median				1.517 (0.086)	1.340 (0.076)	2.572 (0.269)	1.531 (0.128)	1.352 (0.113)	2.705 (0.382)	1.671 (0.069)	1.476 (0.061)	3.142 (0.213)
LOCF				1.446 (0.123)	1.277 (0.109)	2.416 (0.312)	1.477 (0.134)	1.304 (0.118)	2.552 (0.388)	1.571 (0.158)	1.388 (0.139)	2.821 (0.501)
Linear				1.393 (0.140)	1.230 (0.124)	2.281 (0.357)	1.453 (0.127)	1.283 (0.112)	2.486 (0.362)	1.525 (0.163)	1.347 (0.144)	2.670 (0.516)

Table 21: Performance comparison for the regression task on PeMS datasets with 50% point missing, 50% block missing and 50% subsequence missing.

	PeMS (point 50%)											
	MAE wt XGB	MRE wt XGB	MSE wt XGB	MAE w XGB	MRE w XGB	MSE w XGB	MAE w RNN	MRE w RNN	MSE w RNN	MAE w Transformer	MRE w Transformer	MSE w Transformer
iTransformer				0.546 (0.000)	0.439 (0.000)	0.639 (0.000)	0.440 (0.020)	0.354 (0.016)	0.423 (0.033)	0.432 (0.012)	0.347 (0.010)	0.410 (0.020)
SAITS				0.538 (0.000)	0.432 (0.000)	0.621 (0.000)	0.428 (0.015)	0.344 (0.012)	0.400 (0.020)	0.414 (0.006)	0.333 (0.005)	0.380 (0.007)
Nonstationary				0.538 (0.000)	0.433 (0.000)	0.581 (0.000)	0.447 (0.027)	0.359 (0.022)	0.444 (0.040)	0.422 (0.024)	0.340 (0.019)	0.400 (0.036)
ETSformer				0.545 (0.000)	0.438 (0.000)	0.608 (0.000)	0.433 (0.018)	0.348 (0.015)	0.405 (0.025)	0.416 (0.017)	0.335 (0.013)	0.388 (0.031)
PatchTST				0.553 (0.000)	0.445 (0.000)	0.640 (0.000)	0.431 (0.013)	0.347 (0.010)	0.411 (0.021)	0.442 (0.013)	0.355 (0.011)	0.423 (0.012)
Crossformer				0.578 (0.000)	0.465 (0.000)	0.693 (0.000)	0.427 (0.013)	0.344 (0.011)	0.401 (0.018)	0.423 (0.007)	0.340 (0.005)	0.395 (0.016)
Informer				0.546 (0.000)	0.439 (0.000)	0.625 (0.000)	0.437 (0.015)	0.352 (0.012)	0.411 (0.021)	0.420 (0.018)	0.338 (0.014)	0.396 (0.025)
Autoformer				0.630 (0.000)	0.507 (0.000)	0.796 (0.000)	0.495 (0.007)	0.399 (0.006)	0.488 (0.020)	0.485 (0.009)	0.390 (0.007)	0.470 (0.018)
Pyraformer				0.536 (0.000)	0.431 (0.000)	0.611 (0.000)	0.430 (0.017)	0.346 (0.014)	0.403 (0.024)	0.427 (0.014)	0.344 (0.011)	0.412 (0.016)
Transformer				0.542 (0.000)	0.436 (0.000)	0.620 (0.000)	0.427 (0.017)	0.344 (0.014)	0.399 (0.021)	0.418 (0.013)	0.336 (0.010)	0.392 (0.014)
BRITS				0.565 (0.000)	0.455 (0.000)	0.685 (0.000)	0.432 (0.015)	0.347 (0.012)	0.402 (0.018)	0.434 (0.014)	0.349 (0.011)	0.411 (0.022)
MRNN				0.580 (0.000)	0.467 (0.000)	0.692 (0.000)	0.456 (0.020)	0.367 (0.016)	0.436 (0.030)	0.442 (0.017)	0.356 (0.013)	0.415 (0.023)
GRUD				0.534 (0.000)	0.429 (0.000)	0.620 (0.000)	0.451 (0.013)	0.363 (0.011)	0.429 (0.021)	0.434 (0.008)	0.349 (0.007)	0.409 (0.013)
TimesNet				0.541 (0.000)	0.435 (0.000)	0.614 (0.000)	0.441 (0.016)	0.355 (0.013)	0.415 (0.020)	0.440 (0.021)	0.354 (0.017)	0.418 (0.033)
MICN				0.591 (0.000)	0.475 (0.000)	0.685 (0.000)	0.505 (0.017)	0.406 (0.013)	0.521 (0.031)	0.477 (0.011)	0.384 (0.009)	0.469 (0.021)
SCINet	0.591 (0.000)	0.475 (0.000)	0.692 (0.000)	0.547 (0.000)	0.440 (0.000)	0.624 (0.000)	0.474 (0.014)	0.382 (0.011)	0.445 (0.019)	0.482 (0.028)	0.387 (0.022)	0.478 (0.036)
StemGNN				0.548 (0.000)	0.441 (0.000)	0.642 (0.000)	0.462 (0.015)	0.372 (0.012)	0.453 (0.024)	0.448 (0.011)	0.360 (0.008)	0.433 (0.020)
FreTS				0.558 (0.000)	0.449 (0.000)	0.623 (0.000)	0.447 (0.012)	0.360 (0.010)	0.421 (0.020)	0.437 (0.010)	0.352 (0.008)	0.407 (0.010)
Koopa				0.574 (0.000)	0.461 (0.000)	0.648 (0.000)	0.485 (0.012)	0.390 (0.009)	0.459 (0.018)	0.472 (0.021)	0.379 (0.017)	0.449 (0.032)
DLinear				0.551 (0.000)	0.443 (0.000)	0.610 (0.000)	0.427 (0.015)	0.344 (0.012)	0.401 (0.021)	0.430 (0.014)	0.346 (0.011)	0.414 (0.024)
FiLM				0.597 (0.000)	0.480 (0.000)	0.688 (0.000)	0.443 (0.018)	0.356 (0.015)	0.408 (0.030)	0.441 (0.015)	0.355 (0.012)	0.394 (0.016)
CSDI				0.531 (0.000)	0.427 (0.000)	0.604 (0.000)	0.428 (0.023)	0.345 (0.018)	0.417 (0.033)	0.428 (0.010)	0.344 (0.008)	0.416 (0.016)
US-GAN				0.531 (0.000)	0.427 (0.000)	0.590 (0.000)	0.428 (0.015)	0.344 (0.012)	0.399 (0.021)	0.426 (0.012)	0.343 (0.009)	0.408 (0.023)
GP-VAE				0.547 (0.000)	0.440 (0.000)	0.636 (0.000)	0.433 (0.023)	0.348 (0.019)	0.408 (0.033)	0.439 (0.014)	0.353 (0.011)	0.424 (0.018)
Mean				0.607 (0.000)	0.488 (0.000)	0.723 (0.000)	0.428 (0.027)	0.344 (0.022)	0.409 (0.037)	0.400 (0.012)	0.322 (0.010)	0.389 (0.018)
Median				0.606 (0.001)	0.488 (0.001)	0.720 (0.003)	0.422 (0.023)	0.340 (0.019)	0.401 (0.032)	0.397 (0.011)	0.320 (0.009)	0.380 (0.018)
LOCF				0.604 (0.003)	0.486 (0.002)	0.709 (0.017)	0.436 (0.028)	0.351 (0.022)	0.422 (0.040)	0.413 (0.026)	0.332 (0.021)	0.391 (0.028)
Linear				0.592 (0.022)	0.476 (0.017)	0.688 (0.039)	0.444 (0.030)	0.357 (0.025)	0.431 (0.043)	0.419 (0.028)	0.337 (0.023)	0.397 (0.031)
	PeMS (block 50%)											
	MAE wt XGB	MRE wt XGB	MSE wt XGB	MAE w XGB	MRE w XGB	MSE w XGB	MAE w RNN	MRE w RNN	MSE w RNN	MAE w Transformer	MRE w Transformer	MSE w Transformer
iTransformer				0.606 (0.000)	0.487 (0.000)	0.800 (0.000)	0.434 (0.018)	0.349 (0.014)	0.432 (0.024)	0.419 (0.022)	0.337 (0.018)	0.415 (0.032)
SAITS				0.544 (0.000)	0.437 (0.000)	0.638 (0.000)	0.407 (0.021)	0.327 (0.017)	0.383 (0.026)	0.408 (0.011)	0.328 (0.008)	0.386 (0.019)
Nonstationary				0.604 (0.000)	0.486 (0.000)	0.711 (0.000)	0.444 (0.011)	0.357 (0.009)	0.434 (0.020)	0.405 (0.024)	0.325 (0.019)	0.375 (0.033)
ETSformer				0.555 (0.000)	0.447 (0.000)	0.639 (0.000)	0.447 (0.011)	0.359 (0.009)	0.432 (0.015)	0.422 (0.012)	0.339 (0.010)	0.392 (0.019)
PatchTST				0.548 (0.000)	0.441 (0.000)	0.625 (0.000)	0.416 (0.014)	0.335 (0.012)	0.397 (0.019)	0.431 (0.013)	0.347 (0.011)	0.421 (0.013)
Crossformer				0.544 (0.000)	0.438 (0.000)	0.614 (0.000)	0.405 (0.019)	0.326 (0.016)	0.379 (0.027)	0.409 (0.009)	0.329 (0.007)	0.379 (0.016)
Informer				0.547 (0.000)	0.440 (0.000)	0.622 (0.000)	0.416 (0.013)	0.335 (0.011)	0.399 (0.016)	0.416 (0.013)	0.334 (0.011)	0.394 (0.021)
Autoformer				0.584 (0.000)	0.470 (0.000)	0.683 (0.000)	0.487 (0.016)	0.392 (0.013)	0.472 (0.026)	0.477 (0.024)	0.384 (0.019)	0.454 (0.037)
Pyraformer				0.540 (0.000)	0.434 (0.000)	0.616 (0.000)	0.399 (0.019)	0.321 (0.015)	0.377 (0.025)	0.411 (0.015)	0.331 (0.012)	0.394 (0.022)
Transformer				0.560 (0.000)	0.451 (0.000)	0.655 (0.000)	0.413 (0.013)	0.332 (0.010)	0.395 (0.017)	0.407 (0.019)	0.327 (0.015)	0.386 (0.027)
BRITS				0.637 (0.000)	0.512 (0.000)	1.022 (0.000)	0.415 (0.015)	0.334 (0.012)	0.385 (0.018)	0.429 (0.014)	0.345 (0.012)	0.415 (0.018)
MRNN				0.545 (0.000)	0.439 (0.000)	0.588 (0.000)	0.444 (0.022)	0.357 (0.018)	0.406 (0.031)	0.455 (0.026)	0.366 (0.021)	0.428 (0.036)
GRUD				0.539 (0.000)	0.433 (0.000)	0.587 (0.000)	0.419 (0.016)	0.337 (0.013)	0.397 (0.021)	0.418 (0.009)	0.336 (0.007)	0.395 (0.012)
TimesNet				0.547 (0.000)	0.441 (0.000)	0.617 (0.000)	0.416 (0.018)	0.335 (0.015)	0.387 (0.027)	0.416 (0.018)	0.334 (0.014)	0.393 (0.032)
MICN				0.646 (0.000)	0.520 (0.000)	0.828 (0.000)	0.499 (0.018)	0.401 (0.015)	0.541 (0.031)	0.442 (0.020)	0.356 (0.016)	0.441 (0.029)
SCINet	0.624 (0.000)	0.502 (0.000)	0.780 (0.000)	0.627 (0.000)	0.504 (0.000)	0.807 (0.000)	0.472 (0.007)	0.380 (0.005)	0.455 (0.013)	0.485 (0.028)	0.390 (0.022)	0.485 (0.040)
StemGNN				0.553 (0.000)	0.445 (0.000)	0.624 (0.000)	0.442 (0.016)	0.356 (0.013)	0.429 (0.028)	0.447 (0.016)	0.359 (0.013)	0.441 (0.018)
FreTS				0.553 (0.000)	0.445 (0.000)	0.603 (0.000)	0.426 (0.016)	0.342 (0.013)	0.403 (0.021)	0.427 (0.014)	0.343 (0.011)	0.401 (0.019)
Koopa				0.594 (0.000)	0.478 (0.000)	0.815 (0.000)	0.440 (0.016)	0.354 (0.013)	0.410 (0.020)	0.448 (0.014)	0.360 (0.011)	0.426 (0.022)
DLinear				0.563 (0.000)	0.453 (0.000)	0.682 (0.000)	0.433 (0.010)	0.349 (0.008)	0.411 (0.010)	0.441 (0.009)	0.354 (0.007)	0.426 (0.013)
FiLM				0.577 (0.000)	0.464 (0.000)	0.664 (0.000)	0.426 (0.006)	0.343 (0.005)	0.392 (0.008)	0.451 (0.026)	0.363 (0.021)	0.432 (0.031)
CSDI				0.555 (0.000)	0.447 (0.000)	0.650 (0.000)	0.430 (0.011)	0.346 (0.009)	0.444 (0.018)	0.421 (0.006)	0.339 (0.005)	0.420 (0.011)
US-GAN				0.603 (0.000)	0.485 (0.000)	0.796 (0.000)	0.416 (0.015)	0.335 (0.012)	0.383 (0.017)	0.435 (0.012)	0.350 (0.009)	0.429 (0.015)
GP-VAE				0.539 (0.000)	0.433 (0.000)	0.617 (0.000)	0.408 (0.018)	0.328 (0.015)	0.379 (0.023)	0.421 (0.006)	0.339 (0.005)	0.402 (0.007)
Mean				0.603 (0.000)	0.485 (0.000)	0.721 (0.000)	0.405 (0.015)	0.326 (0.013)	0.333 (0.020)	0.399 (0.008)	0.321 (0.006)	0.349 (0.025)
Median				0.616 (0.013)	0.496 (0.011)	0.747 (0.026)	0.408 (0.012)	0.328 (0.010)	0.335 (0.015)	0.395 (0.011)	0.317 (0.009)	0.340 (0.024)
LOCF				0.613 (0.012)	0.493 (0.010)	0.737 (0.026)	0.441 (0.049)	0.354 (0.039)	0.393 (0.084)	0.433 (0.056)	0.348 (0.045)	0.399 (0.087)
Linear				0.611 (0.011)	0.492 (0.009)	0.732 (0.024)	0.443 (0.043)	0.356 (0.035)	0.403 (0.075)	0.435 (0.049)	0.350 (0.040)	0.403 (0.076)
	PeMS (subsequence 50%)											
	MAE wt XGB	MRE wt XGB	MSE wt XGB	MAE w XGB	MRE w XGB	MSE w XGB	MAE w RNN	MRE w RNN	MSE w RNN	MAE w Transformer	MRE w Transformer	MSE w Transformer
iTransformer				0.608 (0.000)	0.489 (0.000)	0.766 (0.000)	0.442 (0.007)	0.356 (0.006)	0.420 (0.010)	0.376 (0.008)	0.303 (0.007)	0.341 (0.014)
SAITS				0.543 (0.000)	0.437 (0.000)	0.615 (0.000)	0.423 (0.021)	0.341 (0.017)	0.412 (0.028)	0.404 (0.011)	0.325 (0.009)	0.384 (0.016)
Nonstationary				0.636 (0.000)	0.511 (0.000)	0.782 (0.000)	0.586 (0.029)	0.471 (0.023)	0.713 (0.063)	0.382 (0.020)	0.307 (0.016)	0.331 (0.027)
ETSformer				0.603 (0.000)	0.485 (0.000)	0.729 (0.000)	0.479 (0.012)	0.385 (0.010)	0.470 (0.017)	0.489 (0.015)	0.394 (0.012)	0.499 (0.028)
PatchTST				0.550 (0.000)	0.443 (0.000)	0.632 (0.000)	0.432 (0.011)	0.347 (0.009)	0.412 (0.015)	0.440 (0.014)	0.354 (0.011)	0.426 (0.020)
Crossformer				0.546 (0.000)	0.439 (0.000)	0.624 (0.000)	0.425 (0.016)	0.342 (0.013)	0.406 (0.024)	0.421 (0.005)	0.339 (0.004)	0.405 (0.008)
Informer				0.533 (0.000)	0.429 (0.000)	0.606 (0.000)	0.430 (0.017)	0.346 (0.014)	0.421 (0.022)	0.416 (0.005)	0.334 (0.004)	0.396 (0.005)
Autoformer				0.608 (0.000)	0.489 (0.000)	0.743 (0.000)	0.486 (0.004)	0.391 (0.003)	0.478 (0.008)	0.463 (0.013)	0.372 (0.010)	0.450 (0.022)
Pyraformer				0.550 (0.000)	0.443 (0.000)	0.629 (0.000)	0.417 (0.013)	0.335 (0.011)	0.401 (0.018)	0.417 (0.013)	0.335 (0.011)	0.404 (0.015)
Transformer				0.555 (0.000)	0.446 (0.000)	0.643 (0.000)	0.420 (0.016)	0.338 (0.013)	0.410 (0.022)	0.402 (0.017)	0.324 (0.014)	0.384 (0.021)
BRITS				0.567 (0.000)	0.456 (0.000)	0.679 (0.000)	0.436 (0.019)	0.351 (0.015)	0.415 (0.027)	0.434 (0.008)	0.349 (0.006)	0.416 (0.016)
MRNN				0.566 (0.000)	0.455 (0.000)	0.629 (0.000)	0.469 (0.009)	0.377 (0.008)	0.441 (0.013)	0.420 (0.021)	0.338 (0.017)	0.383 (0.028)
GRUD				0.528 (0.000)	0.424 (0.000)	0.584 (0.000)	0.421 (0.013)	0.339 (0.010)	0.399 (0.015)	0.417 (0.007)	0.336 (0.006)	0.399 (0.011)
TimesNet				0.534 (0.000)	0.430 (0.000)	0.591 (0.000)	0.432 (0.018)	0.347 (0.015)	0.408 (0.022)	0.424 (0.009)	0.341 (0.008)	0.406 (0.010)
MICN				0.658 (0.000)	0.529 (0.000)	0.898 (0.000)	0.522 (0.017)	0.420 (0.013)	0.609 (0.034)	0.459 (0.039)	0.369 (0.031)	0.481 (0.059)
SCINet	0.662 (0.000)	0.533 (0.000)	0.873 (0.000)	0.581 (0.000)	0.467 (0.000)	0.681 (0.000)	0.493 (0.010)	0.397 (0.008)	0.519 (0.019)	0.446 (0.013)	0.358 (0.010)	0.419 (0.017)
StemGNN				0.562 (0.000)	0.452 (0.000)	0.647 (0.000)	0.462 (0.008)	0.371 (0.006)	0.456 (0.013)	0.437 (0.017)	0.351 (0.014)	0.422 (0.028)
FreTS				0.563 (0.000)	0.453 (0.000)	0.639 (0.000)	0.431 (0.016)	0.347 (0.013)	0.419 (0.023)	0.418 (0.009)	0.336 (0.007)	0.399 (0.010)
Koopa				0.556 (0.000)	0.447 (0.000)	0.637 (0.000)	0.449 (0.004)	0.361 (0.003)	0.429 (0.008)	0.441 (0.013)	0.355 (0.011)	0.418 (0.021)
DLinear				0.551 (0.000)	0.443 (0.000)	0.623 (0.000)	0.451 (0.019)	0.363 (0.015)	0.430 (0.023)	0.439 (0.013)	0.353 (0.011)	0.426 (0.020)
FiLM				0.610 (0.000)	0.491 (0.000)	0.747 (0.000)	0.520 (0.010)	0.418 (0.008)	0.615 (0.024)	0.423 (0.013)	0.341 (0.011)	0.405 (0.020)
CSDI				0.552 (0.000)	0.444 (0.000)	0.639 (0.000)	0.447 (0.014)	0.359 (0.011)	0.472 (0.024)	0.409 (0.018)	0.329 (0.014)	0.399 (0.023)
US-GAN				0.551 (0.000)	0.444 (0.000)	0.622 (0.000)	0.429 (0.011)	0.345 (0.009)	0.399 (0.014)	0.409 (0.015)	0.329 (0.012)	0.382 (0.021)
GP-VAE				0.544 (0.000)	0.438 (0.000)	0.614 (0.000)	0.424 (0.012)	0.342 (0.009)	0.403 (0.015)	0.417 (0.021)	0.336 (0.017)	0.396 (0.029)
Mean				0.675 (0.000)	0.543 (0.000)	0.901 (0.000)	0.457 (0.018)	0.367 (0.014)	0.418 (0.029)	0.454 (0.017)	0.365 (0.014)	0.389 (0.021)
Median				0.715 (0.039)	0.575 (0.032)	1.078 (0.177)	0.534 (0.080)	0.429 (0.064)	0.578 (0.164)	0.438 (0.021)	0.353 (0.017)	0.364 (0.031)
LOCF				0.709 (0.033)	0.571 (0.026)	1.033 (0.158)	0.547 (0.068)	0.440 (0.055)	0.625 (0.150)	0.434 (0.018)	0.349 (0.015)	0.382 (0.036)
Linear				0.702 (0.031)	0.565 (0.025)	1.001 (0.148)	0.596 (0.104)	0.480 (0.083)	0.701 (0.187)	0.427 (0.023)	0.343 (0.018)	0.372 (0.038)

Table 22: Performance comparison for the forecasting task on ETT_h1 datasets with 50% block missing and 50% subsequence missing.

	ETT_h1 (block_50%)											
	MAE wt XGB	**MRE wt XGB**	**MSE wt XGB**	**MAE w XGB**	**MRE w XGB**	**MSE w XGB**	**MAE w RNN**	**MRE w RNN**	**MSE w RNN**	**MAE w Transformer**	**MRE w Transformer**	**MSE w Transformer**
iTransformer				1.137 (0.000)	1.006 (0.000)	1.488 (0.000)	1.240 (0.073)	1.097 (0.065)	1.897 (0.156)	0.347 (0.323)	0.307 (0.286)	0.267 (0.430)
SAITS				1.132 (0.000)	1.001 (0.000)	1.503 (0.000)	1.224 (0.079)	1.083 (0.070)	1.861 (0.172)	0.351 (0.335)	0.311 (0.297)	0.275 (0.452)
Nonstationary				1.212 (0.000)	1.072 (0.000)	1.702 (0.000)	1.335 (0.076)	1.180 (0.067)	2.163 (0.183)	0.366 (0.365)	0.324 (0.323)	0.309 (0.512)
ETSformer				1.011 (0.000)	0.894 (0.000)	1.339 (0.000)	1.149 (0.159)	1.017 (0.141)	1.695 (0.365)	0.304 (0.299)	0.269 (0.264)	0.220 (0.356)
PatchTST				1.150 (0.000)	1.017 (0.000)	1.591 (0.000)	1.194 (0.091)	1.056 (0.081)	1.768 (0.191)	0.317 (0.345)	0.280 (0.305)	0.258 (0.443)
Crossformer				1.099 (0.000)	0.972 (0.000)	1.482 (0.000)	1.192 (0.079)	1.055 (0.069)	1.758 (0.165)	0.325 (0.347)	0.287 (0.307)	0.264 (0.454)
Informer				1.163 (0.000)	1.028 (0.000)	1.672 (0.000)	1.215 (0.080)	1.075 (0.071)	1.813 (0.169)	0.337 (0.366)	0.298 (0.324)	0.284 (0.493)
Autoformer				1.212 (0.000)	1.072 (0.000)	1.812 (0.000)	1.127 (0.058)	0.997 (0.051)	1.500 (0.116)	0.395 (0.153)	0.349 (0.135)	0.253 (0.141)
Pyraformer				1.021 (0.000)	0.903 (0.000)	1.221 (0.000)	1.220 (0.074)	1.079 (0.065)	1.827 (0.158)	0.352 (0.353)	0.311 (0.312)	0.287 (0.482)
Transformer				1.112 (0.000)	0.983 (0.000)	1.459 (0.000)	1.152 (0.093)	1.019 (0.083)	1.688 (0.194)	0.328 (0.346)	0.290 (0.306)	0.267 (0.456)
BRITS				0.788 (0.000)	0.697 (0.000)	0.814 (0.000)	0.975 (0.022)	0.862 (0.020)	1.164 (0.081)	0.441 (0.385)	0.390 (0.341)	0.385 (0.480)
MRNN				0.750 (0.000)	0.663 (0.000)	0.802 (0.000)	1.050 (0.076)	0.929 (0.067)	1.431 (0.156)	0.426 (0.325)	0.377 (0.287)	0.339 (0.370)
GRUD				0.989 (0.000)	0.875 (0.000)	1.165 (0.000)	1.199 (0.062)	1.060 (0.054)	1.728 (0.151)	0.362 (0.403)	0.320 (0.356)	0.325 (0.562)
TimesNet				1.043 (0.000)	0.922 (0.000)	1.369 (0.000)	1.146 (0.107)	1.014 (0.095)	1.667 (0.222)	0.312 (0.333)	0.276 (0.294)	0.244 (0.417)
MICN	1.231 (0.000)	1.089 (0.000)	1.766 (0.000)	1.096 (0.000)	0.969 (0.000)	1.459 (0.000)	1.187 (0.115)	1.050 (0.102)	1.772 (0.252)	0.288 (0.331)	0.255 (0.293)	0.225 (0.398)
SCINet				1.125 (0.000)	0.995 (0.000)	1.520 (0.000)	1.186 (0.083)	1.049 (0.073)	1.759 (0.174)	0.325 (0.351)	0.287 (0.310)	0.267 (0.460)
StemGNN				1.094 (0.000)	0.967 (0.000)	1.421 (0.000)	1.254 (0.069)	1.109 (0.061)	1.913 (0.143)	0.344 (0.340)	0.304 (0.301)	0.276 (0.460)
FreTS				1.126 (0.000)	0.996 (0.000)	1.468 (0.000)	1.216 (0.083)	1.075 (0.073)	1.809 (0.179)	0.326 (0.338)	0.288 (0.299)	0.261 (0.442)
Koopa				1.284 (0.000)	1.136 (0.000)	1.990 (0.000)	1.202 (0.076)	1.063 (0.067)	1.784 (0.157)	0.343 (0.326)	0.303 (0.288)	0.268 (0.432)
DLinear				1.080 (0.000)	0.955 (0.000)	1.391 (0.000)	1.194 (0.093)	1.056 (0.082)	1.774 (0.196)	0.309 (0.334)	0.273 (0.295)	0.243 (0.417)
FiLM				1.271 (0.000)	1.124 (0.000)	1.877 (0.000)	1.269 (0.058)	1.122 (0.052)	1.988 (0.117)	0.364 (0.355)	0.322 (0.314)	0.301 (0.493)
CSDI				1.191 (0.000)	1.054 (0.000)	1.669 (0.000)	1.222 (0.071)	1.081 (0.062)	1.861 (0.157)	0.522 (0.396)	0.462 (0.350)	0.500 (0.545)
US-GAN				0.871 (0.000)	0.770 (0.000)	0.953 (0.000)	1.122 (0.033)	0.992 (0.029)	1.558 (0.067)	0.161 (0.053)	0.142 (0.047)	0.044 (0.025)
GP-VAE				0.942 (0.000)	0.833 (0.000)	1.131 (0.000)	1.041 (0.096)	0.921 (0.085)	1.393 (0.182)	0.334 (0.319)	0.295 (0.282)	0.253 (0.405)
Mean				1.289 (0.000)	1.140 (0.000)	1.883 (0.000)	1.450 (0.124)	1.283 (0.110)	2.538 (0.343)	0.388 (0.325)	0.344 (0.288)	0.295 (0.444)
Median				1.418 (0.129)	1.254 (0.114)	2.294 (0.411)	1.487 (0.141)	1.315 (0.125)	2.682 (0.417)	0.438 (0.339)	0.387 (0.299)	0.355 (0.455)
LOCF				1.390 (0.112)	1.230 (0.099)	2.264 (0.338)	1.415 (0.156)	1.252 (0.138)	2.449 (0.478)	0.430 (0.328)	0.381 (0.290)	0.345 (0.448)
Linear				1.353 (0.116)	1.197 (0.103)	2.152 (0.352)	1.392 (0.145)	1.231 (0.128)	2.372 (0.440)	0.431 (0.331)	0.381 (0.293)	0.347 (0.463)
	ETT_h1 (subseq_50%)											
	MAE wt XGB	**MRE wt XGB**	**MSE wt XGB**	**MAE w XGB**	**MRE w XGB**	**MSE w XGB**	**MAE w RNN**	**MRE w RNN**	**MSE w RNN**	**MAE w Transformer**	**MRE w Transformer**	**MSE w Transformer**
iTransformer				1.138 (0.000)	1.006 (0.000)	1.702 (0.000)	1.314 (0.053)	1.162 (0.046)	2.163 (0.116)	0.340 (0.355)	0.301 (0.314)	0.284 (0.476)
SAITS				1.108 (0.000)	0.980 (0.000)	1.583 (0.000)	1.293 (0.043)	1.143 (0.038)	2.093 (0.075)	0.336 (0.375)	0.297 (0.332)	0.296 (0.518)
Nonstationary				1.228 (0.000)	1.086 (0.000)	1.868 (0.000)	1.369 (0.052)	1.211 (0.046)	2.279 (0.118)	0.341 (0.433)	0.301 (0.383)	0.342 (0.630)
ETSformer				1.073 (0.000)	0.949 (0.000)	1.489 (0.000)	1.282 (0.047)	1.133 (0.042)	2.033 (0.091)	0.335 (0.377)	0.296 (0.334)	0.297 (0.527)
PatchTST				1.301 (0.000)	1.151 (0.000)	2.215 (0.000)	1.318 (0.049)	1.166 (0.043)	2.172 (0.101)	0.345 (0.374)	0.305 (0.331)	0.303 (0.521)
Crossformer				1.097 (0.000)	0.971 (0.000)	1.519 (0.000)	1.309 (0.048)	1.158 (0.043)	2.147 (0.095)	0.342 (0.378)	0.303 (0.335)	0.308 (0.530)
Informer				1.187 (0.000)	1.050 (0.000)	1.749 (0.000)	1.295 (0.050)	1.145 (0.044)	2.096 (0.093)	0.329 (0.347)	0.291 (0.306)	0.271 (0.457)
Autoformer				1.359 (0.000)	1.202 (0.000)	2.200 (0.000)	1.264 (0.041)	1.118 (0.036)	1.993 (0.085)	0.317 (0.352)	0.281 (0.312)	0.264 (0.460)
Pyraformer				1.089 (0.000)	0.963 (0.000)	1.588 (0.000)	1.278 (0.049)	1.130 (0.044)	2.045 (0.092)	0.337 (0.365)	0.298 (0.323)	0.291 (0.499)
Transformer				1.033 (0.000)	0.914 (0.000)	1.300 (0.000)	1.298 (0.046)	1.148 (0.040)	2.098 (0.083)	0.346 (0.353)	0.306 (0.312)	0.292 (0.482)
BRITS				0.991 (0.000)	0.876 (0.000)	1.278 (0.000)	1.143 (0.068)	1.010 (0.060)	1.695 (0.108)	0.314 (0.334)	0.278 (0.295)	0.261 (0.446)
MRNN				1.026 (0.000)	0.907 (0.000)	1.423 (0.000)	1.206 (0.050)	1.067 (0.044)	1.837 (0.110)	0.319 (0.351)	0.282 (0.310)	0.258 (0.446)
GRUD				1.037 (0.000)	0.917 (0.000)	1.328 (0.000)	1.239 (0.052)	1.096 (0.046)	1.927 (0.104)	0.350 (0.357)	0.309 (0.316)	0.298 (0.502)
TimesNet				1.030 (0.000)	0.911 (0.000)	1.376 (0.000)	1.290 (0.052)	1.141 (0.046)	2.109 (0.105)	0.337 (0.372)	0.298 (0.330)	0.299 (0.517)
MICN	1.398 (0.000)	1.237 (0.000)	2.308 (0.000)	1.121 (0.000)	0.992 (0.000)	1.563 (0.000)	1.302 (0.046)	1.151 (0.041)	2.106 (0.103)	0.338 (0.386)	0.298 (0.342)	0.304 (0.535)
SCINet				1.129 (0.000)	0.998 (0.000)	1.581 (0.000)	1.325 (0.043)	1.172 (0.038)	2.184 (0.082)	0.374 (0.391)	0.331 (0.346)	0.339 (0.582)
StemGNN				1.201 (0.000)	1.063 (0.000)	1.741 (0.000)	1.289 (0.048)	1.140 (0.043)	2.079 (0.092)	0.357 (0.373)	0.316 (0.330)	0.316 (0.530)
FreTS				1.106 (0.000)	0.979 (0.000)	1.499 (0.000)	1.306 (0.049)	1.155 (0.043)	2.122 (0.098)	0.352 (0.379)	0.311 (0.335)	0.312 (0.533)
Koopa				1.282 (0.000)	1.134 (0.000)	2.098 (0.000)	1.302 (0.051)	1.151 (0.045)	2.118 (0.100)	0.341 (0.402)	0.301 (0.356)	0.323 (0.577)
DLinear				1.184 (0.000)	1.047 (0.000)	1.794 (0.000)	1.315 (0.049)	1.163 (0.043)	2.162 (0.101)	0.346 (0.382)	0.306 (0.338)	0.310 (0.533)
FiLM				1.393 (0.000)	1.232 (0.000)	2.318 (0.000)	1.306 (0.040)	1.155 (0.035)	2.130 (0.076)	0.343 (0.390)	0.303 (0.345)	0.307 (0.541)
CSDI				1.214 (0.000)	1.073 (0.000)	1.722 (0.000)	1.274 (0.048)	1.127 (0.042)	2.038 (0.086)	0.333 (0.394)	0.295 (0.349)	0.311 (0.551)
US-GAN				1.011 (0.000)	0.894 (0.000)	1.293 (0.000)	1.211 (0.062)	1.071 (0.055)	1.872 (0.107)	0.329 (0.350)	0.291 (0.310)	0.278 (0.474)
GP-VAE				1.110 (0.000)	0.982 (0.000)	1.722 (0.000)	1.246 (0.054)	1.102 (0.048)	1.968 (0.089)	0.360 (0.393)	0.319 (0.347)	0.334 (0.577)
Mean				1.239 (0.000)	1.096 (0.000)	1.847 (0.000)	1.540 (0.085)	1.362 (0.075)	2.815 (0.243)	0.375 (0.470)	0.332 (0.416)	0.394 (0.724)
Median				1.346 (0.107)	1.190 (0.095)	2.167 (0.320)	1.561 (0.097)	1.381 (0.086)	2.894 (0.298)	0.384 (0.465)	0.339 (0.411)	0.396 (0.722)
LOCF				1.327 (0.091)	1.174 (0.081)	2.152 (0.262)	1.474 (0.149)	1.303 (0.132)	2.610 (0.474)	0.373 (0.427)	0.330 (0.378)	0.355 (0.644)
Linear				1.297 (0.095)	1.147 (0.084)	2.051 (0.286)	1.436 (0.147)	1.270 (0.130)	2.503 (0.453)	0.364 (0.417)	0.322 (0.369)	0.341 (0.616)

Table 23: Performance comparison for the forecasting task on ETT_h1 datasets with 10% point missing and 50% point missing.

	ETT_h1 (point_10%)											
	MAE wt XGB	MRE wt XGB	MSE wt XGB	MAE w XGB	MRE w XGB	MSE w XGB	MAE w RNN	MRE w RNN	MSE w RNN	MAE w Transformer	MRE w Transformer	MSE w Transformer
iTransformer	1.137 (0.000)	1.005 (0.000)	1.488 (0.000)	1.114 (0.000)	0.985 (0.000)	1.453 (0.000)	1.266 (0.065)	1.119 (0.057)	2.002 (0.132)	0.376 (0.343)	0.332 (0.303)	0.305 (0.478)
SAITS				1.146 (0.000)	1.014 (0.000)	1.503 (0.000)	1.268 (0.065)	1.121 (0.057)	2.012 (0.131)	0.399 (0.332)	0.352 (0.294)	0.317 (0.469)
Nonstationary				1.137 (0.000)	1.006 (0.000)	1.508 (0.000)	1.287 (0.063)	1.138 (0.056)	2.059 (0.127)	0.383 (0.348)	0.339 (0.308)	0.315 (0.490)
ETSformer				1.117 (0.000)	0.988 (0.000)	1.459 (0.000)	1.266 (0.063)	1.120 (0.056)	2.002 (0.128)	0.398 (0.332)	0.352 (0.294)	0.317 (0.468)
PatchTST				1.151 (0.000)	1.018 (0.000)	1.558 (0.000)	1.272 (0.062)	1.125 (0.055)	2.022 (0.125)	0.385 (0.337)	0.340 (0.298)	0.309 (0.473)
Crossformer				1.130 (0.000)	0.999 (0.000)	1.494 (0.000)	1.270 (0.063)	1.123 (0.056)	2.016 (0.127)	0.390 (0.335)	0.345 (0.296)	0.312 (0.470)
Informer				1.089 (0.000)	0.963 (0.000)	1.396 (0.000)	1.267 (0.064)	1.121 (0.057)	2.008 (0.129)	0.386 (0.341)	0.342 (0.301)	0.312 (0.474)
Autoformer				1.121 (0.000)	0.991 (0.000)	1.467 (0.000)	1.270 (0.062)	1.123 (0.055)	2.014 (0.125)	0.395 (0.334)	0.349 (0.295)	0.318 (0.470)
Pyraformer				1.104 (0.000)	0.977 (0.000)	1.439 (0.000)	1.271 (0.063)	1.124 (0.055)	2.018 (0.126)	0.390 (0.338)	0.345 (0.299)	0.314 (0.474)
Transformer				1.092 (0.000)	0.966 (0.000)	1.368 (0.000)	1.268 (0.063)	1.121 (0.056)	2.009 (0.127)	0.397 (0.334)	0.351 (0.295)	0.318 (0.469)
BRITS				1.063 (0.000)	0.940 (0.000)	1.299 (0.000)	1.266 (0.064)	1.119 (0.056)	2.008 (0.129)	0.406 (0.329)	0.359 (0.291)	0.322 (0.466)
MRNN				1.051 (0.000)	0.930 (0.000)	1.279 (0.000)	1.228 (0.071)	1.086 (0.063)	1.894 (0.146)	0.394 (0.334)	0.348 (0.295)	0.312 (0.473)
GRUD				1.131 (0.000)	1.001 (0.000)	1.467 (0.000)	1.260 (0.064)	1.114 (0.056)	1.983 (0.130)	0.388 (0.339)	0.344 (0.300)	0.312 (0.475)
TimesNet				1.111 (0.000)	0.983 (0.000)	1.425 (0.000)	1.250 (0.063)	1.105 (0.056)	1.956 (0.125)	0.396 (0.334)	0.350 (0.295)	0.317 (0.472)
MICN				1.131 (0.000)	1.000 (0.000)	1.509 (0.000)	1.266 (0.065)	1.120 (0.057)	2.000 (0.132)	0.400 (0.332)	0.353 (0.294)	0.318 (0.472)
SCINet				1.139 (0.000)	1.007 (0.000)	1.513 (0.000)	1.269 (0.063)	1.123 (0.056)	2.016 (0.127)	0.387 (0.335)	0.342 (0.297)	0.310 (0.471)
StemGNN				1.122 (0.000)	0.992 (0.000)	1.507 (0.000)	1.269 (0.064)	1.122 (0.056)	2.013 (0.129)	0.394 (0.332)	0.349 (0.294)	0.314 (0.470)
FreTS				1.135 (0.000)	1.004 (0.000)	1.507 (0.000)	1.274 (0.063)	1.127 (0.055)	2.030 (0.127)	0.385 (0.338)	0.341 (0.299)	0.310 (0.474)
Koopa				1.165 (0.000)	1.030 (0.000)	1.581 (0.000)	1.263 (0.064)	1.117 (0.057)	1.991 (0.129)	0.376 (0.344)	0.333 (0.304)	0.306 (0.479)
DLinear				1.135 (0.000)	1.004 (0.000)	1.504 (0.000)	1.272 (0.062)	1.125 (0.055)	2.021 (0.126)	0.394 (0.332)	0.348 (0.293)	0.313 (0.468)
FiLM				1.147 (0.000)	1.014 (0.000)	1.589 (0.000)	1.269 (0.061)	1.122 (0.054)	2.009 (0.122)	0.387 (0.355)	0.342 (0.314)	0.321 (0.507)
CSDI				1.085 (0.000)	0.960 (0.000)	1.356 (0.000)	1.266 (0.064)	1.120 (0.056)	2.009 (0.129)	0.398 (0.331)	0.352 (0.293)	0.317 (0.466)
US-GAN				1.086 (0.000)	0.960 (0.000)	1.363 (0.000)	1.272 (0.062)	1.125 (0.055)	2.026 (0.127)	0.418 (0.329)	0.370 (0.291)	0.336 (0.471)
GP-VAE				1.146 (0.000)	1.013 (0.000)	1.522 (0.000)	1.264 (0.066)	1.118 (0.058)	1.999 (0.134)	0.386 (0.342)	0.341 (0.303)	0.312 (0.484)
Mean				1.112 (0.000)	0.984 (0.000)	1.423 (0.000)	1.271 (0.070)	1.125 (0.062)	2.013 (0.148)	0.420 (0.329)	0.371 (0.291)	0.330 (0.484)
Median				1.114 (0.002)	0.986 (0.002)	1.434 (0.011)	1.273 (0.072)	1.126 (0.064)	2.018 (0.153)	0.411 (0.333)	0.363 (0.295)	0.325 (0.485)
LOCF				1.118 (0.005)	0.989 (0.005)	1.452 (0.026)	1.271 (0.070)	1.124 (0.062)	2.013 (0.147)	0.404 (0.336)	0.357 (0.297)	0.322 (0.483)
Linear				1.124 (0.012)	0.995 (0.011)	1.466 (0.033)	1.270 (0.069)	1.124 (0.061)	2.013 (0.143)	0.404 (0.335)	0.357 (0.296)	0.323 (0.480)
	ETT_h1 (point_50%)											
	MAE wt XGB	MRE wt XGB	MSE wt XGB	MAE w XGB	MRE w XGB	MSE w XGB	MAE w RNN	MRE w RNN	MSE w RNN	MAE w Transformer	MRE w Transformer	MSE w Transformer
iTransformer	1.350 (0.000)	1.194 (0.000)	2.100 (0.000)	1.223 (0.000)	1.082 (0.000)	1.683 (0.000)	1.240 (0.071)	1.096 (0.062)	1.937 (0.145)	0.379 (0.337)	0.335 (0.298)	0.303 (0.476)
SAITS				1.156 (0.000)	1.023 (0.000)	1.616 (0.000)	1.274 (0.062)	1.126 (0.055)	2.022 (0.127)	0.375 (0.341)	0.332 (0.301)	0.306 (0.474)
Nonstationary				1.196 (0.000)	1.058 (0.000)	1.657 (0.000)	1.317 (0.065)	1.164 (0.057)	2.119 (0.134)	0.378 (0.369)	0.334 (0.326)	0.323 (0.530)
ETSformer				1.205 (0.000)	1.066 (0.000)	1.835 (0.000)	1.235 (0.061)	1.092 (0.054)	1.881 (0.116)	0.321 (0.343)	0.284 (0.303)	0.259 (0.449)
PatchTST				1.192 (0.000)	1.054 (0.000)	1.657 (0.000)	1.264 (0.058)	1.118 (0.051)	2.002 (0.113)	0.370 (0.331)	0.327 (0.292)	0.292 (0.454)
Crossformer				1.180 (0.000)	1.044 (0.000)	1.651 (0.000)	1.268 (0.062)	1.122 (0.055)	2.007 (0.126)	0.377 (0.324)	0.334 (0.287)	0.294 (0.449)
Informer				1.128 (0.000)	0.998 (0.000)	1.502 (0.000)	1.269 (0.059)	1.122 (0.052)	1.990 (0.118)	0.384 (0.347)	0.340 (0.307)	0.314 (0.490)
Autoformer				1.306 (0.000)	1.155 (0.000)	1.948 (0.000)	1.287 (0.177)	1.138 (0.157)	2.069 (0.454)	0.559 (0.102)	0.494 (0.090)	0.402 (0.129)
Pyraformer				1.120 (0.000)	0.990 (0.000)	1.442 (0.000)	1.247 (0.055)	1.103 (0.049)	1.919 (0.106)	0.374 (0.337)	0.331 (0.298)	0.297 (0.469)
Transformer				1.177 (0.000)	1.041 (0.000)	1.634 (0.000)	1.243 (0.057)	1.100 (0.051)	1.923 (0.110)	0.375 (0.334)	0.332 (0.295)	0.297 (0.464)
BRITS				1.220 (0.000)	1.079 (0.000)	1.764 (0.000)	1.254 (0.059)	1.109 (0.052)	1.961 (0.117)	0.399 (0.332)	0.353 (0.293)	0.319 (0.473)
MRNN				0.984 (0.000)	0.870 (0.000)	1.179 (0.000)	1.081 (0.089)	0.956 (0.079)	1.497 (0.175)	0.445 (0.296)	0.394 (0.261)	0.337 (0.347)
GRUD				1.210 (0.000)	1.070 (0.000)	1.828 (0.000)	1.215 (0.057)	1.075 (0.051)	1.810 (0.115)	0.359 (0.340)	0.318 (0.301)	0.286 (0.461)
TimesNet				1.143 (0.000)	1.011 (0.000)	1.486 (0.000)	1.202 (0.063)	1.063 (0.056)	1.806 (0.119)	0.365 (0.329)	0.323 (0.291)	0.290 (0.447)
MICN				1.130 (0.000)	0.999 (0.000)	1.495 (0.000)	1.178 (0.081)	1.042 (0.072)	1.716 (0.163)	0.343 (0.355)	0.304 (0.315)	0.283 (0.477)
SCINet				1.095 (0.000)	0.968 (0.000)	1.407 (0.000)	1.254 (0.063)	1.109 (0.056)	1.975 (0.125)	0.372 (0.339)	0.329 (0.299)	0.300 (0.473)
StemGNN				1.113 (0.000)	0.985 (0.000)	1.437 (0.000)	1.259 (0.057)	1.113 (0.050)	1.967 (0.115)	0.362 (0.346)	0.320 (0.306)	0.294 (0.477)
FreTS				1.173 (0.000)	1.038 (0.000)	1.587 (0.000)	1.259 (0.059)	1.114 (0.052)	1.984 (0.118)	0.367 (0.336)	0.325 (0.297)	0.293 (0.463)
Koopa				1.288 (0.000)	1.139 (0.000)	1.855 (0.000)	1.265 (0.068)	1.119 (0.060)	1.973 (0.138)	0.357 (0.356)	0.316 (0.315)	0.297 (0.494)
DLinear				1.176 (0.000)	1.040 (0.000)	1.616 (0.000)	1.262 (0.054)	1.116 (0.048)	1.981 (0.101)	0.368 (0.336)	0.326 (0.297)	0.295 (0.466)
FiLM				1.215 (0.000)	1.075 (0.000)	1.686 (0.000)	1.283 (0.062)	1.135 (0.055)	2.054 (0.129)	0.376 (0.376)	0.333 (0.332)	0.319 (0.537)
CSDI				1.183 (0.000)	1.047 (0.000)	1.641 (0.000)	1.269 (0.063)	1.122 (0.055)	1.995 (0.134)	0.362 (0.337)	0.321 (0.298)	0.290 (0.459)
US-GAN				1.083 (0.000)	0.958 (0.000)	1.414 (0.000)	1.114 (0.076)	0.985 (0.067)	1.603 (0.172)	0.352 (0.267)	0.311 (0.236)	0.240 (0.336)
GP-VAE				1.170 (0.000)	1.035 (0.000)	1.643 (0.000)	1.169 (0.071)	1.034 (0.063)	1.738 (0.139)	0.344 (0.349)	0.304 (0.309)	0.282 (0.468)
Mean				1.472 (0.000)	1.302 (0.000)	2.410 (0.000)	1.368 (0.147)	1.210 (0.130)	2.237 (0.368)	0.677 (0.346)	0.599 (0.306)	0.645 (0.481)
Median				1.498 (0.026)	1.325 (0.023)	2.493 (0.083)	1.380 (0.147)	1.221 (0.130)	2.281 (0.372)	0.588 (0.404)	0.520 (0.357)	0.563 (0.523)
LOCF				1.411 (0.126)	1.248 (0.112)	2.270 (0.323)	1.327 (0.146)	1.174 (0.129)	2.143 (0.368)	0.523 (0.392)	0.463 (0.347)	0.480 (0.519)
Linear				1.356 (0.144)	1.200 (0.127)	2.118 (0.384)	1.306 (0.136)	1.155 (0.120)	2.093 (0.337)	0.492 (0.382)	0.435 (0.338)	0.440 (0.514)

Table 24: Performance comparison for the forecasting task on PeMS datasets with 50% point missing, 50% block missing and 50% subsequence missing.

	PeMS (point 50%)											
	MAE wt XGB	MRE wt XGB	MSE wt XGB	MAE w XGB	MRE w XGB	MSE w XGB	MAE w RNN	MRE w RNN	MSE w RNN	MAE w Transformer	MRE w Transformer	MSE w Transformer
iTransformer				1.000 (0.000)	1.001 (0.000)	1.309 (0.000)	0.574 (0.020)	0.575 (0.020)	0.636 (0.039)	0.647 (0.097)	0.648 (0.097)	0.703 (0.168)
SAITS				0.998 (0.000)	0.999 (0.000)	1.322 (0.000)	0.550 (0.030)	0.551 (0.030)	0.588 (0.049)	0.611 (0.063)	0.612 (0.063)	0.622 (0.085)
Nonstationary				1.019 (0.000)	1.020 (0.000)	1.357 (0.000)	0.550 (0.031)	0.550 (0.031)	0.609 (0.055)	0.688 (0.067)	0.689 (0.067)	0.765 (0.119)
ETSformer				1.018 (0.000)	1.018 (0.000)	1.336 (0.000)	0.579 (0.041)	0.580 (0.041)	0.640 (0.074)	0.861 (0.243)	0.862 (0.243)	1.175 (0.698)
PatchTST				0.975 (0.000)	0.976 (0.000)	1.254 (0.000)	0.560 (0.029)	0.560 (0.029)	0.619 (0.047)	0.845 (0.216)	0.846 (0.217)	1.171 (0.612)
Crossformer				1.000 (0.000)	1.001 (0.000)	1.340 (0.000)	0.545 (0.034)	0.545 (0.034)	0.598 (0.059)	0.797 (0.285)	0.798 (0.285)	1.096 (0.766)
Informer				1.017 (0.000)	1.018 (0.000)	1.345 (0.000)	0.553 (0.023)	0.554 (0.023)	0.592 (0.037)	0.671 (0.060)	0.671 (0.060)	0.753 (0.101)
Autoformer				1.114 (0.000)	1.115 (0.000)	1.600 (0.000)	0.673 (0.023)	0.674 (0.023)	0.745 (0.050)	0.806 (0.255)	0.807 (0.255)	1.142 (0.694)
Pyraformer				0.975 (0.000)	0.976 (0.000)	1.253 (0.000)	0.556 (0.030)	0.557 (0.030)	0.604 (0.051)	0.765 (0.352)	0.766 (0.353)	1.062 (0.958)
Transformer				1.044 (0.000)	1.045 (0.000)	1.521 (0.000)	0.537 (0.025)	0.537 (0.025)	0.576 (0.036)	0.839 (0.238)	0.840 (0.238)	1.166 (0.628)
BRITS				1.046 (0.000)	1.047 (0.000)	1.436 (0.000)	0.526 (0.034)	0.527 (0.034)	0.564 (0.060)	0.798 (0.147)	0.799 (0.147)	1.036 (0.378)
MRNN				1.040 (0.000)	1.041 (0.000)	1.449 (0.000)	0.545 (0.012)	0.546 (0.012)	0.598 (0.016)	0.656 (0.248)	0.657 (0.249)	0.807 (0.606)
GRUD				1.012 (0.000)	1.013 (0.000)	1.337 (0.000)	0.531 (0.039)	0.531 (0.039)	0.566 (0.064)	0.680 (0.074)	0.681 (0.074)	0.824 (0.226)
TimesNet				1.025 (0.000)	1.026 (0.000)	1.385 (0.000)	0.532 (0.022)	0.532 (0.022)	0.576 (0.046)	0.666 (0.108)	0.667 (0.108)	0.729 (0.177)
MICN	1.084 (0.000)	1.085 (0.000)	1.514 (0.000)	1.132 (0.000)	1.133 (0.000)	1.647 (0.000)	0.653 (0.026)	0.654 (0.026)	0.743 (0.061)	0.737 (0.125)	0.738 (0.125)	0.888 (0.270)
SCINet				0.973 (0.000)	0.974 (0.000)	1.258 (0.000)	0.622 (0.018)	0.623 (0.018)	0.664 (0.032)	0.823 (0.190)	0.824 (0.191)	1.097 (0.490)
StemGNN				1.066 (0.000)	1.067 (0.000)	1.629 (0.000)	0.613 (0.029)	0.613 (0.029)	0.681 (0.046)	0.942 (0.308)	0.943 (0.309)	1.464 (0.856)
FreTS				0.998 (0.000)	0.998 (0.000)	1.255 (0.000)	0.565 (0.037)	0.565 (0.037)	0.612 (0.067)	0.810 (0.165)	0.810 (0.165)	1.036 (0.354)
Koopa				1.036 (0.000)	1.036 (0.000)	1.407 (0.000)	0.640 (0.024)	0.641 (0.024)	0.676 (0.052)	0.632 (0.038)	0.633 (0.038)	0.672 (0.086)
DLinear				1.029 (0.000)	1.030 (0.000)	1.450 (0.000)	0.553 (0.030)	0.554 (0.030)	0.610 (0.037)	0.878 (0.256)	0.879 (0.256)	1.325 (0.682)
FiLM				0.978 (0.000)	0.979 (0.000)	1.265 (0.000)	0.538 (0.017)	0.538 (0.017)	0.512 (0.028)	0.850 (0.351)	0.851 (0.351)	1.238 (0.951)
CSDI				1.057 (0.000)	1.058 (0.000)	1.446 (0.000)	0.553 (0.031)	0.553 (0.031)	0.613 (0.052)	0.779 (0.276)	0.780 (0.276)	1.033 (0.747)
US-GAN				1.038 (0.000)	1.039 (0.000)	1.387 (0.000)	0.507 (0.026)	0.507 (0.026)	0.531 (0.048)	0.972 (0.299)	0.973 (0.300)	1.549 (0.794)
GP-VAE				1.047 (0.000)	1.048 (0.000)	1.488 (0.000)	0.539 (0.042)	0.539 (0.042)	0.591 (0.072)	0.792 (0.280)	0.793 (0.280)	1.073 (0.714)
Mean				1.050 (0.000)	1.051 (0.000)	1.460 (0.000)	0.500 (0.044)	0.501 (0.044)	0.513 (0.078)	0.740 (0.090)	0.741 (0.090)	0.881 (0.193)
Median				1.081 (0.031)	1.082 (0.031)	1.538 (0.077)	0.519 (0.040)	0.519 (0.040)	0.546 (0.073)	0.756 (0.193)	0.757 (0.193)	0.986 (0.482)
LOCF				1.088 (0.027)	1.089 (0.027)	1.530 (0.064)	0.529 (0.040)	0.530 (0.040)	0.562 (0.070)	0.716 (0.178)	0.716 (0.178)	0.887 (0.435)
Linear				1.061 (0.052)	1.062 (0.052)	1.465 (0.127)	0.527 (0.036)	0.528 (0.036)	0.557 (0.065)	0.724 (0.198)	0.724 (0.199)	0.899 (0.496)
	PeMS (block 50%)											
	MAE wt XGB	MRE wt XGB	MSE wt XGB	MAE w XGB	MRE w XGB	MSE w XGB	MAE w RNN	MRE w RNN	MSE w RNN	MAE w Transformer	MRE w Transformer	MSE w Transformer
iTransformer				1.088 (0.000)	1.089 (0.000)	1.598 (0.000)	0.598 (0.027)	0.598 (0.027)	0.691 (0.052)	0.903 (0.264)	0.904 (0.264)	1.308 (0.724)
SAITS				1.024 (0.000)	1.024 (0.000)	1.404 (0.000)	0.555 (0.024)	0.555 (0.024)	0.610 (0.039)	0.984 (0.335)	0.985 (0.335)	1.598 (0.860)
Nonstationary				0.990 (0.000)	0.991 (0.000)	1.291 (0.000)	0.544 (0.018)	0.544 (0.018)	0.592 (0.035)	0.861 (0.260)	0.861 (0.261)	1.243 (0.633)
ETSformer				1.039 (0.000)	1.040 (0.000)	1.393 (0.000)	0.578 (0.021)	0.578 (0.021)	0.638 (0.042)	0.758 (0.092)	0.759 (0.092)	0.894 (0.155)
PatchTST				1.004 (0.000)	1.005 (0.000)	1.310 (0.000)	0.548 (0.021)	0.548 (0.021)	0.587 (0.035)	0.917 (0.267)	0.918 (0.267)	1.339 (0.796)
Crossformer				1.002 (0.000)	1.003 (0.000)	1.333 (0.000)	0.548 (0.011)	0.549 (0.011)	0.596 (0.028)	0.735 (0.202)	0.736 (0.202)	0.932 (0.537)
Informer				1.065 (0.000)	1.066 (0.000)	1.510 (0.000)	0.551 (0.025)	0.551 (0.025)	0.604 (0.043)	0.919 (0.360)	0.920 (0.360)	1.445 (0.940)
Autoformer				1.174 (0.000)	1.175 (0.000)	1.856 (0.000)	0.657 (0.016)	0.658 (0.016)	0.762 (0.020)	0.912 (0.201)	0.913 (0.201)	1.309 (0.525)
Pyraformer				1.012 (0.000)	1.013 (0.000)	1.338 (0.000)	0.550 (0.031)	0.550 (0.031)	0.607 (0.059)	0.921 (0.336)	0.922 (0.336)	1.454 (0.890)
Transformer				1.135 (0.000)	1.137 (0.000)	1.786 (0.000)	0.561 (0.021)	0.562 (0.021)	0.623 (0.044)	0.689 (0.122)	0.690 (0.122)	0.775 (0.219)
BRITS				1.033 (0.000)	1.034 (0.000)	1.403 (0.000)	0.529 (0.022)	0.529 (0.022)	0.571 (0.037)	0.796 (0.293)	0.796 (0.293)	1.144 (0.764)
MRNN				1.012 (0.000)	1.013 (0.000)	1.368 (0.000)	0.551 (0.038)	0.551 (0.038)	0.590 (0.054)	0.754 (0.249)	0.755 (0.250)	0.985 (0.613)
GRUD				1.048 (0.000)	1.048 (0.000)	1.402 (0.000)	0.522 (0.014)	0.522 (0.014)	0.556 (0.028)	0.926 (0.341)	0.927 (0.342)	1.440 (0.900)
TimesNet				1.058 (0.000)	1.059 (0.000)	1.467 (0.000)	0.538 (0.024)	0.539 (0.024)	0.585 (0.043)	0.848 (0.300)	0.848 (0.300)	1.249 (0.773)
MICN	1.068 (0.000)	1.069 (0.000)	1.507 (0.000)	1.150 (0.000)	1.151 (0.000)	1.731 (0.000)	0.662 (0.030)	0.663 (0.030)	0.819 (0.048)	1.065 (0.325)	1.066 (0.326)	1.847 (0.911)
SCINet				1.048 (0.000)	1.049 (0.000)	1.456 (0.000)	0.666 (0.017)	0.666 (0.017)	0.740 (0.032)	0.819 (0.175)	0.819 (0.175)	1.112 (0.383)
StemGNN				1.011 (0.000)	1.012 (0.000)	1.397 (0.000)	0.616 (0.026)	0.617 (0.026)	0.701 (0.054)	0.879 (0.218)	0.880 (0.218)	1.229 (0.591)
FreTS				1.010 (0.000)	1.011 (0.000)	1.323 (0.000)	0.558 (0.014)	0.559 (0.014)	0.599 (0.027)	0.987 (0.330)	0.988 (0.330)	1.629 (0.860)
Koopa				0.969 (0.000)	0.969 (0.000)	1.248 (0.000)	0.590 (0.034)	0.591 (0.034)	0.640 (0.063)	0.719 (0.221)	0.720 (0.222)	0.912 (0.560)
DLinear				1.079 (0.000)	1.079 (0.000)	1.554 (0.000)	0.572 (0.028)	0.573 (0.028)	0.638 (0.052)	0.903 (0.294)	0.904 (0.294)	1.411 (0.787)
FiLM				1.011 (0.000)	1.012 (0.000)	1.349 (0.000)	0.503 (0.014)	0.503 (0.014)	0.534 (0.025)	0.641 (0.104)	0.642 (0.104)	0.724 (0.155)
CSDI				0.989 (0.000)	0.990 (0.000)	1.318 (0.000)	0.639 (0.033)	0.639 (0.033)	0.745 (0.066)	0.920 (0.361)	0.920 (0.362)	1.414 (0.957)
US-GAN				1.038 (0.000)	1.039 (0.000)	1.425 (0.000)	0.508 (0.021)	0.509 (0.021)	0.532 (0.046)	1.014 (0.331)	1.015 (0.332)	1.692 (0.877)
GP-VAE				1.025 (0.000)	1.026 (0.000)	1.367 (0.000)	0.528 (0.027)	0.529 (0.027)	0.572 (0.050)	0.630 (0.093)	0.630 (0.093)	0.650 (0.148)
Mean				1.040 (0.000)	1.040 (0.000)	1.463 (0.000)	0.470 (0.018)	0.470 (0.018)	0.445 (0.032)	0.791 (0.276)	0.792 (0.276)	1.134 (0.662)
Median				1.057 (0.018)	1.058 (0.018)	1.512 (0.049)	0.503 (0.037)	0.503 (0.037)	0.494 (0.058)	0.705 (0.215)	0.706 (0.215)	0.916 (0.527)
LOCF				1.048 (0.020)	1.049 (0.020)	1.471 (0.071)	0.548 (0.072)	0.548 (0.073)	0.569 (0.120)	0.759 (0.272)	0.760 (0.272)	1.032 (0.658)
Linear				1.046 (0.017)	1.048 (0.017)	1.463 (0.063)	0.541 (0.064)	0.541 (0.064)	0.560 (0.105)	0.728 (0.248)	0.728 (0.248)	0.942 (0.597)
	PeMS (subsequence 50%)											
	MAE wt XGB	MRE wt XGB	MSE wt XGB	MAE w XGB	MRE w XGB	MSE w XGB	MAE w RNN	MRE w RNN	MSE w RNN	MAE w Transformer	MRE w Transformer	MSE w Transformer
iTransformer				1.013 (0.000)	1.014 (0.000)	1.402 (0.000)	0.546 (0.009)	0.546 (0.009)	0.607 (0.016)	1.030 (0.292)	1.031 (0.292)	1.641 (0.805)
SAITS				1.038 (0.000)	1.039 (0.000)	1.420 (0.000)	0.571 (0.020)	0.572 (0.020)	0.635 (0.033)	0.802 (0.286)	0.803 (0.286)	1.095 (0.792)
Nonstationary				1.050 (0.000)	1.051 (0.000)	1.496 (0.000)	0.587 (0.040)	0.588 (0.040)	0.684 (0.081)	0.661 (0.289)	0.661 (0.289)	0.804 (0.594)
ETSformer				1.086 (0.000)	1.087 (0.000)	1.554 (0.000)	0.595 (0.016)	0.596 (0.016)	0.683 (0.027)	0.791 (0.236)	0.792 (0.237)	1.085 (0.635)
PatchTST				1.061 (0.000)	1.062 (0.000)	1.496 (0.000)	0.573 (0.027)	0.574 (0.027)	0.637 (0.052)	0.810 (0.243)	0.810 (0.243)	1.086 (0.669)
Crossformer				1.058 (0.000)	1.059 (0.000)	1.480 (0.000)	0.576 (0.023)	0.576 (0.023)	0.642 (0.041)	0.655 (0.056)	0.655 (0.056)	0.698 (0.096)
Informer				1.028 (0.000)	1.030 (0.000)	1.388 (0.000)	0.583 (0.018)	0.583 (0.018)	0.650 (0.029)	0.769 (0.236)	0.770 (0.236)	1.007 (0.612)
Autoformer				1.116 (0.000)	1.117 (0.000)	1.574 (0.000)	0.646 (0.030)	0.647 (0.030)	0.747 (0.056)	1.024 (0.295)	1.025 (0.295)	1.657 (0.794)
Pyraformer				0.982 (0.000)	0.983 (0.000)	1.301 (0.000)	0.565 (0.016)	0.565 (0.016)	0.623 (0.028)	0.758 (0.118)	0.759 (0.118)	0.945 (0.299)
Transformer				1.005 (0.000)	1.006 (0.000)	1.300 (0.000)	0.582 (0.017)	0.582 (0.017)	0.654 (0.026)	0.766 (0.270)	0.766 (0.270)	0.998 (0.666)
BRITS				1.086 (0.000)	1.087 (0.000)	1.541 (0.000)	0.567 (0.015)	0.567 (0.015)	0.620 (0.023)	0.664 (0.078)	0.665 (0.078)	0.745 (0.125)
MRNN				1.028 (0.000)	1.029 (0.000)	1.363 (0.000)	0.610 (0.024)	0.611 (0.024)	0.670 (0.043)	0.773 (0.064)	0.774 (0.064)	0.956 (0.165)
GRUD				1.029 (0.000)	1.030 (0.000)	1.389 (0.000)	0.553 (0.022)	0.554 (0.022)	0.610 (0.037)	0.835 (0.334)	0.836 (0.334)	1.225 (0.919)
TimesNet				1.067 (0.000)	1.068 (0.000)	1.450 (0.000)	0.567 (0.019)	0.568 (0.019)	0.629 (0.034)	0.784 (0.271)	0.785 (0.271)	1.044 (0.715)
MICN	1.192 (0.000)	1.193 (0.000)	1.870 (0.000)	1.179 (0.000)	1.180 (0.000)	1.881 (0.000)	0.654 (0.015)	0.655 (0.015)	0.826 (0.029)	0.983 (0.346)	0.983 (0.346)	1.584 (0.976)
SCINet				1.017 (0.000)	1.018 (0.000)	1.348 (0.000)	0.645 (0.038)	0.645 (0.038)	0.728 (0.079)	0.681 (0.048)	0.681 (0.048)	0.737 (0.103)
StemGNN				1.008 (0.000)	1.009 (0.000)	1.309 (0.000)	0.604 (0.028)	0.605 (0.028)	0.685 (0.052)	0.693 (0.048)	0.693 (0.048)	0.789 (0.085)
FreTS				0.974 (0.000)	0.974 (0.000)	1.219 (0.000)	0.593 (0.013)	0.594 (0.013)	0.668 (0.037)	0.802 (0.207)	0.802 (0.207)	1.059 (0.552)
Koopa				0.988 (0.000)	0.989 (0.000)	1.307 (0.000)	0.606 (0.036)	0.607 (0.036)	0.668 (0.068)	0.872 (0.311)	0.873 (0.311)	1.257 (0.841)
DLinear				1.013 (0.000)	1.014 (0.000)	1.319 (0.000)	0.597 (0.024)	0.598 (0.024)	0.677 (0.045)	0.825 (0.270)	0.825 (0.271)	1.135 (0.736)
FiLM				1.154 (0.000)	1.155 (0.000)	1.737 (0.000)	0.497 (0.022)	0.498 (0.022)	0.543 (0.029)	0.533 (0.071)	0.533 (0.071)	0.500 (0.105)
CSDI				0.995 (0.000)	0.996 (0.000)	1.327 (0.000)	0.604 (0.025)	0.605 (0.025)	0.682 (0.033)	0.716 (0.179)	0.717 (0.179)	0.851 (0.372)
US-GAN				1.011 (0.000)	1.012 (0.000)	1.377 (0.000)	0.537 (0.027)	0.537 (0.028)	0.585 (0.054)	0.959 (0.358)	0.960 (0.358)	1.532 (0.969)
GP-VAE				1.017 (0.000)	1.018 (0.000)	1.350 (0.000)	0.545 (0.018)	0.546 (0.018)	0.597 (0.032)	0.791 (0.283)	0.792 (0.283)	1.066 (0.765)
Mean				1.133 (0.000)	1.134 (0.000)	1.715 (0.000)	0.468 (0.021)	0.468 (0.021)	0.477 (0.034)	0.701 (0.314)	0.701 (0.314)	0.931 (0.833)
Median				1.156 (0.023)	1.157 (0.023)	1.774 (0.059)	0.507 (0.046)	0.507 (0.046)	0.558 (0.089)	0.621 (0.238)	0.622 (0.238)	0.725 (0.626)
LOCF				1.155 (0.019)	1.156 (0.019)	1.775 (0.048)	0.570 (0.097)	0.571 (0.097)	0.692 (0.204)	0.734 (0.325)	0.734 (0.326)	1.034 (0.857)
Linear				1.137 (0.034)	1.139 (0.034)	1.722 (0.100)	0.568 (0.086)	0.568 (0.086)	0.679 (0.181)	0.679 (0.299)	0.679 (0.299)	0.902 (0.780)