BasicTS: An Open-Source PyTorch-based Time Series Forecasting Benchmark

Anonymous Author(s)

1 EXPERIMENTS

1.1 Baselines

- **HI**:
- **AR**:
- **VAR**:
- **Graph WaveNet** [5]: Graph WaveNet stacks Gated TCN and GCN layer by layer to jointly capture the spatial and temporal dependencies.
- **DCRNN** [4]:

1.2 Datasets

1.2.1 Short-term Multivariate Time Series Forecasting. The statistical information is summarized in Table 1.

- **METR-LA** is a public traffic speed dataset collected from loop-detectors located on the LA County road network [3]. Specifically, METR-LA contains data of 207 selected sensors over a period of 4 months from Mar 1st 2012 to Jun 30th 2012 [4]. The traffic information is recorded at the rate of every 5 minutes, and the total number of time slices is 34,272.
- **PEMS-BAY** is a public traffic speed dataset collected from California Transportation Agencies (CalTrans) Performance Measurement System (PeMS) [1]. Specifically, PEMS-BAY contains data of 325 sensors in the Bay Area over a period of 6 months from Jan 1st 2017 to May 31th 2017 [4]. The traffic information is recorded at the rate of every 5 minutes, and the total number of time slices is 52,116.
- **PEMS04** is a public traffic flow dataset collected from California Transportation Agencies (CalTrans) Performance Measurement System (PeMS) [1]. Specifically, PEMS04 contains data of 307 sensors in the District04 over a period of 2 months from Jan 1st 2018 to Feb 28th 2018 [2]. The traffic information is recorded at the rate of every 5 minutes, and the total number of time slices is 16,992.
- **PEMS08** is a public traffic flow dataset collected from California Transportation Agencies (CalTrans) Performance Measurement System (PeMS) [1]. Specifically, PEMS08 contains data of 170 sensors in the District08 over a period of 2 months from July 1st 2018 to Aug 31th 2018 [2]. The traffic information is recorded at the rate of every 5 minutes, and the total number of time slices is 17,833.

1.2.2 Long-term Multivariate Time Series Forecasting.

- **ETTHh$_1$**
- **ETTHh$_2$**
- **ETTHm$_1$**
- **Electricity**

Table 1: Statistics of datasets.

Dataset	# Time Step	# Node	Sample Rate	Time Span
METR-LA	34272	207	5mins	4 mouths
PEMS-BAY	52116	325	5mins	6 mouths
PEMS04	16992	307	5mins	2 mouths
PEMS08	17833	170	5mins	2 mouths

1.3 Metrics

1.4 Main Results

1.5 Efficiency

REFERENCES

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Table 2: Short-term multivariate time series forecasting on the METR-LA, PEMS-BAY, PEMS04, PEMS08 datasets.

Datasets	Methods	Horizon 3			Horizon 6			Horizon 12			Overall (12 Horizon)		
		MAE	RMSE	MAPE	MAE	RMSE	MAPE	MAE	RMSE	MAPE	MAE	RMSE	MAPE
METR-LA	HI	6.80	14.21	16.72%	6.80	14.21	16.72%	6.80	14.20	10.15%	6.80	14.21	16.72%
	Graph WaveNet	2.69	5.15	6.96%	3.08	6.21	8.47%	3.53	7.30	10.15%	3.04	6.15	8.31%
	DCRNN	2.67	5.16	6.85%	3.07	6.28	8.43%	3.57	7.57	10.43%	3.04	6.26	8.33%
PEMS-BAY	HI	3.06	7.05	6.85%	3.06	7.04	6.84%	3.05	7.03	6.83%	3.05	7.05	6.84%
	Graph WaveNet	1.30	2.80	2.69%	1.65	3.75	3.65%	1.97	4.58	4.63%	1.59	3.69	3.52%
	DCRNN	1.31	2.80	2.73%	1.66	3.81	3.75%	1.98	4.64	4.73%	1.60	3.74	3.61%
PEMS04	HI	42.33	61.64	29.90%	42.35	61.66	29.92%	42.38	61.67	29.96%	42.35	61.66	29.92%
	Graph WaveNet	18.00	28.83	13.64%	18.96	30.33	14.23%	20.53	32.54	15.41%	18.97	30.32	14.26%
	DCRNN	18.67	29.64	13.13%	19.85	31.39	14.09%	21.87	34.07	15.88%	19.87	34.40	14.15%
PEMS08	HI	36.65	50.44	21.60%	36.66	50.45	21.63%	36.68	50.46	21.68%	36.66	50.45	21.63%
	Graph WaveNet	13.72	21.71	8.80%	14.67	23.50	9.49%	16.15	25.85	10.74%	14.67	23.47	9.52%
	DCRNN	14.16	22.20	9.31%	15.24	24.26	9.90%	17.70	27.14	11.13%	15.26	24.28	9.96%