Supplementary Material: A Survey on Time-Series Pre-Trained Models

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APPENDIX A
RELATED SURVEY ANALYSIS

Among the six surveys focus on time series pre-training, the first web online time of [1] predates ours by three months, while [2]–[6] appeared later. Table I details the differences between these surveys: [1]–[3] focus on obtaining feature representations of time series through label-efficient, self-supervised, and unsupervised scenarios in the pre-training phase, while [4]–[6] explore transferring knowledge from pre-trained natural language models to the time series domain via fine-tuning. Our survey comprehensively analyzes pre-training methods for six tasks: classification, forecasting, clustering, anomaly detection, imputation, and extrinsic regression from supervised, unsupervised, and self-supervised learning perspectives. It also examines the effects of various transfer strategies during fine-tuning and measures the performance of different pre-training methods through extensive experiments.

Table II presents comprehensive statistics on the experimental scope, encompassing 27 distinct models (with a total of 35 models, adjusted by removing duplicates across different downstream tasks), 434 datasets (comprised of 166, 9, and 259 datasets), and 679 transfer learning experiments (calculated as 15 source datasets multiplied by 45 target datasets, plus an additional 4 independent time series scenarios for transfer learning) focused on classification tasks. By reproducing experiments under consistent conditions across many datasets, we offer a more objective evaluation of the performance of various TS-PTMs. These experiments provide guidance for readers in selecting suitable deep learning models or pre-training techniques for the design of pre-training models.

In summarizing the existing literature, Eldele et al. [1] systematically reviewed and analyzed work on learning time series representations in both in-domain and cross-domain settings under label-efficient scenarios with few labeled data and only unlabeled data. Although [1] focuses on pre-training and fine-tuning techniques for time series, it mainly emphasizes RNN- and CNN-based pre-training in label-efficient scenarios. In contrast, our survey systematically summarizes pre-training methods based on five deep neural network architectures (RNN, CNN, TCN, Transformer, and GNN) from a transfer learning perspective. Zhang et al. [2] and Meng et al. [3] discuss obtaining time series feature representations through self-supervised or unsupervised learning in the pre-training stage but neglect other pre-training methods and the fine-tuning process within the transfer learning framework. Jin et al. [4] and Liang et al. [6] reviewed techniques for pre-training Large Language Models (LLMs) for fine-tuning on time series downstream tasks. However, the rationale behind the successful application of LLMs for downstream task fine-tuning in time series remains to be fully explored. Jin et al. [5] focused on transferring knowledge gained from pre-training LLMs to time series downstream tasks but overlooked leveraging domain-specific knowledge during the pre-training process to obtain appropriate time series feature representations. In contrast to [4]–[6], our survey focuses on the existing time series domain. We validate the importance of maintaining consistency between source and target datasets in time series transfer learning through extensive experiments. This demonstrates that the design of TS-PTMs, utilizing time series domain datasets for pre-training and fine-tuning paradigms, holds significant developmental potential.

APPENDIX B
EXPERIMENTAL DETAILS AND RESOURCES

A. Source Datasets, Code and TS-PTMs

In time series domain, the statistics of publicly available benchmark datasets are shown in Table III. Also, the statistics of existing TS-PTMs containing open-source code and the summary of TS-PTMs are shown in Table IV and Table V.

B. Experimental Datasets

In the time series domain, 128 univariate UCR time series datasets [82] and 30 multivariate UEA time series datasets [83] are commonly utilized in time-series classification studies. However, each dataset in the UCR and UEA archives does not contain the validation set employed for hyperparameter selection. For a fair analysis, we first combine the training and test sets for each dataset in UCR and UEA archives. Then, we adopt the five-fold cross-validation strategy to divide the training, validation, and test sets according to a ratio of 60%, 20%, and 20%, respectively. Finally, these repartitioned datasets are used to evaluate the time-series classification task performance. Unlike the time series forecasting task,

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TABLE I
COMPARISON OF OUR WORK WITH OTHER RELATED SURVEYS. "✓" INDICATES THAT THE CORRESPONDING SURVEY COVERS A SPECIFIC POINT. A "1" MEANS THE SURVEY FULLY COVERS THE MODEL WITH DETAILED DISCUSSION (FULLY COVERED), WHILE A "0.5" INDICATES PARTIAL COVERAGE (PARTIALLY COVERED) WITH SOME ARTICLES USING THE MODEL. SURVEYS MARKED WITH AN ASTERISK (*) IN THE EXPERIMENTS COLLECTED EXISTING EXPERIMENTAL RESULTS FROM THE LITERATURE BUT DID NOT CONDUCT UNIFORM CODE REPLICATION EXPERIMENTS.

Survey	First Online Time	Focus Topic		Pre-training Techniques			Model Architecture					Experiments
		Pre-training	Fine-tuning	Supervised	Unsupervised	Self-supervised	RNN	CNN	TCN	Transformer	GNN	
Eldele et al. [1]	Feb 2023	✓	✓	✓	✓	✓	1	1	0.5	0.5		
Zhang et al. [2]	Jun 2023	✓				✓	1	1		0.5		*
Meng et al. [3]	Aug 2023	✓			✓	✓	1	1		0.5		✓
Jin et al. [4]	Oct 2023	✓	✓				0.5			1	1	
Jin et al. [5]	Feb 2024		✓							1		✓
Liang et al. [6]	Mar 2024	✓	✓	✓		✓		1	1	1		
Our Survey	May 2023	✓	✓	✓	✓	✓	1	1	1	1	1	✓

TABLE II
EXPERIMENTAL COMPARISON OF OUR WORK WITH OTHER RELATED SURVEYS. "DATASETS" REFERS TO THE NUMBER OF DATASETS USED IN THE EXPERIMENT. "METHODS" INDICATES THE NUMBER OF COMPARISON METHODS EMPLOYED FOR THE CORRESPONDING TASK. "TRANSFER SETS" REPRESENTS THE NUMBER OF GROUPS UNDERGOING SOURCE DOMAIN-TARGET DOMAIN MIGRATION IN THE TRANSFER LEARNING EXPERIMENT.

Survey	Classification		Forecasting		Anomaly Detection		Transfer Learning		
	Datasets	Methods	Datasets	Methods	Datasets	Methods	Datasets	Methods	Transfer Sets
Meng et al. [3]	15	17	0	0	0	0	0	0	0
Jin et al. [5]	1	1	0	0	0	0	0	0	0
Our Survey	166	13	9	12	259	10	53	4	679

TABLE III
BENCHMARK DATASETS IN TIME-SERIES DOMAIN

Resource	Description	URL
UCR	128 univariate UCR time series classification datasets	https://www.cs.ucr.edu/ eamonn/time_series_data_2018/
UEA	30 multivariate UEA time series classification datasets	http://www.timeseriesclassification.com/
IHEPC	Individual Household Electric Power Consumption (IHEPC) dataset	https://archive.ics.uci.edu/ml/datasets/individual+household+electric+power+consumption
XJTU-SU	Run-to-failure data of 15 rolling element bearings	http://biaowang.tech/xjtu-sy-bearing-datasets
MFPT	Bearing Fault Dataset	https://www.mfpt.org/fault-data-sets/
ECG Waveform	Long-term Electrocardiogram (ECG) recordings	https://archive.physionet.org/cgi-bin/atm/ATM
HAR	Human Activity Recognition Using Smartphones Data Set	https://archive.ics.uci.edu/ml/datasets/human+activity+recognition+using+smartphones
Sleep-EDF	Sleep Stage Classification	https://github.com/emadeldeen24/TS-TCC
Epilepsy	Epilepsy Seizure Prediction	https://github.com/emadeldeen24/TS-TCC
FD	Fault Diagnosis	https://github.com/emadeldeen24/TS-TCC
EMG	Electromyograms (EMG) measures muscle responses as electrical activity	https://github.com/mims-harvard/TFC-pretraining
ETT	A crucial indicator in the electric power long-term deployment	https://github.com/zhouhaoyi/ETDataset
Electricity	The electricity consumption (Kwh) of 321 clients	https://archive.ics.uci.edu/ml/datasets/ElectricityLoadDiagrams20112014
Traffic	A collection of hourly data from the California Department of Transportation for forecasting	http://pems.dot.ca.gov
Weather	Recorded every 10 minutes, the dataset includes 21 meteorological indicators for forecasting	https://www.bgc-jena.mpg.de/wetter/
Exchange	Records the daily exchange rates of eight different countries from 1990 to 2016	https://github.com/laiguokun/multivariate-time-series-data
ILI	The weekly recorded data of influenza-like illness (ILI) patients for forecasting	https://gis.cdc.gov/grasp/fluview/fluportaldashboard.html
TSER	19 time series extrinsic regression datasets	http://tseregression.org/
Yahoo	367 hourly sampled time series with tagged anomaly points	https://webscope.sandbox.yahoo.com/
KPI	Multiple minutely sampled real KPI curves from many internet companies	https://github.com/NetManAIOps/donut/tree/master/sample_data
UCR-AT	250 univariate UCR time series anomaly detection datasets	https://wu.renjie.im/research/anomaly-benchmarks-are-flawed/#ucr-time-series-anomaly-archiv
MSL	Collected by NASA, the dataset reveals the condition of sensors and actuator data	https://github.com/khundman/telemanom
SMAP	Collected by NASA, the dataset presents soil samples and telemetry information	https://github.com/eBay/RANSynCoders
PSM	A public dataset from eBay Server Machines with 25 dimensions	https://github.com/khundman/telemanom
SMD	A five-week-long dataset collected from an internet company compute cluster	https://github.com/NetManAIOps/OmniAnomaly
SWaT	A 51-dimension sensor-based dataset collected from critical infrastructure systems	https://itrust.sutd.edu.sg/itrust-labs_datasets/dataset_info/#swat
NIPS-TS-SWAN	A multivariate time series dataset extracted from solar photospheric vector magnetograms	https://github.com/datamllab/tods/tree/benchmark/benchmark
NIPS-TS-GECCO	A drinking water quality dataset for the 'internet of things'	https://github.com/datamllab/tods/tree/benchmark/benchmark

time series classification does not require predicting past and future values of individual series. Further, each dataset in UCR and UEA archives contains several independent time series. Therefore, we can reasonably use a five-fold cross-validation strategy for time series classification. For the time-series forecasting task, like [15], [84], we utilize ETTh1, ETTh2, ETTm1, ETTm2, Electricity, Traffic, Weather, Exchange, and national illness (ILI) datasets for the experimental analysis. In addition, following [15], [22], we employ the Yahoo, KPI, UCR anomaly detection archive, seven multivariate datasets (SMD, MSL, SMAP, PSM, SWAT, NIPS_TS_Swan, and NIPS_TS_Water) for the time-series anomaly detection task.

C. Baselines

Transfer learning has been a significant success in the study of PTMs. Fawaz et al. [7] utilized 85 UCR datasets for time series transfer learning. Firstly, a randomly selected dataset is used as the source dataset to pre-train the Fully Convolutional Networks (FCN) [85] model via the supervised classification task. Then a randomly selected target UCR dataset is fine-tuned on the pre-trained FCN model. Meanwhile, Malhotra et al. [37] employed a symmetric RNN-based encoder-decoder architecture as the backbone. The encoder is first pre-trained using the unsupervised reconstruction task on various UCR datasets as source datasets. Then, the target dataset is fine-tuned on the pre-trained RNN-based encoder. Therefore, in terms of employing transfer learning for time series pre-

TABLE IV
THE OPEN-SOURCE IMPLEMENTATIONS OF TS-PTMS.

Resource	Description	URL
TL-FCN [7]	Framework: Keras (2018 Big Data)	https://github.com/hfawaz/bigdata18
CPC [8]	Framework: PyTorch (2018 arXiv)	https://github.com/jefflai108/Contrastive-Predictive-Coding-PyTorch
T-Loss [9]	Framework: PyTorch (2019 NeurIPS)	https://github.com/White-Link/UnsupervisedScalableRepresentationLearningTimeSeries
SelfTime [10]	Framework: PyTorch (2020 arXiv)	https://github.com/haoyfan/SelfTime
TNC [11]	Framework: PyTorch (2021 ICLR)	https://github.com/sanatonek/TNC_representation_learning
Voice2Series [12]	Framework: Tensorflow (2021 ICML)	https://github.com/huckiyang/Voice2Series-Reprogramming
TS-TCC [13]	Framework: PyTorch (2021 IJCAI)	https://github.com/emadeldeen24/TS-TCC
TST [14]	Framework: PyTorch (2021 KDD)	https://github.com/gzerveas/mvts_transformer
TS2Vec [15]	Framework: PyTorch (2022 AAAI)	https://github.com/yuezhihan/ts2vec
CoST [16]	Framework: PyTorch (2022 ICLR)	https://github.com/salesforce/CoST
ExpCLR [17]	Framework: PyTorch (2022 ICML)	https://github.com/boschresearch/expclr
TF-C [18]	Framework: PyTorch (2022 NeurIPS)	https://github.com/mims-harvard/TFC-pretraining
SLVM [19]	Framework: PyTorch (2023 ICLR)	https://github.com/john-x-jiang/meta_ssm
CLUDA [20]	Framework: PyTorch (2023 ICLR)	https://github.com/oezyurty/CLUDA
PatchTST [21]	Framework: PyTorch (2023 ICLR)	https://github.com/yuqinie98/PatchTST
DCdetector [22]	Framework: PyTorch (2023 KDD)	https://github.com/DAMO-DI-ML/KDD2023-DCdetector
SimMTM [23]	Framework: PyTorch (2023 NeurIPS)	https://github.com/thuml/SimMTM
STPT [24]	Framework: PyTorch (2023 ICDM)	https://github.com/mhu3/STPT
TimesURL [25]	Framework: PyTorch (2024 AAAI)	https://github.com/Alrash/TimesURL
TimeSiam [26]	Framework: PyTorch (2024 ICML)	https://github.com/thuml/TimeSiam
UP2ME [27]	Framework: PyTorch (2024 ICML)	https://github.com/Thinklab-SJTU/UP2ME
TSLANet: [28]	Framework: PyTorch (2024 ICML)	https://github.com/emadeldeen24/TSLANet
MOMENT [29]	Framework: PyTorch (2024 ICML)	https://github.com/moment-timeseries-foundation-model/moment
Timer [30]	Framework: PyTorch (2024 ICML)	https://github.com/thuml/Large-Time-Series-Model
MOIRAI [31]	Framework: PyTorch (2024 ICML)	https://github.com/SalesforceAIResearch/uni2ts
TimesFM [32]	Framework: PyTorch (2024 ICML)	https://github.com/google-research/timesfm

training, we perform a comparative analysis utilizing a supervised classification transfer strategy and an unsupervised reconstruction transfer strategy.

Recently, TS-PTMs have achieved good performance in TSM tasks. For the time-series classification task, we select T-Loss [9], SelfTime [10], TS-TCC [13], TST [14], TS2Vec [15], and GPT4TS [86] to analyze the performance of TS-PTMs and compare them with the supervised FCN [85], PatchTST [21], and TimesNet [84] model. Meanwhile, we select TS2Vec [15] and CoST [16] as benchmark TS-PTMs methods for the time-series forecasting task. Also, we compare them with supervised benchmark methods in time-series forecasting, including LogTrans [87], TCN [88], Informer [89], and Autoformer [90], where LogTrans, Informer, and Autoformer are end-to-end models based on the Transformer. For the time-series anomaly detection task, we select TS2Vec [15] as the benchmark TS-PTM method. We compare it with the benchmark methods SPOT [91], DSPOT [91], LSTM-VAE [92], DONUT [93], Spectral Residual (SR) [94], and Anomaly Transformer (AT) [95] in time-series anomaly detection, where AT is a model based on the Transformer.

1) Time-Series Classification: In the time-series classification task, we first compare the performance of FCN, TCN, and Transformer for direct classification on 128 UCR time series datasets. Then, we analyze the classification performance of T-Loss, SelfTime, TS-TCC, TST, and TS2Vec after pre-training on 128 UCR and 30 UEA time series datasets. In addition, for the datasets containing missing values in the UCR and UEA archives, we use the mean-imputation method to fill the divided training, validation, and test sets, respectively. In this work, the classification accuracy of the test set is employed to evaluate classification performance. Experiments are performed on eight 1080Ti GPUs and two 3090 GPUs. For the running time of the corresponding method, we use the test results on the 3090 GPU.

The specific methods used in this study are described as follows:

FCN: Based on literature [85], we build the model using a three-layer one-dimensional **F**ully **C**onvolutional **N**etwork (**FCN**) and a one-layer global average pooling layer. We set the FCN structure and parameters based on the open source code from https://github.com/cauchyturing/UCR_Time_Series_Classification_Deep_Learning_Baseline.

TCN: Based on the open source code of literature [9], we build the **T**emporal **C**onvolutional **N**etwork (**TCN**) using Pytorch. The original TCN contains ten layers of residual blocks. To compare and analyze the three-layer structure of FCN, we employ a three-layer TCN for comparison experiments. We use the open source code from https://github.com/White-Link/UnsupervisedScalableRepresentationLearningTimeSeries for TCN structure and parameter setting.

Transformer: Zerveas et al. [14] proposed a Transformer-based model for unsupervised time series representation learning. We use the **Transformer** model in open source code from https://github.com/gzerveas/mvts_transformer for direct classification experiments on 128 UCR time series datasets.

T-Loss: Franceschi et al. [9] proposed an unsupervised time series representation learning method using TCN and a novel **T**riplet **L**oss (**T-Loss**). We use the open source code from https://github.com/White-Link/UnsupervisedScalableRepresentationLearningTimeSeries for experimental analysis.

SelfTime: Fan et al. [10] proposed a self-supervised time series representation learning framework called **SelfTime**, exploring the inter-sample and intra-temporal relation of time se-

TABLE V
THE SUMMARY OF TIME-SERIES PRE-TRAINED MODELS (TS-PTMS).

Year	Method	Superviesed PTMs		Unsupervised PTMs	Self-supervised PTMs		Architecture
		CLS	FORE	REC	CONSIS	PSEUDO	
2016	Audio Word2Vec [33]			✓			RNN
2016	DCFT [34]	✓					CNN&RNN
2016	TCL [35]				✓		MLP
2016	SHL-DNN [36]			✓			MLP
2017	TimeNet [37]			✓			RNN
2017	VRADA [38]	✓					RNN
2018	CPC [8]		✓		✓		CNN&RNN
2018	TL-FCN [7]	✓					CNN
2018	Encoder [39]	✓					CNN
2018	TL-CTSAD [40]		✓				RNN
2018	Speech2Vec [41]					✓	RNN
2018	TL-LSTM [42]		✓	✓			RNN
2018	HDCNN [43]	✓					CNN
2018	STL [44]	✓					CNN
2019	vq-wav2vec [45]				✓		Transformer Enc
2019	FRTL [46]	✓					CNN&RNN
2019	ConvTimeNet [47]	✓					CNN
2019	wav2vec [48]		✓		✓		CNN
2019	T-Loss [9]				✓		TCN
2020	SMS [49]	✓					CNN
2020	SelfTime [10]				✓		CNN
2020	InceptionTime [50]	✓					CNN
2020	Mockingjay [51]			✓			Transformer Enc
2020	ML-TSC [52]	✓					CNN
2020	ML-TSF [53]		✓				RNN
2020	DTL-TS [54]	✓					CNN
2020	LSTM-DANN [55]	✓					RNN
2020	CoDATS [56]	✓					CNN
2021	TL-DCRNN [57]		✓				CNN&RNN&GNN
2021	SASA [58]	✓					RNN
2021	SLARDA [59]	✓					Transformer&CNN
2021	GCA [60]	✓					RNN
2021	AdvSKM [61]	✓					CNN
2021	CALDA [62]	✓					CNN
2021	CMTN [63]	✓					RNN
2021	TSAD-TL [64]		✓				RNN
2021	TNC [11]				✓		RNN/TCN
2021	Voice2Series [12]	✓					Trans&CNN&RNN
2021	SleepPriorCL [65]				✓	✓	CNN
2021	TS-TCC [13]		✓		✓		CNN/Transformer
2021	TS-Transformer [14]			✓			Transformer Enc
2021	SSL-TS [66]			✓	✓		Transformer Enc
2021	InfoTS [67]				✓		TCN
2021	TabBERT [68]			✓			Transformer Enc
2021	TabAConvBERT [69]			✓			Transformer Enc
2021	TERA [70]			✓			Transformer Enc
2021	AdaRNN [71]		✓				RNN
2022	TSSN [72]			✓			Transformer Enc
2022	ST-GSP [73]			✓			Transformer Enc
2022	CoST [16]				✓		TCN
2022	TS2Vec [15]				✓		TCN
2022	BTSF [74]				✓		TCN
2022	STEP [75]			✓			Transformer&GNN
2022	TARNet [76]			✓			Transformer
2022	ST-GFSL [77]		✓				RNN
2022	ExpCLR [17]				✓		TCN
2022	TimeHetNet [78]		✓				CNN&RNN
2022	CRT [79]	✓					Transformer Enc
2022	SPGN [80]	✓					CNN
2022	TF-C [18]				✓		CNN
2023	SLVM [19]		✓				RNN
2023	CLUDA [20]				✓		TCN
2023	PatchTST [21]			✓			Transformer Enc
2023	DCdetector [22]				✓		Transformer Enc
2023	SimMTM [23]			✓			Transformer&CNN
2023	STPT [24]				✓		Transformer Enc
2023	TriD-MAE [81]			✓			TCN
2024	TimesURL [25]				✓		TCN
2024	TimeSiam [26]			✓			Transformer&TCN
2024	UP2ME [27]			✓			Transformer
2024	TSLANet [28]			✓			CNN
2024	MOMENT [29]			✓			Transformer Enc
2024	Timer [30]		✓				Transformer
2024	MOIRAI [31]		✓				Transformer
2024	TimesFM [32]		✓				Transformer

ries for learning representations on unlabeled data. We use the open source code from https://github.com/haoyfan/SelfTime for experimental analysis.

TS-TCC: Eldele et al. [13] proposed an unsupervised **T**ime **S**eries representation learning framework via **T**emporal and **C**ontextual **C**ontrasting (**TS-TCC**), thus learning feature representations of unlabeled time series. We use the open source code from https://github.com/emadeldeen24/TS-TCC for experimental analysis.

TST: Zerveas et al. [14] first proposed a multivariate time series unsupervised representation learning framework called **T**ime **S**eries **T**ransformer (**TST**). We use the open source code from https://github.com/gzerveas/mvts_transformer for experimental analysis.

TS2Vec: Yue et al. [15] proposed a general framework for time series representation learning in an arbitrary semantic level called **TS2Vec**. For the time series classification task, the authors employed TCN as the backbone and the low-dimensional feature representation obtained from TCN to input into an SVM classifier with RBF kernel for classification. We use the open source code from https://github.com/yuezhihan/ts2vec for experimental analysis.

TimesNet: Wu et al. [84] propose TimesNet with TimesBlock to identify multiple periods and capture temporal 2D-variations from transformed 2D tensors using a parameter-efficient inception block. For the classification task, we employ TimesNet as a backbone for fully supervised training to analyze the potential in time series pre-training. We use the open source code from https://github.com/thuml/TimesNet for experimental analysis.

PatchTST: Nie et al. [21] segment time series into patches and assume channels are independent for multivariate time series forecasting and self-supervised representation learning via a reconstruction-based pre-training strategy. Given that GPT4TS [86] has employed similar patch and channel-independent strategies for fine-tuning, to reduce training time in the classification experiments, we utilize only the patches strategy and channel-independent strategy by combining a transformer for fully supervised training. We use the open source code from https://github.com/yuqinie98/PatchTST for experimental analysis.

GPT4TS: Zhou et al. [86] present a unified framework for time-series modeling using pre-trained Large Language Models (LLMs). Specifically, GPT4TS employs the same patch and channel-independent strategies in PatchTST [21] for LLMs fine-tuning for time series downstream tasks. We use the open source code from https://github.com/DAMO-DI-ML/NeurIPS2023-One-Fits-All for experimental analysis.

2) Time-Series Forecasting: TS2Vec: Yue et al. [15] employed TCN as the backbone and the data from the last T observations to predict the observations for the next H timestamps for the time series forecasting task. We use the open source code from https://github.com/yuezhihan/ts2vec for experimental analysis.

CoST: Woo et al. [16] proposed a representation learning framework for long time series forecasting, called **CoST**, which utilizes contrastive learning to learn time series disentangled seasonal-trend representations. We use the open source code from https://github.com/salesforce/CoST for experimental analysis.

LongTrans: Li et al. [87] proposed a Transformer-based model for **Long** time series forecasting with convolutional self-attention and LogSparse **Trans**former (**LongTrans**) to capture the time series' local context and long-term dependencies information. We use the open source code from https://github.com/AIStream-Peelout/flow-forecast for experimental analysis.

TCN: Bai et al. [88]'s extensive experiments on the sequence modeling problem indicated that a simple convolutional architecture consisting of **T**emporal **C**onvolutional **N**etworks (**TCN**) outperformed canonical recurrent networks such as LSTMs for time series forecasting on different datasets. We use the open source code from https://github.com/locuslab/TCN for experimental analysis.

Informer: Zhou et al. [89] designed an efficient transformer-based model called **Informer** for long time series forecasting. We use the open source code from https://github.com/zhouhaoyi/Informer2020 for experimental analysis.

Autoformer: Wu et al. [90] designed **Autoformer** as a novel decomposition architecture with an Auto-Correlation mechanism for long time series forecasting. We use the open source code from https://github.com/thuml/autoformer for experimental analysis.

TimesNet: Wu et al. [84] propose TimesNet with TimesBlock to identify multiple periods and capture temporal 2D-variations from transformed 2D tensors using a parameter-efficient inception block. For the forecasting task, we employ TimesNet as a backbone for fully supervised training to analyze the potential in time series pre-training. We use the open source code from https://github.com/thuml/TimesNet for experimental analysis.

PatchTST: Nie et al. [21] propose an efficient design of Transformer-based models for multivariate time series forecasting and self-supervised representation learning. Given that GPT4TS [86] has employed similar patch and channel-independent strategies for fine-tuning, to reduce training time in the forecasting experiments, we utilize only the patches strategy and channel-independent strategy by combining a transformer for fully supervised training. We use the open source code from https://github.com/yuqinie98/PatchTST for experimental analysis.

DLinear: Zeng et al. [96] introduce a set of embarrassingly simple one-layer linear models named DLinear for long-term time series forecasting. Given that DLinear runs faster and achieves good performance in the forecasting task, we select it as a supervised baseline for experimental analysis. We use the open source code from https://github.com/vivva/DLinear for experimental analysis.

GPT4TS: Zhou et al. [86] introduce a unified framework for time series modeling utilizing pre-trained Large Language Models (LLMs). Specifically, GPT4TS employs the patch and channel-independent strategies from PatchTST [21] for fine-tuning LLMs on time series downstream tasks. We use the open source code from https://github.com/DAMO-DI-ML/NeurIPS2023-One-Fits-All for experimental analysis.

iTransformer: Liu et al. [97] propose to investigate why Transformer-based models do not seem to be as efficient as Linear-based models [96] for multivariate time series forecasting. Consequently, we select it as a supervised baseline for experimental analysis. We use the open source code from https://github.com/thuml/iTransformer for experimental analysis.

TEMPO: Cao et al. [98] propose TEMPO, which leverages a pre-trained language model for time-series forecasting tasks. The two main components of the proposed approach: the decomposition of time series into trend, seasonality, and residuals, as well as the prompt learning—effectively enhance the forecasting performance. We use the open source code from https://github.com/DC-research/TEMPO for experimental analysis.

3) Time-Series Anomaly Detection: TS2Vec: For the time-series anomaly detection task, Yue et al. [15] followed a streaming evaluation protocol [94] to perform point anomaly detection of time series. We use the open source code from https://github.com/yuezhihan/ts2vec for experimental analysis.

SPOT and DSPOT: Siffer et al. [91] proposed a time series anomaly detection method based on extreme value theory. The authors divided the proposed approach into two algorithms: **SPOT** for streaming data having any stationary distribution, and **DSPOT** for streaming data that can be subject to concept drift. We use the open source code from https://github.com/Amossys-team/SPOT for experimental analysis.

LSTM-VAE: Park et al. [92] proposed a **L**ong **S**hort-**T**erm **M**emory-based **V**ariational **a**uto**E**ncoder (**LSTM-VAE**) model for outlier detection of multimodal sensory signals. We use the open source code from https://github.com/SchindlerLiang/VAE-for-Anomaly-Detection for experimental analysis.

DONUT: Xu et al. [93] proposed an unsupervised anomaly detection algorithm based on a variational autoencoder called **DONUT**. We use the open source code from https://github.com/NetManAIOps/donut for experimental analysis.

SR: Ren et al. [94] proposed an algorithm based on **S**pectral **R**esidual (**SR**) and CNN for anomaly detection of time series. Since the authors do not provide the open source code, we use the experimental results on Yahoo and KPI datasets in the original paper for comparative analysis.

AT: Xu et al. [95] proposed **A**nomaly **T**ransformer (**AT**) with a new anomaly-attention mechanism for unsupervised detection of anomaly points in time series. We use the open source code from https://github.com/spencerbraun/anomaly_transformer_pytorch for experimental analysis.

TimesNet: Wu et al. [84] propose TimesNet, which incorporates TimesBlock to identify multiple periods and capture temporal 2D variations from transformed 2D tensors using a parameter-efficient inception block. For the anomaly detection task, we utilize TimesNet as a backbone to directly train and analyze its potential in time series pre-training. We use the open source code from https://github.com/thuml/TimesNet for experimental analysis.

GPT4TS: Zhou et al. [86] introduce a unified framework for time series modeling using pre-trained Large Language Models (LLMs). Specifically, GPT4TS applies the patch and channel-independent strategies from PatchTST [21] to fine-tune LLMs for time series anomaly detection. We use the open source code from https://github.com/DAMO-DI-ML/NeurIPS2023-One-Fits-All for experimental analysis.

DCdetector: Yang et al. [22] propose DCdetector, a multi-scale dual attention self-supervised contrastive representation learning model for time series anomaly detection. Specifically, DCdetector employs the patch strategy similar to PatchTST [21] to process raw time series data. We use the open source code from https://github.com/DAMO-DI-ML/KDD2023-DCdetector for experimental analysis.

For the above baselines in three major time-series mining tasks (classification, forecasting, and anomaly detection), we use uniform random seeds for the model's training. In addition, the dataset partitioning used by all baselines is kept consistent. Further, the hyperparameter settings of all baselines are set according to the parameters provided by the original authors, and the details can be found in our open-source code https://github.com/qianlima-lab/time-series-ptms.

D. Implementation Details

PTMs are usually trained in two stages. Firstly, supervised, unsupervised or self-supervised techniques are used to pre-train the base model on the source dataset. Then, the base model is fine-tuned using the training set of the target dataset. Finally, the base model is evaluated on the target test set to obtain the test results. However, there is no available benchmark large-scale well-labelled time series dataset. In other words, selecting a suitable source dataset to pre-train the encoder to obtain a positive transfer performance on the target dataset is difficult. To address the above issues, existing studies (e.g., TS2Vec [15], TST [14], TS-TCC [13], and CoST [16]) utilize self-supervised or unsupervised learning strategies to pre-train the base model using the target dataset and then fine-tune it on the target dataset. We conducted extensive experiments on two fronts to evaluate the effectiveness of existing TS-PTMs. On the one hand, we selected the UCR archive and four scenarios time series datasets for transfer learning using the selected source and target datasets, thus analyzing the performance of different pre-training techniques on the downstream classification task. On the other hand, following the strategy of studies in TS2Vec [15] and CoST [16], we compare and analyze the strategy (using the target dataset to pretrain the base model) on time-series downstream classification, forecasting, and anomaly detection tasks. Through extensive experiments, we aim to provide guidance for the study of pre-training paradigms, techniques for TS-PTMs on different downstream tasks.

For the time-series classification task, we normalize each series of the UCR and UEA datasets via z-score [99], and build FCN and TCN models using Pytorch according to the settings of [9], [99]. Adam is adopted as the optimizer with a learning rate of 0.001 and a maximum batch size of 128. The maximum epoch of the source UCR times series dataset for transfer learning is 2000, while the maximum epoch of the target UCR times series dataset is 1000. Also, a uniform early stopping rule is used for all baselines in training. The

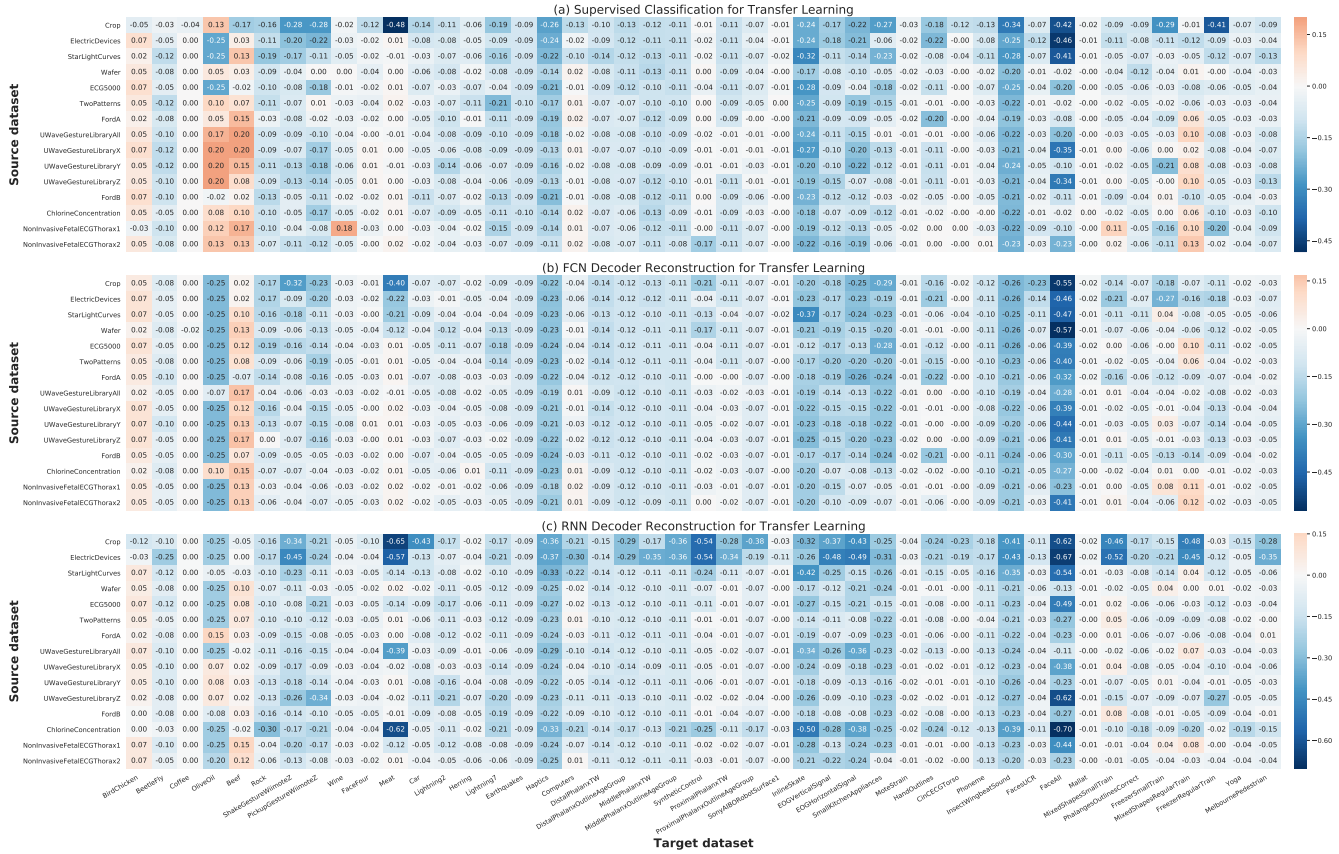


Fig. 1. Classification comparison results based on transfer learning. The values indicate the difference in classification accuracy on the FCN encoder with and without transfer learning. A value greater than zero indicates positive transfer, while a value less than zero indicates negative transfer. Red background is for positive values and blue for negative, with larger magnitude values more saturated.

maximum epoch of the source dataset of four independent time series scenarios (refer to Table VIII) is 40, while the maximum epoch of the corresponding target dataset is 100. For the classification accuracy of the target UCR time series, we use the average test accuracy on five-fold test sets by running one seed. For the classification accuracy of the target datasets on four independent time series scenarios, we use the average test accuracy on the test set by running ten different seeds. For the time-series forecasting and anomaly detection tasks, we follow the way of [15] to preprocess the datasets and set the hyperparameters. In addition, the comparative benchmark methods for time-series classification, forecasting, and anomaly detection tasks are reproduced and analyzed using the open-source codes provided by the original authors. To ensure the reproducibility of the experimental results, we use a uniform random seed for all baselines. Finally, all experiments are done on eight 1080Ti GPUs and two 3090 GPUs with Ubuntu 18.04 system. Also, the training times in the main experimental results are all run on 3090 GPUs.

TABLE VI
DETAILS OF THE SOURCE UCR TIME SERIES DATASETS USED FOR TRANSFER LEARNING.

ID	Dataset Name	Total Sample Size	Length	Class
1	Crop	24000	46	24
2	ElectricDevices	16637	96	7
3	StarLightCurves	9236	1024	3
4	Wafer	7164	152	2
5	ECG5000	5000	140	5
6	TwoPatterns	5000	128	4
7	FordA	4921	500	2
8	UWaveGestureLibraryAll	4478	945	8
9	UWaveGestureLibraryX	4478	315	8
10	UWaveGestureLibraryY	4478	315	8
11	UWaveGestureLibraryZ	4478	315	8
12	FordB	4446	500	2
13	ChlorineConcentration	4307	166	3
14	NonInvasiveFetalECGThorax1	3765	750	42
15	NonInvasiveFetalECGThorax2	3765	750	42

APPENDIX C
FULL RESULTS

A. Comparison of Transfer Learning PTMs based on Supervised Classification and Unsupervised Reconstruction

Advanced time series classification methods (i.e., TS-CHIEF [100], miniRocket [101], and OS-CNN [102]) methods either integrate multiple techniques or require finding the optimal hyperparameters in training and are not suitable as the backbone of PTMs. In recent years, related scholars have employed FCN [7], TCN [15], and Transformer [14] as the backbone for studying TS-PTMs. The test supervised classification accuracy of FCN, TCN, and Transformer on 128 UCR time series datasets is given in Table IX. To facilitate the layout and reading of the test classification results, the standard

TABLE VII
DETAILS OF THE TARGET UCR TIME SERIES DATASETS USED FOR TRANSFER LEARNING.

ID	Dataset Name	Total Sample Size	Length	Class
15 Minmum Sample Size Target Datasets				
1	BirdChicken	40	512	2
2	BeetleFly	40	512	2
3	Coffee	56	286	2
4	OliveOil	60	570	4
5	Beef	60	470	5
6	Rock	70	2844	4
7	ShakeGestureWiimoteZ	100	385	10
8	PickupGestureWiimoteZ	100	361	10
9	Wine	111	234	2
10	FaceFour	112	350	4
11	Meat	120	448	3
12	Car	120	577	4
13	Lightning2	121	637	2
14	Herring	128	512	2
15	Lightning7	143	319	7
15 Medium Sample Size Target Datasets				
ID	Dataset Name	Total Sample Size	Length	Class
1	Earthquakes	461	512	2
2	Haptics	463	1092	5
3	Computers	500	720	2
4	DistalPhalanxTW	539	80	6
5	DistalPhalanxOutlineAgeGroup	539	80	3
6	MiddlePhalanxTW	553	80	6
7	MiddlePhalanxOutlineAgeGroup	554	80	3
8	SyntheticControl	600	60	6
9	ProximalPhalanxTW	605	80	6
10	ProximalPhalanxOutlineAgeGroup	605	80	3
11	SonyAIBORobotSurface1	621	70	2
12	InlineSkate	650	1882	7
13	EOGHorizontalSignal	724	1250	12
14	EOGVerticalSignal	724	1250	12
15	SmallKitchenAppliances	750	720	3
15 Maxmum Sample Size Target Datasets				
ID	Dataset Name	Total Sample Size	Length	Class
1	MoteStrain	1272	84	2
2	HandOutlines	1370	2709	2
3	CinCECGTorso	1420	1639	4
4	Phoneme	2110	1024	39
5	InsectWingbeatSound	2200	256	11
6	FacesUCR	2250	131	14
7	FaceAll	2250	131	14
8	Mallat	2400	1024	8
9	MixedShapesSmallTrain	2525	1024	5
10	PhalangesOutlinesCorrect	2658	80	2
11	FreezerSmallTrain	2878	301	2
12	MixedShapesRegularTrain	2925	1024	5
13	FreezerRegularTrain	3000	301	2
14	Yoga	3300	426	2
15	MelbournePedestrian	3633	24	10

deviation of the classification accuracy for each dataset is not given in Table IX. Considering the training time and classification performance on 128 UCR time series datasets of the models (please refer to Table IX), we choose FCN for transfer learning. From the 128 UCR datasets, the 15 datasets with the largest numbers of samples are employed as source datasets. The FCN encoder is pre-trained using the supervised classification task or unsupervised reconstruction task combined with a decoder (symmetric FCN decoder or asymmetric RNN decoder). From the remaining 113 UCR datasets, we select a total of 45 time series datasets as target datasets for downstream classification task fine-tuning. 15 of them have the smallest numbers of samples, 15 of them have the largest numbers of samples, and 15 of them have the medium numbers of samples. For the datasets used in transfer learning PTMs, please refer to Tables VI, VII, and VIII. For the source dataset, we employ all samples to pre-train the FCN encoder. Using the five-fold cross-validation strategy, each target dataset contains five different training sets, and so we performed five fine-tunings for analysis. For each transfer strategy, $15 \times 15 = 225$ sets of transfer results (15 source datasets, 15 target datasets) are obtained for each target dataset sample size (minimum, medium, and maximum). The detailed transfer learning results are shown in Fig. 1.

B. Comparison of TS-PTMs on Classification

The pre-training test classification accuracy using transformer-based and contrastive learning on 128 UCR and 30 UEA time series datasets are shown in Tables X and XI. Also, for the convenience of layout and reading of the test classification results, the standard deviations of the classification performance evaluated for each dataset are not given in Tables X and XI.

1) Visualization on the classification task: In this section, we use the Class Activation Map (CAM) [103] and heatmap [15] for visualization of the time series classification models. CAM is a way to visualize CNNs and analyze which regions of the input data the CNN-based model focuses on. The heatmap is used in [15] to analyze the heat distribution of the 16-dimensional variables with the largest variance among the feature variables, thus assisting to analyze the trend of the time series. Hence, the ability of the model to capture the change in time series distributions can be measured based on the heat distribution. We employ the validation sets from the five-fold cross-validation strategy to select models for all comparison settings. Among the five models for analysis, we choose the one with the most significant visualization difference to highlight the visualization.

The Gunpoint dataset in the UCR archive contains two types of series, representing a male or female performing two actions (using a replica gun or finger to point to the target) [104]. Fawaz et al. [99] employed the Gunpoint dataset for CAM visualization due to its 100% classification accuracy on FCN, low noise, and containing only two types of data. Therefore, we perform a CAM visualization on the Gunpoint dataset, as shown in Fig. 2.

We select the sample with the smallest variance in each class of series in the Gunpoint dataset for the CAM visualization. As shown in Fig. 2, the above two series are discriminative between the two fragments at [45, 60] and [90, 105]. The direct classification using FCN can learn the discriminative subseries information between the two class of series well. However, when the TCN is utilized for direct classification, only one class of series is marked in red (on the fragment [90, 105]), while the other class is marked in blue, resulting in low classification performance. Meanwhile, we select UWaveGestureLibraryX as the source dataset for transfer learning of the Gunpoint dataset. Regarding the supervised classification-based transfer strategy, the FCN model can simultaneously make the two classes of series marked in red for the [90, 105] fragment. For the unsupervised transfer strategy, the FCN model can make one class of series marked in dark red on the

TABLE VIII
THE DETAILED INFORMATION OF FOUR INDEPENDENT TIME SERIES SCENARIOS DATASETS. FOR COLUMN *Samples*, *Train* IS THE TRAINING SET, *Val* IS THE VALIDATION SET, AND *Test* IS THE TEST SET.

Scenario	Transfer Learning	Dataset	# Samples	# Channels	# Classes	# Length
Neurological Stage Detection	Pre-training (Source)	SleepEEG	Train (371055)	1	5	200
	Fine-turning (Target)	Epilepsy	Train (60), Val (20), Test (11420)	1	2	178
Mechanical Device Diagnosis	Pre-training (Source)	FD-A	Train (8184)	1	3	5120
	Fine-turning (Target)	FD-B	Train (60), Val (21), Test (13559)	1	3	5120
Activity Recognition	Pre-training (Source)	HAR	Train (10299)	9	6	128
	Fine-turning (Target)	Gesture	Train (320), Val (120), Test (120)	3	8	315
Physical Status Monitoring	Pre-training (Source)	ECG	Train (43673)	1	4	1500
	Fine-turning (Target)	EMG	Train (122), Val (41), Test (41)	1	3	1500

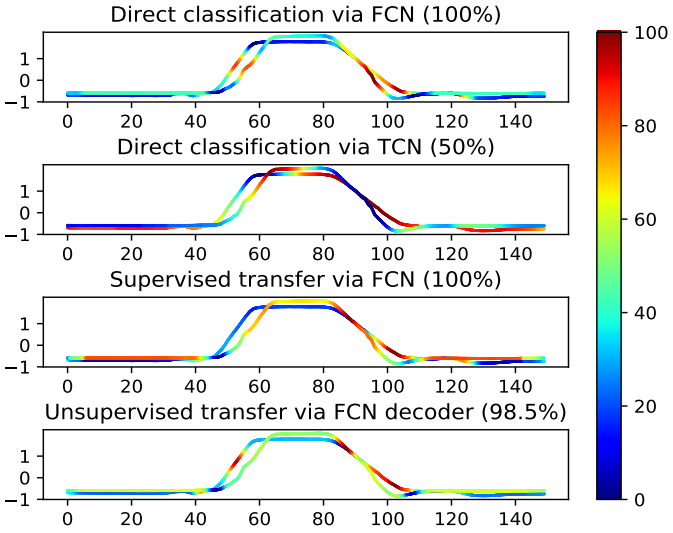
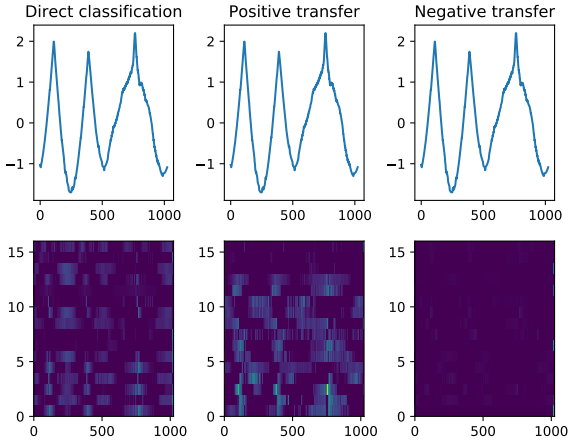
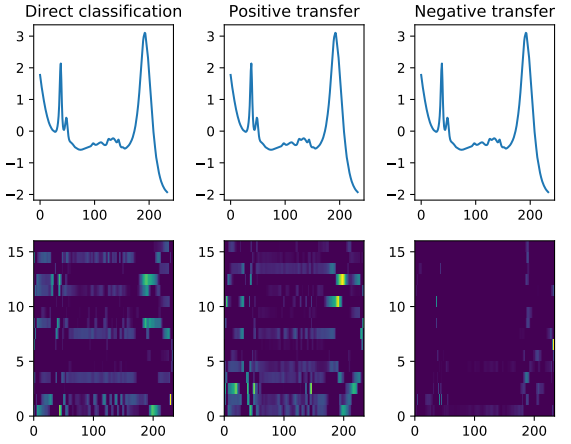


Fig. 2. Visualization of the Gunpoint dataset using CAM. For the discriminative features learned by the CNN-based model, red represents high contribution, blue indicates almost no contribution, and yellow is medium contribution (each subplot title gives the accuracy).



(a) MixedShapesSmallTrain



(b) Wine

Fig. 3. Comparison of positive and negative transfer based on supervised classification using the MixedShapesSmallTrain and Wine dataset.

[45, 60] and [90, 105] fragments, and another class of series marked in yellow on the [45, 60] and [90, 105] fragments.

The MixedShapesSmallTrain and Wine datasets from the UCR archive are selected as the target datasets to analyze the learning of positive and negative transfer on time-series classification. Based on the classification results of transfer learning in Fig. 1 in the Appendix, we select the source datasets with the best accuracy for positive transfer and the worst accuracy for negative transfer. From Fig. 3, the heat distribution of the variable with the largest 16-dimensional variance obtained by direct classification and positive transfer is more similar to the trend of the original time series, while the negative transfer is difficult to present a heat distribution that matches the trend of the original time series. The heatmap visualization indicates that negative transfer may make it difficult for the model to capture the dynamic change information of the original time series, leading to degraded classification performance.

C. Details of Results on Time-Series Forecasting

The detailed test results of prediction lengths on time series forecasting tasks are presented in Table XII. For the ETTh1, ETTh2, ETTm1, and Electricity datasets, we selected the prediction lengths and train-val-test set configurations based on the experimental settings of TSVec [15] and CoST [16]. For the ETTm2, Traffic, Weather, Exchange, and National Illness (ILI) datasets, we followed the experimental settings of TimesNet [84] to determine the appropriate prediction lengths and train-val-test set configurations for analysis. In addition, for the LogTrans, TCN, Informer, Autformer, PatchTST, DLin-

TABLE IX
TEST CLASSIFICATION ACCURACY USING FCN, TCN, AND TRANSFORMER FOR DIRECTLY SUPERVISED CLASSIFICATION TRAINING ON 128 UCR DATASETS.

ID	Dataset	FCN	TCN (three layers)	TCN (ten layers)	Transformer
1	ACSF1	**0.6250**	0.3950	0.5400	0.3450
2	Adiac	**0.6492**	0.2549	0.2894	0.6415
3	AllGestureWiimoteX	**0.7110**	0.2370	0.6630	0.3720
4	AllGestureWiimoteY	0.6740	0.4980	**0.6960**	0.4950
5	AllGestureWiimoteZ	**0.7200**	0.7050	0.6300	0.3380
6	ArrowHead	**0.8958**	0.3838	0.3838	0.8676
7	Beef	0.6000	0.3167	0.4167	**0.6500**
8	BeetleFly	0.8250	0.6500	0.7000	**0.8500**
9	BirdChicken	0.9250	0.6250	0.8500	**0.9944**
10	BME	0.7833	0.9944	**1.0000**	0.7167
11	Car	0.9417	0.8750	0.9417	**1.0000**
12	CBF	**1.0000**	**1.0000**	**1.0000**	0.7250
13	Chinatown	0.9753	0.9808	**0.9836**	**0.9836**
14	ChlorineConcentration	**0.9984**	0.5356	0.5407	0.9970
15	CinCECGTorso	**0.9986**	0.9915	0.9500	0.9951
16	Coffee	**1.0000**	**1.0000**	**1.0000**	**1.0000**
17	Computers	**0.8800**	0.8740	0.5000	0.6680
18	CricketX	**0.9064**	0.7615	0.6974	0.5513
19	CricketY	**0.9000**	0.6551	0.7013	0.5526
20	CricketZ	**0.8833**	0.8026	0.7679	0.5641
21	Crop	0.1312	0.0417	0.0417	**0.7239**
22	DiatomSizeReduction	**0.9969**	0.8913	0.6569	**0.9969**
23	DistalPhalanxOutlineAgeGroup	**0.9091**	0.5974	0.8032	0.8107
24	DistalPhalanxOutlineCorrect	0.8917	**0.9020**	0.8962	0.8185
25	DistalPhalanxTW	**0.8423**	0.4731	0.4731	0.7792
26	DodgerLoopDay	0.7486	**0.7990**	0.2833	0.4869
27	DodgerLoopGame	0.8167	0.5190	0.5190	**0.8798**
28	DodgerLoopWeekend	0.9812	0.7089	0.7089	**0.9871**
29	Earthquakes	**0.8482**	0.7983	0.7983	0.5995
30	ECG200	0.9350	**0.9400**	0.6650	0.7374
31	ECG5000	**0.9258**	0.5838	0.5380	0.8750
32	ECGFiveDays	**1.0000**	**1.0000**	**1.0000**	0.9494
33	ElectricDevices	**0.6731**	0.1845	0.2633	0.5428
34	EOGHorizontalSignal	0.7376	0.5347	0.7336	**1.0000**
35	EOGVerticalSignal	0.6519	0.7003	0.7514	**0.8053**
36	EthanolLevel	0.8307	0.3717	**0.9154**	0.2720
37	FaceAll	0.9462	**0.9911**	0.9711	0.9556
38	FaceFour	0.9557	**0.9913**	0.9648	0.9296
39	FacesUCR	**0.9969**	0.9893	0.9876	0.9618
40	FiftyWords	0.5072	0.2155	0.4243	**0.6740**
41	Fish	**0.9686**	0.4086	0.9400	0.8086
42	FordA	**0.9734**	0.9651	0.9705	0.5237
43	FordB	0.9312	0.9517	**0.9559**	0.5461
44	FreezerRegularTrain	0.9790	0.5000	0.5000	**0.9987**
45	FreezerSmallTrain	0.8359	0.5000	0.5000	**0.9997**
46	Fungi	0.9118	0.3987	0.0980	**1.0000**
47	GestureMidAirD1	**0.6954**	0.2781	0.4621	0.5087
48	GestureMidAirD2	**0.5860**	0.2930	0.4650	0.4972
49	GestureMidAirD3	**0.3819**	0.2486	0.3407	0.2694
50	GesturePebbleZ1	**0.9541**	0.5330	0.8852	0.6875
51	GesturePebbleZ2	**0.9343**	0.3584	0.3185	0.6615
52	GunPoint	**1.0000**	0.9950	0.5900	0.9900
53	GunPointAgeSpan	**0.9956**	**0.9956**	**0.9956**	0.9822
54	GunPointMaleVersusFemale	0.9978	0.9956	0.9978	**1.0000**
55	GunPointOldVersusYoung	**0.9934**	0.9823	0.9557	0.9756
56	Ham	0.6632	0.8828	**0.9442**	0.8750
57	HandOutlines	**0.8956**	0.6752	0.6387	0.8757
58	Haptics	0.6158	0.5623	**0.7261**	0.4083
59	Herring	**0.6406**	0.5938	0.6092	0.6243
60	HouseTwenty	**0.9875**	0.5597	0.5597	0.7292
61	InlineSkate	0.7046	0.4923	**0.8169**	0.3369
62	InsectEPGRegularTrain	**0.9935**	0.8232	0.9457	0.7651
63	InsectEPGSmallTrain	**0.8761**	0.8270	0.6836	0.7971
64	InsectWingbeatSound	0.7309	**0.7527**	0.7364	0.6691
65	ItalyPowerDemand	**0.9891**	0.9781	0.9754	0.9735
66	LargeKitchenAppliances	**0.9507**	0.7680	0.8707	0.5187
67	Lightning2	0.7940	0.6113	**0.8843**	0.7593
68	Lightning7	**0.8406**	0.2655	0.8123	0.6352
69	Mallat	**0.9975**	0.9858	0.8213	0.9800
70	Meat	0.9667	0.4417	0.3917	**0.9917**
71	MedicalImages	**0.8397**	0.5206	0.5206	0.7388
72	MelbournePedestrian	0.8145	0.8748	**0.9219**	0.8792
73	MiddlePhalanxOutlineAgeGroup	**0.8177**	0.7635	0.7274	0.7383
74	MiddlePhalanxOutlineCorrect	0.8834	**0.9372**	0.9092	0.8451
75	MiddlePhalanxTW	**0.7074**	0.5967	0.5967	0.6184
76	MixedShapesRegularTrain	0.7463	0.2010	0.1908	**0.8732**
77	MixedShapesSmallTrain	0.7339	0.1893	0.1893	**0.8745**
78	MoteStrain	**0.9819**	0.9811	0.9772	0.9584
79	NonInvasiveFetalECGThorax1	**0.8542**	0.3057	0.4167	0.8510
80	NonInvasiveFetalECGThorax2	0.8093	0.5216	0.4733	**0.8951**
81	OliveOil	**0.7000**	0.5000	0.4667	0.4955
82	OSULeaf	**0.9887**	0.6668	0.9167	0.8667
83	PhalangesOutlinesCorrect	0.8691	0.9079	**0.9090**	0.1469
84	Phoneme	0.3019	0.1128	0.1128	**0.5600**
85	PickupGestureWiimoteZ	**0.7800**	0.6300	0.6700	0.0352
86	PigAirwayPressure	0.1091	0.0706	0.0351	**0.1345**
87	PigArtPressure	**0.5164**	0.1251	0.0446	0.0607
88	PigCVP	0.4822	0.1764	0.0446	**0.5708**
89	PLAID	0.4348	0.4004	0.4321	**0.8295**
90	Plane	**1.0000**	**1.0000**	0.6524	0.9857
91	PowerCons	0.9139	0.9222	**0.9694**	0.9528
92	ProximalPhalanxOutlineAgeGroup	**0.8727**	0.7818	0.7884	0.8496
93	ProximalPhalanxOutlineCorrect	0.9214	0.9181	**0.9237**	0.8833
94	ProximalPhalanxTW	0.8083	0.7074	0.4165	**0.8182**
95	RefrigerationDevices	0.5747	0.7307	**0.7640**	0.4013
96	Rock	0.6429	**0.7000**	0.3714	0.6571
97	ScreenType	0.6093	**0.7573**	0.7240	0.4373
98	SemgHandGenderCh2	**0.9378**	0.6111	0.6000	0.8422
99	SemgHandMovementCh2	**0.7156**	0.6444	0.5711	0.4122
100	SemgHandSubjectCh2	0.6922	0.3889	**0.7744**	0.7567
101	ShakeGestureWiimoteZ	**0.9200**	0.3700	0.6600	0.5300
102	ShapeletSim	**0.9700**	0.5000	0.5000	0.4550
103	ShapesAll	**0.7267**	0.2750	0.5250	0.6675
104	SmallKitchenAppliances	**0.7987**	0.3480	0.3333	0.5320
105	SmoothSubspace	0.9467	0.9433	0.9600	**0.9800**
106	SonyAIBORobotSurface1	**0.9984**	0.9952	0.9888	0.9952
107	SonyAIBORobotSurface2	**0.9990**	0.9980	0.9908	0.9643
108	StarLightCurves	**0.9803**	0.8555	0.6883	0.9153
109	Strawberry	**0.9756**	0.9705	0.9654	0.9613
110	SwedishLeaf	**0.9929**	0.9040	0.7884	0.8880
111	Symbols	**0.9961**	0.8206	0.9843	0.9529
112	SyntheticControl	**0.9700**	0.5000	0.8283	**0.9700**
113	ToeSegmentation1	**0.9664**	0.9518	0.5628	0.6864
114	ToeSegmentation2	**0.9282**	0.7471	0.7471	0.8316
115	Trace	**1.0000**	**1.0000**	**1.0000**	**1.0000**
116	TwoLeadECG	**1.0000**	0.9991	0.9991	**1.0000**
117	TwoPatterns	0.9454	0.6958	0.5568	**0.9862**
118	UMD	0.8778	0.3333	0.9944	**1.0000**
119	UWaveGestureLibraryAll	0.9245	0.9359	**0.9884**	0.8957
120	UWaveGestureLibraryX	0.8665	0.8761	**0.9134**	0.7347
121	UWaveGestureLibraryY	0.7906	0.8091	**0.8627**	0.6876
122	UWaveGestureLibraryZ	0.8484	0.8569	**0.8629**	0.6648
123	Wafer	**1.0000**	0.8936	0.8936	0.9987
124	Wine	0.5411	0.5316	0.5229	**0.7012**
125	WordSynonyms	0.5967	0.2210	0.2210	**0.6243**
126	Worms	**0.7906**	0.4225	0.4225	0.4028
127	WormsTwoClass	0.8025	**0.8528**	0.5968	0.5504
128	Yoga	0.9718	0.9645	**0.9788**	0.8906
	Avg Acc	**0.8296**	0.6610	0.6835	0.7415
	Avg Rank	**1.68**	2.74	2.64	2.56
	P-value	-	1.38E-16	1.44E-13	5.41E-07
	Training Time (hours)	4.87	**3.06**	10.99	263.48

ear, GPT4TS, TEMPO, and iTransformer models, we adhere to the unified settings for the maximum number of epochs as used in TimesNet for our experimental analysis. For other parameters, we follow the default settings of the respective models to ensure consistency in our experimental analysis.

D. Details of Results on Time-Series Anomaly Detection

We select SPOT, DSPOT, LSTM-VAE, DOUNT, AI, TS2Vec, TimesNet, GPT4TS, and DCdetector for time series anomaly detection analysis. Due to memory or training errors, TimesNet, GPT4TS, and DCdetector could not obtain results on the Yahoo and KPI datasets; therefore, we provide the test results for the remaining six methods on these datasets. The detailed test results for time series anomaly detection on the UCR anomaly detection archive are presented in the following tables: Table XIII (F1-score), Table XIV (Precision), Table XV (Recall), Table XVI (Aff-P), Table XVII (Aff-R), Table XVIII (R_A_R), Table XIX (R_A_P), Table XX (V_ROC), Table XXI (V_PR), Table XXII (F1-PA-10), Table XXIII (F1-PA-50), and Table XXIV (F1-PA-90). The *UCR ID* column in these tables refers to the dataset IDs in the UCR anomaly detection archive. In addition, for the four datasets with IDs [79, 108, 187, 203] in the UCR anomaly detection archive, we uniformly set their experimental results to zero because their true labels contain no anomalous data points. This absence leads to errors in calculating nine assessment metrics, aside from F1, P, and R metrics, by the relevant methods. To reasonably analyze the performance of different methods on the UCR anomaly detection archive, we use the number of the most recent performance datasets (Win) for statistical analysis to avoid errors introduced by the large discrepancies in assessment indicator values across different datasets. Also, detailed test results for time series anomaly detection on seven multivariate datasets are presented in Table XXV.

TABLE X
TEST CLASSIFICATION ACCURACY USING DIFFERENT TIME SERIES PTMS ON 128 UCR DATASETS. THE BEST RESULTS ARE IN BOLD.

ID	Dataset	Supervised (FCN)	T-Loss	Selftime	TS-TCC	TST	TS2Vec	TimesNet	PatchTST	GPT4TS
1	ACSF1	0.6250	0.8050	0.7250	0.5700	0.7050	**0.8800**	0.6000	0.7600	0.6200
2	Adiac	0.6492	0.7811	0.7322	0.4003	0.7363	0.8066	0.8082	**0.8358**	0.8069
3	AllGestureWiimoteX	0.7110	0.7170	0.6461	0.7201	0.5280	**0.7820**	0.5120	0.5730	0.7220
4	AllGestureWiimoteY	0.6740	0.8110	0.7170	0.7615	0.3850	**0.8400**	0.5820	0.6730	0.7800
5	AllGestureWiimoteZ	0.7200	0.7470	0.6485	0.6567	0.4780	**0.7730**	0.6620	0.5890	0.7300
6	ArrowHead	**0.8958**	0.8770	0.8155	0.8200	0.8722	0.8908	0.7821	0.7078	0.8348
8	Beef	0.8250	0.8750	0.5167	0.6333	0.6667	0.6833	0.8000	0.4167	**0.9333**
9	BeetleFly	0.9250	**0.9750**	0.8000	0.6250	0.6750	0.9250	0.7000	0.8500	0.7250
10	BirdChicken	0.7833	**0.9833**	0.9000	0.6750	0.8500	0.9750	0.8250	0.8500	0.7500
7	BME	0.6000	0.5333	0.9722	0.9889	0.9722	**0.9944**	0.9778	0.9500	0.9611
12	Car	**1.0000**	**1.0000**	0.6583	0.7167	0.7583	0.8833	0.8417	0.9083	0.9000
11	CBF	0.9417	0.8250	0.9936	0.9967	0.9946	**1.0000**	**1.0000**	**1.0000**	0.9978
13	Chinatown	0.9753	0.9807	0.9669	0.9507	0.9699	0.9726	**0.9863**	0.9836	**0.9863**
14	ChlorineConcentration	0.9984	0.9988	0.6116	0.8424	0.9974	**0.9998**	0.9993	0.9995	**0.9998**
15	CinCECGTorso	0.9986	0.9944	0.9877	0.9995	0.9993	0.9972	0.9930	**1.0000**	0.9930
16	Coffee	**1.0000**	0.9818	0.9273	0.9455	0.8758	**1.0000**	**1.0000**	**1.0000**	**1.0000**
17	Computers	**0.8800**	0.7140	0.7920	0.6080	0.6880	0.6940	0.8120	0.8380	0.8080
18	CricketX	**0.9064**	0.7795	0.7316	0.7327	0.7026	0.8321	0.7974	0.7821	0.7910
19	CricketY	**0.9000**	0.7487	0.6904	0.7161	0.6962	0.8256	0.7808	0.7821	0.8026
20	CricketZ	**0.8833**	0.7833	0.7411	0.7384	0.6936	0.8487	0.7962	0.7923	0.8026
21	Crop	0.1312	0.7063	0.6634	0.7801	0.7709	0.7448	0.8503	0.1193	**0.8764**
22	DiatomSizeReduction	0.9969	0.9969	0.9723	0.9783	**1.0000**	0.9969	0.9938	**1.0000**	0.9907
23	DistalPhalanxOutlineAgeGroup	**0.9091**	0.8274	0.7959	0.8200	0.8404	0.8125	0.8590	0.8779	0.8890
24	DistalPhalanxOutlineCorrect	0.8917	0.8471	0.7895	0.7646	0.8254	0.8185	0.8860	**0.9009**	0.8929
25	DistalPhalanxTW	0.8423	0.7421	0.7514	0.7755	0.7551	0.7792	**0.8499**	0.8485	0.8263
26	DodgerLoopDay	**0.7486**	0.4819	0.4742	0.5885	0.5377	0.6391	0.7107	0.6694	0.7403
27	DodgerLoopGame	0.8167	0.8921	0.8282	0.8857	0.8988	**0.9563**	0.8484	0.8872	0.9001
28	DodgerLoopWeekend	**0.9812**	0.9677	0.9681	0.9742	0.9679	**0.9812**	0.9688	0.9492	0.9165
34	Earthquakes	0.7376	0.7417	0.7983	0.7505	0.7961	0.7983	**0.9136**	0.9115	0.9052
29	ECG200	0.8482	0.7983	0.7900	0.7950	0.8600	0.8800	**0.9100**	0.8763	0.8951
30	ECG5000	0.9350	0.8500	0.9317	0.9525	0.9502	0.9528	0.9708	0.9364	**0.9746**
31	ECGFiveDays	0.9258	0.9478	0.9873	0.9972	0.9977	**1.0000**	**1.0000**	**1.0000**	0.9978
35	ElectricDevices	0.6519	0.6547	0.7173	0.8639	0.8758	**0.8848**	0.8610	0.4883	0.8610
32	EOGHorizontalSignal	**1.0000**	**1.0000**	0.7579	0.6295	0.6781	0.7279	0.6092	0.8010	0.7581
33	EOGVerticalSignal	0.6731	**0.8736**	0.6774	0.6190	0.4806	0.6519	0.6369	0.8013	0.7804
36	EthanolLevel	0.8307	0.5627	0.4864	0.2985	0.7919	0.5897	0.7690	0.7248	**0.8337**
37	FaceAll	0.9462	0.9720	0.9552	**0.9914**	0.9720	0.9871	0.9733	0.8057	0.9877
38	FaceFour	0.9557	0.9281	0.8830	0.9379	0.9375	0.9640	0.9557	0.9068	**0.9826**
39	FacesUCR	**0.9969**	0.9729	0.9544	0.9899	0.9702	0.9902	0.9800	0.9824	0.9796
40	FiftyWords	0.5072	0.8088	0.6705	0.7628	0.7381	0.8022	0.8276	**0.8417**	0.7709
41	Fish	**0.9686**	0.8743	0.8514	0.8114	0.8628	0.9343	0.8000	0.9343	0.9143
42	FordA	**0.9734**	0.9114	0.8787	0.9342	0.8990	0.9303	0.9348	0.9500	0.9403
43	FordB	0.9312	0.9035	0.8771	0.9087	0.8650	0.9132	0.9046	**0.9377**	0.9287
44	FreezerRegularTrain	0.9790	0.9980	0.9974	0.9969	0.9987	0.9977	**0.9990**	0.9393	0.9987
45	FreezerSmallTrain	0.8359	0.9965	0.9975	0.9966	0.9979	0.9969	0.9969	0.8492	**0.9983**
46	Fungi	0.9118	**1.0000**	0.9316	0.9557	0.9902	**1.0000**	0.8337	0.7276	0.9049
47	GestureMidAirD1	0.6954	0.5919	**0.7067**	0.6120	0.6181	0.6479	0.6099	0.6103	0.6449
48	GestureMidAirD2	**0.5860**	0.4973	0.5504	0.4853	0.5475	0.5270	0.5449	0.5692	0.5410
49	GestureMidAirD3	0.3819	0.3108	0.3664	0.3137	0.3462	0.3315	0.4559	0.4962	**0.5282**
50	GesturePebbleZ1	**0.9541**	0.6420	0.9043	0.8977	0.7761	0.9507	**0.9541**	0.8316	0.9158
51	GesturePebbleZ2	0.9343	0.6614	0.8817	0.8914	0.8159	**0.9473**	0.8850	0.7800	0.9382
52	GunPoint	**1.0000**	0.9850	0.9550	0.9500	0.9700	0.9950	0.9850	0.9800	0.9800
53	GunPointAgeSpan	**0.9956**	0.9756	0.9800	0.9578	0.9778	0.9889	0.9823	0.9889	0.9890
54	GunPointMaleVersusFemale	0.9978	0.9911	0.9845	0.9823	0.9867	0.9956	0.9956	**1.0000**	0.9956
55	GunPointOldVersusYoung	0.9934	0.9468	0.9490	0.9512	0.9667	**0.9956**	0.9800	0.9912	0.9691
56	Ham	0.6632	0.8080	0.7193	0.8275	0.8450	0.8741	0.9023	0.5420	**0.9349**
57	HandOutlines	0.8956	0.9073	0.8425	0.8657	0.7170	0.9168	0.9029	**0.9350**	0.8956
58	Haptics	0.6158	0.4879	0.4730	0.4990	0.4794	0.5594	0.6422	0.6672	**0.6842**
59	Herring	0.6406	0.5929	0.6086	0.5452	0.6400	0.6806	0.6560	0.7604	**0.8003**
60	HouseTwenty	**0.9875**	0.8935	0.9746	0.8244	0.7673	0.9496	0.8615	0.8617	0.8683
61	InlineSkate	0.7046	0.6354	0.1922	0.4172	0.4754	0.6415	0.5369	**0.8985**	0.6499
62	InsectEPGRegularTrain	**0.9935**	0.9839	0.9616	0.8554	0.8327	0.9807	0.8267	0.9617	0.8307
63	InsectEPGSmallTrain	0.8761	**0.9850**	0.9774	0.8308	0.8235	0.9699	0.8011	0.9511	0.8198
64	InsectWingbeatSound	0.7309	0.6673	0.6092	0.7119	0.6982	0.7077	0.7355	**0.8609**	0.8518
65	ItalyPowerDemand	**0.9891**	0.9671	0.9674	0.9660	0.9726	0.9745	0.9863	0.9827	0.9818
66	LargeKitchenAppliances	**0.9507**	0.8907	0.9403	0.7401	0.5693	0.9147	0.7520	0.8253	0.6747
67	Lightning2	0.7940	**0.9090**	0.7860	0.7187	0.6787	0.9010	0.8937	0.8219	0.8946
68	Lightning7	0.8406	**0.8596**	0.7419	0.7419	0.7059	0.8389	0.8264	0.7025	0.8378
69	Mallat	0.9975	0.9875	0.9901	0.9857	0.9954	0.9962	0.9954	**0.9996**	0.9983
70	Meat	0.9667	**1.0000**	0.8917	0.5417	0.9833	**1.0000**	**1.0000**	0.9750	**1.0000**
71	MedicalImages	0.8397	0.8291	0.7530	0.8175	0.8010	0.8431	0.8677	**0.8823**	0.8772
72	MelbournePedestrian	0.8145	0.8489	0.8485	0.9141	0.5888	0.8986	**0.9567**	0.6573	0.9321
73	MiddlePhalanxOutlineAgeGroup	**0.8177**	0.7544	0.7527	0.7563	0.7600	0.7347	0.8140	0.8092	0.7692
74	MiddlePhalanxOutlineCorrect	0.8834	0.8294	0.7936	0.7838	0.8507	0.8507	**0.9339**	0.9170	0.8924
75	MiddlePhalanxTW	0.7074	0.6202	0.6184	0.6256	0.6456	0.6455	0.7309	**0.7611**	0.7027
76	MixedShapesRegularTrain	0.7463	0.9586	0.9580	0.9310	0.9296	0.9450	0.9053	0.7318	**0.9645**
77	MixedShapesSmallTrain	0.7339	0.9541	0.9530	0.9255	0.9275	0.9410	0.9038	0.6924	**0.9545**
78	MoteStrain	**0.9819**	0.9670	0.9505	0.9435	0.9772	0.9717	0.9623	0.9757	0.9694
79	NonInvasiveFetalECGThorax1	0.8542	0.9384	0.8799	0.9253	0.9129	0.9392	0.9349	0.9504	**0.9639**
80	NonInvasiveFetalECGThorax2	0.8093	0.9461	0.9012	0.9400	0.9286	0.9490	0.9575	0.9451	**0.9657**
82	OliveOil	**0.9887**	0.8304	0.5333	0.4000	0.5334	0.8500	0.8500	0.6967	0.9000
81	OSULeaf	0.7000	0.8833	0.8370	0.6493	0.6111	**0.8937**	0.8127	0.8799	0.8085
84	PhalangesOutlinesCorrect	0.3019	0.3664	0.7466	0.7803	0.8423	0.8439	**0.9316**	0.8619	0.8548
85	Phoneme	**0.7800**	0.7200	0.4144	0.3587	0.1929	0.4204	0.1981	0.2781	0.5569
86	PickupGestureWiimoteZ	0.1091	0.1700	0.8000	0.7800	0.6200	**0.8400**	0.7200	0.6300	0.7000
87	PigAirwayPressure	0.5164	**0.6446**	0.2182	0.0575	0.0353	0.4038	0.2446	0.3500	0.4280
88	PigArtPressure	0.4822	0.6731	**0.9456**	0.0929	0.1312	0.9424	0.3826	0.5308	0.4893
89	PigCVP	0.4348	0.5121	0.7083	0.0449	0.0321	**0.8753**	0.4181	0.5269	0.6079
83	PLAID	**0.8691**	0.8424	0.3912	0.4832	0.7421	0.5503	0.5951	0.4107	0.5867
90	Plane	**1.0000**	**1.0000**	0.9762	0.9714	0.9381	0.9905	0.9810	0.9952	0.9810
91	PowerCons	0.9139	0.9194	0.8889	0.9444	0.9722	**0.9861**	0.9722	0.9333	0.9833
92	ProximalPhalanxOutlineAgeGroup	0.8727	0.8496	0.8446	0.8231	0.8496	0.8545	**0.8860**	0.8727	0.8793
93	ProximalPhalanxOutlineCorrect	0.9214	0.8889	0.8383	0.8303	0.8799	0.8833	**0.9406**	0.9170	0.8945
94	ProximalPhalanxTW	0.8083	0.8215	0.8000	0.7653	0.8347	0.8281	0.8512	**0.8798**	0.8645
95	RefrigerationDevices	0.5747	**0.7773**	0.7193	0.5170	0.5146	0.7627	0.5693	0.6400	0.7267
96	Rock	0.6429	0.7143	0.6857	0.7857	0.7714	0.8286	0.8143	0.6940	**0.9143**
97	ScreenType	0.6093	0.5480	**0.6852**	0.4805	0.4827	0.5520	0.6347	0.5093	0.6480
98	SemgHandGenderCh2	0.9378	0.7456	0.8745	0.9516	0.9111	**0.9544**	0.9367	0.9378	0.9389
99	SemgHandMovementCh2	0.7156	0.4056	0.5769	0.6980	0.4667	0.7767	0.7800	0.6311	**0.7989**
100	SemgHandSubjectCh2	0.6922	0.6356	0.8286	0.9310	0.8467	0.9344	**0.9411**	0.8278	0.9089
101	ShakeGestureWiimoteZ	0.9200	0.9100	0.8900	0.8500	0.6800	**0.9300**	0.5900	0.6900	0.7200
102	ShapeletSim	0.9700	0.9200	0.9450	0.6050	0.5600	**0.9850**	0.5500	0.9150	0.6300
103	ShapesAll	0.7267	0.8925	0.8835	0.7777	0.7292	**0.9133**	0.8325	0.8833	0.8500
104	SmallKitchenAppliances	0.7987	0.7227	**0.8256**	0.7095	0.5747	0.7347	0.7840	0.6387	0.7213
105	SmoothSubspace	0.9467	0.9233	0.9367	0.9433	**0.9800**	0.9633	0.9767	0.9633	0.9133
106	SonyAIBORobotSurface1	**0.9984**	0.9920	0.9726	0.9775	0.9823	0.9952	0.9952	0.9888	0.9888
107	SonyAIBORobotSurface2	**0.9990**	0.9878	0.9376	0.9849	0.9847	0.9949	0.9939	0.9939	0.9949
108	StarLightCurves	0.9803	0.9783	0.9793	0.9738	0.9734	0.9801	0.9616	**0.9912**	0.9818
109	Strawberry	0.9756	0.9614	0.9426	0.9414	0.9735	0.9685	**0.9766**	0.9624	0.9736
110	SwedishLeaf	**0.9929**	0.9404	0.9158	0.9423	0.9253	0.9502	0.9449	0.9778	0.9671
111	Symbols	**0.9961**	0.9824	0.9798	0.9733	0.9765	0.9863	0.9618	0.9922	0.9667
112	SyntheticControl	0.9700	0.9883	0.9683	0.9950	0.9767	**0.9983**	0.9767	0.9700	0.9717
113	ToeSegmentation1	**0.9664**	0.9551	0.9143	0.9181	0.6903	0.9588	0.8514	0.9219	0.8846
114	ToeSegmentation2	0.9282	0.9219	0.9283	0.8250	0.8435	**0.9517**	0.8316	0.8510	0.8143
115	Trace	**1.0000**	**1.0000**	0.9950	0.9150	0.9700	**1.0000**	0.9400	**1.0000**	0.8900
116	TwoLeadECG	**1.0000**	0.9983	0.9932	0.9965	0.9914	0.9991	0.9983	0.9991	0.9948
117	TwoPatterns	0.9454	**1.0000**	0.9513	0.9990	0.9994	**1.0000**	0.9980	0.9990	0.9962
118	UMD	0.8778	0.9944	0.9389	0.9611	0.9778	0.9944	0.9833	**1.0000**	0.9778
119	UWaveGestureLibraryAll	0.9245	0.9518	0.8595	0.9750	0.9602	0.9652	0.9504	**0.9913**	0.9708
120	UWaveGestureLibraryX	0.8665	0.8457	0.6680	0.8385	0.8091	0.8513	0.8924	**0.9214**	0.9002
121	UWaveGestureLibraryY	0.7906	0.7887	0.5342	0.7573	0.7300	0.7874	0.8455	**0.8955**	0.8399
122	UWaveGestureLibraryZ	0.8484	0.8021	0.6076	0.7762	0.4790	0.8024	0.8669	**0.9006**	0.8535
123	Wafer	**1.0000**	0.9989	0.9587	0.9982	0.9992	0.9990	0.9986	0.9992	0.9992
124	Wine	0.5411	0.9553	0.6743	0.5221	0.5854	**0.9648**	0.8289	0.5135	0.8561
125	WordSynonyms	0.5967	0.8022	0.5718	0.7444	0.7083	0.7989	0.8442	**0.8690**	0.7823
126	Worms	0.7906	0.6821	0.6860	0.5423	0.4148	0.7210	0.7446	**0.8072**	0.7097
127	WormsTwoClass	0.8025	0.7634	0.7557	0.6898	0.6240	0.7716	0.7833	**0.9037**	0.8221
128	Yoga	0.9718	0.9661	0.7699	0.9207	0.9497	0.9709	0.9539	**0.9739**	0.9476
	Avg. Acc	0.8296	0.8325	0.8017	0.7807	0.7755	**0.8691**	0.8367	0.8265	0.8593
	Avg. Rank	4.15	5.07	6.59	6.59	6.39	**3.28**	4.4	4.16	3.73

TABLE XI
TEST CLASSIFICATION ACCURACY USING TIME SERIES PTMS ON 30 UEA DATASETS. THE BEST RESULTS ARE IN **BOLD**.

ID	Dataset	Supervised (FCN)	T-Loss	TS-TCC	TST	TS2Vec	TimesNet	PatchTST	GPT4TS
1	ArticularyWordRecognition	**0.9983**	0.8974	0.9757	0.9826	0.9913	0.9739	0.9513	0.9739
2	AtrialFibrillation	0.3667	0.4000	0.3667	0.5667	0.1667	0.5667	0.5333	**0.7667**
3	BasicMotions	**1.0000**	0.6375	0.9625	0.9000	0.9500	0.8500	0.8000	0.8750
4	CharacterTrajectories	0.9738	0.9598	0.9882	0.9815	**0.9941**	0.9843	0.8982	0.9916
5	Cricket	0.9500	0.6778	0.9278	0.9611	**0.9889**	0.9111	0.9778	0.9111
6	DuckDuckGeese	**0.7200**	0.2500	0.2800	0.5100	0.4000	0.5500	0.5000	0.6200
7	EigenWorms	0.8839	0.5056	0.7476	0.5791	**0.8996**	0.7265	0.8153	0.7574
8	Epilepsy	0.9855	0.5600	0.9236	0.7018	0.9818	0.5564	**0.9891**	0.8109
9	ERing	**0.9867**	0.9200	0.9667	0.9533	0.9600	0.9500	0.9700	0.9800
10	EthanolConcentration	0.3321	0.2500	0.2633	0.2596	0.2157	**0.5807**	0.4568	0.5235
11	FaceDetection	0.7987	0.5255	0.6973	0.6935	0.5228	**0.9028**	0.8506	0.8628
12	FingerMovements	0.6638	0.5145	0.5047	0.5265	0.5239	**0.7073**	0.6783	0.7024
13	HandMovementDirection	0.6550	0.2992	0.4144	0.4660	0.3079	0.5862	0.6245	**0.7744**
14	Handwriting	**0.9520**	0.3480	0.7266	0.3080	0.8740	0.8280	0.6470	0.8580
15	Heartbeat	**0.8363**	0.7213	0.7066	0.7164	0.7115	0.6995	0.7335	0.7167
16	InsectWingbeat	0.1503	0.2676	0.6004	0.6253	0.2805	0.1771	0.4594	**0.7628**
17	JapaneseVowels	**0.9937**	0.7406	0.9594	0.9609	0.9656	0.9609	0.9781	0.9844
18	Libras	**0.9250**	0.7306	0.7444	0.7972	0.8500	0.7833	0.8389	0.7917
19	LSST	0.6016	0.3155	0.5682	0.5127	0.6268	0.5978	0.4357	**0.8258**
20	MotorImagery	0.7572	0.5025	0.5318	0.5157	0.5267	0.7520	0.7862	**0.8076**
21	NATOPS	**0.9278**	0.5944	0.7806	0.8722	0.8417	0.8139	0.8250	0.8444
22	PEMS-SF	0.9318	0.6864	0.8159	0.8068	0.8682	0.9341	0.8659	**0.9773**
23	PenDigits	0.9979	0.9933	0.9932	0.9895	0.9953	**0.9986**	0.9974	0.9976
24	PhonemeSpectra	0.1570	0.0964	0.2356	0.0562	0.2478	0.4309	0.1101	**0.7010**
25	RacketSports	**0.9408**	0.6169	0.8317	0.8181	0.8709	0.9277	0.8683	0.8683
26	SelfRegulationSCP1	0.8486	0.8128	0.8288	0.7968	0.7736	0.8040	**0.9163**	0.9093
27	SelfRegulationSCP2	0.6395	0.5000	0.5105	0.4868	0.5132	**0.7684**	0.6737	0.6605
28	SpokenArabicDigits	0.8131	0.9519	0.9960	0.9849	**0.9975**	0.9953	0.8454	0.9932
29	StandWalkJump	0.4067	0.4533	0.4000	0.5133	0.5067	0.5333	0.5200	**0.8600**
30	UWaveGestureLibrary	0.9614	0.8591	0.9273	0.9205	0.9500	0.8591	**0.9659**	0.9568
	Avg. Acc	0.7718	0.5863	0.7059	0.6921	0.7101	0.7570	0.7504	**0.8355**
	Avg. Rank	3.07	7.07	5.27	5.37	4.27	4.13	3.9	**2.7**

TABLE XII
COMPARISON OF TEST RESULTS FOR TIME-SERIES FORECASTING. "-" INDICATES THAT THE RESULTS COULD NOT BE OBTAINED DUE TO MEMORY ERRORS OR EXCESSIVE TRAINING TIME. THE BEST RESULTS ARE IN UNDERLINE AND **BOLD**.

Models		LogTrans		TCN		Informer		Autoformer		TS2Vec		CoST		TimesNet		PatchTST		DLinear		GPT4TS		TEMPO		iTransformer	
Metric		MSE	MAE	MSE	MAE	MSE	MAE	MSE	MAE	MSE	MAE	MSE	MAE	MSE	MAE	MSE	MAE	MSE	MAE	MSE	MAE	MSE	MAE	MSE	MAE
ETTh1	24	0.6149	0.5823	0.6476	0.5765	0.5972	0.5680	0.3729	0.4176	0.5952	0.5313	0.3861	0.4289	0.3485	0.3873	0.3890	0.4128	0.3885	0.4105	0.3102	0.3626	0.4262	0.4264	**0.3065**	**0.3589**
	48	0.8360	0.7075	0.7417	0.6292	0.7344	0.6460	0.4296	0.4419	0.6316	0.5566	0.4358	0.4634	0.3991	0.4169	0.4362	0.4379	0.4111	0.4232	0.3529	0.3904	0.4677	0.4518	**0.3451**	**0.3818**
	168	1.0119	0.8084	0.9388	0.7324	0.9414	0.7480	0.4796	0.4687	0.7669	0.6405	0.6415	0.5817	0.4846	0.4670	0.5304	0.4879	0.4762	0.4613	0.4600	0.4661	0.5128	0.4857	**0.4307**	**0.4304**
	336	1.0821	0.8458	1.1151	0.8305	1.1217	0.8375	0.4939	0.4815	0.9419	0.7334	0.8099	0.6776	0.5583	0.5175	0.5928	0.5193	0.5243	0.4903	0.5167	0.4960	0.6184	0.5496	**0.4889**	**0.4602**
	720	1.0381	0.8167	0.9641	0.7802	1.1921	0.8591	**0.5112**	0.5100	1.0948	0.8098	0.9678	0.7700	0.5886	0.5287	0.6123	0.5442	0.5483	0.5310	0.6878	0.5858	0.6454	0.5724	0.5184	**0.4982**
	Avg.	0.9166	0.7521	0.8815	0.7098	0.9174	0.7317	0.4574	0.4639	0.8061	0.6543	0.6482	0.5843	0.4758	0.4635	0.5121	0.4804	0.4697	0.4633	0.4655	0.4602	0.5341	0.4972	**0.4179**	**0.4259**
ETTh2	24	0.7676	0.6854	0.9376	0.7760	1.2772	0.9142	0.2933	0.3689	0.4478	0.5032	0.4463	0.5032	0.2129	0.2929	0.2176	0.3043	0.2332	0.3289	0.2009	0.2917	0.2507	0.3258	**0.1831**	**0.2719**
	48	1.2485	0.9004	1.2930	0.9183	1.4506	0.9663	0.3349	0.3922	0.6460	0.6184	0.7022	0.6397	0.2824	0.3429	0.2722	0.3388	0.2902	0.3677	0.2738	0.3443	0.3078	0.3659	**0.2413**	**0.3120**
	168	5.4984	1.8806	4.0537	1.6939	5.6799	1.9599	0.4627	0.4638	1.7771	1.0569	1.5428	0.9822	0.4461	0.4361	0.4092	0.4172	0.4807	0.4829	0.4436	0.4476	0.4891	0.4739	**0.3725**	**0.3940**
	336	4.4323	1.6926	5.3142	2.0093	4.6730	1.8000	0.4753	0.4794	2.1157	1.1759	1.7560	1.0478	0.4875	0.4687	0.4670	0.4610	0.6314	0.5638	0.5011	0.4876	0.5549	0.5214	**0.4368**	**0.4433**
	720	3.1966	1.4905	9.1991	2.2230	3.6218	1.5993	0.4970	0.5015	2.5823	1.3521	1.9716	1.0938	0.5193	0.4893	0.4721	0.4734	0.8289	0.6648	0.5389	0.5146	0.6687	0.5851	**0.4479**	**0.4585**
	Avg.	3.0287	1.3299	4.1595	1.5241	3.3405	1.4479	0.4126	0.4412	1.5138	0.9413	1.2838	0.8533	0.3896	0.4060	0.3676	0.3989	0.4929	0.4816	0.3917	0.4172	0.4542	0.4544	**0.3363**	**0.3759**
ETTm1	24	0.1576	0.2780	0.2003	0.3345	0.2123	0.3418	0.1473	0.2610	0.1970	0.3179	**0.1331**	**0.2589**	0.2416	0.3115	0.2522	0.3186	0.2777	0.3328	0.2004	0.2769	0.2324	0.3011	0.2251	0.2967
	48	0.2533	0.3658	0.2432	0.3641	0.3220	0.4262	**0.1897**	**0.2898**	0.2682	0.3784	0.1959	0.3192	0.3194	0.3637	0.3202	0.3593	0.3302	0.3643	0.3006	0.3344	0.3026	0.3472	0.3019	0.3474
	96	0.4699	0.5022	0.3856	0.4599	0.4427	0.5227	0.3424	0.3546	0.3735	0.4496	**0.3043**	**0.4034**	0.3558	0.3864	0.3553	0.3793	0.3543	0.3785	0.3008	0.3519	0.3683	0.3889	0.3393	0.3740
	288	1.2230	0.8335	0.8695	0.7408	1.1282	0.8074	**0.3264**	**0.3663**	0.7566	0.6672	0.7554	0.6609	0.4411	0.4304	0.4207	0.4162	0.4117	0.4131	0.3712	0.3989	0.4491	0.4441	0.4147	0.4163
	672	3.0955	1.3050	1.9628	1.1394	3.0900	1.3206	**0.4497**	**0.4357**	1.8217	1.0452	1.5897	0.9840	0.6567	0.5324	0.4878	0.4527	0.4725	0.4496	0.4570	0.4483	0.4964	0.4723	0.4880	0.4577
	Avg.	1.0399	0.6569	0.7323	0.6077	1.0390	0.6837	**0.2911**	**0.3415**	0.6834	0.5717	0.5957	0.5253	0.4029	0.4049	0.3672	0.3852	0.3693	0.3876	0.3260	0.3621	0.3698	0.3907	0.3538	0.3784
ETTm2	96	0.4411	0.5149	0.3053	0.4097	0.3951	0.4839	0.2220	0.3040	0.3502	0.4381	0.2958	0.3955	0.1877	0.2678	0.1876	0.2728	0.2015	0.3025	0.1861	0.2781	0.2031	0.2830	**0.1830**	**0.2652**
	192	0.7027	0.6550	0.5954	0.5979	0.7435	0.6675	0.2763	0.3342	0.5684	0.5732	0.5266	0.5391	0.2748	0.3220	0.2544	0.3140	0.2878	0.3650	0.2624	0.3271	0.2653	0.3206	**0.2507**	**0.3101**
	336	1.0915	0.8209	1.1618	0.8573	1.2908	0.8660	0.3308	0.3676	0.9589	0.7532	0.8752	0.7091	0.3922	0.3830	0.3173	0.3527	0.3833	0.4285	**0.3164**	0.3650	0.3214	0.3646	0.3179	**0.3524**
	720	2.7116	1.4048	1.8699	1.0495	3.3230	1.3981	0.4256	0.4203	2.5705	1.2483	1.9638	1.0948	0.4477	0.4244	0.4179	**0.4075**	0.5472	0.5202	0.4246	0.4331	0.4232	0.4286	**0.4161**	0.4090
	Avg.	1.2367	0.8489	0.9831	0.7286	1.4381	0.8539	0.3137	0.3565	1.1120	0.7532	0.9154	0.6846	0.3256	0.3493	0.2943	0.3367	0.3550	0.4041	0.2974	0.3508	0.3032	0.3492	**0.2919**	**0.3342**
Electricity	24	0.3667	0.4054	0.4616	0.4673	0.5750	0.5159	0.1888	0.3031	0.3038	0.3836	0.1438	0.2471	0.1612	0.2630	0.1681	0.2502	0.2443	0.3408	**0.1019**	**0.1970**	-	-	0.1434	0.2336
	48	0.3842	0.4182	0.4581	0.4694	0.5808	0.5281	0.2043	0.3148	0.3311	0.4014	0.1602	0.2611	0.1692	0.2704	0.2017	0.2765	0.2687	0.3565	**0.1166**	**0.2108**	-	-	0.1774	0.2603
	168	0.3911	0.4206	0.5079	0.4938	0.5486	0.5220	0.2446	0.3401	0.3581	0.4195	0.1776	0.2739	0.1936	0.2907	0.2019	0.2839	0.2628	0.3576	**0.1459**	**0.2376**	-	-	0.1930	0.2754
	336	0.4065	0.4300	0.5209	0.5024	0.6021	0.5571	0.2551	0.3464	0.3865	0.4367	0.2134	0.3018	0.2081	0.3034	0.2260	0.3063	0.2823	0.3746	**0.1721**	**0.2649**	-	-	0.2203	0.3014
	720	0.4118	0.4308	0.5505	0.5116	0.7690	0.6517	0.3075	0.3808	0.4313	0.4618	0.2629	0.3384	0.2257	0.3183	0.2704	0.3397	0.3170	0.4009	**0.2118**	**0.2942**	-	-	0.2682	0.3385
	Avg.	0.3921	0.4210	0.4998	0.4889	0.6151	0.5550	0.2401	0.3370	0.3622	0.4206	0.1916	0.2845	0.1915	0.2891	0.2136	0.2913	0.2750	0.3661	**0.1497**	**0.2409**	-	-	0.2005	0.2818
Traffic	96	0.9029	0.5171	0.8102	0.4755	0.6845	0.3824	0.6348	0.3876	-	-	-	-	0.6087	0.3164	0.6389	0.3960	0.8068	0.4901	**0.3725**	**0.2571**	0.4036	0.2966	0.4185	0.2845
	192	0.9389	0.5377	0.7557	0.4582	0.6899	0.3879	0.6329	0.3935	-	-	-	-	0.6264	0.3314	0.6053	0.3817	0.7679	0.4747	**0.3848**	**0.2612**	0.4125	0.3027	0.4394	0.2921
	336	0.9559	0.5441	0.6804	0.4326	0.7360	0.4147	0.6349	0.3930	-	-	-	-	0.6548	0.3462	0.6173	0.3874	0.7768	0.4773	**0.3924**	**0.2647**	0.4231	0.3056	0.4578	0.3016
	720	1.0025	0.5596	0.5696	0.3777	0.8059	0.4507	0.6566	0.4028	-	-	-	-	0.6770	0.3506	0.6617	0.4097	0.8157	0.4917	**0.4316**	**0.2879**	0.4383	0.3091	0.4917	0.3226
	Avg.	0.9500	0.5396	0.7040	0.4360	0.7291	0.4089	0.6398	0.3942	-	-	-	-	0.6417	0.3362	0.6308	0.3937	0.7918	0.4835	**0.3953**	**0.2677**	0.4194	0.3035	0.4518	0.3002
Weather	96	0.2476	0.3360	0.1899	0.2645	0.5056	0.5075	0.2936	0.3491	0.1858	0.2668	0.1590	0.2389	0.1817	0.2291	0.2013	0.2406	0.1980	0.2602	**0.1534**	**0.2079**	0.1575	0.2139	0.1792	0.2191
	192	0.2733	0.3527	0.2171	0.2872	0.4882	0.4902	0.3222	0.3707	0.2252	0.3035	0.2038	0.2804	0.2423	0.2793	0.2466	0.2770	0.2378	0.2973	**0.1996**	**0.2532**	0.2029	0.2542	0.2278	0.2600
	336	0.3160	0.3805	0.2738	0.3339	0.6144	0.5359	0.3607	0.3927	0.2805	0.3466	**0.2557**	0.3219	0.2895	0.3099	0.2984	0.3129	0.2826	0.3331	0.2613	0.2980	0.2715	**0.2976**	0.2835	0.3002
	720	0.3926	0.4230	0.3365	0.3819	1.5827	0.9240	0.4268	0.4286	0.3565	0.3984	0.3203	0.3691	0.3975	0.3784	0.3704	0.3586	0.3463	0.3831	**0.3269**	**0.3428**	0.3493	0.3549	0.3596	0.3505
	Avg.	0.3074	0.3730	0.2543	0.3169	0.7977	0.6144	0.3508	0.3853	0.2620	0.3288	**0.2347**	0.3026	0.2777	0.2992	0.2791	0.2973	0.2662	0.3184	0.2353	**0.2755**	0.2453	0.2802	0.2625	0.2825
Exchange	96	1.3842	0.9759	0.6826	0.5662	0.8626	0.7415	0.1551	0.2850	0.2186	0.3501	0.3092	0.4261	0.1289	0.2537	0.1049	0.2301	0.1168	0.2594	0.1067	0.2346	-	-	**0.0899**	**0.2113**
	192	1.4420	1.0010	0.5730	0.5741	1.3249	0.9216	0.2944	0.3954	0.4687	0.5080	0.4843	0.5387	0.2479	0.3510	0.1983	0.3205	0.2049	0.3458	0.2008	0.3242	-	-	**0.1848**	**0.3088**
	336	1.5682	1.0433	0.7006	0.6566	1.2885	0.9438	0.4476	0.4967	0.7984	0.6789	0.8584	0.7139	0.4307	0.4832	0.3517	0.4316	**0.3261**	0.4442	0.4064	0.4729	-	-	0.3388	**0.4222**
	720	1.9746	1.1628	2.0907	1.1803	1.5762	1.0094	1.1311	0.8274	1.2703	0.8875	1.3870	0.9669	1.3950	0.8633	0.8876	0.7148	**0.5293**	**0.5717**	1.0583	0.7784	-	-	0.8761	0.7120
	Avg.	1.5922	1.0458	1.0117	0.7443	1.2631	0.9041	0.5071	0.5011	0.6890	0.6061	0.7597	0.6614	0.5506	0.4878	0.3856	0.4242	**0.2943**	**0.4053**	0.4430	0.4525	-	-	0.3724	0.4136
ILI	24	7.0450	1.8932	7.0507	1.8967	5.2708	1.5313	3.4776	1.3505	3.2963	1.1271	**1.7753**	**0.8399**	2.4637	1.0337	3.6716	1.3056	3.9658	1.4726	2.9939	1.2228	4.1965	1.5388	2.3113	1.0427
	36	7.0539	1.8949	7.1350	1.9084	5.1110	1.5148	3.3136	1.3154	3.2484	1.1215	**2.0151**	**0.8936**	2.2281	0.9843	2.7695	1.1426	3.8974	1.4451	3.4103	1.3562	4.2705	1.5554	2.1656	1.0194
	48	7.2207	1.9205	7.2418	1.9256	5.2915	1.5469	3.3103	1.2902	3.2821	1.1190	2.2033	**0.9327**	2.1243	**0.9546**	2.2878	0.9802	3.9395	1.4410	2.7575	1.2639	4.4945	1.5472	**2.0375**	0.9793
	60	7.4870	1.9667	7.4951	1.9698	5.6127	1.6050	3.3582	1.2956	3.1346	1.0879	2.3573	**0.9627**	2.1243	0.9672	2.1775	0.9778	4.1150	1.4639	2.8209	1.2752	4.5043	1.5694	**2.0194**	0.9991
	Avg.	7.2016	1.9188	7.2306	1.9251	5.3215	1.5495	3.3649	1.3129	3.2403	1.1139	**2.0877**	**0.9073**	2.2351	0.9849	2.7266	1.1015	3.9794	1.4557	2.9957	1.2795	4.3664	1.5527	2.1335	1.0102

TABLE XIII
THE TEST F1-SCORE OF TIME SERIES ANOMALY DETECTION IN UCR 250 SUB-DATASETS. THE BEST RESULTS ARE IN **BOLD**.

UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector	UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector
1	0.0000	0.0000	0.7456	0.7529	0.6978	0.8569	0.7588	0.7652	**0.8593**	126	0.0000	0.0000	0.0000	0.4717	0.4776	0.6024	0.0000	0.4989	**0.6849**
2	0.0000	0.0000	0.5725	0.5769	0.4893	0.0000	0.0001	0.0287	**0.7472**	127	0.0000	0.0000	**0.5535**	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.5720	0.5720	0.4979	0.7444	0.6083	0.5613	**0.7500**	128	0.0000	0.0000	0.8537	0.8623	0.7007	0.0000	0.6403	0.7744	**0.9301**
4	0.0000	0.0000	0.0000	0.8247	0.6839	**0.9732**	0.7758	0.7050	0.9091	129	0.0000	0.0000	0.0000	0.6164	0.3481	0.0000	0.1485	0.3658	**0.7500**
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0009**	0.0000	130	0.0000	0.0000	0.0000	0.7638	0.4980	0.0000	0.3415	0.6202	**0.8645**
6	0.0000	0.0000	**0.5106**	0.4898	0.0000	0.0000	0.0000	0.0320	0.0000	131	0.0000	0.0000	0.0000	0.7376	0.5053	0.0000	0.0961	0.5880	**0.8851**
7	0.0000	0.0000	0.0000	**0.4486**	0.0950	0.0000	0.0883	0.0279	0.0000	132	0.0000	0.0000	0.0000	0.0000	0.2782	0.0000	0.0000	0.0508	**0.8333**
8	0.0000	0.0000	0.0000	0.0000	0.1509	**0.8889**	0.8404	0.2863	0.0000	133	0.0000	0.0000	0.0000	0.0000	0.0106	0.0000	0.1089	**0.2439**	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.1043	0.0000	0.0811	0.0585	**0.8727**	134	0.0000	0.0000	0.0000	0.8564	0.7219	0.0000	0.5851	0.5383	**0.9315**
10	0.0000	0.0000	0.6857	0.6857	0.0195	0.0000	0.7533	0.2832	**0.8205**	135	0.0000	0.0000	0.0000	0.0000	**0.1509**	0.0000	0.0222	0.0047	0.0000
11	0.0000	0.0000	0.7435	0.7722	0.7588	0.7371	0.7940	0.7922	**0.8785**	136	0.0000	0.0000	0.8162	0.7929	0.5522	0.0000	0.3084	0.5533	**0.9024**
12	0.0000	0.0000	0.6192	0.5797	0.6146	0.5698	0.5721	0.5713	**0.7663**	137	0.0000	0.0000	0.0000	0.0000	0.5001	0.0000	0.1292	0.4974	**0.9148**
13	0.0000	0.0000	0.6079	0.6289	0.3653	0.0000	0.0000	0.1146	**0.7435**	138	0.0000	0.0000	0.3448	0.0000	0.0431	0.0000	0.0242	0.1963	**0.5263**
14	0.0000	0.0000	0.5495	0.4695	0.3681	0.6024	0.0000	0.0867	**0.6944**	139	0.0000	0.0000	0.8767	0.8743	0.7295	0.0000	0.6521	0.6143	**0.9384**
15	0.0000	0.0000	0.2379	0.2353	0.2960	0.0000	**0.3624**	0.3308	0.0000	140	0.0000	**1.0000**	0.9409	0.9144	0.8563	0.0000	0.8260	0.8366	0.9585
16	0.0000	0.0000	0.6154	0.6070	0.6569	**0.7273**	0.5646	0.5682	0.0000	141	0.0000	0.0000	0.0000	0.9392	0.8233	0.0000	0.6668	0.8347	**0.9687**
17	0.0000	0.0000	0.4762	0.4505	0.5004	0.5747	0.4917	0.4979	**0.6024**	142	0.0000	0.0000	0.8732	0.8447	0.6600	0.0000	0.5211	0.4788	**0.9038**
18	0.0000	0.0000	0.5155	0.4640	0.0898	0.6024	0.0000	0.4933	**0.7246**	143	0.0000	0.0000	0.0000	**0.8583**	0.6620	0.0000	0.1082	0.0023	0.0000
19	0.0000	0.0000	0.0000	**0.5789**	0.0504	0.0000	0.0951	0.0000	0.0000	144	0.0000	0.0000	**0.8241**	0.0000	0.6405	0.0000	0.0460	0.0483	0.0000
20	0.0000	0.0000	0.8730	0.8537	0.7498	0.0000	0.6414	0.7714	**0.9404**	145	0.0000	0.0000	0.2841	0.2618	0.4257	**0.5319**	0.4406	0.4556	0.0000
21	0.0000	0.0000	0.0000	0.0000	0.1588	0.0000	0.1166	0.2925	**0.7317**	146	0.0000	0.0000	0.3211	**0.3675**	0.2434	0.0000	0.0723	0.2214	0.0000
22	0.0000	0.0000	0.7738	0.7638	0.6309	0.0000	0.4399	0.5946	**0.8676**	147	**0.8108**	0.0000	0.0000	0.1863	0.1508	0.4959	0.3324	0.1846	0.0000
23	0.0000	0.0000	0.7536	0.7619	0.5075	0.0000	0.1773	0.5986	**0.8927**	148	0.0000	0.0000	0.5108	0.0000	0.3665	0.0000	0.2688	0.3378	**0.7008**
24	0.0000	0.0000	**0.5607**	0.0000	0.4818	0.0000	0.0000	0.0378	0.0000	149	0.0000	0.0000	0.0000	0.5579	0.3525	0.0000	0.5346	0.5922	**0.6952**
25	0.0000	0.0000	**0.5567**	0.0000	0.0000	0.0000	0.1625	0.2112	0.0000	150	0.0000	0.0000	**0.6845**	0.6755	0.6346	0.0000	0.0000	0.0000	0.0000
26	0.0000	0.0000	**0.8786**	0.8718	0.6602	0.0000	0.5900	0.5358	0.0000	151	0.0000	0.0000	0.6375	0.6867	0.7257	0.7843	0.7395	0.7322	**0.8101**
27	0.0000	0.0000	0.0000	0.0000	0.0046	0.0000	0.0000	**0.0157**	0.0000	152	0.0000	0.0000	0.7619	0.7483	0.7372	0.0000	**0.7706**	0.0000	0.0000
28	0.0000	0.0000	0.8102	0.8284	0.7250	**1.0000**	0.3538	0.6034	0.9098	153	0.0000	0.0000	0.7991	0.8362	0.8001	0.0000	0.8364	0.7698	**0.9195**
29	0.0000	0.0000	0.8160	0.8193	0.5050	0.0000	0.1390	0.4585	**0.9027**	154	0.0000	0.0000	**0.5035**	0.0000	0.3436	0.0000	0.1618	0.0959	0.0000
30	0.0000	0.0000	0.0000	0.0000	0.0019	0.0000	0.0759	0.1809	**0.4651**	155	0.0000	0.0000	0.0000	0.0000	0.6895	0.0000	0.7458	0.2196	**0.8372**
31	0.0000	0.0000	0.8767	0.0000	0.7598	0.0000	0.5731	0.6020	**0.9412**	156	0.0000	0.0000	0.6736	0.0000	0.4725	0.0000	0.1380	0.1162	**0.8584**
32	0.0000	0.8742	0.9227	0.9509	0.8405	0.0000	0.8603	0.8372	**0.9676**	157	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0348**	0.0000
33	0.0000	0.0000	0.9264	0.9115	0.8248	0.0000	0.5808	0.8145	**0.9366**	158	0.0000	0.0000	0.7376	**0.7405**	0.4486	0.0000	0.0965	0.2654	0.0000
34	0.0000	0.0000	0.8659	0.0000	0.5402	0.0000	0.4893	0.4874	**0.8934**	159	0.0000	0.0000	0.1739	0.0000	**0.3262**	0.0000	0.3093	0.1331	0.0000
35	0.0000	0.0000	0.8015	0.8104	0.7265	0.0000	0.2676	0.0032	**0.8862**	160	0.0000	0.0000	0.7481	0.6975	0.4098	0.0000	0.6050	0.3196	**0.8596**
36	0.0000	0.0000	0.0000	**0.8410**	0.5289	0.0000	0.0418	0.0481	0.0000	161	0.0000	0.0000	0.8701	0.9041	0.8043	**0.9296**	0.6797	0.6948	0.0000
37	0.0000	0.0000	0.2941	0.2646	0.4192	**0.6250**	0.4427	0.4548	0.4444	162	0.0000	0.0000	0.0000	0.0000	0.1008	**0.7516**	0.7389	0.5610	0.0000
38	0.0000	0.0000	0.3406	0.0000	0.3740	**0.4590**	0.0294	0.1573	0.0000	163	0.0000	0.0000	0.5300	0.5329	0.5164	**0.5607**	0.5019	0.5132	0.0000
39	0.0000	0.0000	0.1911	0.0000	0.2113	0.0000	**0.3354**	0.1849	0.0000	164	0.0000	0.0000	0.3992	0.0000	0.2654	0.0000	0.0000	0.0323	**0.5195**
40	0.0000	0.0000	0.5159	0.5019	0.5143	0.0000	0.2748	0.3284	**0.7008**	165	0.0000	0.0000	**0.4082**	0.0000	0.1065	0.0000	0.0000	0.0000	0.0000
41	0.0000	0.0000	0.5263	0.5579	0.3112	0.0000	0.5099	0.5931	**0.6650**	166	0.0000	0.0000	0.3350	0.0000	0.1883	0.3588	0.0065	0.4320	**0.4964**
42	0.0000	0.0000	0.0000	0.6775	0.6419	0.0000	0.0000	0.5604	**0.8056**	167	0.0000	0.0000	0.5650	0.6154	0.6844	0.0000	0.5665	0.6281	**0.7634**
43	0.0000	0.0000	0.7064	0.6838	0.6541	0.7692	0.7360	0.7280	**0.8000**	168	0.0000	0.0000	0.5906	0.6186	0.6558	**0.8108**	0.5758	0.6152	0.7326
44	0.0000	0.0000	0.7568	**0.7878**	0.7286	0.0000	0.7731	0.7038	0.0000	169	0.0000	0.0000	0.7500	0.7747	0.8197	**0.8863**	0.7802	0.7923	0.8596
45	0.0000	0.0000	0.8304	0.8401	0.7812	0.0000	0.8180	0.7784	**0.9102**	170	0.0000	0.0000	0.3338	0.3577	0.1599	**0.8594**	0.0774	0.2617	0.0000
46	0.0000	0.0000	0.0000	**0.5692**	0.2705	0.0000	0.1330	0.0890	0.0000	171	0.0000	0.0000	0.7733	0.7593	0.7823	**0.9946**	0.7741	0.7832	0.8547
47	0.0000	0.0000	0.5783	0.5830	0.6930	0.0000	**0.7295**	0.2206	0.0000	172	0.0000	0.0000	0.7996	0.8260	0.8694	**1.0000**	0.8319	0.8637	0.8934
48	0.0000	0.0000	0.6855	0.0000	0.6376	0.0000	0.1308	0.1388	**0.8398**	173	0.0000	0.0000	0.0000	0.5455	0.0694	0.0000	0.0269	0.0544	**0.6122**
49	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0347**	0.0000	174	0.0000	0.0000	0.0000	0.0000	0.5756	0.0000	0.5942	0.0031	**0.6024**
50	0.0000	0.0000	0.7185	0.0000	0.0885	0.0000	0.0942	0.1738	**0.8509**	175	0.0000	0.0000	0.0000	0.6803	0.4948	**0.9524**	0.2471	0.1906	0.0000
51	0.0000	0.0000	0.0000	0.0000	**0.3296**	0.0000	0.2685	0.1358	0.0000	176	0.0000	0.0000	0.0000	0.0000	0.2882	0.0000	0.0374	0.0159	**0.7246**
52	0.0000	0.0000	0.7313	0.6735	0.4174	0.0000	0.5080	0.2750	**0.8376**	177	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0019**	0.0000	0.0000
53	0.0000	0.0000	0.0000	0.8540	0.7347	0.9203	0.0001	0.6932	**0.9371**	178	0.0000	0.0000	0.5450	0.5682	0.5543	**0.7092**	0.5975	0.6070	0.0000
54	0.0000	0.0000	0.0000	0.0000	0.3106	**0.7815**	0.7471	0.5743	0.0000	179	0.0000	0.0000	0.5706	0.5935	0.6359	**0.7463**	0.6712	0.6601	0.0000
55	0.0000	0.0000	0.5181	0.0000	0.3871	**0.5445**	0.5025	0.5098	0.0000	180	0.0000	0.0000	0.5413	0.0000	**0.5954**	0.0000	0.0000	0.4281	0.0000
56	0.0000	0.0000	0.3704	0.4202	0.1255	0.0000	0.0000	0.0323	**0.5333**	181	0.0000	0.0000	0.7106	0.7034	0.7125	0.0000	0.6666	0.7003	**0.8384**
57	0.0000	0.0000	**0.3906**	0.3663	0.1576	0.0000	0.0000	0.0000	0.0000	182	0.0000	0.0000	0.7214	0.7729	0.7619	**0.8290**	0.6945	0.7008	0.8230
58	0.0000	0.0000	0.3523	0.0000	0.4413	0.3309	0.0000	0.4296	**0.4892**	183	0.0000	0.0000	0.8122	0.7790	0.7647	0.8574	0.7526	0.7446	**0.8658**
59	0.0000	0.0000	0.5797	0.6141	0.6060	**0.8811**	0.5588	0.6224	0.0000	184	0.0000	0.0000	0.6184	0.6193	0.7484	**0.9966**	0.7493	0.7462	0.7867
60	0.0000	0.0000	0.5952	0.6231	0.6537	**0.9063**	0.5835	0.6152	0.7782	185	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	**0.0030**	0.0005	0.0000
61	0.0000	0.0000	0.7547	0.7737	0.8057	**0.9554**	0.7804	0.7932	0.8639	186	0.0000	0.0000	0.2340	0.0000	0.2755	0.0000	0.0037	0.0006	**0.4270**
62	0.0000	0.0000	0.3226	0.3543	0.2169	**0.8730**	0.0775	0.2428	0.0000	187	0.0000	0.0000	0.0000	**2.0000**	0.0000	**2.0000**	0.0000	0.0000	0.0000
63	0.0000	0.0000	0.7391	0.7598	0.8087	0.0000	0.7745	0.7910	**0.8707**	188	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
64	0.0000	0.9406	0.7756	0.8138	0.8466	**0.9804**	0.8295	0.8542	0.8984	189	0.0000	0.0000	0.0000	0.0000	**0.0000**	0.0000	0.0000	0.0000	0.0000
65	0.0000	0.0000	**0.4918**	0.0000	0.0385	0.0000	0.0356	0.0658	0.0000	190	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
66	0.0000	0.0000	0.0000	0.0000	0.4327	0.0000	0.4686	0.0000	**0.6944**	191	0.0000	0.0000	0.0000	0.0000	0.1309	**0.9615**	0.2052	0.2032	0.2220
67	0.0000	0.0000	0.6494	0.0000	**0.7438**	0.0000	0.3618	0.1765	0.0000	192	0.0000	0.0000	0.5181	0.4598	0.4528	0.4435	0.5406	**0.5785**	0.5510
68	0.0000	0.0000	0.0000	0.0000	**0.3287**	0.0000	0.0319	0.0159	0.0000	193	0.0000	0.0000	0.4386	0.4444	0.5175	**0.5602**	0.4526	0.4735	0.0000
69	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0020**	0.0000	0.0000	194	0.0000	0.0000	0.4682	0.4209	0.4627	**0.9542**	0.5375	0.5318	0.0000
70	0.0000	0.0000	0.5006	0.5435	0.5250	**0.7080**	0.5942	0.6084	0.6826	195	0.0000	0.0000	0.6740	0.6396	0.6580	0.6981	0.7027	0.6821	**0.7543**
71	0.0000	0.0000	0.5540	0.5450	0.6246	**0.7463**	0.6695	0.6602	0.0000	196	0.0000	0.0000	0.6903	0.6631	0.7344	**0.7923**	0.6787	0.6886	0.0000
72	0.0000	0.0000	0.5420	**0.5533**	0.5144	0.0000	0.0000	0.4273	0.0000	197	0.0000	0.0000	**0.3004**	0.0000	0.1341	0.0000	0.2739	0.1417	0.0000
73	0.0000	0.0000	0.6956	0.7256	0.6940	**0.9163**	0.6770	0.7050	0.8679	198	0.0000	0.0000	0.6906	0.6921	0.7673	0.0000	0.7581	0.7606	**0.7942**
74	0.0000	0.0000	0.7401	0.7456	0.7724	**0.8316**	0.6948	0.7004	0.0000	199	0.0000	0.0000	0.4660	0.5055	**0.5344**	0.0000	0.0107	0.4833	0.0000
75	0.0000	0.0000	0.7944	0.8032	0.7999	0.8574	0.7493	0.7424	**0.8639**	200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0038**	0.0005	0.0000
76	0.0000	0.0000	0.6152	0.6194	0.7369	**0.9899**	0.7453	0.7406	0.7593	201	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.1486**	0.0042	0.0000
77	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000	**0.0027**	0.0005	0.0000	202	0.0000	0.0000	0.0000	0.0000	0.0256	0.0000	**0.0946**	0.0271	0.0000
78	0.0000	0.0000	0.2338	0.2434	0.2853	0.0000	0.0015	0.0011	**0.4252**	203	0.0000	0.0000	0.0000	**3.0000**	0.0000	**3.0000**	0.0000	0.0000	0.0000
79	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	204	0.0000	0.0000	0.0000	0.3509	0.1232	0.0000	**0.4953**	0.1319	0.0000
80	0.0000	0.0000	0.0000	0.0000	**0.0000**	0.0000	0.0000	0.0000	0.0000	205	0.0000	0.0000	0.0000	0.4444	0.1420	0.0000	0.0234	0.1079	**0.4569**
81	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	206	0.0000	0.0000	0.0000	0.4167	0.1963	0.0000	**0.6011**	0.0956	0.5854
82	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	207	0.0000	0.0000	0.0000	0.2277	0.1889	**0.4444**	0.2947	0.0520	0.3810
83	0.0000	0.0000	0.1130	0.0000	0.0785	0.0000	**0.2053**	0.2030	0.0000	208	0.0000	0.0000	0.0000	0.0000	0.2703	0.1487	0.2148	0.0769	**0.2797**
84	0.0000	0.0000	0.4505	0.4484	0.2430	0.4425	0.5432	0.5790	**0.5988**	209	0.0000	0.0000	0.4914	0.4918	0.5874	**0.6857**	0.6293	0.6381	0.0000
85	0.0000	0.0000	0.4202	0.3984	0.4701	**0.7042**	0.4415	0.4744	0.0000	210	0.0000	0.0000	0.0000	0.1994	0.0621	0.0000	0.0390	0.1177	**0.3221**
86	0.0000	0.0000	0.0000	0.4405	0.4798	**0.8711**	0.5290	0.5315	0.0000	211	0.0000	0.0000	0.0000	0.2051	0.1436	**0.8101**	0.0534	0.1104	0.0000
87	0.0000	0.0000	0.6514	0.6379	0.6548	0.6981	0.7030	0.6754	**0.7490**	212	0.0000	0.0000	0.0000	**0.2069**	0.0159	0.0000	0.0043	0.0082	0.0000
88	0.0000	0.0000	0.6942	0.6789	0.6971	**0.7914**	0.6786	0.6915	0.0000	213	0.0000	0.0000	0.2574	0.2563	0.3505	**0.4749**	0.3674	0.3651	0.4100
89	0.0000	0.0000	0.0000	**0.2952**	0.1374	0.0000	0.2790	0.1256	0.0000	214	0.0000	0.0000	0.3400	0.3629	0.4373	**0.6112**	0.4443	0.4386	0.5068
90	0.0000	0.0000	0.6973	0.6901	0.7729	0.0000	0.7627	0.7694	**0.8082**	215	0.0000	0.0000	0.3328	0.3177	0.4458	**0.6106**	0.4386	0.4362	0.4930
91	0.0000	0.0000	0.0000	0.4728	**0.5329**	0.0000	0.5032	0.4869	0.0000	216	0.0000	0.0000	0.3399	0.3239	0.4717	**0.5572**	0.4431	0.4393	0.5023
92	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	**0.0038**	0.0005	0.0000	217	0.0000	0.0000	0.3456	0.3661	0.4396	0.0000	0.4400	0.4409	**0.5149**
93	0.0000	0.0000	0.7465	0.7439	0.7759	**0.8581**	0.7915	0.7652	0.8552	218	0.0000	0.0000	0.3453	0.3367	0.4736	**0.5811**	0.4433	0.4424	0.4956
94	0.0000	0.0000	0.8386	0.9091	0.7262	**0.9756**	0.7770	0.6905	0.9029	219	0.0000	0.0000	0.0000	0.1451	0.2252	**0.3231**	0.1893	0.1746	0.0000
95	0.0000	0.0000	0.0000	0.7111	0.0977	**0.9897**	0.8539	0.2955	0.8807	220	0.0000	0.0000	0.3355	0.3370	0.4812	**0.6549**	0.4516	0.4545	0.4799
96	0.0000	0.0000	0.6525	0.6339	0.6908	0.7273	0.5629	0.5704	**0.7634**	221	0.0000	0.0000	0.4844	0.4868	0.6366	**0.7381**	0.6213	0.6201	0.6501
97	0.0000	0.0000	0.0000	**0.5325**	0.2940	0.0000	0.1566	0.3323	0.0000	222	0.0000	0.0000	0.4193	0.4290	**0.5028**	0.3812	0.4754	0.4743	0.4325
98	0.0000	0.0000	0.0000	0.0000	**0.0682**	0.0000	0.0441	0.0099	0.0000	223	0.0000	0.0000	0.5105	0.4897	**0.5504**	0.0000	0.4868	0.5111	0.5501
99	0.0000	0.0000	0.8401	0.8031	0.6375	**0.9627**	0.5309	0.4880	0.0000	224	0.0000	0.0000	0.4733	0.4798	0.5589	0.4492	0.5251	**0.5746**	0.2691
100	0.0000	0.0000	0.2833	0.2967	0.4313	**0.5587**	0.4401	0.4545	0.0000	225	0.0000	0.0000	0.3661	0.3580	0.4334	0.3183	0.4076	0.4118	**0.4338**
101	0.0000	0.0000	0.0000	0.0000	**0.4867**	0.0000	0.2788	0.1350	0.0000	226	0.0000	0.0000	0.4515	0.4228	0.5257	0.3911	0.6263	0.6160	**0.6356**
102	0.0000	0.0000	0.7048	0.6681	0.7244	**0.7862**	0.7359	0.7255	0.0000	227	0.0000	0.0000	0.0000	**0.3150**	0.0417	0.0000	0.0077	0.0560	0.0000
103	0.0000	0.0000	**0.7000**	0.0000	0.0790	0.0000	0.5889	0.2824	0.0000	228	0.0000	0.0000	0.0000	0.0000	0.0440	0.0000	0.0000	**0.0516**	0.0000
104	0.0000	0.0000	0.4107	0.4237	0.1052	0.0000	0.0000	0.0000	**0.5391**	229	**0.3774**	0.0000	0.0000	0.0000	0.0025	0.0000	0.0004	0.0239	0.0000
105	0.0000	0.0000	0.7757	0.7910	0.8036	**0.9252**	0.7739	0.7929	0.8664	230	0.0000	0.0000	0.3311	0.3328	0.2195	**0.4132**	0.3745	0.3815	0.0000
106	0.0000	0.0000	0.7345	0.7652	0.7972	**0.9129**	0.7720	0.7806	0.8655	231	0.0000	0.0000	0.5434	0.5093	0.5732	0.0000	0.0060	0.4969	**0.5963**
107	0.0000	0.0000	0.0000	0.0000	**0.2974**	0.0000	0.1053	0.1625	0.0000	232	0.0000	0.0000	0.5428	0.5295	**0.5972**	0.5646	0.4988	0.4926	0.0000
108	0.0000	0.0000	0.0000	**1.0000**	0.0000	**1.0000**	0.0000	0.0000	0.0000	233	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0015	**0.0031**	0.0000
109	0.0000	0.0000	0.7612	0.7617	0.7771	0.8575	0.7793	0.7654	**0.8653**	234	0.0000	0.0000	**0.0028**	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000
110	0.0000	0.0000	0.5814	0.5714	0.0250	0.0000	0.0000	0.5679	**0.7353**	235	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	**0.0051**	0.0040	0.0000
111	0.0000	0.0000	0.5780	0.5877	0.5936	0.7417	0.6776	0.5617	**0.7547**	236	0.0000	0.0000	0.0000	0.0000	0.0482	0.0000	0.0039	0.0023	**0.1852**
112	0.0000	0.0000	0.8264	0.8299	0.7042	**0.9852**	0.7750	0.7464	0.9070	237	0.0000	0.0000	0.6926	0.6888	**0.7925**	0.7053	0.7694	0.7802	0.7891
113	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0509**	0.0009	0.0000	238	0.0000	0.0000	0.2988	0.3523	0.3576	0.3636	0.4216	0.4438	**0.5255**
114	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2025	0.0319	**0.7164**	239	0.0000	0.0000	0.0000	0.0000	0.0013	0.0000	0.0077	**0.0164**	0.0000
115	0.0000	0.0000	**0.5161**	0.0000	0.0211	0.0000	0.0821	0.0279	0.0000	240	0.0000	0.0000	0.0000	0.0000	**0.0401**	0.0000	0.0108	0.0090	0.0000
116	0.0000	0.0000	0.6857	0.7385	0.0891	**0.9412**	0.8530	0.3251	0.0000	241	0.0000	0.0000	0.3534	0.3615	0.7810	**0.7991**	0.4872	0.4919	0.6454
117	0.0000	0.0000	0.0000	0.0000	0.1245	0.0000	0.5932	0.0686	**0.8727**	242	0.0000	0.0000	0.2179	0.2194	0.2847	0.0000	0.2784	0.2774	**0.4422**
118	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6773	0.2900	**0.8889**	243	0.0000	0.0000	0.0564	0.0602	0.0164	0.0000	0.0243	0.0567	**0.1124**
119	0.0000	0.0000	0.7528	0.7481	0.7843	0.7362	0.7884	0.7892	**0.8658**	244	0.0000	0.0000	0.2064	0.2139	0.2354	0.0000	0.2441	0.2478	**0.3013**
120	0.0000	0.0000	0.5362	0.0000	0.5800	0.5556	0.5847	0.5751	**0.7843**	245	0.0000	0.0000	0.2131	0.2275	0.2810	**0.5023**	0.3061	0.3266	0.3010
121	0.0000	0.0000	0.5780	0.6079	0.5983	0.0000	0.0000	0.1246	**0.6757**	246	0.0000	0.0059	0.2134	0.2206	0.2722	**0.3362**	0.2455	0.3044	0.3275
122	0.0000	0.0000	0.4684	0.0000	0.2056	0.0000	0.0000	0.0869	**0.6826**	247	0.0000	0.0000	0.0000	0.0000	0.0871	0.0000	0.0000	0.0502	**0.1704**
123	0.0000	0.0000	0.2272	0.2593	0.3390	**0.9231**	0.3249	0.3497	0.0000	248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0144**	0.0000	0.0000
124	0.0000	0.0000	0.6279	0.6768	0.6176	0.7273	0.5641	0.5698	**0.7648**	249	0.0000	0.0000	**0.4878**	0.0000	0.2953	0.0000	0.0049	0.0153	0.0000
125	0.0000	0.0000	0.4796	0.4587	0.5999	0.5714	0.4892	0.4991	**0.6135**	250	0.0000	0.0000	0.0000	0.0000	0.0168	0.0000	0.0000	**0.0272**	0.0000

TABLE XIV
THE TEST PRECISION OF TIME SERIES ANOMALY DETECTION IN UCR 250 SUB-DATASETS. THE BEST RESULTS ARE IN **BOLD**.

UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector	UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector
1	0.0000	0.0000	0.5944	0.6037	0.5813	0.7497	0.6896	0.6949	**0.7533**	126	0.0000	0.0000	0.0000	0.3086	0.3748	0.4310	0.0000	0.3915	**0.5208**
2	0.0000	0.0000	0.4011	0.4054	0.3613	0.0000	0.0001	0.0322	**0.5964**	127	0.0000	0.0000	**0.3826**	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.4005	0.4005	0.3680	0.5929	0.4990	0.4719	**0.6000**	128	0.0000	0.0000	0.7448	0.7580	0.8004	0.0000	0.7743	0.8231	**0.8694**
4	0.0000	0.0000	0.0000	0.7018	0.7543	**0.9479**	0.7952	0.7564	0.8333	129	0.0000	0.0000	0.0000	0.4455	0.3283	0.0000	0.1559	0.3420	**0.6000**
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0005**	0.0000	130	0.0000	0.0000	0.0000	0.6178	0.5789	0.0000	0.4531	0.6501	**0.7613**
6	0.0000	0.0000	**0.3429**	0.3243	0.0000	0.0000	0.0000	0.0342	0.0000	131	0.0000	0.0000	0.0000	0.5843	0.5787	0.0000	0.1689	0.6287	**0.7939**
7	0.0000	0.0000	0.0000	**0.2892**	0.0995	0.0000	0.1026	0.0298	0.0000	132	0.0000	0.0000	0.0000	0.0000	0.2794	0.0000	0.0000	0.0593	**0.7143**
8	0.0000	0.0000	0.0000	0.0000	0.2032	**0.8000**	0.7861	0.3599	0.0000	133	0.0000	0.0000	0.0000	0.0000	0.0113	0.0000	0.1094	**0.2335**	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.1498	0.0000	0.1542	0.0920	**0.7742**	134	0.0000	0.0000	0.0000	0.7489	0.8022	0.0000	0.7513	0.7216	**0.8718**
10	0.0000	0.0000	0.5217	0.5217	0.0304	0.0000	**0.7330**	0.3598	0.6957	135	0.0000	0.0000	0.0000	0.0000	**0.1020**	0.0000	0.0154	0.0032	0.0000
11	0.0000	0.0000	0.5917	0.6289	0.7148	0.5837	0.7185	0.7311	**0.7833**	136	0.0000	0.0000	0.6894	0.6568	0.6510	0.0000	0.4673	0.6553	**0.8222**
12	0.0000	0.0000	0.4484	0.4082	0.5293	0.3984	0.4598	0.4793	**0.6211**	137	0.0000	0.0000	0.0000	0.0000	0.6308	0.0000	0.2574	0.6317	**0.8430**
13	0.0000	0.0000	0.4367	0.4587	0.3488	0.0000	0.0000	0.1282	**0.5917**	138	0.0000	0.0000	0.2083	0.0000	0.0311	0.0000	0.0176	0.1381	**0.3571**
14	0.0000	0.0000	0.3788	0.3067	0.3007	0.4310	0.0000	0.0802	**0.5319**	139	0.0000	0.0000	0.7805	0.7767	0.8210	0.0000	0.7942	0.7804	**0.8840**
15	0.0000	0.0000	0.1350	0.1333	0.1852	0.0000	**0.2248**	0.2062	0.0000	140	0.0000	**1.0000**	0.8883	0.8424	0.9077	0.0000	0.9035	0.9153	0.9203
16	0.0000	0.0000	0.4444	0.4357	0.5617	**0.5714**	0.5117	0.5153	0.0000	141	0.0000	0.0000	0.0000	0.8854	0.8985	0.0000	0.8565	0.9019	**0.9392**
17	0.0000	0.0000	0.3125	0.2907	0.3749	0.4032	0.3749	0.3788	**0.4310**	142	0.0000	0.0000	0.7750	0.7311	0.7550	0.0000	0.6947	0.6651	**0.8245**
18	0.0000	0.0000	0.3472	0.3021	0.0815	0.4310	0.0000	0.3874	**0.5682**	143	0.0000	0.0000	0.0000	**0.7517**	0.7423	0.0000	0.2423	0.0062	0.0000
19	0.0000	0.0000	0.0000	**0.4074**	0.0563	0.0000	0.1010	0.0000	0.0000	144	0.0000	0.0000	**0.7009**	0.0000	**0.7510**	0.0000	0.1249	0.1306	0.0000
20	0.0000	0.0000	0.7745	0.7448	0.8137	0.0000	0.7802	0.8218	**0.8875**	145	0.0000	0.0000	0.1656	0.1506	0.2742	**0.3623**	0.2849	0.2971	0.0000
21	0.0000	0.0000	0.0000	0.0000	0.1663	0.0000	0.1261	0.2840	**0.5769**	146	0.0000	0.0000	0.1913	**0.2251**	0.1778	0.0000	0.0547	0.1639	0.0000
22	0.0000	0.0000	0.6310	0.6178	0.6564	0.0000	0.5325	0.6411	**0.7662**	147	**0.6818**	0.0000	0.0000	0.1027	0.0921	0.3297	0.1994	0.1125	0.0000
23	0.0000	0.0000	0.6047	0.6154	0.5797	0.0000	0.2794	0.6386	**0.8062**	148	0.0000	0.0000	0.3430	0.0000	0.3197	0.0000	0.2445	0.3000	**0.5394**
24	0.0000	0.0000	**0.3896**	0.0000	**0.4364**	0.0000	0.0000	0.0455	0.0000	149	0.0000	0.0000	0.0000	0.3869	0.3147	0.0000	0.4425	0.4789	**0.5328**
25	0.0000	0.0000	**0.3857**	0.0000	0.0000	0.0000	0.1591	0.2049	0.0000	150	0.0000	0.0000	**0.5204**	0.5100	**0.5813**	0.0000	0.0000	0.0000	0.0000
26	0.0000	0.0000	**0.7834**	0.7727	0.7765	0.0000	0.7475	0.7126	0.0000	151	0.0000	0.0000	0.4678	0.5229	0.6698	0.6452	0.6221	0.6118	**0.6809**
27	0.0000	0.0000	0.0000	0.0000	0.0032	0.0000	0.0000	**0.0108**	0.0000	152	0.0000	0.0000	0.6154	0.5979	0.7109	0.0000	**0.7391**	0.0000	0.0000
28	0.0000	0.0000	0.6810	0.7070	0.7385	**1.0000**	0.4949	0.6786	0.8346	153	0.0000	0.0000	0.6654	0.7186	0.7861	0.0000	0.8250	0.7813	**0.8511**
29	0.0000	0.0000	0.6892	0.6939	0.6349	0.0000	0.2682	0.6028	**0.8226**	154	0.0000	0.0000	**0.3364**	0.0000	0.3037	0.0000	0.1619	0.0923	0.0000
30	0.0000	0.0000	0.0000	0.0000	0.0014	0.0000	0.0557	0.1305	**0.3030**	155	0.0000	0.0000	0.0000	0.0000	0.5490	0.0000	0.6010	0.2184	**0.7200**
31	0.0000	0.0000	0.7805	0.0000	0.8345	0.0000	0.7557	0.7713	**0.8889**	156	0.0000	0.0000	0.5079	0.0000	0.5141	0.0000	0.3048	0.1855	**0.7519**
32	0.0000	0.7766	0.8565	0.9063	0.9052	0.0000	0.9218	0.9161	**0.9372**	157	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0244**	0.0000
33	0.0000	0.0000	0.8629	0.8374	0.8993	0.0000	0.8401	**0.9026**	0.8808	158	0.0000	0.0000	0.5843	**0.5879**	0.5212	0.0000	0.2224	0.3630	0.0000
34	0.0000	0.0000	0.7635	0.0000	0.6921	0.0000	0.7071	0.6751	**0.8073**	159	0.0000	0.0000	0.0952	0.0000	**0.1966**	0.0000	**0.2138**	0.0834	0.0000
35	0.0000	0.0000	0.6687	0.6813	0.7665	0.0000	0.4617	0.0088	**0.7956**	160	0.0000	0.0000	0.5976	0.5355	0.4679	0.0000	0.7152	0.4153	**0.7538**
36	0.0000	0.0000	0.0000	**0.7257**	0.6941	0.0000	0.1136	0.1274	0.0000	161	0.0000	0.0000	0.7700	0.8250	**0.8795**	**0.8684**	0.8208	0.8447	0.0000
37	0.0000	0.0000	0.1724	0.1524	0.2701	**0.4545**	0.2867	0.2963	0.2857	162	0.0000	0.0000	0.0000	0.0000	0.1643	**0.6020**	**0.6465**	0.5901	0.0000
38	0.0000	0.0000	0.2053	0.0000	0.2642	**0.2979**	0.0226	0.1185	0.0000	163	0.0000	0.0000	0.3606	0.3632	0.4145	**0.3896**	0.4110	**0.4198**	0.0000
39	0.0000	0.0000	0.1056	0.0000	0.1286	0.0000	**0.2016**	0.1127	0.0000	164	0.0000	0.0000	0.2494	0.0000	0.1970	0.0000	0.0000	0.0253	**0.3509**
40	0.0000	0.0000	0.3476	0.3351	0.4227	0.0000	0.2517	0.2930	**0.5394**	165	0.0000	0.0000	**0.2564**	0.0000	0.0835	0.0000	0.0000	0.0000	0.0000
41	0.0000	0.0000	0.3571	0.3869	0.2847	0.0000	0.4279	0.4800	**0.4981**	166	0.0000	0.0000	0.2012	0.0000	0.1320	0.2186	0.0048	0.2893	**0.3301**
42	0.0000	0.0000	0.0000	0.5122	0.5907	0.0000	0.0000	0.5436	**0.6745**	167	0.0000	0.0000	0.3937	0.4444	0.5451	0.0000	0.4726	0.5091	**0.6173**
43	0.0000	0.0000	0.5461	0.5195	0.6129	0.6250	0.6198	0.6105	**0.6667**	168	0.0000	0.0000	0.4190	0.4478	0.5427	**0.6818**	0.4846	0.5086	0.5780
44	0.0000	0.0000	0.6087	**0.6499**	0.7124	0.0000	**0.7353**	0.6965	0.0000	169	0.0000	0.0000	0.6000	0.6322	0.7369	**0.7958**	0.7106	0.7154	0.7538
45	0.0000	0.0000	0.7101	0.7243	0.7800	0.0000	0.8189	0.7847	**0.8353**	170	0.0000	0.0000	0.2004	0.2178	0.1141	**0.7534**	0.0556	0.1797	0.0000
46	0.0000	0.0000	0.0000	**0.3978**	0.2443	0.0000	0.1365	0.0860	0.0000	171	0.0000	0.0000	0.6305	0.6121	0.7151	**0.9893**	0.7033	0.7056	0.7463
47	0.0000	0.0000	0.4068	0.4114	0.5479	0.0000	**0.5794**	0.2192	0.0000	172	0.0000	0.0000	0.6661	0.7036	0.7974	**1.0000**	0.7732	0.7860	0.8073
48	0.0000	0.0000	0.5215	0.0000	0.6205	0.0000	0.2458	0.2137	**0.7239**	173	0.0000	0.0000	0.0000	0.3750	0.0627	0.0000	0.0244	0.0485	**0.4412**
49	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0243**	0.0000	174	0.0000	0.0000	0.0000	0.0000	0.4263	0.0000	**0.4331**	0.0027	**0.4310**
50	0.0000	0.0000	0.5607	0.0000	0.1491	0.0000	0.1973	0.2599	**0.7405**	175	0.0000	0.0000	0.0000	0.5155	0.5229	**0.9091**	0.2913	0.2388	0.0000
51	0.0000	0.0000	0.0000	0.0000	**0.2014**	0.0000	0.1789	0.0849	0.0000	176	0.0000	0.0000	0.0000	0.0000	0.2690	0.0000	0.0395	0.0170	**0.5682**
52	0.0000	0.0000	0.5765	0.5078	0.4910	0.0000	0.6192	0.3694	**0.7206**	177	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0010**	0.0000	0.0000
53	0.0000	0.0000	0.0000	0.7452	0.8600	0.8524	0.0003	0.8438	**0.8817**	178	0.0000	0.0000	0.3745	0.3968	0.4401	**0.5495**	0.4703	0.4752	0.0000
54	0.0000	0.0000	0.0000	0.0000	0.4183	**0.6413**	**0.6528**	0.5955	0.0000	179	0.0000	0.0000	0.3992	0.4219	0.5130	**0.5952**	0.5602	0.5387	0.0000
55	0.0000	0.0000	0.3497	0.0000	0.3317	**0.3741**	0.4106	**0.4174**	0.0000	180	0.0000	0.0000	0.3711	0.0000	**0.4772**	0.0000	0.0000	0.3624	0.0000
56	0.0000	0.0000	0.2273	0.2660	0.0960	0.0000	0.0000	0.0253	**0.3636**	181	0.0000	0.0000	0.5511	0.5425	0.6387	0.0000	0.6035	0.6281	**0.7218**
57	0.0000	0.0000	**0.2427**	0.2242	0.1214	0.0000	0.0000	0.0000	0.0000	182	0.0000	0.0000	0.5642	0.6299	0.6807	**0.7080**	0.6412	0.6492	0.6993
58	0.0000	0.0000	0.2138	0.0000	0.2972	0.1983	0.0000	0.2878	**0.3238**	183	0.0000	0.0000	0.6838	0.6380	0.7174	0.7505	0.7082	0.7068	**0.7634**
59	0.0000	0.0000	0.4082	0.4431	0.5020	**0.7874**	0.4678	0.5054	0.0000	184	0.0000	0.0000	0.4476	0.4485	0.6142	**0.9933**	0.6225	0.6114	0.6484
60	0.0000	0.0000	0.4237	0.4525	0.5433	**0.8287**	0.4911	0.5086	0.6369	185	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	**0.0015**	0.0003	0.0000
61	0.0000	0.0000	0.6061	0.6309	0.7261	**0.9146**	0.7118	0.7167	0.7605	186	0.0000	0.0000	0.1325	0.0000	0.1729	0.0000	0.0026	0.0004	**0.2714**
62	0.0000	0.0000	0.1923	0.2153	0.1530	**0.7746**	0.0557	0.1673	0.0000	187	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
63	0.0000	0.0000	0.5861	0.6126	0.7262	0.0000	0.7037	0.7087	**0.7711**	188	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
64	0.0000	0.8879	0.6334	0.6861	0.7869	**0.9615**	0.7728	0.7816	0.8155	189	0.0000	0.0000	0.0000	0.0000	**0.0000**	0.0000	0.0000	0.0000	0.0000
65	0.0000	0.0000	**0.3261**	0.0000	0.0353	0.0000	0.0323	0.0584	0.0000	190	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
66	0.0000	0.0000	0.0000	0.0000	0.3310	0.0000	0.3519	0.0000	**0.5319**	191	0.0000	0.0000	0.0000	0.0000	0.0733	**0.9259**	0.1144	0.1133	0.1248
67	0.0000	0.0000	0.4808	0.0000	**0.6540**	0.0000	0.3926	0.2239	0.0000	192	0.0000	0.0000	0.3497	0.2985	0.3327	0.2849	0.4058	**0.4263**	0.3802
68	0.0000	0.0000	0.0000	0.0000	**0.2989**	0.0000	0.0338	0.0170	0.0000	193	0.0000	0.0000	0.2809	0.2857	0.3726	**0.3891**	0.3232	0.3444	0.0000
69	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0010**	0.0000	0.0000	194	0.0000	0.0000	0.3056	0.2665	0.3590	**0.9124**	0.4133	0.4117	0.0000
70	0.0000	0.0000	0.3339	0.3731	0.4224	**0.5479**	0.4675	0.4761	0.5181	195	0.0000	0.0000	0.5082	0.4701	0.5650	0.5362	0.5899	0.5798	**0.6056**
71	0.0000	0.0000	0.3831	0.3745	0.5046	**0.5952**	0.5583	0.5387	0.0000	196	0.0000	0.0000	0.5271	0.4960	0.6370	**0.6560**	0.6280	0.6317	0.0000
72	0.0000	0.0000	0.3717	**0.3824**	**0.4263**	0.0000	0.0000	0.3612	0.0000	197	0.0000	0.0000	**0.1768**	0.0000	0.0932	0.0000	**0.1835**	0.0895	0.0000
73	0.0000	0.0000	0.5332	0.5693	0.6364	**0.8456**	0.6100	0.6342	0.7667	198	0.0000	0.0000	0.5275	0.5291	0.6450	0.0000	0.6383	0.6328	**0.6587**
74	0.0000	0.0000	0.5874	0.5944	0.6891	**0.7117**	0.6418	0.6489	0.0000	199	0.0000	0.0000	0.3038	0.3382	**0.3911**	0.0000	0.0095	0.3594	0.0000
75	0.0000	0.0000	0.6590	0.6711	0.7312	0.7505	0.7069	0.7061	**0.7605**	200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0019**	0.0003	0.0000
76	0.0000	0.0000	0.4443	0.4487	0.6062	**0.9801**	0.6200	0.6076	0.6120	201	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0803**	0.0023	0.0000
77	0.0000	0.0000	0.0000	0.0000	0.0003	0.0000	**0.0014**	0.0003	0.0000	202	0.0000	0.0000	0.0000	0.0000	0.0150	0.0000	**0.0565**	0.0164	0.0000
78	0.0000	0.0000	0.1324	0.1386	0.1793	0.0000	0.0010	0.0007	**0.2700**	203	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
79	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	204	0.0000	0.0000	0.0000	0.2128	0.0887	0.0000	**0.3292**	0.0973	0.0000
80	0.0000	0.0000	0.0000	0.0000	**0.0000**	0.0000	0.0000	0.0000	0.0000	205	0.0000	0.0000	0.0000	0.2857	0.1091	0.0000	0.0187	0.0863	**0.2961**
81	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	206	0.0000	0.0000	0.0000	0.2632	0.1642	0.0000	**0.5252**	0.0862	0.4138
82	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	207	0.0000	0.0000	0.0000	0.1285	0.1219	**0.2857**	0.1863	0.0343	0.2353
83	0.0000	0.0000	0.0599	0.0000	0.0441	0.0000	**0.1145**	0.1131	0.0000	208	0.0000	0.0000	0.0000	0.0000	**0.1733**	0.0803	0.1381	0.0506	**0.1626**
84	0.0000	0.0000	0.2907	0.2890	0.1906	0.2841	0.4088	0.4269	**0.4274**	209	0.0000	0.0000	0.3257	0.3261	0.4326	**0.5217**	0.4612	0.4706	0.0000
85	0.0000	0.0000	0.2660	0.2488	0.3428	**0.5435**	0.3187	0.3453	0.0000	210	0.0000	0.0000	0.0000	0.1107	0.0380	0.0000	0.0239	0.0715	**0.1920**
86	0.0000	0.0000	0.0000	0.2825	0.3705	**0.7716**	0.4068	0.4122	0.0000	211	0.0000	0.0000	0.0000	0.1143	0.0873	**0.6809**	0.0329	0.0675	0.0000
87	0.0000	0.0000	0.4830	0.4684	0.5713	0.5362	0.5904	0.5764	**0.5987**	212	0.0000	0.0000	0.0000	**0.1154**	0.0098	0.0000	0.0027	0.0050	0.0000
88	0.0000	0.0000	0.5316	0.5139	0.6188	**0.6549**	0.6279	0.6362	0.0000	213	0.0000	0.0000	0.1477	0.1470	0.2221	**0.3114**	0.2316	0.2302	0.2579
89	0.0000	0.0000	0.0000	**0.1731**	0.0952	0.0000	**0.1863**	0.0805	0.0000	214	0.0000	0.0000	0.2049	0.2217	0.2922	**0.4401**	0.2988	0.2953	0.3394
90	0.0000	0.0000	0.5353	0.5268	0.6582	0.0000	0.6475	0.6410	**0.6782**	215	0.0000	0.0000	0.1996	0.1888	0.3015	**0.4395**	0.2950	0.2933	0.3271
91	0.0000	0.0000	0.0000	0.3096	**0.3892**	0.0000	0.3808	0.3618	0.0000	216	0.0000	0.0000	0.2047	0.1932	0.3165	**0.3862**	0.2994	0.2961	0.3354
92	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	**0.0019**	0.0002	0.0000	217	0.0000	0.0000	0.2089	0.2241	0.2951	0.0000	0.2968	0.2976	**0.3467**
93	0.0000	0.0000	0.5956	0.5922	0.7104	**0.7515**	0.7123	0.6949	0.7470	218	0.0000	0.0000	0.2087	0.2024	0.3188	**0.4096**	0.2997	0.2990	0.3294
94	0.0000	0.0000	0.7220	0.8333	0.7653	**0.9524**	0.7970	0.7544	0.8230	219	0.0000	0.0000	0.0000	0.0782	0.1299	**0.1926**	0.1091	0.1007	0.0000
95	0.0000	0.0000	0.0000	0.5517	0.1464	**0.9796**	0.7529	0.3727	0.7869	220	0.0000	0.0000	0.2016	0.2026	0.3244	**0.4869**	0.3060	0.3064	0.3157
96	0.0000	0.0000	0.4843	0.4640	0.5824	0.5714	0.5089	0.5172	**0.6173**	221	0.0000	0.0000	0.3196	0.3217	0.4814	**0.5849**	0.4689	0.4675	0.4816
97	0.0000	0.0000	0.0000	**0.3629**	0.2848	0.0000	0.1638	0.3158	0.0000	222	0.0000	0.0000	0.2653	0.2731	**0.3478**	0.2355	0.3215	0.3284	0.2759
98	0.0000	0.0000	0.0000	0.0000	**0.0467**	0.0000	0.0305	0.0069	0.0000	223	0.0000	0.0000	0.3427	0.3243	**0.4111**	0.0000	0.3487	0.3742	0.3794
99	0.0000	0.0000	0.7243	0.6710	0.7463	**0.9281**	0.6972	0.6701	0.0000	224	0.0000	0.0000	0.3100	0.3157	0.4132	0.2897	0.3725	**0.4184**	0.1555
100	0.0000	0.0000	0.1650	0.1742	0.2783	**0.3876**	0.2846	0.2962	0.0000	225	0.0000	0.0000	0.2240	0.2180	**0.3076**	0.1893	0.2638	0.2692	**0.2770**
101	0.0000	0.0000	0.0000	0.0000	**0.4024**	0.0000	0.2544	0.1324	0.0000	226	0.0000	0.0000	0.2915	0.2681	0.3780	0.2431	**0.4690**	0.4582	**0.4658**
102	0.0000	0.0000	0.5442	0.5016	0.6455	**0.6478**	0.6203	0.6086	0.0000	227	0.0000	0.0000	0.0000	**0.1869**	0.0294	0.0000	0.0056	0.0400	0.0000
103	0.0000	0.0000	**0.5385**	0.0000	0.1280	0.0000	**0.6554**	0.3783	0.0000	228	0.0000	0.0000	0.0000	0.0000	0.0238	0.0000	0.0000	**0.0280**	0.0000
104	0.0000	0.0000	0.2584	0.2688	0.0822	0.0000	0.0000	0.0000	**0.3690**	229	**0.2326**	0.0000	0.0000	0.0000	0.0013	0.0000	0.0002	0.0125	0.0000
105	0.0000	0.0000	0.6336	0.6543	0.7273	**0.8608**	0.7082	0.7165	0.7643	230	0.0000	0.0000	0.1984	0.1996	0.1583	**0.2604**	0.2541	0.2599	0.0000
106	0.0000	0.0000	0.5804	0.6196	0.7205	**0.8398**	0.7015	0.7058	0.7629	231	0.0000	0.0000	0.3730	0.3417	**0.4500**	0.0000	0.0064	0.4061	**0.4248**
107	0.0000	0.0000	0.0000	0.0000	**0.3619**	0.0000	0.1378	0.2093	0.0000	232	0.0000	0.0000	0.3725	0.3601	**0.4684**	0.3933	0.4137	0.4036	0.0000
108	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	233	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0008	**0.0016**	0.0000
109	0.0000	0.0000	0.6145	0.6151	0.7148	0.7506	0.7073	0.6943	**0.7626**	234	0.0000	0.0000	**0.0014**	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
110	0.0000	0.0000	0.4098	0.4000	0.0297	0.0000	0.0000	0.4743	**0.5814**	235	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	**0.0026**	0.0020	0.0000
111	0.0000	0.0000	0.4065	0.4161	0.4990	0.5894	0.5458	0.4711	**0.6061**	236	0.0000	0.0000	0.0000	0.0000	0.0265	0.0000	0.0021	0.0013	**0.1020**
112	0.0000	0.0000	0.7042	0.7092	0.7590	**0.9709**	0.7971	0.7743	0.8299	237	0.0000	0.0000	0.5298	0.5253	**0.6750**	0.5447	0.6584	0.6636	0.6516
113	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0267**	0.0005	0.0000	238	0.0000	0.0000	0.1756	0.2138	0.2430	0.2222	0.2769	0.2913	**0.3564**
114	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2033	0.0340	**0.5581**	239	0.0000	0.0000	0.0000	0.0000	0.0007	0.0000	0.0039	**0.0084**	0.0000
115	0.0000	0.0000	**0.3478**	0.0000	0.0224	0.0000	0.0839	0.0299	0.0000	240	0.0000	0.0000	0.0000	0.0000	**0.0207**	0.0000	0.0056	0.0046	0.0000
116	0.0000	0.0000	0.5217	0.5854	0.1318	**0.8889**	0.7507	0.3984	0.0000	241	0.0000	0.0000	0.2146	0.2206	**0.6665**	**0.6654**	0.3284	0.3327	0.4765
117	0.0000	0.0000	0.0000	0.0000	0.1800	0.0000	0.5847	0.1066	**0.7742**	242	0.0000	0.0000	0.1223	0.1232	0.1750	0.0000	0.1753	0.1729	**0.2838**
118	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6016	0.3648	**0.8000**	243	0.0000	0.0000	0.0290	0.0310	0.0087	0.0000	0.0130	0.0301	**0.0595**
119	0.0000	0.0000	0.6036	0.5976	0.7226	0.5825	0.7094	0.7292	**0.7634**	244	0.0000	0.0000	0.1151	0.1198	0.1445	0.0000	0.1516	0.1526	**0.1774**
120	0.0000	0.0000	0.3663	0.0000	0.4781	0.3846	0.4747	0.4834	**0.6452**	245	0.0000	0.0000	0.1193	0.1283	0.1721	**0.3354**	0.1903	0.2010	0.1772
121	0.0000	0.0000	0.4065	0.4367	0.5054	0.0000	0.0000	0.1385	**0.5102**	246	0.0000	0.0030	0.1195	0.1240	0.1653	**0.2021**	0.1466	0.1835	0.1958
122	0.0000	0.0000	0.3058	0.0000	0.1795	0.0000	0.0000	0.0806	**0.5181**	247	0.0000	0.0000	0.0000	0.0000	0.0478	0.0000	0.0000	0.0278	**0.0931**
123	0.0000	0.0000	0.1282	0.1490	0.2108	**0.8571**	0.2025	0.2173	0.0000	248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0180**	0.0000	0.0000
124	0.0000	0.0000	0.4577	0.5115	0.5407	0.5714	0.5109	0.5170	**0.6192**	249	0.0000	0.0000	**0.3226**	0.0000	0.2424	0.0000	0.0133	0.0155	0.0000
125	0.0000	0.0000	0.3155	0.2976	0.4398	0.4000	0.3719	0.3793	**0.4425**	250	0.0000	0.0000	0.0000	0.0000	0.0097	0.0000	0.0000	**0.0163**	0.0000

TABLE XV
THE TEST RECALL OF TIME SERIES ANOMALY DETECTION IN UCR 250 SUB-DATASETS. THE BEST RESULTS ARE IN **BOLD**.

UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector	UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector
1	0.0000	0.0000	**1.0000**	**1.0000**	0.8727	**1.0000**	0.8435	0.8513	**1.0000**	126	0.0000	0.0000	0.0000	**1.0000**	0.6580	**1.0000**	0.0000	0.6875	**1.0000**
2	0.0000	0.0000	**1.0000**	**1.0000**	0.7577	0.0000	0.0001	0.0258	**1.0000**	127	0.0000	0.0000	**1.0000**	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	**1.0000**	**1.0000**	0.7695	**1.0000**	0.7790	0.6923	**1.0000**	128	0.0000	0.0000	**1.0000**	**1.0000**	0.6230	0.0000	0.5458	0.7311	**1.0000**
4	0.0000	0.0000	0.0000	**1.0000**	0.6255	**1.0000**	0.7574	0.6601	**1.0000**	129	0.0000	0.0000	0.0000	**1.0000**	0.3704	0.0000	0.1418	0.3931	**1.0000**
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0100**	0.0000	130	0.0000	0.0000	0.0000	**1.0000**	0.4369	0.0000	0.2741	0.5929	**1.0000**
6	0.0000	0.0000	**1.0000**	**1.0000**	0.0000	0.0000	0.0000	0.0300	0.0000	131	0.0000	0.0000	0.0000	**1.0000**	0.4485	0.0000	0.0671	0.5522	**1.0000**
7	0.0000	0.0000	0.0000	**1.0000**	0.0908	0.0000	0.0775	0.0263	0.0000	132	0.0000	0.0000	0.0000	0.0000	0.2770	0.0000	0.0000	0.0443	**1.0000**
8	0.0000	0.0000	0.0000	0.0000	0.1200	**1.0000**	0.9027	0.2377	0.0000	133	0.0000	0.0000	0.0000	0.0000	0.0100	0.0000	0.1085	**0.2552**	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0800	0.0000	0.0550	0.0429	**1.0000**	134	0.0000	0.0000	0.0000	**1.0000**	0.6562	0.0000	0.4791	0.4293	**1.0000**
10	0.0000	0.0000	**1.0000**	**1.0000**	0.0144	0.0000	**0.7748**	0.2335	**1.0000**	135	0.0000	0.0000	0.0000	0.0000	**0.2900**	0.0000	0.0400	0.0083	0.0000
11	0.0000	0.0000	**1.0000**	**1.0000**	0.8086	**1.0000**	0.8872	0.8645	**1.0000**	136	0.0000	0.0000	**1.0000**	**1.0000**	0.4794	0.0000	0.2302	0.4788	**1.0000**
12	0.0000	0.0000	**1.0000**	**1.0000**	0.7327	**1.0000**	0.7569	0.7070	**1.0000**	137	0.0000	0.0000	0.0000	0.0000	0.4143	0.0000	0.0863	0.4102	**1.0000**
13	0.0000	0.0000	**1.0000**	**1.0000**	0.3833	0.0000	0.0000	0.1036	**1.0000**	138	0.0000	0.0000	**1.0000**	0.0000	0.0700	0.0000	0.0390	0.3390	**1.0000**
14	0.0000	0.0000	**1.0000**	**1.0000**	0.4746	**1.0000**	0.0000	0.0944	**1.0000**	139	0.0000	0.0000	**1.0000**	**1.0000**	0.6564	0.0000	0.5532	0.5064	**1.0000**
15	0.0000	0.0000	**1.0000**	**1.0000**	0.7368	0.0000	**0.9342**	0.8358	0.0000	140	0.0000	**1.0000**	**1.0000**	**1.0000**	0.8103	0.0000	0.7607	0.7703	**1.0000**
16	0.0000	0.0000	**1.0000**	**1.0000**	0.7908	**1.0000**	0.6297	0.6332	0.0000	141	0.0000	0.0000	0.0000	**1.0000**	0.7596	0.0000	0.5459	0.7768	**1.0000**
17	0.0000	0.0000	**1.0000**	**1.0000**	0.7524	**1.0000**	0.7144	0.7262	**1.0000**	142	0.0000	0.0000	**1.0000**	**1.0000**	0.5863	0.0000	0.4169	0.3741	**1.0000**
18	0.0000	0.0000	**1.0000**	**1.0000**	0.0999	**1.0000**	0.0000	0.6786	**1.0000**	143	0.0000	0.0000	0.0000	**1.0000**	0.5973	0.0000	0.0696	0.0014	0.0000
19	0.0000	0.0000	0.0000	**1.0000**	0.0457	0.0000	0.0898	0.0000	0.0000	144	0.0000	0.0000	**1.0000**	0.0000	**0.5583**	0.0000	0.0282	0.0296	0.0000
20	0.0000	0.0000	**1.0000**	**1.0000**	0.6952	0.0000	0.5445	0.7269	**1.0000**	145	0.0000	0.0000	**1.0000**	**1.0000**	0.9518	**1.0000**	0.9708	0.9770	0.0000
21	0.0000	0.0000	0.0000	0.0000	0.1520	0.0000	0.1084	0.3016	**1.0000**	146	0.0000	0.0000	**1.0000**	**1.0000**	0.3857	0.0000	0.1066	0.3410	0.0000
22	0.0000	0.0000	**1.0000**	**1.0000**	0.6072	0.0000	0.3747	0.5543	**1.0000**	147	**1.0000**	0.0000	0.0000	**1.0000**	0.4157	**1.0000**	0.9980	0.5137	0.0000
23	0.0000	0.0000	**1.0000**	**1.0000**	0.4513	0.0000	0.1299	0.5634	**1.0000**	148	0.0000	0.0000	**1.0000**	0.0000	0.4294	0.0000	0.2984	0.3865	**1.0000**
24	0.0000	0.0000	**1.0000**	0.0000	**0.5377**	0.0000	0.0000	0.0323	0.0000	149	0.0000	0.0000	0.0000	**1.0000**	0.4008	0.0000	0.6750	0.7755	**1.0000**
25	0.0000	0.0000	**1.0000**	0.0000	0.0000	0.0000	0.1659	0.2178	0.0000	150	0.0000	0.0000	**1.0000**	**1.0000**	**0.6987**	0.0000	0.0000	0.0000	0.0000
26	0.0000	0.0000	**1.0000**	**1.0000**	0.5742	0.0000	0.4874	0.4293	0.0000	151	0.0000	0.0000	**1.0000**	**1.0000**	0.7918	**1.0000**	0.9115	0.9117	**1.0000**
27	0.0000	0.0000	0.0000	0.0000	0.0083	0.0000	0.0000	**0.0283**	0.0000	152	0.0000	0.0000	**1.0000**	**1.0000**	0.7655	0.0000	**0.8048**	0.0000	0.0000
28	0.0000	0.0000	**1.0000**	**1.0000**	0.7120	**1.0000**	0.2753	0.5432	**1.0000**	153	0.0000	0.0000	**1.0000**	**1.0000**	0.8146	0.0000	0.8482	0.7586	**1.0000**
29	0.0000	0.0000	**1.0000**	**1.0000**	0.4193	0.0000	0.0938	0.3699	**1.0000**	154	0.0000	0.0000	**1.0000**	0.0000	0.3956	0.0000	0.1617	0.0999	0.0000
30	0.0000	0.0000	0.0000	0.0000	0.0030	0.0000	0.1190	0.2950	**1.0000**	155	0.0000	0.0000	0.0000	0.0000	0.9267	0.0000	0.9826	0.2208	**1.0000**
31	0.0000	0.0000	**1.0000**	0.0000	0.6974	0.0000	0.4616	0.4936	**1.0000**	156	0.0000	0.0000	**1.0000**	0.0000	0.4371	0.0000	0.0892	0.0846	**1.0000**
32	0.0000	**1.0000**	**1.0000**	**1.0000**	0.7845	0.0000	0.8065	0.7708	**1.0000**	157	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0607**	0.0000
33	0.0000	0.0000	**1.0000**	**1.0000**	0.7618	0.0000	0.4438	**0.7421**	**1.0000**	158	0.0000	0.0000	**1.0000**	**1.0000**	0.3937	0.0000	0.0616	0.2092	0.0000
34	0.0000	0.0000	**1.0000**	0.0000	0.4430	0.0000	0.3741	0.3814	**1.0000**	159	0.0000	0.0000	**1.0000**	0.0000	**0.9580**	0.0000	**0.5590**	0.3300	0.0000
35	0.0000	0.0000	**1.0000**	**1.0000**	0.6904	0.0000	0.1884	0.0019	**1.0000**	160	0.0000	0.0000	**1.0000**	**1.0000**	0.3645	0.0000	0.5242	0.2598	**1.0000**
36	0.0000	0.0000	0.0000	**1.0000**	0.4272	0.0000	0.0256	0.0296	0.0000	161	0.0000	0.0000	**1.0000**	**1.0000**	**0.7410**	**1.0000**	0.5800	0.5901	0.0000
37	0.0000	0.0000	**1.0000**	**1.0000**	0.9352	**1.0000**	0.9708	0.9770	**1.0000**	162	0.0000	0.0000	0.0000	0.0000	0.0727	**1.0000**	**0.8620**	0.5346	0.0000
38	0.0000	0.0000	**1.0000**	0.0000	0.6399	**1.0000**	0.0421	0.2337	0.0000	163	0.0000	0.0000	**1.0000**	**1.0000**	0.6849	**1.0000**	0.6443	**0.6601**	0.0000
39	0.0000	0.0000	**1.0000**	0.0000	0.5927	0.0000	**0.9980**	0.5137	0.0000	164	0.0000	0.0000	**1.0000**	0.0000	0.4068	0.0000	0.0000	0.0445	**1.0000**
40	0.0000	0.0000	**1.0000**	**1.0000**	0.6566	0.0000	0.3025	0.3737	**1.0000**	165	0.0000	0.0000	**1.0000**	0.0000	0.1470	0.0000	0.0000	0.0000	0.0000
41	0.0000	0.0000	**1.0000**	**1.0000**	0.3433	0.0000	0.6309	0.7761	**1.0000**	166	0.0000	0.0000	**1.0000**	0.0000	0.3287	**1.0000**	0.0101	0.8528	**1.0000**
42	0.0000	0.0000	0.0000	**1.0000**	0.7029	0.0000	0.0000	0.5782	**1.0000**	167	0.0000	0.0000	**1.0000**	**1.0000**	0.9195	0.0000	0.7069	0.8198	**1.0000**
43	0.0000	0.0000	**1.0000**	**1.0000**	0.7013	**1.0000**	0.9058	0.9016	**1.0000**	168	0.0000	0.0000	**1.0000**	**1.0000**	0.8284	**1.0000**	0.7093	0.7783	**1.0000**
44	0.0000	0.0000	**1.0000**	**1.0000**	0.7454	0.0000	**0.8150**	0.7113	0.0000	169	0.0000	0.0000	**1.0000**	**1.0000**	0.9233	**1.0000**	0.8648	0.8877	**1.0000**
45	0.0000	0.0000	**1.0000**	**1.0000**	0.7823	0.0000	0.8171	0.7721	**1.0000**	170	0.0000	0.0000	**1.0000**	**1.0000**	0.2672	**1.0000**	0.1275	0.4809	0.0000
46	0.0000	0.0000	0.0000	**1.0000**	0.3029	0.0000	0.1297	0.0922	0.0000	171	0.0000	0.0000	**1.0000**	**1.0000**	0.8633	**1.0000**	0.8608	0.8800	**1.0000**
47	0.0000	0.0000	**1.0000**	**1.0000**	0.9429	0.0000	**0.9844**	0.2221	0.0000	172	0.0000	0.0000	**1.0000**	**1.0000**	0.9556	**1.0000**	0.9003	0.9585	**1.0000**
48	0.0000	0.0000	**1.0000**	0.0000	0.6556	0.0000	0.0891	0.1028	**1.0000**	173	0.0000	0.0000	0.0000	**1.0000**	0.0777	0.0000	0.0300	0.0620	**1.0000**
49	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0607**	0.0000	174	0.0000	0.0000	0.0000	0.0000	0.8856	0.0000	**0.9464**	0.0036	**1.0000**
50	0.0000	0.0000	**1.0000**	0.0000	0.0629	0.0000	0.0619	0.1305	**1.0000**	175	0.0000	0.0000	0.0000	**1.0000**	0.4696	**1.0000**	0.2146	0.1586	0.0000
51	0.0000	0.0000	0.0000	0.0000	**0.9070**	0.0000	0.5380	0.3400	0.0000	176	0.0000	0.0000	0.0000	0.0000	0.3102	0.0000	0.0356	0.0150	**1.0000**
52	0.0000	0.0000	**1.0000**	**1.0000**	0.3630	0.0000	0.4306	0.2190	**1.0000**	177	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0400**	0.0000	0.0000
53	0.0000	0.0000	0.0000	**1.0000**	0.6413	**1.0000**	0.0000	0.5882	**1.0000**	178	0.0000	0.0000	**1.0000**	**1.0000**	0.7485	**1.0000**	0.8191	0.8402	0.0000
54	0.0000	0.0000	0.0000	0.0000	0.2469	**1.0000**	**0.8732**	0.5546	0.0000	179	0.0000	0.0000	**1.0000**	**1.0000**	0.8364	**1.0000**	0.8372	0.8523	0.0000
55	0.0000	0.0000	**1.0000**	0.0000	0.4647	**1.0000**	0.6473	**0.6549**	0.0000	180	0.0000	0.0000	**1.0000**	0.0000	**0.7915**	0.0000	0.0000	0.5230	0.0000
56	0.0000	0.0000	**1.0000**	**1.0000**	0.1811	0.0000	0.0000	0.0445	**1.0000**	181	0.0000	0.0000	**1.0000**	**1.0000**	0.8056	0.0000	0.7445	0.7914	**1.0000**
57	0.0000	0.0000	**1.0000**	**1.0000**	0.2244	0.0000	0.0000	0.0000	0.0000	182	0.0000	0.0000	**1.0000**	**1.0000**	0.8651	**1.0000**	0.7575	0.7614	**1.0000**
58	0.0000	0.0000	**1.0000**	0.0000	0.8562	**1.0000**	0.0000	0.8472	**1.0000**	183	0.0000	0.0000	**1.0000**	**1.0000**	0.8187	**1.0000**	0.8031	0.7866	**1.0000**
59	0.0000	0.0000	**1.0000**	**1.0000**	0.7643	**1.0000**	0.6938	0.8100	0.0000	184	0.0000	0.0000	**1.0000**	**1.0000**	0.9577	**1.0000**	0.9411	0.9572	**1.0000**
60	0.0000	0.0000	**1.0000**	**1.0000**	0.8203	**1.0000**	0.7188	0.7783	**1.0000**	185	0.0000	0.0000	0.0000	0.0000	0.1200	0.0000	**0.9000**	0.1700	0.0000
61	0.0000	0.0000	**1.0000**	**1.0000**	0.9048	**1.0000**	0.8636	0.8881	**1.0000**	186	0.0000	0.0000	**1.0000**	0.0000	0.6771	0.0000	0.0069	0.0014	**1.0000**
62	0.0000	0.0000	**1.0000**	**1.0000**	0.3724	**1.0000**	0.1269	0.4423	0.0000	187	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
63	0.0000	0.0000	**1.0000**	**1.0000**	0.9124	0.0000	0.8613	0.8949	**1.0000**	188	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
64	0.0000	**1.0000**	**1.0000**	**1.0000**	0.9162	**1.0000**	0.8952	0.9417	**1.0000**	189	0.0000	0.0000	0.0000	0.0000	**0.0100**	0.0000	0.0000	0.0000	0.0000
65	0.0000	0.0000	**1.0000**	0.0000	0.0423	0.0000	0.0397	0.0753	0.0000	190	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
66	0.0000	0.0000	0.0000	0.0000	0.6248	0.0000	0.7008	0.0000	**1.0000**	191	0.0000	0.0000	0.0000	0.0000	0.6121	**1.0000**	0.9912	0.9874	**1.0000**
67	0.0000	0.0000	**1.0000**	0.0000	**0.8622**	0.0000	0.3354	0.1456	0.0000	192	0.0000	0.0000	**1.0000**	**1.0000**	0.7088	**1.0000**	0.8093	**0.8999**	**1.0000**
68	0.0000	0.0000	0.0000	0.0000	**0.3650**	0.0000	0.0302	0.0150	0.0000	193	0.0000	0.0000	**1.0000**	**1.0000**	0.8467	**1.0000**	0.7543	0.7575	0.0000
69	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0400**	0.0000	0.0000	194	0.0000	0.0000	**1.0000**	**1.0000**	0.6507	**1.0000**	0.7684	0.7510	0.0000
70	0.0000	0.0000	**1.0000**	**1.0000**	0.6934	**1.0000**	0.8151	0.8426	**1.0000**	195	0.0000	0.0000	**1.0000**	**1.0000**	0.7877	**1.0000**	0.8688	0.8281	**1.0000**
71	0.0000	0.0000	**1.0000**	**1.0000**	0.8196	**1.0000**	0.8361	0.8523	0.0000	196	0.0000	0.0000	**1.0000**	**1.0000**	0.8669	**1.0000**	0.7383	0.7567	0.0000
72	0.0000	0.0000	**1.0000**	**1.0000**	**0.6482**	0.0000	0.0000	0.5230	0.0000	197	0.0000	0.0000	**1.0000**	0.0000	0.2388	0.0000	**0.5397**	0.3400	0.0000
73	0.0000	0.0000	**1.0000**	**1.0000**	0.7631	**1.0000**	0.7606	0.7935	**1.0000**	198	0.0000	0.0000	**1.0000**	**1.0000**	0.9467	0.0000	0.9332	0.9532	**1.0000**
74	0.0000	0.0000	**1.0000**	**1.0000**	0.8786	**1.0000**	0.7575	0.7608	0.0000	199	0.0000	0.0000	**1.0000**	**1.0000**	**0.8431**	0.0000	0.0123	0.7378	0.0000
75	0.0000	0.0000	**1.0000**	**1.0000**	0.8827	**1.0000**	0.7973	0.7826	**1.0000**	200	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**1.0000**	0.1500	0.0000
76	0.0000	0.0000	**1.0000**	**1.0000**	0.9396	**1.0000**	0.9339	0.9480	**1.0000**	201	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.9893**	0.0233	0.0000
77	0.0000	0.0000	0.0000	0.0000	0.2100	0.0000	**0.8500**	0.1800	0.0000	202	0.0000	0.0000	0.0000	0.0000	0.0857	0.0000	**0.2917**	0.0780	0.0000
78	0.0000	0.0000	**1.0000**	**1.0000**	0.6976	0.0000	0.0028	0.0024	**1.0000**	203	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
79	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	204	0.0000	0.0000	0.0000	**1.0000**	0.2016	0.0000	**0.9991**	0.2047	0.0000
80	0.0000	0.0000	0.0000	0.0000	**0.0100**	0.0000	0.0000	0.0000	0.0000	205	0.0000	0.0000	0.0000	**1.0000**	0.2036	0.0000	0.0312	0.1437	**1.0000**
81	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	206	0.0000	0.0000	0.0000	**1.0000**	0.2440	0.0000	**0.7027**	0.1072	**1.0000**
82	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	207	0.0000	0.0000	0.0000	**1.0000**	0.4195	**1.0000**	0.7047	0.1082	**1.0000**
83	0.0000	0.0000	**1.0000**	0.0000	0.3571	0.0000	**0.9909**	0.9893	0.0000	208	0.0000	0.0000	0.0000	0.0000	**0.6137**	**1.0000**	0.4830	0.1602	**1.0000**
84	0.0000	0.0000	**1.0000**	**1.0000**	0.3350	**1.0000**	0.8093	0.8999	**1.0000**	209	0.0000	0.0000	**1.0000**	**1.0000**	0.9149	**1.0000**	0.9902	0.9903	0.0000
85	0.0000	0.0000	**1.0000**	**1.0000**	0.7477	**1.0000**	0.7183	0.7580	0.0000	210	0.0000	0.0000	0.0000	**1.0000**	0.1696	0.0000	0.1046	0.3326	**1.0000**
86	0.0000	0.0000	0.0000	**1.0000**	0.6802	**1.0000**	0.7560	0.7478	0.0000	211	0.0000	0.0000	0.0000	**1.0000**	0.4032	**1.0000**	0.1402	0.3021	0.0000
87	0.0000	0.0000	**1.0000**	**1.0000**	0.7668	**1.0000**	0.8688	0.8156	**1.0000**	212	0.0000	0.0000	0.0000	**1.0000**	0.0433	0.0000	0.0108	0.0221	0.0000
88	0.0000	0.0000	**1.0000**	**1.0000**	0.7982	**1.0000**	0.7383	0.7573	0.0000	213	0.0000	0.0000	**1.0000**	**1.0000**	0.8308	**1.0000**	0.8889	0.8822	**1.0000**
89	0.0000	0.0000	0.0000	**1.0000**	0.2466	0.0000	**0.5557**	0.2864	0.0000	214	0.0000	0.0000	**1.0000**	**1.0000**	0.8685	**1.0000**	0.8663	0.8522	**1.0000**
90	0.0000	0.0000	**1.0000**	**1.0000**	0.9360	0.0000	0.9278	0.9622	**1.0000**	215	0.0000	0.0000	**1.0000**	**1.0000**	0.8552	**1.0000**	0.8552	0.8507	**1.0000**
91	0.0000	0.0000	0.0000	**1.0000**	**0.8446**	0.0000	0.7414	0.7444	0.0000	216	0.0000	0.0000	**1.0000**	**1.0000**	0.9258	**1.0000**	0.8522	0.8507	**1.0000**
92	0.0000	0.0000	0.0000	0.0000	0.0900	0.0000	**1.0000**	0.1300	0.0000	217	0.0000	0.0000	**1.0000**	**1.0000**	0.8620	0.0000	0.8507	0.8507	**1.0000**
93	0.0000	0.0000	**1.0000**	**1.0000**	0.8548	**1.0000**	0.8903	0.8512	**1.0000**	218	0.0000	0.0000	**1.0000**	**1.0000**	0.9206	**1.0000**	0.8507	0.8507	**1.0000**
94	0.0000	0.0000	**1.0000**	**1.0000**	0.6910	**1.0000**	0.7579	0.6367	**1.0000**	219	0.0000	0.0000	0.0000	**1.0000**	0.8482	**1.0000**	0.7169	0.6580	0.0000
95	0.0000	0.0000	0.0000	**1.0000**	0.0733	**1.0000**	0.9860	0.2448	**1.0000**	220	0.0000	0.0000	**1.0000**	**1.0000**	0.9313	**1.0000**	0.8612	0.8794	**1.0000**
96	0.0000	0.0000	**1.0000**	**1.0000**	0.8489	**1.0000**	0.6297	0.6359	**1.0000**	221	0.0000	0.0000	**1.0000**	**1.0000**	0.9393	**1.0000**	0.9205	0.9205	**1.0000**
97	0.0000	0.0000	0.0000	**1.0000**	0.3038	0.0000	0.1500	0.3507	0.0000	222	0.0000	0.0000	**1.0000**	**1.0000**	**0.9072**	**1.0000**	0.9115	0.8533	**1.0000**
98	0.0000	0.0000	0.0000	0.0000	**0.1267**	0.0000	0.0800	0.0175	0.0000	223	0.0000	0.0000	**1.0000**	**1.0000**	**0.8324**	0.0000	0.8060	0.8060	**1.0000**
99	0.0000	0.0000	**1.0000**	**1.0000**	0.5565	**1.0000**	0.4286	0.3837	0.0000	224	0.0000	0.0000	**1.0000**	**1.0000**	0.8633	**1.0000**	0.8895	**0.9170**	**1.0000**
100	0.0000	0.0000	**1.0000**	**1.0000**	0.9578	**1.0000**	0.9708	0.9770	0.0000	225	0.0000	0.0000	**1.0000**	**1.0000**	**0.7333**	**1.0000**	0.8964	0.8756	**1.0000**
101	0.0000	0.0000	0.0000	0.0000	**0.6158**	0.0000	0.3084	0.1378	0.0000	226	0.0000	0.0000	**1.0000**	**1.0000**	0.8629	**1.0000**	**0.9425**	0.9398	**1.0000**
102	0.0000	0.0000	**1.0000**	**1.0000**	0.8253	**1.0000**	0.9044	0.8979	0.0000	227	0.0000	0.0000	0.0000	**1.0000**	0.0713	0.0000	0.0123	0.0935	0.0000
103	0.0000	0.0000	**1.0000**	0.0000	0.0571	0.0000	**0.5347**	0.2253	0.0000	228	0.0000	0.0000	0.0000	0.0000	0.2865	0.0000	0.0000	**0.3260**	0.0000
104	0.0000	0.0000	**1.0000**	**1.0000**	0.1461	0.0000	0.0000	0.0000	**1.0000**	229	**1.0000**	0.0000	0.0000	0.0000	0.0290	0.0000	0.0050	0.2790	0.0000
105	0.0000	0.0000	**1.0000**	**1.0000**	0.8977	**1.0000**	0.8531	0.8875	**1.0000**	230	0.0000	0.0000	**1.0000**	**1.0000**	0.3581	**1.0000**	0.7120	0.7168	0.0000
106	0.0000	0.0000	**1.0000**	**1.0000**	0.8922	**1.0000**	0.8582	0.8732	**1.0000**	231	0.0000	0.0000	**1.0000**	**1.0000**	**0.7893**	0.0000	0.0057	0.6401	**1.0000**
107	0.0000	0.0000	0.0000	0.0000	**0.2524**	0.0000	0.0852	0.1328	0.0000	232	0.0000	0.0000	**1.0000**	**1.0000**	**0.8239**	**1.0000**	0.6279	0.6319	0.0000
108	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	233	0.0000	0.0000	0.0000	0.0000	0.0100	0.0000	0.3100	**0.6200**	0.0000
109	0.0000	0.0000	**1.0000**	**1.0000**	0.8514	**1.0000**	0.8677	0.8528	**1.0000**	234	0.0000	0.0000	**1.0000**	0.0000	0.0000	0.0000	0.0100	0.0100	0.0000
110	0.0000	0.0000	**1.0000**	**1.0000**	0.0216	0.0000	0.0000	0.7075	**1.0000**	235	0.0000	0.0000	0.0000	0.0000	0.1900	0.0000	**0.9900**	0.7900	0.0000
111	0.0000	0.0000	**1.0000**	**1.0000**	0.7324	**1.0000**	0.8934	0.6954	**1.0000**	236	0.0000	0.0000	0.0000	0.0000	0.2648	0.0000	0.0210	0.0125	**1.0000**
112	0.0000	0.0000	**1.0000**	**1.0000**	0.6569	**1.0000**	0.7542	0.7205	**1.0000**	237	0.0000	0.0000	**1.0000**	**1.0000**	**0.9595**	**1.0000**	0.9254	0.9465	**1.0000**
113	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.5400**	0.0100	0.0000	238	0.0000	0.0000	**1.0000**	**1.0000**	0.6766	**1.0000**	0.8825	0.9313	**1.0000**
114	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2017	0.0300	**1.0000**	239	0.0000	0.0000	0.0000	0.0000	0.0373	0.0000	0.2183	**0.4741**	0.0000
115	0.0000	0.0000	**1.0000**	0.0000	0.0200	0.0000	0.0804	0.0263	0.0000	240	0.0000	0.0000	0.0000	0.0000	**0.6025**	0.0000	0.1861	0.1554	0.0000
116	0.0000	0.0000	**1.0000**	**1.0000**	0.0673	**1.0000**	0.9875	0.2746	0.0000	241	0.0000	0.0000	**1.0000**	**1.0000**	**0.9429**	**1.0000**	0.9429	0.9429	**1.0000**
117	0.0000	0.0000	0.0000	0.0000	0.0952	0.0000	0.6019	0.0506	**1.0000**	242	0.0000	0.0000	**1.0000**	**1.0000**	0.7635	0.0000	0.6761	0.7009	**1.0000**
118	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7748	0.2406	**1.0000**	243	0.0000	0.0000	**1.0000**	**1.0000**	0.1436	0.0000	0.1958	0.4893	**1.0000**
119	0.0000	0.0000	**1.0000**	**1.0000**	0.8576	**1.0000**	0.8872	0.8601	**1.0000**	244	0.0000	0.0000	**1.0000**	**1.0000**	0.6332	0.0000	0.6268	0.6594	**1.0000**
120	0.0000	0.0000	**1.0000**	0.0000	0.7371	**1.0000**	0.7612	0.7096	**1.0000**	245	0.0000	0.0000	**1.0000**	**1.0000**	0.7649	**1.0000**	0.7821	0.8712	**1.0000**
121	0.0000	0.0000	**1.0000**	**1.0000**	0.7330	0.0000	0.0000	0.1132	**1.0000**	246	0.0000	**1.0000**	**1.0000**	**1.0000**	0.7703	**1.0000**	0.7543	0.8904	**1.0000**
122	0.0000	0.0000	**1.0000**	0.0000	0.2407	0.0000	0.0000	0.0944	**1.0000**	247	0.0000	0.0000	0.0000	0.0000	0.4878	0.0000	0.0000	0.2633	**1.0000**
123	0.0000	0.0000	**1.0000**	**1.0000**	0.8655	**1.0000**	0.8217	0.8944	0.0000	248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	**0.0120**	0.0000	0.0000
124	0.0000	0.0000	**1.0000**	**1.0000**	0.7201	**1.0000**	0.6297	0.6346	**1.0000**	249	0.0000	0.0000	**1.0000**	0.0000	0.3777	0.0000	0.0030	0.0150	0.0000
125	0.0000	0.0000	**1.0000**	**1.0000**	0.9429	**1.0000**	0.7144	0.7292	**1.0000**	250	0.0000	0.0000	0.0000	0.0000	0.0617	0.0000	0.0000	**0.0817**	0.0000

TABLE XVI

THE TEST PRECISION OF AFFILIATION OF TIME SERIES ANOMALY DETECTION IN UCR 250 SUB-DATASETS. THE BEST RESULTS ARE IN **BOLD**.

UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector	UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector
1	0.4090	0.4340	**0.7925**	**0.7973**	0.5759	**0.8733**	0.6697	**0.8979**	**0.4961**	126	0.0000	0.0000	0.4992	**0.5000**	0.9586	**0.4992**	0.8155	**0.9857**	**0.5040**
2	0.4730	0.5176	**0.6823**	**0.7018**	0.6484	0.4983	0.1161	0.3632	**0.5071**	127	0.2293	0.2600	**0.5169**	0.5348	0.3807	0.0000	0.1867	0.3611	**0.5395**
3	0.4291	0.4200	**0.6981**	**0.7136**	0.5393	**0.7986**	**0.8196**	0.4588	**0.5051**	128	0.2293	0.2600	**0.4437**	**0.5113**	0.8652	0.0000	0.8869	**0.9056**	**0.5862**
4	0.4679	0.6378	0.4833	**0.8511**	0.4663	**0.9712**	0.9668	0.8493	**0.4469**	129	0.2293	0.2600	0.4410	**0.5015**	**0.7551**	0.0000	0.7144	0.6575	**0.5017**
5	0.0000	0.0000	0.4387	0.4426	0.4021	0.6587	**0.8404**	**0.6251**	0.4833	130	0.2646	0.2275	0.4891	**0.4888**	**0.9753**	0.0000	0.5775	0.9131	**0.5506**
6	0.0000	0.0000	**0.7010**	**0.6349**	0.4571	0.5504	0.2876	0.6208	0.4422	131	0.5054	0.5703	0.5058	**0.4966**	0.6409	0.0000	0.3799	**0.7442**	**0.6075**
7	0.0000	0.0000	0.5382	**0.6364**	0.6201	**0.8482**	0.7904	0.6689	0.5536	132	0.0000	0.0000	0.5076	0.5183	**0.6503**	0.0000	0.6090	0.6015	**0.5117**
8	0.6262	0.0000	0.5179	0.4954	0.4352	**0.9116**	**0.9854**	0.8970	0.4993	133	0.0000	0.2061	0.5108	0.4819	0.7030	0.0000	0.7215	**0.7792**	0.4760
9	**0.7261**	0.0000	0.5304	0.4944	0.2892	0.5197	0.4992	0.5213	**0.5336**	134	0.0000	0.0000	0.5069	**0.5256**	**0.9487**	0.4852	0.3271	0.6699	**0.5188**
10	0.6526	0.0000	**0.7434**	**0.7140**	0.5885	**0.9123**	**0.7026**	0.6453	**0.4855**	135	0.0000	0.0071	0.5321	0.4862	**0.5915**	0.0000	**0.6074**	0.4460	0.5877
11	0.4779	0.6753	**0.7894**	**0.8087**	0.5209	**0.7902**	**0.8195**	0.7516	**0.5296**	136	0.0000	0.0000	**0.5088**	**0.5289**	0.9330	0.0000	0.6958	**0.9702**	**0.5360**
12	0.4344	0.5121	**0.7054**	**0.6807**	0.6772	**0.6963**	0.6144	**0.7968**	**0.4894**	137	0.0000	0.0087	0.4947	0.4424	**0.9770**	0.0000	0.5219	0.9048	**0.4902**
13	0.0000	0.0000	**0.7022**	**0.7228**	0.9250	0.4935	0.8053	**0.9297**	**0.4839**	138	0.0000	0.0100	**0.4191**	0.4475	0.5145	0.0000	0.6177	**0.6414**	**0.5014**
14	0.0000	0.0000	**0.6938**	**0.6504**	**0.9390**	**0.7129**	0.8161	0.9234	**0.4660**	139	0.0000	0.0000	**0.4543**	**0.4584**	0.8115	0.0000	0.7234	**0.8918**	**0.4835**
15	0.6844	0.6748	**0.5649**	**0.5714**	0.6458	0.7063	**0.7973**	0.5234	0.5038	140	0.0000	**1.0000**	**0.5125**	**0.5335**	0.7924	0.0000	0.9625	0.6768	**0.5179**
16	0.0000	0.0000	**0.5119**	**0.4999**	**0.9172**	**0.5000**	0.4574	0.5545	0.4930	141	0.0000	0.0000	0.5067	**0.5413**	**0.9781**	0.6648	0.9771	0.8911	**0.6654**
17	0.0000	0.0000	**0.4914**	**0.4886**	0.9158	**0.5036**	0.9889	**0.9906**	**0.4791**	142	0.0000	0.0000	**0.4196**	**0.5124**	0.6888	0.0000	0.4036	**0.8662**	**0.5172**
18	0.0000	0.0000	**0.5326**	**0.4949**	0.9528	**0.4992**	0.8234	**0.9865**	**0.5114**	143	0.0000	0.7069	0.4859	**0.5221**	**0.8850**	0.5871	0.7575	0.5010	0.4933
19	0.1908	0.1626	0.4943	**0.4950**	0.4826	0.0000	0.3853	0.3579	**0.4995**	144	0.0000	0.0000	**0.4353**	0.5029	**0.6865**	0.0000	0.6442	0.4005	0.5139
20	0.3901	0.0000	**0.4632**	**0.5129**	0.7538	0.4182	0.1775	**0.9643**	**0.5249**	145	0.4586	0.5061	**0.4984**	**0.4786**	0.9546	**0.5545**	**0.9704**	0.9518	0.4867
21	0.0000	0.2134	0.4667	0.5073	**0.6822**	0.2769	0.5285	0.6454	**0.4847**	146	0.4455	0.7358	**0.4877**	**0.4783**	0.7359	0.4253	0.5940	**0.8209**	0.0000
22	0.2165	**0.9405**	**0.4605**	**0.5017**	0.9282	0.0000	0.6275	0.9063	**0.5015**	147	**0.8268**	0.4426	0.5046	**0.4825**	0.7909	**0.5442**	**0.9669**	0.8668	0.4550
23	0.6619	0.0000	**0.5021**	**0.4676**	0.5980	0.0000	0.6807	**0.7541**	**0.5346**	148	0.5049	0.4998	**0.5202**	0.4881	0.4061	0.4866	0.3951	**0.7532**	**0.5208**
24	0.0143	0.5877	**0.5070**	0.4907	**0.9039**	0.0000	0.4380	0.5629	0.5112	149	0.4526	0.4936	0.4842	**0.5210**	0.6934	0.5119	**0.9292**	0.9053	**0.4670**
25	0.5895	**0.8517**	**0.5004**	0.5198	0.6258	0.5368	0.6222	0.7623	0.5162	150	0.4034	0.2884	**0.4838**	**0.4889**	**0.4717**	**0.5780**	0.2167	0.5702	0.4984
26	0.5541	0.3944	**0.4824**	**0.5030**	0.7922	0.4822	**0.9598**	0.6638	0.5352	151	0.4822	0.5936	**0.5244**	**0.4921**	0.9104	**0.5207**	0.9529	**0.9674**	**0.5001**
27	0.4727	0.5683	0.4312	0.4845	**0.5898**	0.0000	0.4788	**0.4988**	0.5593	152	0.2768	0.0000	**0.4968**	**0.4871**	**0.5547**	0.4196	**0.5242**	0.5334	0.4799
28	0.0000	0.8727	**0.5086**	**0.5122**	0.9582	**1.0000**	0.9840	0.9869	**0.4601**	153	0.6630	0.0000	**0.5211**	**0.5384**	**0.8302**	0.4811	0.7076	0.7430	**0.5376**
29	0.0000	0.7844	**0.5004**	**0.5021**	**0.9651**	0.3984	0.9514	0.9034	**0.5670**	154	0.6213	0.0000	**0.4542**	0.5065	**0.7663**	0.4949	0.7417	0.6720	0.5179
30	0.5074	0.0000	0.5029	0.4614	0.4162	0.0000	0.4679	**0.6087**	**0.5388**	155	0.6584	0.0000	0.5361	0.5085	0.9646	0.5256	**0.9675**	0.7510	**0.5599**
31	0.3990	0.4394	**0.4046**	0.4734	0.8321	0.3744	0.5779	**0.9672**	**0.5054**	156	0.8445	0.4079	**0.4700**	0.5067	**0.8567**	0.0000	0.3316	0.5184	**0.5451**
32	0.6730	**0.8425**	**0.5044**	**0.4987**	0.6328	0.0000	**0.8470**	0.6438	**0.4582**	157	0.6595	0.0000	0.5146	0.4836	0.4788	0.0000	0.5033	**0.7280**	0.4654
33	0.0000	0.0000	**0.5246**	**0.5620**	**0.9634**	0.0000	0.9355	**0.8628**	**0.5264**	158	0.8507	0.0000	**0.4783**	**0.5454**	**0.9076**	0.0000	0.5334	0.7140	0.5221
34	0.0000	0.0000	**0.5288**	0.4444	0.4724	0.0000	0.6774	**0.9020**	**0.5317**	159	0.3955	0.0000	**0.5337**	0.4874	**0.9716**	0.0000	**0.9635**	0.8019	0.5169
35	0.0000	0.0000	**0.5205**	**0.5191**	**0.8913**	0.6949	0.8273	0.5143	**0.4107**	160	0.6005	0.4330	**0.5001**	**0.4866**	**0.7874**	0.0000	0.7659	0.6782	**0.5013**
36	0.0000	0.5359	0.4940	**0.4370**	**0.6749**	0.0000	0.6078	0.3859	0.3942	161	**0.6560**	0.0000	**0.4482**	**0.4572**	**0.6404**	**0.4740**	0.4230	0.4332	0.4952
37	0.4200	0.1991	**0.4888**	**0.4504**	0.9360	**0.4652**	**0.9768**	0.9498	**0.4751**	162	0.2332	0.0000	0.5189	0.4870	0.5058	**0.4909**	**0.7324**	**0.8019**	0.0000
38	0.4111	0.0000	**0.5165**	0.4709	**0.9105**	**0.4624**	0.4753	0.8027	0.0000	163	0.0000	0.0000	**0.4990**	**0.5095**	0.6063	**0.4864**	**0.9714**	**0.9626**	0.5067
39	0.5874	0.4426	**0.5317**	0.4700	0.9441	0.5421	**0.9652**	0.8765	0.4889	164	0.0000	0.0000	**0.4822**	0.5139	**0.8649**	0.5006	0.4684	0.8473	**0.4815**
40	0.5762	0.7005	**0.4955**	**0.4788**	**0.8234**	0.5067	0.6610	0.7423	**0.5073**	165	0.0000	0.0000	**0.5120**	0.4892	0.4280	0.4969	0.4943	0.3353	0.4827
41	0.5221	0.4936	**0.4854**	**0.4892**	0.6294	0.4854	**0.9439**	0.9012	**0.4926**	166	0.0000	0.0000	**0.4948**	0.4893	0.7737	**0.4958**	0.7606	**0.9774**	**0.4426**
42	0.4134	0.4360	0.4885	**0.4962**	0.4889	0.3974	0.1913	**0.6485**	**0.4972**	167	0.4158	0.3852	**0.5098**	**0.4976**	**0.8979**	0.5875	0.6155	0.8889	**0.5208**
43	0.4781	0.5999	**0.4684**	**0.5191**	0.8685	**0.5105**	0.9516	**0.9664**	**0.5361**	168	0.5258	0.5547	**0.5295**	**0.4975**	0.6544	**0.5164**	0.5953	**0.6796**	**0.5342**
44	**0.6683**	0.0000	**0.5140**	**0.4996**	0.2938	0.5047	**0.5308**	0.5405	0.4450	169	0.5439	0.5011	**0.4937**	**0.4862**	0.8264	**0.4926**	0.7881	**0.8478**	**0.5326**
45	0.6939	0.0000	**0.5304**	**0.5158**	0.3719	0.4979	0.6952	**0.7714**	**0.5352**	170	0.3518	0.5921	**0.4941**	**0.5271**	0.6987	**0.4977**	0.3312	**0.8203**	0.4857
46	0.5436	0.0000	0.4959	**0.4957**	0.6887	0.4940	**0.7577**	0.6393	0.5767	171	0.3772	0.5900	**0.5163**	**0.4896**	0.5778	**0.5497**	0.9098	**0.9677**	**0.5036**
47	0.6773	0.0000	**0.4773**	**0.5012**	**0.9815**	0.6063	**0.9736**	0.7593	0.5443	172	0.3010	0.5988	**0.4965**	**0.5229**	0.9641	**1.0000**	0.8594	0.8987	**0.4792**
48	0.0000	0.0000	**0.5404**	0.4446	**0.9428**	0.0000	0.2819	0.5323	**0.5571**	173	0.7701	0.8053	0.4313	**0.4654**	0.5941	**0.8850**	0.5032	0.6067	**0.5289**
49	0.0000	0.0000	0.4384	0.5036	0.3587	0.0000	0.4996	**0.7203**	0.5369	174	0.5766	0.4668	0.4570	0.5849	**0.9358**	0.5300	**0.9122**	0.4489	**0.4766**
50	**0.8199**	0.0000	**0.5335**	0.4719	0.7320	0.0000	0.5307	0.6391	**0.5037**	175	0.7075	0.7118	0.5206	**0.5100**	**0.8719**	**0.7451**	0.8001	0.6601	0.4589
51	0.0000	0.0000	0.5226	0.5044	**0.9634**	0.0000	0.9596	0.8260	0.5283	176	0.8324	**0.9541**	0.5029	0.4688	0.6040	0.6535	0.4389	0.5023	**0.5451**
52	0.6574	0.7546	**0.5203**	**0.4710**	0.7472	0.0000	**0.7612**	0.7084	**0.5213**	177	0.5395	**0.9470**	0.5201	0.4828	0.3968	0.5376	**0.6433**	0.4591	0.4970
53	0.6560	**0.8681**	0.4509	**0.5425**	0.5982	**0.4595**	0.3792	0.4323	**0.5115**	178	0.0000	0.0000	**0.5071**	**0.5012**	0.7631	**0.5050**	0.9077	**0.9780**	0.5149
54	0.1833	0.0000	0.4858	0.5287	0.6585	**0.5194**	**0.7293**	**0.8145**	0.0000	179	0.1933	0.0000	**0.4838**	**0.5004**	0.8836	**0.5052**	0.9223	**0.9798**	0.0000
55	0.0000	0.0000	**0.4785**	0.5072	0.3700	**0.4970**	**0.9718**	**0.9620**	0.4869	180	0.5364	0.4119	**0.4974**	0.4937	**0.9443**	0.5027	0.8315	0.8768	0.0000
56	0.0000	0.0000	**0.4869**	**0.5120**	0.5509	0.4959	0.4683	**0.8474**	**0.4947**	181	0.4276	0.2641	**0.5120**	**0.5157**	0.6008	0.4795	0.6821	**0.6908**	**0.5322**
57	0.0000	0.0000	**0.5047**	**0.5045**	0.3864	0.4934	0.4943	0.3394	0.5011	182	0.5755	0.0000	**0.5033**	**0.4887**	**0.7029**	**0.4981**	0.6495	0.4526	**0.5088**
58	0.0000	0.0000	**0.4978**	0.5185	0.8926	**0.4940**	0.5251	**0.9772**	**0.4672**	183	0.0000	0.0000	**0.5231**	**0.4851**	**0.8771**	**0.5036**	0.7103	0.5267	**0.4839**
59	0.5339	0.4963	**0.5033**	**0.4988**	0.7011	**0.5132**	0.5828	**0.8865**	0.4930	184	0.0000	0.5549	**0.4956**	**0.4992**	0.9651	**0.4086**	0.8423	**0.9829**	**0.4994**
60	0.5195	0.4222	**0.4990**	**0.4924**	**0.8825**	**0.5328**	0.6217	0.6982	**0.5099**	185	0.0000	0.0000	0.5026	0.5029	**0.9624**	0.5474	**0.9219**	0.7226	0.5246
61	0.2186	0.5567	**0.4882**	**0.4991**	0.7483	**0.5157**	0.7963	**0.8582**	**0.5167**	186	0.0000	0.0000	**0.5037**	0.5010	**0.8374**	0.0000	0.4138	0.4258	**0.5493**
62	0.4631	0.5151	**0.5014**	**0.5181**	0.7087	**0.4717**	0.2772	**0.7738**	0.5282	187	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
63	0.7064	0.6624	**0.4937**	**0.4967**	0.9306	0.4745	0.9099	**0.9428**	**0.5086**	188	**0.0000**	**0.4360**	0.4977	0.5096	**0.7675**	**0.1637**	**0.5039**	**0.5011**	**0.4742**
64	0.6446	**0.9698**	**0.4949**	**0.4901**	0.8399	**0.5076**	0.8389	0.8854	**0.5138**	189	0.0000	0.4104	0.5055	0.4989	**0.6607**	0.2405	0.5015	0.5038	0.4885
65	0.5930	0.0000	**0.4775**	0.5517	0.4440	**0.8850**	0.5544	0.6341	0.5364	190	**0.0000**	**0.0000**	**0.5025**	**0.5115**	**0.7739**	**0.7447**	**0.5366**	**0.7622**	**0.5018**
66	0.4987	0.6659	0.5358	0.5086	**0.8540**	0.0000	0.7929	0.4097	**0.4726**	191	0.0000	0.5513	0.5075	0.5057	0.9601	**0.2591**	**0.9820**	0.9534	**0.4839**
67	0.5356	0.7255	**0.4808**	0.5420	**0.9535**	0.5844	0.8390	0.6626	0.4449	192	0.0000	0.0000	**0.4760**	**0.4955**	0.8514	**0.4946**	0.7989	**0.9093**	**0.4751**
68	0.5759	0.4420	0.4978	0.4955	**0.6722**	0.3676	0.4191	0.5090	0.5155	193	0.2186	0.1120	**0.4704**	**0.5144**	**0.9332**	**0.4829**	0.7937	0.8731	0.0000
69	0.4963	**0.9853**	0.5091	0.5428	0.2606	0.6008	**0.6543**	0.4671	0.4940	194	0.5224	0.6026	**0.4874**	**0.4876**	0.4224	**0.5473**	0.6490	**0.6591**	0.4454
70	0.0000	0.0000	**0.5022**	**0.5188**	0.6289	**0.5078**	0.9144	**0.9774**	**0.4988**	195	**0.7749**	0.0000	**0.5170**	**0.4945**	0.5410	**0.4998**	0.6552	0.6213	**0.4765**
71	0.1933	0.0000	**0.5092**	**0.5004**	0.7971	**0.5052**	0.9278	**0.9798**	0.0000	196	0.6549	0.6015	**0.4946**	**0.5128**	**0.6940**	**0.4897**	0.5178	0.3982	0.0000
72	0.5822	0.5573	**0.5117**	**0.4741**	**0.7503**	0.4971	0.8302	**0.8773**	0.0000	197	0.0000	0.0000	**0.4784**	0.5129	0.6329	0.2389	**0.7889**	0.6069	0.5376
73	0.4122	0.3353	**0.4949**	**0.4963**	0.6351	**0.4774**	**0.7114**	0.6817	**0.5026**	198	0.0000	0.0000	**0.5042**	**0.4997**	**0.8717**	0.2442	0.8682	0.8174	**0.5440**
74	0.5755	0.0000	**0.4909**	**0.4846**	**0.7644**	**0.4936**	0.6653	0.4699	0.5022	199	0.0000	0.0000	**0.4854**	**0.4923**	**0.7947**	0.3238	0.6631	0.5462	0.5727
75	0.0000	0.0000	**0.5092**	**0.4750**	**0.9918**	**0.5036**	0.7264	0.5439	**0.5035**	200	0.0000	0.0000	0.4987	0.4891	0.7915	0.3649	**0.8991**	**0.9005**	0.4355
76	0.7596	0.4042	**0.5004**	**0.5021**	0.8151	**0.4605**	0.7413	**0.9638**	**0.5040**	201	0.0000	0.0000	0.4879	0.4990	0.6423	0.0000	**0.9277**	0.5607	0.4451
77	0.3286	0.0000	0.4917	0.5014	**0.9690**	0.6314	**0.9337**	0.7512	0.5401	202	0.0000	0.0000	0.4856	0.5131	0.5803	0.0000	**0.6303**	0.5485	0.4793
78	0.6531	0.6538	**0.4953**	**0.5079**	**0.8425**	0.5452	0.4661	0.4620	**0.5472**	203	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
79	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	204	0.0000	0.0000	0.5106	**0.5162**	**0.7758**	0.0000	**0.6486**	0.7409	0.4725
80	0.2359	0.3255	**0.5028**	0.5008	**0.4916**	0.2702	0.4988	0.4985	0.4836	205	0.0000	0.0000	0.5036	**0.5080**	0.5700	0.0000	0.5154	**0.7049**	**0.5431**
81	**0.2928**	**0.0457**	**0.4991**	**0.5045**	**0.5825**	**0.3949**	**0.4988**	**0.5042**	**0.4703**	206	0.0000	0.0000	0.4733	**0.5180**	0.6328	0.0000	**0.9341**	0.6576	**0.4440**
82	**0.8599**	**0.0000**	**0.4966**	**0.4991**	**0.3642**	**0.6227**	**0.5272**	**0.7452**	**0.5164**	207	0.3067	0.5079	0.4948	**0.5022**	**0.8520**	**0.3034**	0.7088	0.6328	**0.5253**
83	0.2399	0.3385	**0.4950**	0.4889	0.8242	0.2674	**0.9855**	0.9482	0.4931	208	0.0000	0.0000	0.5148	0.5150	**0.8190**	**0.5166**	0.7677	0.6691	**0.5256**
84	0.0000	0.0000	**0.4932**	**0.4897**	0.7231	**0.4961**	0.8000	**0.9112**	**0.4715**	209	0.0000	0.0000	**0.4843**	**0.4778**	0.9399	**0.5018**	**0.9944**	0.9849	0.5195
85	0.2648	0.1120	**0.4920**	**0.4877**	0.8342	**0.3781**	0.7868	**0.8804**	0.0000	210	0.3520	0.3719	0.4888	**0.4961**	0.6086	0.3646	0.7185	**0.7546**	**0.5004**
86	0.0000	0.6026	0.5089	**0.4907**	0.4522	**0.5772**	**0.7001**	0.6817	0.4844	211	0.2385	0.2281	0.4863	**0.5127**	**0.8891**	**0.4008**	0.6980	0.7116	0.5024
87	**0.7726**	0.0000	**0.5005**	**0.4959**	0.5572	**0.5062**	0.6640	0.5853	**0.4853**	212	**0.8235**	0.0000	0.4942	**0.5120**	0.6473	0.4581	0.5174	0.5100	0.0000
88	0.6636	0.5273	**0.4790**	**0.4816**	**0.7469**	**0.4932**	0.5675	0.3788	0.0000	213	0.3824	0.0000	**0.4979**	**0.4982**	0.6892	**0.5017**	0.9695	**0.9867**	**0.5063**
89	0.0000	0.0000	0.5025	**0.4952**	0.7109	0.0367	**0.8318**	0.6472	0.5100	214	0.0000	0.0000	**0.4947**	**0.5047**	0.5392	**0.4846**	**0.7529**	0.7505	**0.5163**
90	0.0000	0.2014	**0.5040**	**0.4974**	0.8578	0.4353	**0.8789**	0.8387	**0.4897**	215	0.3596	0.0000	**0.5019**	**0.5021**	0.2652	**0.4938**	**0.7325**	0.6685	**0.5146**
91	0.0000	0.0000	0.4994	**0.5177**	**0.8598**	0.6709	0.6232	0.5837	0.4992	216	0.2538	0.0000	**0.5015**	**0.5009**	**0.8448**	**0.5000**	0.7504	0.6660	**0.4983**
92	0.0000	0.3084	0.4932	0.4854	**0.9531**	0.4783	**0.9236**	0.8856	0.5016	217	0.0000	0.0000	**0.5054**	**0.5167**	0.6586	0.4909	0.6684	**0.6696**	**0.4993**
93	0.3979	0.4356	**0.4985**	**0.5013**	0.4765	**0.4958**	0.7348	**0.7831**	**0.5030**	218	0.0161	0.0000	**0.5025**	**0.4959**	**0.9746**	**0.5014**	0.6651	0.5019	**0.4983**
94	0.4818	0.6114	**0.5604**	**0.5420**	0.5440	**0.5554**	0.7075	**0.8507**	**0.5221**	219	0.8486	0.0000	0.5003	**0.5007**	0.9106	**0.4963**	**0.9742**	0.9657	0.5137
95	0.7103	0.0000	0.5969	**0.5360**	0.4877	**0.8981**	**0.9655**	0.9247	**0.4035**	220	0.8291	0.5692	**0.5064**	**0.5050**	**0.8947**	**0.4914**	0.4805	0.8259	**0.4855**
96	0.0000	0.0000	**0.4921**	**0.4924**	**0.8389**	**0.4999**	0.6752	0.5807	**0.4684**	221	0.4453	0.0000	**0.5028**	**0.5049**	**0.7315**	**0.4993**	0.6644	0.6655	**0.4919**
97	0.2279	0.2607	0.4928	**0.4842**	0.7318	0.4562	**0.7711**	0.6562	0.5002	222	0.0000	0.0000	**0.5037**	**0.4947**	**0.6806**	**0.5047**	**0.6900**	0.5895	**0.5849**
98	0.1193	0.3287	0.4625	0.4822	**0.6650**	0.0000	0.6355	0.4688	0.5715	223	0.4168	0.3068	**0.4702**	**0.4901**	**0.3513**	0.4821	0.3819	0.3409	**0.4477**
99	0.1799	0.0000	**0.5308**	**0.5036**	0.6542	**0.4634**	0.4255	**0.8798**	0.5589	224	0.0000	0.0000	**0.4944**	**0.5001**	0.4137	**0.4998**	0.7424	**0.7581**	**0.3902**
100	0.4900	0.3244	**0.5059**	**0.4968**	0.9728	**0.4855**	**0.9769**	0.9552	0.4921	225	0.2987	0.2164	**0.4984**	**0.4879**	**0.5322**	**0.4891**	0.8650	**0.9032**	**0.4266**
101	0.5421	0.7005	0.4941	0.4941	**0.6167**	0.4978	0.5958	**0.7251**	0.4854	226	0.1899	0.0000	**0.5132**	**0.4904**	0.7048	**0.5034**	**0.8493**	**0.9429**	**0.4824**
102	0.4886	0.5941	**0.5280**	**0.4831**	0.8810	**0.5264**	0.9507	**0.9682**	0.4648	227	0.3243	0.0000	0.4965	**0.5108**	0.9132	0.4950	0.8873	**0.9702**	0.4716
103	0.0000	0.0000	**0.4729**	0.4852	0.4029	0.0000	**0.7932**	0.6753	0.4609	228	0.7742	0.0000	0.5014	0.5062	0.7900	0.5141	0.4999	**0.7985**	0.4818
104	0.0000	0.0000	**0.5223**	**0.4972**	0.4115	0.5001	0.4948	0.3361	**0.5043**	229	**0.5641**	0.0000	0.4891	0.4986	0.8083	0.5058	0.6579	**0.8256**	0.0000
105	0.5628	0.3172	**0.5090**	**0.4701**	**0.8531**	**0.5119**	0.7037	0.8460	**0.4992**	230	0.5307	0.4506	**0.4999**	**0.5077**	0.7018	**0.5293**	0.7908	**0.8208**	0.4154
106	0.4707	0.4988	**0.5021**	**0.4963**	0.8057	**0.5077**	0.8900	**0.8990**	**0.5057**	231	0.0000	0.0000	**0.4921**	**0.4928**	**0.5239**	0.5105	0.3801	**0.5613**	**0.5261**
107	0.7156	0.6298	0.5115	0.4631	**0.6400**	**0.7474**	0.7350	0.6464	0.4087	232	0.0000	0.0000	**0.4944**	**0.4961**	**0.8692**	**0.5069**	0.4017	0.4584	0.0000
108	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	233	0.7963	0.0000	0.5064	0.4996	**0.9524**	0.4951	0.9156	**0.8734**	0.4776
109	0.4122	0.4414	**0.4734**	**0.5055**	0.4744	**0.4974**	0.5643	**0.9065**	**0.5037**	234	0.4772	0.0000	**0.5028**	0.5014	0.3495	0.4917	0.3248	**0.6025**	0.4662
110	0.4661	0.5117	**0.4930**	**0.5198**	0.4715	0.4980	0.0718	0.4087	**0.5006**	235	0.7982	0.0000	0.5065	0.5029	**0.9710**	0.4950	**0.9539**	0.8038	0.5350
111	0.4118	0.4259	**0.4955**	**0.5101**	0.5216	**0.5024**	**0.8845**	0.5057	**0.4941**	236	**0.8113**	0.0000	0.4916	0.4996	0.7422	0.4968	0.6374	0.6681	**0.4796**
112	0.4407	0.6619	**0.4784**	**0.4683**	0.4655	**0.6070**	0.7291	**0.8659**	**0.5393**	237	0.1063	0.0000	**0.4883**	**0.5046**	**0.7666**	**0.4996**	0.6779	**0.8336**	**0.5065**
113	0.5877	0.0000	0.4576	0.4836	0.2418	0.4577	**0.7811**	0.6511	0.5313	238	0.4157	0.0000	**0.5018**	**0.5011**	0.8688	**0.4965**	0.9638	**0.9735**	**0.4690**
114	**0.7424**	0.0000	0.5389	0.4819	0.4333	0.6022	0.6340	0.6306	**0.4877**	239	0.0000	0.0000	0.4965	0.5029	0.5185	0.4988	0.5193	**0.7237**	0.4989
115	**0.8671**	0.0000	**0.5060**	0.5020	0.6207	0.5887	0.6805	0.6878	0.6112	240	0.0000	0.0000	0.4947	0.4989	**0.8144**	0.5089	0.7226	0.6089	0.5087
116	0.6745	0.0000	**0.4814**	**0.5325**	0.2954	**0.7158**	**0.9619**	0.9042	0.4380	241	0.0000	0.0000	**0.5058**	**0.4984**	**0.6620**	**0.5098**	**0.6732**	0.6705	**0.5064**
117	0.4613	0.0000	0.4588	0.5067	0.3386	0.5143	**0.6741**	0.5388	**0.4136**	242	0.6634	0.5290	**0.4991**	**0.5017**	0.6655	0.6438	**0.9442**	0.8600	**0.5037**
118	**0.8929**	0.0000	0.5124	0.4469	0.5296	0.7120	0.4410	0.6437	**0.4947**	243	0.1965	0.5566	**0.5015**	**0.4906**	0.5382	0.4023	**0.9068**	0.8258	**0.5182**
119	0.4360	0.0000	**0.5205**	**0.5009**	0.4610	**0.5039**	**0.9425**	0.7480	**0.5058**	244	0.8036	0.5446	**0.4965**	**0.5107**	0.4625	0.7754	**0.8203**	0.7208	**0.4630**
120	0.5053	0.4951	**0.5373**	0.5223	0.6379	**0.5015**	**0.8377**	0.8055	**0.5141**	245	0.1902	0.4514	**0.5065**	**0.4936**	0.6503	**0.2269**	**0.8681**	0.7888	**0.5473**
121	0.0000	0.0000	**0.4953**	**0.4621**	**0.9598**	0.4935	0.8020	0.9322	**0.5073**	246	0.3196	**0.7582**	**0.5004**	**0.5027**	0.6764	**0.4558**	0.8129	**0.8437**	**0.5064**
122	0.0000	0.0000	**0.5039**	0.4993	**0.9763**	0.4954	0.8155	0.9235	**0.5155**	247	0.6972	0.8161	0.5067	0.5049	0.6950	0.6059	0.5637	**0.9242**	**0.5532**
123	0.7213	0.6561	**0.4992**	**0.5064**	**0.8187**	**0.8018**	0.6336	0.5989	0.5260	248	0.0000	0.0000	**0.5327**	0.4956	0.1969	0.1695	**0.5317**	0.5233	0.4921
124	0.0000	0.0000	**0.5136**	**0.4837**	0.5538	**0.5000**	**0.6534**	0.5774	**0.5031**	249	0.0000	0.0000	**0.5083**	0.4822	**0.6812**	0.0000	0.5325	0.5657	0.5393
125	0.0000	0.0000	**0.5142**	**0.4789**	0.9816	**0.5000**	0.9884	**0.9889**	**0.4887**	250	0.0000	0.0000	0.4909	0.4960	**0.7844**	0.0000	0.5168	**0.5935**	0.4819

TABLE XVII
THE TEST RECALL OF AFFILIATION OF TIME SERIES ANOMALY DETECTION IN UCR 250 SUB-DATASETS. THE BEST RESULTS ARE IN **BOLD**.

UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector	UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector
1	0.8970	0.8970	**1.0000**	**1.0000**	0.4844	**1.0000**	0.0149	**0.0369**	**0.9939**	126	0.0000	0.0000	0.9955	**0.9982**	0.4275	**0.9969**	0.0344	**0.3782**	**0.9979**
2	0.9741	0.9741	**1.0000**	**1.0000**	0.3930	0.9944	0.0642	0.1064	**0.9986**	127	0.3393	0.3397	**0.9963**	0.9614	0.1373	0.0000	0.0680	0.2334	**0.9838**
3	0.9547	0.9547	**1.0000**	**1.0000**	0.4170	**1.0000**	**0.2048**	0.1430	**0.9984**	128	0.3431	0.3437	**0.9894**	**0.9871**	0.1569	0.0000	0.0436	**0.2462**	**0.9903**
4	0.6381	0.6391	0.9642	**1.0000**	0.2022	**1.0000**	0.4152	0.3633	**0.9876**	129	0.3393	0.3397	0.9759	**0.9939**	**0.4392**	0.0000	0.3926	0.5553	**0.9966**
5	0.0000	0.0000	**0.9940**	0.9888	0.1028	0.7813	**0.4673**	**0.0849**	0.9622	130	0.4515	0.2973	0.9862	**0.9958**	**0.2235**	0.0000	0.1778	0.3196	**0.9954**
6	0.0000	0.0000	**1.0000**	**1.0000**	0.3136	0.7887	0.0766	0.2455	0.9925	131	0.7254	0.7263	0.9722	**0.9889**	0.4038	0.0000	0.0604	**0.4965**	**0.9948**
7	0.0000	0.0000	0.9895	**1.0000**	0.3308	**0.8676**	0.2035	0.1199	0.9897	132	0.0000	0.0000	0.9888	0.9823	**0.2302**	0.0000	0.2587	0.2113	**0.9924**
8	0.6272	0.0000	0.9282	0.9893	0.3647	**1.0000**	**0.7218**	0.2516	0.9844	133	0.0000	0.4008	**0.9926**	0.9917	0.3180	0.0000	0.4164	**0.3986**	0.9897
9	**0.9034**	0.0000	0.9737	0.9336	0.2335	0.9039	0.2983	0.2769	**0.9911**	134	0.0000	0.0000	0.9835	**0.9828**	**0.2561**	0.8685	0.1129	0.0136	**0.9896**
10	0.9044	0.0000	**1.0000**	**1.0000**	0.2563	**0.9388**	**0.5237**	0.3208	**0.9879**	135	0.0000	0.0089	**0.9879**	0.9854	**0.4875**	0.0000	**0.3353**	0.2606	0.9847
11	0.9733	0.9268	**1.0000**	**1.0000**	0.2748	**1.0000**	**0.2739**	0.2746	**0.9955**	136	0.0000	0.0000	**0.9912**	**0.9902**	0.3427	0.0000	0.0794	**0.2122**	**0.9902**
12	0.9874	0.9400	**1.0000**	**1.0000**	0.3858	**1.0000**	0.3971	**0.3781**	**0.9935**	137	0.0000	0.0108	0.9612	0.9753	**0.3795**	0.0000	0.1235	0.1773	**0.9883**
13	0.0000	0.0000	**1.0000**	**1.0000**	0.2685	0.9819	0.0295	**0.0919**	**0.9954**	138	0.0000	0.0122	**0.9982**	0.9844	0.1955	0.0000	0.3966	**0.6013**	**0.9983**
14	0.0000	0.0000	**1.0000**	**1.0000**	**0.3357**	**1.0000**	0.0344	0.0713	**0.9957**	139	0.0000	0.0000	**0.9842**	**0.9892**	0.3146	0.0000	0.2445	**0.0945**	**0.9909**
15	0.9718	0.9725	**1.0000**	**1.0000**	0.4101	0.9816	**0.5142**	0.5101	0.9979	140	0.0000	**1.0000**	**0.9752**	**0.9937**	0.2292	0.0000	0.0984	0.1739	**0.9824**
16	0.0000	0.0000	**0.9973**	**0.9981**	**0.3315**	**0.9965**	0.1713	0.1879	0.9824	141	0.0000	0.0000	0.9468	**0.9831**	**0.3505**	0.8694	0.1245	0.4958	**0.9859**
17	0.0000	0.0000	**0.9974**	**0.9972**	0.4765	**0.9974**	0.3684	**0.3824**	**0.9969**	142	0.0000	0.0000	**0.9932**	**0.9883**	0.3675	0.0000	0.1188	**0.0611**	**0.9892**
18	0.0000	0.0000	**0.9971**	**0.9977**	0.1045	**0.9969**	0.0344	**0.3720**	**0.9951**	143	0.0000	0.7075	0.9778	**0.9946**	**0.3637**	0.9082	0.2038	0.0826	0.9423
19	0.2140	0.2146	0.9906	**0.9964**	0.2407	0.0000	0.1438	0.2310	**0.9900**	144	0.0000	0.0000	**0.9831**	0.9415	**0.3075**	0.0000	0.3195	0.1837	0.8875
20	0.7956	0.0000	**0.9936**	**0.9952**	0.1949	0.7927	0.0335	**0.2196**	**0.9836**	145	0.9401	0.5061	**0.9989**	**0.9989**	0.7218	**0.9989**	**0.7899**	0.7974	0.9961
21	0.0000	0.2141	0.9701	0.9859	**0.3286**	0.3399	0.2844	0.4946	**0.9955**	146	0.9229	0.7358	**0.9986**	**0.9989**	0.4151	0.9891	0.2298	**0.3575**	0.0000
22	0.5685	**0.9423**	**0.9880**	**0.9928**	0.3573	0.0000	0.2964	0.2985	**0.9918**	147	**1.0000**	0.4426	0.9988	**0.9992**	0.7003	**0.9995**	**0.9884**	0.5562	0.9944
23	0.7249	0.0000	**0.9909**	**0.9964**	0.3773	0.0000	0.1222	**0.4845**	**0.9927**	148	0.9181	0.4998	**0.9968**	0.9939	0.2140	0.9013	0.0916	**0.2060**	**0.9960**
24	0.0149	0.5973	**0.9967**	0.9884	**0.4172**	0.0000	0.1317	0.1820	0.9906	149	0.9169	0.4936	0.9912	**0.9946**	0.2595	0.9248	**0.3437**	0.4046	**0.9962**
25	0.8568	**0.8615**	**0.9971**	0.9815	0.2270	0.8530	0.4871	0.3499	0.9891	150	0.5837	0.2884	**0.9953**	**0.9959**	**0.4245**	**0.9754**	0.0826	0.0815	0.9740
26	0.8668	0.5167	**0.9930**	**0.9848**	0.2519	0.8688	**0.0747**	0.0134	0.9767	151	0.9759	0.9824	**0.9979**	**0.9968**	0.4363	**0.9971**	0.5928	**0.5717**	**0.9963**
27	0.9914	0.9352	0.9943	0.9797	**0.4089**	0.0000	0.1218	**0.2717**	**0.9960**	152	0.3664	0.0000	**0.9971**	**0.9898**	**0.1356**	0.9709	**0.4185**	0.1586	0.9668
28	0.0000	0.8764	**0.9872**	**0.9950**	0.4767	**0.9902**	0.1919	0.2415	**0.9907**	153	0.7807	0.0000	**0.9963**	**0.9947**	**0.1495**	0.7807	0.2754	0.1098	**0.9950**
29	0.0000	0.7888	**0.9957**	**0.9921**	**0.2989**	0.8531	0.0790	0.1544	**0.9890**	154	0.7354	0.0000	**0.9989**	0.9912	**0.4002**	0.8066	0.2429	0.1463	0.9637
30	0.6080	0.0000	0.9831	0.9596	0.1180	0.0000	0.3046	**0.5327**	**0.9987**	155	0.7916	0.0000	0.9757	0.9892	0.5961	0.7918	**0.8120**	0.2927	**0.9945**
31	0.6842	0.6854	**0.9823**	0.9623	0.3863	0.6813	0.1665	**0.0840**	**0.9721**	156	0.8447	0.9774	**0.9965**	0.9896	**0.2747**	0.0000	0.0801	0.1331	**0.9889**
32	0.6747	**1.0000**	**0.9928**	**0.9851**	0.2093	0.0000	**0.3083**	0.1913	**0.9812**	157	0.6596	0.0000	0.9946	**0.9956**	0.1549	0.0000	0.1341	**0.3229**	0.9883
33	0.0000	0.0000	**0.9832**	**0.9899**	**0.4005**	0.0000	0.0663	**0.4621**	**0.9852**	158	0.8508	0.0000	**0.9922**	**0.9935**	**0.2405**	0.0000	0.3299	0.2655	0.9810
34	0.0000	0.0000	**0.9907**	0.9733	0.3542	0.0000	0.0133	**0.0668**	**0.9903**	159	0.3955	0.0000	**0.9992**	0.9731	**0.9182**	0.0000	**0.5967**	0.4487	0.9900
35	0.0000	0.0000	**0.9917**	**0.9945**	**0.3949**	0.6951	0.1900	0.0830	**0.9844**	160	0.6005	0.9854	**0.9889**	**0.9880**	**0.3526**	0.0000	0.3302	0.2134	**0.9893**
36	0.0000	0.5486	0.9540	**0.9854**	**0.2524**	0.0000	0.2390	0.1499	0.8700	161	**0.8686**	0.0000	**0.9899**	**0.9899**	**0.3246**	**0.9781**	0.0535	0.0866	0.9292
37	0.9881	0.5061	**0.9989**	**0.9989**	0.7039	**0.9995**	**0.7858**	0.7965	**0.9987**	162	0.3471	0.0000	0.9847	0.9852	0.3621	**0.9875**	**0.5869**	**0.3518**	0.0000
38	0.9449	0.0000	**0.9986**	0.9919	**0.3970**	**0.9976**	0.2053	0.3158	0.0000	163	0.0000	0.0000	**0.9989**	**0.9979**	0.3253	**0.9984**	**0.2042**	**0.2307**	0.9933
39	0.9523	0.4426	**0.9990**	0.9986	0.4994	0.9988	**0.9875**	0.5496	0.9944	164	0.0000	0.0000	**0.9983**	0.9924	**0.2853**	0.9911	0.0096	0.0183	**0.9986**
40	0.9208	0.9013	**0.9974**	**0.9968**	**0.2865**	0.9297	0.0863	0.1962	**0.9967**	165	0.0000	0.0000	**0.9989**	0.9936	0.2334	0.9960	0.0099	0.0159	0.9930
41	0.9169	0.4936	**0.9963**	**0.9962**	0.2258	0.9469	**0.3310**	0.3994	**0.9971**	166	0.0000	0.0000	**0.9989**	0.9933	0.3782	**0.9988**	0.0195	**0.4815**	**0.9975**
42	0.6423	0.5836	0.9923	**0.9931**	0.3763	0.7186	0.0832	**0.0812**	**0.9947**	167	0.9484	0.9486	**0.9991**	**0.9978**	**0.4069**	0.9484	0.1966	0.2983	**0.9980**
43	0.9759	0.9824	**0.9980**	**0.9984**	0.4063	**0.9971**	0.5785	**0.5528**	**0.9965**	168	0.9873	0.9907	**0.9991**	**0.9971**	0.3009	**0.9966**	0.3218	**0.2199**	**0.9985**
44	**0.9718**	0.0000	**0.9973**	**0.9973**	0.2733	0.9868	**0.4655**	0.1626	0.9286	169	0.9722	0.8489	**0.9984**	**0.9989**	0.3361	**0.9959**	0.2849	**0.3094**	**0.9984**
45	0.7807	0.0000	**0.9958**	**0.9978**	0.2481	0.7808	0.2146	**0.1329**	**0.9953**	170	0.9861	0.9146	**0.9988**	**0.9988**	0.4410	**0.9992**	0.1488	**0.3272**	0.9975
46	0.5887	0.0000	0.9790	**0.9986**	0.2198	0.8066	**0.2119**	0.1258	0.9938	171	0.9439	0.8574	**0.9986**	**0.9965**	0.3517	**0.9925**	0.0296	**0.1463**	**0.9982**
47	0.7916	0.0000	**0.9954**	**0.9984**	**0.6880**	0.8708	**0.8204**	0.2866	0.9878	172	0.9083	0.9095	**0.9981**	**0.9986**	0.3362	**0.9900**	0.2129	0.4264	**0.9971**
48	0.0000	0.0000	**0.9960**	0.9828	**0.3615**	0.0000	0.0794	0.1855	**0.9942**	173	0.9691	0.8055	0.9911	**0.9988**	0.3106	**0.8852**	0.1758	0.2418	**0.9978**
49	0.0000	0.0000	0.9948	**0.9968**	0.2121	0.0000	0.0647	**0.3132**	0.9898	174	0.9490	0.4670	0.9894	0.9954	**0.7314**	0.6486	**0.8778**	0.1396	**0.9974**
50	**0.8206**	0.0000	**0.9975**	0.9896	0.0985	0.0000	0.3301	0.2340	**0.9922**	175	0.9508	0.7120	0.8970	**0.9932**	**0.3575**	**0.9937**	0.1840	0.3205	0.9731
51	0.0000	0.0000	0.9802	0.9850	**0.8514**	0.0000	0.5851	0.4438	**0.9934**	176	0.9784	**0.9542**	0.9800	0.9792	0.3364	0.9602	0.2332	0.1481	**0.9967**
52	0.7249	0.7789	**0.9950**	**0.9939**	0.3195	0.0000	**0.1916**	0.1706	**0.9934**	177	0.8100	**0.9890**	0.9644	0.9717	0.2931	0.6864	**0.8743**	0.2876	0.9727
53	0.8686	**0.8686**	0.9502	**0.9948**	0.1493	**0.9781**	0.0758	0.1080	**0.9730**	178	0.0000	0.0000	**0.9988**	**0.9981**	0.4196	**0.9964**	0.3866	**0.3945**	0.9942
54	0.3469	0.0000	0.9847	0.9852	0.3457	**0.9880**	**0.5930**	**0.3616**	0.0000	179	0.1933	0.0000	**0.9989**	**0.9970**	0.4953	**0.9955**	0.4246	**0.4625**	0.0000
55	0.0000	0.0000	**0.9978**	0.9942	0.3244	**0.9984**	**0.2077**	**0.2277**	0.9931	180	0.9906	0.9501	**0.9972**	0.9900	**0.4304**	0.9906	0.0479	0.0675	0.0000
56	0.0000	0.0000	**0.9989**	**0.9972**	0.1413	0.9911	0.0101	**0.0183**	**0.9988**	181	0.9788	0.2676	**0.9968**	**0.9985**	0.3681	0.9883	0.1506	**0.2911**	**0.9951**
57	0.0000	0.0000	**0.9986**	**0.9977**	0.3335	0.9960	0.0099	0.0159	0.9910	182	0.7551	0.0000	**0.9952**	**0.9938**	**0.4288**	**0.9967**	0.1287	0.1475	**0.9978**
58	0.0000	0.0000	**0.9985**	0.9912	0.6052	**0.9988**	0.0114	**0.4774**	**0.9986**	183	0.0000	0.0000	**0.9973**	**0.9970**	**0.1774**	**0.9960**	0.2650	0.2167	**0.9947**
59	0.9622	0.5661	**0.9990**	**0.9985**	0.3046	**0.9957**	0.2195	**0.2863**	0.9855	184	0.0000	0.9555	**0.9990**	**0.9995**	0.1971	**0.9961**	0.0781	**0.1545**	**0.9990**
60	0.9545	0.8606	**0.9990**	**0.9986**	**0.2768**	**0.9965**	0.3348	0.2131	**0.9978**	185	0.0000	0.0000	**1.0000**	0.9991	**0.9717**	0.7807	**0.9991**	0.9917	0.9992
61	0.6904	0.8554	**0.9984**	**0.9969**	0.3518	**0.9868**	0.2525	**0.3183**	**0.9981**	186	0.0000	0.0000	**0.9997**	0.9972	**0.4244**	0.0000	0.2970	0.1535	**0.9990**
62	0.9572	0.9884	**0.9991**	**0.9988**	0.3691	**0.9980**	0.1136	**0.3390**	0.9971	187	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
63	0.9682	0.9690	**0.9984**	**0.9961**	0.2792	0.9175	0.0286	**0.1752**	**0.9968**	188	**0.0000**	**0.6540**	**1.0000**	**0.9997**	**0.0877**	**0.6535**	**0.0200**	**0.0200**	**0.9994**
64	0.8442	**1.0000**	**0.9990**	**0.9985**	0.2407	**0.9910**	0.1953	0.3939	**0.9943**	189	0.0000	0.6751	**0.9996**	0.9993	**0.2110**	0.6739	0.0200	0.0200	0.9994
65	0.8132	0.0000	**0.9960**	0.9777	0.1468	**0.8852**	0.1613	0.2549	0.9909	190	**0.0000**	**0.0000**	**0.9979**	**0.9993**	**0.0883**	**0.8988**	**0.0199**	**0.0484**	**0.9998**
66	0.9227	0.6661	0.9954	0.9865	**0.5409**	0.0000	0.6865	0.1121	**0.9965**	191	0.0000	0.8881	0.9985	0.9994	0.3441	**0.9996**	**0.9196**	0.9089	**0.9997**
67	0.9829	0.9504	**0.9950**	0.9882	**0.5612**	0.9504	0.2246	0.3161	0.9425	192	0.0000	0.0000	**0.9983**	**0.9990**	0.4707	**0.9982**	0.5221	**0.6560**	**0.9983**
68	0.9616	0.9542	0.9890	**0.9934**	**0.3228**	0.7845	0.2191	0.1516	0.9838	193	0.8409	0.1366	**0.9983**	**0.9977**	**0.4442**	**0.9983**	0.4074	0.4494	0.0000
69	0.6571	**0.9890**	0.9782	**0.9996**	0.1021	0.8675	**0.8274**	0.2704	0.9992	194	0.5224	0.6028	**0.9992**	**0.9993**	0.2501	**0.9980**	0.1626	**0.2272**	0.9945
70	0.0000	0.0000	**0.9991**	**0.9981**	0.3431	**0.9964**	0.3846	**0.4035**	**0.9952**	195	**0.9821**	0.0000	**0.9986**	**0.9988**	0.4262	**0.9978**	0.4871	0.4264	**0.9983**
71	0.1933	0.0000	**0.9979**	**0.9965**	0.4982	**0.9955**	0.4146	**0.4618**	0.0000	196	0.7712	0.7712	**0.9987**	**0.9982**	**0.5397**	**0.9972**	0.0597	0.1972	0.0000
72	0.9885	0.9501	**0.9958**	**0.9978**	**0.3495**	0.9906	0.0479	**0.0678**	0.0000	197	0.0000	0.0000	**0.9993**	0.9964	0.3362	0.7525	**0.5212**	0.4129	0.9835
73	0.9286	0.3370	**0.9963**	**0.9961**	0.1766	**0.9901**	**0.1946**	0.3424	**0.9930**	198	0.0000	0.0000	**0.9982**	**0.9992**	**0.4612**	0.9482	0.3398	0.4470	**0.9993**
74	0.7551	0.0000	**0.9958**	**0.9963**	**0.5282**	**0.9967**	0.1588	0.1576	0.9919	199	0.0000	0.0000	**0.9994**	**0.9995**	**0.2455**	0.7222	0.0758	0.1946	0.9912
75	0.0000	0.0000	**0.9933**	**0.9974**	**0.4821**	**0.9960**	0.2369	0.1945	**0.9976**	200	0.0000	0.0000	0.9999	0.9999	0.4810	0.9146	**1.0000**	**0.9915**	0.9997
76	0.8980	0.9556	**0.9993**	**0.9993**	0.1975	**0.9956**	0.0720	**0.1265**	**0.9984**	201	0.0000	0.0000	**0.9995**	0.9963	0.1688	0.0000	**0.9392**	0.2786	0.9973
77	0.3287	0.0000	**1.0000**	0.9993	**0.8898**	0.9521	**0.9986**	0.9919	0.9993	202	0.0000	0.0000	0.9973	0.9976	0.1625	0.0000	**0.3452**	0.2868	**0.9980**
78	0.6788	0.6544	**0.9992**	**0.9997**	**0.3792**	0.7792	0.2736	0.1502	**0.9990**	203	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
79	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	204	0.0000	0.0000	0.9957	**0.9986**	**0.2638**	0.0000	**0.8647**	0.3198	0.9979
80	0.6798	0.6540	**0.9998**	0.9995	**0.4915**	0.9631	0.0200	0.0200	0.9996	205	0.0000	0.0000	0.9970	**0.9984**	0.2604	0.0000	0.3060	**0.2506**	**0.9986**
81	**0.6340**	**0.0460**	**0.9989**	**0.9997**	**0.1402**	**0.9936**	**0.0200**	**0.0303**	**0.9999**	206	0.0000	0.0000	0.9957	**0.9981**	0.2633	0.0000	**0.4294**	0.1961	**0.9967**
82	**0.8974**	**0.0000**	**0.9997**	**0.9998**	**0.1333**	**0.8986**	**0.0199**	**0.1533**	**0.9991**	207	0.8512	0.9984	0.9983	**0.9996**	**0.3458**	**0.9991**	0.5120	0.2745	**0.9988**
83	0.8873	0.8882	**0.9994**	0.9986	0.3251	0.8870	**0.9185**	0.8881	**0.9995**	208	0.0000	0.0000	0.9971	0.9962	**0.3731**	**0.9991**	0.3882	0.2555	**0.9988**
84	0.0000	0.0000	**0.9982**	**0.9989**	0.2998	**0.9982**	0.5217	**0.6471**	**0.9980**	209	0.0000	0.0000	**0.9990**	**0.9988**	0.5050	**0.9984**	**0.5885**	0.6303	0.9956
85	0.6995	0.1366	**0.9984**	**0.9978**	0.4733	**0.9983**	0.3867	**0.4409**	0.0000	210	0.8861	0.3719	0.9983	**0.9991**	0.2023	0.9627	0.1678	**0.3570**	**0.9992**
86	0.0000	0.6026	0.9954	**0.9989**	0.1654	**0.9980**	**0.1459**	0.2135	0.9953	211	0.6344	0.2281	0.9993	**0.9995**	**0.3233**	**0.9994**	0.1869	0.3621	0.9987
87	**0.9821**	0.0000	**0.9990**	**0.9986**	0.3304	**0.9978**	0.5208	0.4067	**0.9985**	212	**0.8582**	0.0000	0.9931	**0.9994**	0.1262	0.9599	0.1480	0.1362	0.0000
88	0.7712	0.7712	**0.9960**	**0.9978**	**0.2679**	**0.9972**	0.0486	0.1954	0.0000	213	0.3921	0.0000	**0.9998**	**0.9992**	0.2802	**0.9987**	0.3584	**0.3362**	**0.9987**
89	0.0000	0.0000	0.9962	**0.9979**	0.3362	0.1803	**0.5402**	0.4434	0.9886	214	0.0000	0.0000	**0.9998**	**0.9997**	0.1872	**0.9984**	**0.0540**	0.0159	**0.9988**
90	0.0000	0.2178	**0.9994**	**0.9987**	0.4332	0.9773	**0.3031**	0.4533	**0.9991**	215	0.9568	0.0000	**0.9998**	**0.9999**	0.0823	**0.9984**	**0.0190**	0.0132	**0.9995**
91	0.0000	0.0000	0.9968	**0.9996**	**0.1970**	0.9862	0.0679	0.2275	0.9961	216	0.8194	0.0000	**0.9998**	**0.9998**	**0.2970**	**0.9986**	0.0147	0.0133	**0.9976**
92	0.0000	0.3958	0.9999	0.9990	**0.9627**	0.9750	**1.0000**	0.9913	0.9998	217	0.0000	0.0000	**0.9997**	**0.9997**	0.0902	0.9950	0.0145	**0.0136**	**0.9997**
93	0.8970	0.8970	**0.9988**	**0.9953**	0.3133	**0.9931**	0.1085	**0.0395**	**0.9939**	218	0.0188	0.0000	**0.9996**	**0.9995**	**0.2000**	**0.9985**	0.0134	0.0148	**0.9989**
94	0.8108	0.7139	**0.9973**	**0.9941**	0.3137	**0.9802**	0.4598	**0.3282**	**0.9851**	219	0.8540	0.0000	0.9991	**0.9998**	0.3905	**0.9996**	**0.1595**	0.0877	0.9978
95	0.7758	0.0000	0.9801	**0.9924**	0.2094	**0.9973**	**0.8640**	0.2395	**0.9927**	220	0.9686	0.9870	**0.9995**	**0.9998**	**0.4233**	**0.9991**	0.2094	0.1824	**0.9993**
96	0.0000	0.0000	**0.9976**	**0.9979**	**0.3673**	**0.9965**	0.1440	0.1949	**0.9974**	221	0.9901	0.0000	**0.9998**	**0.9997**	**0.3833**	**0.9987**	0.0142	0.0142	**0.9995**
97	0.3396	0.4644	0.9871	**0.9955**	0.3759	0.9544	**0.3857**	0.5324	0.9780	222	0.0000	0.0000	**0.9985**	**0.9989**	**0.5082**	**0.9988**	**0.2856**	0.2160	**0.9996**
98	0.3722	0.8683	0.9762	**0.9873**	**0.3728**	0.0000	0.3571	0.2744	0.9840	223	0.9437	0.9233	**0.9991**	**0.9979**	**0.3524**	0.9915	0.0213	0.0439	**0.9980**
99	0.2681	0.0000	**0.9908**	**0.9885**	0.2968	**0.9874**	0.1184	**0.0673**	0.9759	224	0.0000	0.0000	**0.9994**	**0.9993**	0.2408	**0.9997**	0.2252	**0.2815**	**0.9994**
100	0.9426	0.5061	**0.9990**	**0.9990**	0.6880	**0.9995**	**0.7845**	0.7941	0.9907	225	0.9439	0.6586	**0.9994**	**0.9997**	**0.1849**	**0.9996**	0.3070	**0.2823**	**0.9995**
101	0.9208	0.9013	**0.9948**	0.9918	**0.4167**	0.9181	0.0851	**0.2021**	0.9731	226	0.5680	0.0000	**0.9995**	**0.9991**	0.3415	**0.9994**	**0.4794**	**0.4518**	**0.9984**
102	0.9759	0.9824	**0.9928**	**0.9969**	0.4567	**0.9971**	0.5746	**0.5437**	0.9767	227	0.3411	0.0000	0.9948	**0.9988**	0.0694	0.9875	0.0348	**0.1277**	0.9909
103	0.0000	0.0000	**0.9959**	0.9817	0.2424	0.0000	**0.3300**	0.1943	0.9883	228	0.8315	0.0000	0.9965	0.9991	0.4521	**0.9992**	0.0168	**0.4097**	0.9988
104	0.0000	0.0000	**0.9983**	**0.9988**	0.2702	0.9960	0.0099	0.0159	**0.9982**	229	**1.0000**	0.0000	0.9993	0.9993	0.2175	0.9996	0.0267	**0.4673**	0.0000
105	0.9727	0.7514	**0.9985**	**0.9972**	**0.3449**	**0.9948**	0.1748	0.3168	**0.9974**	230	0.6227	0.5040	**0.9989**	**0.9985**	0.2795	**0.9986**	0.3909	**0.4404**	0.9951
106	0.9449	0.8520	**0.9959**	**0.9986**	0.3549	**0.9939**	0.0261	**0.1222**	**0.9970**	231	0.0000	0.0000	**0.9978**	**0.9977**	**0.2483**	0.9958	0.0213	**0.0743**	**0.9972**
107	0.9504	0.7028	0.9787	**0.9883**	**0.3953**	**0.9504**	0.1107	0.2951	0.9519	232	0.0000	0.0000	**0.9978**	**0.9987**	**0.3715**	**0.9978**	0.2599	0.1024	0.0000
108	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	233	0.8839	0.0000	**0.9999**	0.9999	**0.9141**	0.9977	0.9932	**0.9761**	0.9989
109	0.8970	0.8970	**0.9962**	**0.9981**	0.2777	**0.9931**	0.0991	**0.0385**	**0.9898**	234	0.6177	0.0000	**1.0000**	0.9989	0.2176	1.0000	0.0234	**0.3065**	0.9996
110	0.9741	0.9741	**0.9985**	**0.9990**	0.1494	0.9944	0.0654	0.1149	**0.9986**	235	0.8645	0.0000	0.9973	0.9988	**0.9912**	0.9972	**1.0000**	0.9427	0.9998
111	0.9547	0.9547	**0.9981**	**0.9985**	0.2277	**0.9974**	**0.4171**	0.1414	**0.9985**	236	**0.8696**	0.0000	0.9984	0.9994	0.3603	0.9994	0.5083	0.1603	**0.9996**
112	0.6388	0.9765	**0.9937**	**0.9863**	0.2325	**0.9802**	0.4418	**0.4177**	**0.9920**	237	0.1545	0.0000	**0.9989**	**0.9990**	**0.3549**	**0.9989**	0.2689	**0.3663**	**0.9989**
113	0.5882	0.0000	0.9926	0.9902	0.2041	0.5992	**0.9955**	0.0946	0.9622	238	0.7278	0.0000	**0.9989**	**0.9994**	0.2996	**0.9986**	0.4471	**0.5256**	**0.9988**
114	**0.7428**	0.0000	0.9895	0.9713	0.3554	0.7887	0.4713	0.2384	**0.9955**	239	0.0000	0.0000	0.9999	0.9998	0.3889	0.9993	0.3764	**0.4217**	**0.9999**
115	**0.8676**	0.0000	**0.9968**	0.9594	0.5152	0.8786	0.7947	0.1170	0.9913	240	0.0000	0.0000	0.9995	**0.9998**	**0.4202**	0.9991	0.2608	0.2941	0.9998
116	0.6750	0.0000	**0.9973**	**0.9926**	0.1904	**0.9973**	**0.8711**	0.2761	0.9769	241	0.0000	0.0000	**0.9999**	**0.9998**	**0.0147**	**0.9988**	**0.0143**	0.0146	**0.9995**
117	0.4615	0.0000	0.9842	0.9837	0.3011	0.9728	**0.6447**	0.2742	**0.9923**	242	0.8137	0.5323	**0.9998**	**0.9998**	0.4369	0.9896	**0.0569**	0.1755	**0.9994**
118	**0.8934**	0.0000	0.9784	0.9790	0.1303	0.9393	0.5819	0.3188	**0.9879**	243	0.2203	0.5640	**0.9998**	**0.9998**	0.3038	0.9948	**0.2661**	0.6626	**0.9998**
119	0.9733	0.0000	**0.9967**	**0.9966**	0.3531	**0.9974**	**0.2590**	0.2672	**0.9965**	244	0.8057	0.5479	**0.9996**	**0.9994**	0.2054	0.9963	**0.0383**	0.1531	**0.9989**
120	0.9875	0.7651	**0.9972**	0.9913	0.4135	**0.9968**	**0.3555**	0.3734	**0.9964**	245	0.1912	0.4541	**0.9998**	**0.9997**	0.3233	**0.9997**	**0.1648**	0.3620	**0.9993**
121	0.0000	0.0000	**0.9986**	**0.9969**	**0.4756**	0.9819	0.0295	0.0948	**0.9953**	246	0.7260	**1.0000**	**0.9997**	**0.9998**	0.2581	**0.9997**	0.1255	**0.4240**	**0.9995**
122	0.0000	0.0000	**0.9980**	0.9911	**0.1875**	0.9877	0.0344	0.0713	**0.9961**	247	0.9793	0.8353	0.9994	0.9978	0.4610	0.9902	0.0112	**0.2679**	**0.9996**
123	0.9719	0.9985	**0.9996**	**0.9996**	**0.5010**	**0.9990**	0.4995	0.5652	0.9990	248	0.0000	0.0000	**0.9768**	**0.9986**	0.1386	0.1696	**0.0570**	0.1435	0.9942
124	0.0000	0.0000	**0.9980**	**0.9964**	0.4157	**0.9965**	**0.1486**	0.2055	**0.9966**	249	0.0000	0.0000	**0.9976**	0.9897	**0.4235**	0.0000	0.0498	0.1251	0.9950
125	0.0000	0.0000	**0.9995**	**0.9975**	0.6142	**0.9975**	0.3775	**0.3984**	**0.9981**	250	0.0000	0.0000	0.9872	**0.9984**	**0.4321**	0.0000	0.0498	**0.2461**	0.9875

TABLE XVIII
THE TEST RANGE-AUC-ROC OF TIME SERIES ANOMALY DETECTION IN UCR 250 SUB-DATASETS. THE BEST RESULTS ARE IN **BOLD**.

UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector
1	0.5064	0.5054	**0.7237**	**0.7096**	0.9023	**0.6215**	0.8896	**0.8933**	**0.9671**
2	0.5100	0.5090	**0.7267**	**0.7291**	0.8248	0.6142	0.4988	0.5096	**0.9352**
3	0.5100	0.5090	**0.7360**	**0.7328**	0.8306	**0.6225**	**0.8352**	0.7978	**0.9353**
4	0.4923	0.4907	0.7546	**0.7332**	0.7536	**0.5445**	0.8064	0.7671	**0.9101**
5	0.0000	0.0000	**0.6867**	**0.7148**	0.5048	0.5174	**0.5101**	**0.5039**	0.5042
6	0.0000	0.0000	**0.7339**	**0.7948**	0.5084	0.5396	0.5059	0.5110	0.5126
7	0.0000	0.0000	0.7506	**0.8350**	0.5224	**0.5080**	0.5186	0.5086	0.5179
8	0.4993	0.0000	0.6686	**0.8058**	0.5387	**0.5671**	**0.7309**	0.5640	0.5100
9	**0.5045**	0.0000	**0.7841**	0.7042	0.5279	0.5328	0.5232	0.5186	**0.7659**
10	0.5088	0.0000	**0.7260**	**0.7578**	0.5098	**0.5051**	**0.7106**	0.5660	**0.7648**
11	0.5225	0.4967	**0.7719**	**0.7196**	0.8488	**0.8986**	**0.8817**	0.8723	**0.9370**
12	0.5237	0.5024	**0.6941**	**0.7384**	0.7503	**0.8586**	0.7583	**0.7405**	**0.8487**
13	0.0000	0.0000	**0.7018**	**0.6870**	0.6299	0.6679	0.4997	**0.5347**	**0.8517**
14	0.0000	0.0000	**0.6798**	**0.7505**	**0.6606**	**0.6756**	0.4989	0.5309	**0.8487**
15	0.5009	0.5028	**0.7202**	**0.7180**	0.8175	0.5067	**0.9091**	0.8744	0.4975
16	0.0000	0.0000	**0.7422**	**0.7391**	**0.8186**	**0.6716**	0.7545	0.7561	0.4980
17	0.0000	0.0000	**0.7133**	**0.7350**	0.7552	**0.6703**	0.7416	**0.7455**	**0.8514**
18	0.0000	0.0000	**0.7076**	**0.7519**	0.5325	**0.6734**	0.4990	**0.7296**	**0.8490**
19	0.5030	0.5030	0.7101	**0.7183**	0.5150	0.0000	0.5292	0.5053	**0.5062**
20	0.5042	0.0000	**0.6989**	**0.7448**	0.7844	0.5081	0.7230	**0.7970**	**0.9151**
21	0.0000	0.4998	0.7555	0.7329	**0.5409**	0.5029	0.5302	0.5787	**0.7603**
22	0.5038	**0.4953**	**0.6850**	**0.6973**	0.7172	0.0000	0.6356	0.6982	**0.8658**
23	0.4986	0.0000	**0.6980**	**0.7323**	0.6584	0.0000	0.5458	**0.6977**	**0.8568**
24	0.5015	0.5021	**0.7351**	0.6998	**0.6084**	0.0000	0.5053	0.5114	0.5159
25	0.5111	**0.5017**	**0.7205**	0.6846	0.5055	0.5128	0.5393	0.5464	0.5118
26	0.4927	0.4927	**0.7105**	**0.7071**	**0.7255**	0.5007	**0.6912**	0.6685	0.5100
27	0.5207	0.5164	0.7275	**0.7575**	**0.5081**	0.0000	0.5080	**0.5147**	**0.5167**
28	0.0000	0.4941	**0.7009**	**0.6824**	0.7508	**0.9974**	0.5974	0.6911	**0.8660**
29	0.0000	0.4942	**0.7290**	**0.6925**	**0.6451**	0.5119	0.5340	0.6281	**0.8517**
30	0.5083	0.0000	**0.7418**	0.6388	0.5048	0.0000	0.5213	**0.5367**	**0.5969**
31	0.5053	0.4910	**0.7024**	0.6901	0.7708	0.5073	0.6804	**0.6916**	**0.8937**
32	0.4748	**0.5836**	**0.7453**	**0.6290**	0.8462	0.0000	**0.8560**	0.8412	**0.9463**
33	0.0000	0.0000	**0.6862**	**0.7497**	**0.7997**	0.0000	0.6766	**0.7938**	**0.9010**
34	0.0000	0.0000	**0.6800**	0.6940	0.6731	0.0000	0.6445	**0.6472**	**0.8943**
35	0.0000	0.0000	**0.7369**	**0.7527**	**0.7427**	0.4933	0.5682	0.5043	**0.8578**
36	0.0000	0.4939	0.6878	**0.7481**	**0.6406**	0.0000	0.5147	0.5167	0.5048
37	0.5160	0.5016	**0.7176**	**0.7603**	0.7408	**0.5512**	**0.7501**	0.7542	**0.7715**
38	0.5106	0.0000	**0.7408**	0.6845	**0.6907**	**0.6381**	0.5138	0.5708	0.0000
39	0.5073	0.5003	**0.7414**	**0.7461**	0.6161	0.5249	**0.7023**	0.6030	0.4984
40	0.5086	0.4991	**0.7103**	**0.7427**	**0.7400**	0.5288	0.6099	0.6367	**0.8743**
41	0.5058	0.4981	**0.7248**	**0.7156**	0.6261	0.5799	**0.7306**	0.7848	**0.8766**
42	0.5036	0.4968	0.7337	**0.7081**	0.7924	0.5082	0.4992	**0.7387**	**0.9195**
43	0.5649	0.5729	**0.7057**	**0.7448**	0.7707	**0.6330**	0.8500	**0.8471**	**0.8921**
44	**0.4962**	0.0000	**0.7381**	**0.7005**	0.8270	0.5187	**0.8583**	0.8111	0.4991
45	0.4949	0.0000	**0.7230**	**0.7041**	0.8454	0.5021	0.8604	**0.8399**	**0.9456**
46	0.5026	0.0000	**0.7237**	**0.6798**	0.5919	0.5301	**0.5404**	0.5278	0.5038
47	0.5119	0.0000	**0.7087**	**0.7067**	**0.7848**	0.5241	**0.7979**	0.5683	0.5045
48	0.0000	0.0000	**0.7756**	0.7251	**0.7207**	0.0000	0.5338	0.5374	**0.8455**
49	0.0000	0.0000	0.6976	**0.6983**	0.5051	0.0000	0.5025	**0.5122**	0.5079
50	**0.4965**	0.0000	**0.7382**	0.7656	0.5224	0.0000	0.5281	0.5464	**0.8491**
51	0.0000	0.0000	0.7247	**0.7357**	**0.5845**	0.0000	0.5524	0.5350	**0.5090**
52	0.5019	0.4992	**0.7286**	**0.8035**	0.6244	0.0000	**0.6480**	0.5756	**0.8500**
53	0.4889	**0.4817**	0.6910	**0.8563**	0.7671	**0.7091**	0.5024	0.7455	**0.9195**
54	0.5134	0.0000	0.7486	**0.7840**	0.5737	**0.7419**	**0.7555**	**0.6591**	0.0000
55	0.0000	0.0000	**0.7437**	0.7330	0.6787	**0.7511**	**0.7447**	**0.7476**	0.5006
56	0.0000	0.0000	**0.7596**	**0.7002**	0.5609	0.6088	0.4981	**0.5133**	**0.8514**
57	0.0000	0.0000	**0.7343**	**0.7513**	0.5794	0.7286	0.4982	0.4983	0.4980
58	0.0000	0.0000	**0.7052**	0.7165	0.7533	**0.7893**	0.4983	**0.7492**	**0.8082**
59	0.5042	0.4985	**0.7166**	**0.6885**	0.8292	**0.5325**	0.7985	**0.8486**	0.4980
60	0.5007	0.4990	**0.7164**	**0.6900**	**0.8529**	**0.5273**	0.8094	0.8351	**0.9357**
61	0.4948	0.4947	**0.7206**	**0.6994**	0.9176	**0.5207**	0.8983	**0.9096**	**0.9651**
62	0.5020	0.5016	**0.7331**	**0.6940**	0.6312	**0.5137**	0.5441	**0.6544**	0.5044
63	0.4974	0.4961	**0.7272**	**0.6993**	0.9233	0.5019	0.8992	**0.9149**	**0.9689**
64	0.4936	**0.7034**	**0.7698**	**0.6989**	0.9305	**0.5064**	0.9209	0.9426	**0.9729**
65	0.5135	0.0000	**0.7007**	0.6903	0.5112	**0.5009**	0.5107	0.5196	0.5066
66	0.5299	0.5014	0.7116	**0.7327**	**0.6119**	0.0000	0.6288	0.5033	**0.6925**
67	0.5668	0.5239	**0.7761**	0.6440	**0.7237**	0.5291	0.5889	0.5427	0.5044
68	0.5372	0.5122	**0.7394**	**0.6681**	**0.5960**	0.5054	0.5123	0.5078	0.5037
69	0.5160	**0.5100**	0.6491	**0.6813**	0.5037	0.5417	**0.6222**	0.5114	0.5124
70	0.0000	0.0000	**0.7361**	**0.6983**	0.7805	**0.6111**	0.8321	**0.8396**	**0.9099**
71	0.4975	0.0000	**0.7408**	**0.7379**	0.8315	**0.6100**	0.8400	**0.8437**	0.0000
72	0.5364	0.5002	**0.7172**	**0.7106**	**0.7617**	0.6137	0.4983	**0.7099**	0.0000
73	0.5017	0.4949	**0.7229**	**0.6785**	0.8342	**0.5396**	**0.8329**	0.8478	**0.9431**
74	0.4971	0.0000	**0.7089**	**0.6859**	**0.8918**	**0.6341**	0.8371	0.8391	0.4989
75	0.0000	0.0000	**0.6918**	**0.6795**	**0.8928**	**0.6375**	0.8552	0.8490	**0.9495**
76	0.4965	0.4964	**0.7312**	**0.7154**	0.9495	**0.5020**	0.9469	**0.9535**	**0.9799**
77	0.5002	0.0000	**0.7373**	0.7050	**0.5089**	0.5020	**0.5414**	0.5606	0.5140
78	0.5000	0.4995	**0.7261**	**0.7078**	**0.7654**	0.5039	0.5060	0.4998	**0.8883**
79	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
80	0.5010	0.5004	**0.7277**	0.7106	**0.5071**	0.5058	0.4976	0.4976	0.5073
81	**0.5003**	**0.5001**	**0.7326**	**0.7135**	**0.4998**	**0.5041**	**0.4978**	**0.4979**	**0.5087**
82	**0.5004**	**0.0000**	**0.7323**	**0.7165**	**0.5010**	**0.5014**	**0.4980**	**0.4996**	**0.4977**
83	0.5004	0.5002	**0.7220**	0.7180	0.6208	0.5041	**0.8361**	**0.8375**	**0.5041**
84	0.0000	0.0000	**0.7693**	**0.7293**	0.6136	**0.8170**	0.7762	**0.8061**	**0.8483**
85	0.5150	0.5062	**0.7114**	**0.7395**	0.7542	**0.5685**	0.7440	**0.7580**	0.0000
86	0.0000	0.4981	0.7224	**0.7417**	0.7852	**0.5246**	**0.8170**	0.8139	0.5008
87	**0.5022**	0.0000	**0.7217**	**0.7288**	0.8389	**0.6610**	0.8858	0.8612	**0.9497**
88	0.4969	0.4967	**0.7051**	**0.7083**	**0.8524**	**0.6442**	0.8258	0.8352	0.0000
89	0.0000	0.0000	0.7424	**0.7464**	0.5733	0.5034	**0.6676**	0.5854	0.4984
90	0.0000	0.4953	**0.7042**	**0.7115**	0.9407	0.5052	**0.9366**	0.9531	**0.9735**
91	0.0000	0.0000	0.7195	**0.7080**	**0.8724**	0.5046	0.8273	0.8289	0.4988
92	0.0000	0.5004	**0.7167**	0.6984	**0.5088**	0.5020	**0.5388**	0.5213	0.5087
93	0.5065	0.5054	**0.7208**	**0.7099**	0.8958	**0.6128**	0.9117	**0.8933**	**0.9664**
94	0.5090	0.4973	**0.7051**	**0.6154**	0.7803	**0.5262**	0.8091	**0.7577**	**0.9099**
95	0.5115	0.0000	0.6807	**0.7039**	0.5245	**0.6278**	**0.7547**	0.5655	**0.7660**
96	0.0000	0.0000	**0.7093**	**0.7101**	**0.8425**	**0.6716**	0.7539	0.7572	**0.9096**
97	0.5103	0.5066	0.7570	**0.7888**	0.5766	0.5471	**0.5400**	0.5912	0.5057
98	0.5133	0.5220	**0.7674**	**0.7209**	**0.5185**	0.0000	0.5204	0.5131	0.5081
99	0.4942	0.0000	**0.6935**	**0.7841**	0.7149	**0.5462**	0.6665	**0.6481**	0.5065
100	0.5124	0.5016	**0.7371**	**0.7229**	0.7459	**0.5660**	**0.7500**	**0.7540**	0.4982
101	0.5044	0.4991	**0.7426**	0.6838	**0.7269**	0.5497	0.6124	**0.5501**	0.4981
102	0.5616	0.5833	**0.7042**	**0.7503**	0.8182	**0.6302**	**0.8493**	**0.8458**	0.4993
103	0.0000	0.0000	**0.7563**	0.7548	0.5232	0.0000	**0.6846**	0.5780	0.5075
104	0.0000	0.0000	**0.7246**	**0.6963**	0.5516	0.7435	0.4982	0.4983	**0.8482**
105	0.5286	0.5001	**0.6971**	**0.6670**	**0.9143**	**0.5467**	0.8934	0.9095	**0.9644**
106	0.5227	0.4977	**0.7235**	**0.6982**	0.9142	**0.5551**	0.8977	**0.9048**	**0.9675**
107	0.5348	0.5037	**0.6828**	**0.6206**	**0.5701**	**0.5200**	0.5246	0.5388	0.5041
108	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
109	0.5064	0.5054	**0.7005**	**0.6951**	0.8942	**0.6141**	0.9012	**0.8940**	**0.9659**
110	0.5100	0.5090	**0.7230**	**0.7308**	0.5085	0.6186	0.4996	0.8042	**0.9374**
111	0.5100	0.5090	**0.7238**	**0.7185**	0.8157	**0.6202**	**0.8851**	0.7990	**0.9353**
112	0.4999	0.6029	**0.7430**	**0.7086**	0.7665	**0.5246**	0.8079	**0.7917**	**0.9119**
113	0.5050	0.0000	0.7514	**0.7676**	0.5099	0.5119	**0.5464**	0.5040	0.5045
114	**0.5022**	0.0000	**0.7657**	0.7198	0.5098	0.5395	0.5446	0.5109	**0.6815**
115	**0.5022**	0.0000	**0.7390**	0.7243	0.5133	0.5317	0.5459	0.5084	0.5115
116	0.4993	0.0000	**0.7464**	**0.6804**	0.5240	**0.5508**	**0.7561**	0.5733	0.5092
117	0.4993	0.0000	0.6814	0.7366	0.5331	0.5289	**0.6781**	0.5203	**0.7659**
118	**0.4993**	0.0000	0.6878	**0.7819**	0.5049	0.5229	0.7606	0.5683	**0.7662**
119	0.5274	0.0000	**0.7786**	**0.7487**	0.8705	**0.8957**	**0.8814**	0.8704	**0.9370**
120	0.5333	0.5024	**0.7744**	0.7826	0.7517	**0.8927**	**0.7581**	0.7414	**0.8523**
121	0.0000	0.0000	**0.7200**	**0.6961**	**0.7488**	0.6679	0.4998	0.5380	**0.8474**
122	0.0000	0.0000	**0.7397**	0.7360	**0.5805**	0.6697	0.4991	0.5310	**0.8485**
123	0.5016	0.5022	**0.7322**	**0.6942**	**0.8726**	**0.5054**	0.8598	**0.8999**	0.5003
124	0.0000	0.0000	**0.7360**	**0.6826**	0.7917	**0.6716**	**0.7540**	0.7568	**0.9096**
125	0.0000	0.0000	**0.7058**	**0.7248**	0.8196	**0.6735**	0.7417	**0.7466**	**0.8516**
126	0.0000	0.0000	0.6970	**0.7334**	0.7229	**0.6734**	0.4991	**0.7326**	**0.8520**
127	0.5061	0.5030	**0.7394**	0.6811	0.5032	0.0000	0.5026	0.5053	**0.5105**
128	0.4938	0.4907	**0.7357**	**0.7017**	0.7549	0.0000	0.7232	**0.7991**	**0.9162**
129	0.5060	0.5029	0.7142	**0.6868**	**0.5933**	0.0000	0.5383	0.6022	**0.7611**
130	0.5034	0.4979	0.7404	**0.7153**	**0.6564**	0.0000	0.5991	0.7119	**0.8657**
131	0.5017	0.4986	0.7291	**0.7335**	0.6570	0.0000	0.5246	**0.6940**	**0.8535**
132	0.0000	0.0000	**0.7592**	0.6915	**0.5585**	0.0000	0.5069	0.5146	**0.7087**
133	0.0000	0.5071	**0.7316**	0.6951	0.5079	0.0000	0.5293	**0.5534**	0.5118
134	0.0000	0.0000	0.7646	**0.7243**	**0.7571**	0.5076	0.6904	0.6686	**0.8983**
135	0.0000	0.5020	**0.7552**	0.6919	**0.5364**	0.0000	**0.5173**	0.5122	0.5077
136	0.0000	0.0000	**0.6868**	**0.7381**	0.6696	0.0000	0.5822	**0.6687**	**0.8631**
137	0.0000	0.4937	0.6921	0.6939	**0.6434**	0.0000	0.5326	0.6418	**0.8520**
138	0.0000	0.5031	**0.6950**	0.6640	0.5115	0.0000	0.5154	**0.5421**	**0.5977**
139	0.0000	0.0000	**0.7138**	**0.7321**	0.7548	0.0000	0.7151	**0.6968**	**0.8936**
140	0.0000	**0.9472**	**0.6361**	**0.7379**	0.8573	0.0000	0.8352	0.8407	**0.9445**
141	0.0000	0.0000	0.7119	**0.6497**	**0.7988**	0.5013	0.7159	0.8069	**0.9012**
142	0.0000	0.0000	**0.6654**	**0.7053**	0.7267	0.0000	0.6621	**0.6444**	**0.8967**
143	0.0000	0.4933	0.7085	**0.6614**	**0.7104**	0.5325	0.5272	0.5045	0.5019
144	0.0000	0.0000	**0.7510**	0.6603	**0.6819**	0.0000	0.5167	0.5175	0.5048
145	0.5078	0.4999	**0.7299**	**0.7609**	0.7449	**0.5764**	**0.7505**	0.7543	0.5031
146	0.5081	0.4994	**0.7708**	**0.7192**	0.6163	0.5602	0.5327	**0.6029**	0.0000
147	**0.5129**	0.5003	0.7338	**0.7404**	0.5850	**0.5526**	**0.7021**	0.6034	0.4980
148	0.5053	0.4982	**0.7471**	0.7357	0.6582	0.5275	0.6091	**0.6414**	**0.8743**
149	0.5018	0.4981	0.7754	**0.7051**	0.6470	0.5504	**0.7470**	0.7847	**0.8743**
150	0.4996	0.4959	**0.7147**	**0.7215**	**0.7909**	**0.5667**	0.4993	0.4990	0.4984
151	0.5583	0.5802	**0.7983**	**0.7490**	0.8056	**0.6295**	0.8521	**0.8510**	**0.8923**
152	0.4965	0.0000	**0.7237**	**0.7439**	**0.8343**	0.5198	**0.8537**	0.4996	0.4993
153	0.4947	0.0000	**0.7516**	**0.7017**	**0.8585**	0.5008	0.8743	0.8339	**0.9467**
154	0.5028	0.0000	**0.7345**	0.6921	**0.6205**	0.5268	0.5505	0.5302	0.4996
155	0.5033	0.0000	0.7443	0.7487	0.7798	0.5123	**0.7979**	0.5680	**0.8132**
156	0.4965	0.5862	**0.7695**	0.7427	**0.6475**	0.0000	0.5338	0.5309	**0.8459**
157	0.5018	0.0000	**0.7524**	**0.7018**	0.5027	0.0000	0.5043	**0.5122**	0.5140
158	0.4965	0.0000	**0.6943**	**0.7233**	**0.6333**	0.0000	0.5275	0.5727	0.5044
159	0.5021	0.0000	**0.7752**	0.7532	**0.5892**	0.0000	**0.5545**	0.5353	0.5091
160	0.4964	0.6754	**0.6856**	**0.7534**	**0.6245**	0.0000	0.6817	0.5898	**0.8470**
161	**0.4889**	0.0000	**0.8023**	**0.7421**	**0.8088**	**0.6844**	0.7410	0.7461	0.5013
162	0.5134	0.0000	0.7580	**0.7885**	0.5274	**0.7785**	**0.7516**	**0.6545**	0.0000
163	0.0000	0.0000	**0.7291**	**0.7220**	**0.7607**	**0.7273**	**0.7436**	**0.7497**	0.5007
164	0.0000	0.0000	**0.7221**	0.7245	**0.6372**	0.6079	0.4981	0.5133	**0.8511**
165	0.0000	0.0000	**0.7254**	**0.7592**	0.5514	0.7067	0.4982	0.4984	0.4979
166	0.0000	0.0000	**0.7368**	0.7255	0.5975	**0.7380**	0.5013	**0.7509**	**0.8050**
167	0.5104	0.5069	**0.7346**	**0.6874**	**0.8957**	0.4990	0.8040	0.8528	**0.9355**
168	0.5094	0.5046	**0.7202**	**0.6879**	0.8568	**0.5714**	0.8053	**0.8353**	**0.9390**
169	0.5023	0.4994	**0.7191**	**0.6910**	0.9261	**0.5747**	0.8989	**0.9095**	**0.9643**
170	0.5045	0.5011	**0.7212**	**0.6968**	0.5943	**0.5171**	0.5446	**0.6675**	0.5009
171	0.4994	0.4951	**0.6961**	**0.6886**	0.9009	**0.5129**	0.8990	**0.9079**	**0.9674**
172	0.4953	0.4922	**0.7210**	**0.6934**	0.9491	**0.9912**	0.9232	0.9506	**0.9728**
173	0.5360	0.5009	0.6568	**0.6648**	0.5197	**0.5009**	0.5094	0.5170	**0.7056**
174	0.5404	0.5014	**0.7233**	0.6928	**0.6572**	0.5060	**0.6717**	0.5042	**0.6915**
175	0.5467	0.4992	0.7003	**0.7199**	**0.6239**	**0.5587**	0.5580	0.5459	0.5089
176	0.5273	**0.4996**	0.6950	0.7285	0.5828	0.5157	0.5138	0.5078	**0.7688**
177	0.5392	**0.5089**	0.6780	**0.7011**	0.5074	0.5106	**0.6493**	0.5133	0.5001
178	0.0000	0.0000	**0.7006**	**0.6913**	0.8023	**0.6103**	0.8342	**0.8387**	0.5014
179	0.4975	0.0000	**0.7169**	**0.6995**	0.8377	**0.6100**	0.8407	**0.8437**	0.0000
180	0.5343	0.4990	**0.7083**	0.6946	**0.8188**	0.6112	0.4983	0.7100	0.0000
181	0.5058	0.4949	**0.7192**	**0.7173**	0.8532	0.5640	0.8257	**0.8468**	**0.9449**
182	0.4971	0.0000	**0.7251**	**0.6672**	**0.8858**	**0.6374**	0.8370	0.8394	**0.9502**
183	0.0000	0.0000	**0.6746**	**0.7055**	**0.8643**	**0.6375**	0.8579	0.8509	**0.9506**
184	0.0000	0.4963	**0.7194**	**0.7163**	0.9582	**0.5954**	0.9504	**0.9579**	**0.9810**
185	0.0000	0.0000	**0.7325**	0.7119	**0.5094**	0.5006	**0.5514**	0.5346	0.4977
186	0.0000	0.0000	**0.7222**	0.6997	**0.7573**	0.0000	0.5103	0.4995	**0.8883**
187	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
188	**0.0000**	**0.5003**	**0.7201**	**0.6957**	**0.4986**	**0.5018**	**0.4976**	**0.4976**	**0.5063**
189	0.0000	0.5003	**0.7271**	0.7058	**0.5007**	0.5008	0.4977	0.4977	0.5151
190	**0.0000**	**0.0000**	**0.7282**	**0.7245**	**0.4986**	**0.5012**	**0.4981**	**0.4980**	**0.5085**
191	0.0000	0.5000	0.7167	0.7160	0.7064	**0.5144**	**0.8367**	0.8368	**0.8514**
192	0.0000	0.0000	**0.6892**	**0.7222**	0.7408	**0.8149**	0.7762	**0.8060**	**0.8543**
193	0.5115	0.5062	**0.6966**	**0.6988**	**0.7869**	**0.6452**	0.7562	0.7580	0.0000
194	0.4983	0.4981	**0.7185**	**0.7476**	0.7735	**0.5096**	**0.8226**	**0.8153**	0.4995
195	**0.5012**	0.0000	**0.6979**	**0.7197**	0.8488	**0.6610**	0.8856	0.8667	**0.9453**
196	0.4971	0.4967	**0.7055**	**0.7260**	**0.8836**	**0.6425**	0.8259	0.8349	0.0000
197	0.0000	0.0000	**0.7360**	0.7335	0.5717	0.5125	**0.6626**	0.6012	0.4985
198	0.0000	0.0000	**0.7129**	**0.7144**	**0.9455**	0.5108	0.9391	0.9489	**0.9727**
199	0.0000	0.0000	**0.7192**	**0.6816**	**0.8720**	0.5071	0.5038	0.8258	0.4972
200	0.0000	0.0000	**0.7181**	0.7011	0.5042	0.5020	**0.5400**	**0.5210**	0.5076
201	0.0000	0.0000	**0.7296**	0.6955	0.5002	0.0000	**0.6297**	0.5052	0.5113
202	0.0000	0.0000	**0.7247**	0.6526	0.5163	0.0000	**0.5610**	0.5174	**0.5028**
203	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
204	0.0000	0.0000	0.6794	**0.6900**	**0.5602**	0.0000	**0.8601**	0.5621	0.5044
205	0.0000	0.0000	0.7233	**0.6587**	0.5675	0.0000	0.5126	**0.5473**	**0.8390**
206	0.0000	0.0000	0.7491	**0.7226**	0.5698	0.0000	**0.6978**	0.5309	**0.7941**
207	0.5235	0.5156	0.7312	**0.7430**	**0.6167**	**0.5509**	0.7107	0.5309	**0.7936**
208	0.0000	0.0000	0.8081	0.7011	**0.6714**	**0.9288**	0.6353	0.5448	**0.7883**
209	0.0000	0.0000	**0.6995**	**0.6964**	0.8935	**0.5954**	**0.9260**	**0.9262**	0.5009
210	0.5017	0.4997	0.7144	**0.7043**	0.5564	0.5180	0.5342	**0.6116**	**0.8438**
211	0.5020	0.4997	**0.7077**	**0.7049**	**0.6340**	**0.5128**	0.5465	0.6015	0.5014
212	**0.5040**	0.0000	**0.7052**	**0.6935**	0.5070	0.5297	0.5027	0.5041	0.0000
213	0.4994	0.0000	**0.7248**	**0.7226**	0.8745	**0.5332**	0.9004	**0.8971**	**0.9542**
214	0.0000	0.0000	**0.7166**	**0.6879**	0.9029	**0.5318**	**0.9017**	0.8950	**0.9673**
215	0.5040	0.0000	**0.7266**	**0.7380**	0.8969	**0.5332**	**0.8964**	0.8943	**0.9666**
216	0.4999	0.0000	**0.7158**	**0.7315**	**0.9296**	**0.5354**	0.8951	0.8943	**0.9667**
217	0.0000	0.0000	**0.7137**	**0.6899**	0.8996	0.5313	0.8943	**0.8943**	**0.9669**
218	0.4989	0.0000	**0.7194**	**0.7222**	**0.9269**	**0.5327**	0.8943	0.8943	**0.9667**
219	0.4998	0.0000	0.7244	**0.7281**	**0.8478**	**0.5335**	**0.7932**	0.7689	0.4976
220	0.4993	0.5041	**0.7279**	**0.7232**	**0.9321**	**0.5344**	0.8996	0.9078	**0.9676**
221	0.5028	0.0000	**0.7329**	**0.7294**	**0.9501**	**0.5314**	0.9407	0.9407	**0.9811**
222	0.0000	0.0000	**0.7337**	**0.7220**	**0.9131**	**0.8685**	**0.9150**	0.8884	**0.9581**
223	0.5385	0.5054	**0.7508**	**0.7522**	**0.8794**	0.8711	0.8650	0.8655	**0.9585**
224	0.0000	0.0000	**0.7415**	**0.7234**	0.8931	**0.8480**	0.9043	**0.9173**	**0.9228**
225	0.5308	0.5037	**0.7544**	**0.7268**	**0.8159**	**0.8810**	0.8849	**0.8760**	**0.9344**
226	0.5001	0.0000	**0.6888**	**0.7125**	0.8718	**0.8485**	**0.9103**	**0.9052**	**0.9359**
227	0.4998	0.0000	**0.7312**	**0.7271**	0.5226	0.7153	0.5024	**0.5300**	0.4978
228	0.5007	0.0000	**0.7220**	0.7212	0.5443	**0.6669**	0.4980	**0.5521**	0.5049
229	**0.5145**	0.0000	**0.7327**	0.7221	0.5028	0.7295	0.4984	**0.5295**	0.0000
230	0.5056	0.5011	**0.7460**	**0.7295**	0.6216	**0.7136**	0.7417	**0.7445**	0.5007
231	0.0000	0.0000	**0.7274**	**0.7458**	**0.8334**	0.7644	0.5007	**0.7694**	**0.9285**
232	0.0000	0.0000	**0.7261**	**0.7415**	**0.8473**	**0.7590**	0.7660	0.7663	0.0000
233	0.5026	0.0000	**0.7544**	0.7539	**0.5085**	**0.8085**	0.5155	**0.5288**	0.5050
234	0.5087	0.0000	**0.7144**	0.7050	0.5033	**0.8019**	0.4980	**0.5033**	0.5081
235	0.5005	0.0000	0.7356	0.7338	**0.5105**	**0.7884**	**0.5639**	0.5405	0.5083
236	**0.5006**	0.0000	0.7559	0.7132	0.5618	**0.7953**	0.5142	0.5026	**0.7400**
237	0.4956	0.0000	**0.7198**	**0.7323**	**0.9515**	**0.7958**	0.9353	**0.9453**	**0.9727**
238	0.5008	0.0000	**0.7641**	**0.7097**	0.7668	**0.7640**	0.8482	**0.8675**	**0.9023**
239	0.0000	0.0000	**0.7302**	0.6997	0.5132	0.5175	0.5823	**0.6470**	**0.5023**
240	0.0000	0.0000	**0.7245**	**0.6983**	**0.7052**	0.5175	0.5630	0.5544	0.5019
241	0.0000	0.0000	**0.7149**	**0.6952**	**0.9582**	**0.5161**	**0.9563**	0.9564	**0.9863**
242	0.5007	0.4999	**0.7245**	**0.7267**	0.8224	0.5106	**0.7845**	0.7952	**0.9278**
243	0.5013	0.5006	**0.7299**	**0.7148**	0.5368	0.5147	**0.5473**	0.6216	**0.7626**
244	0.4997	0.4999	**0.7258**	**0.7157**	0.7669	0.5455	**0.7635**	0.7777	**0.9279**
245	0.4996	0.4999	**0.7250**	**0.7122**	0.8249	**0.5456**	**0.8317**	0.8703	**0.9309**
246	0.5020	**0.5021**	**0.7241**	**0.7174**	0.8265	**0.5813**	0.8190	**0.8777**	**0.9305**
247	0.5136	0.5005	0.7321	0.7143	0.6542	0.5760	0.4978	**0.5816**	**0.8236**
248	0.0000	0.0000	**0.6372**	**0.7144**	0.5062	0.5024	**0.5043**	0.5049	0.5118
249	0.0000	0.0000	**0.6983**	**0.7041**	**0.5773**	0.0000	0.5036	0.5055	0.5091
250	0.0000	0.0000	0.6692	**0.6893**	**0.5092**	0.0000	0.5031	**0.5103**	0.5108

TABLE XIX
THE TEST RANGE-AUC-PR OF TIME SERIES ANOMALY DETECTION IN UCR 250 SUB-DATASETS. THE BEST RESULTS ARE IN **BOLD**.

UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector	UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector
1	0.0278	0.0259	**0.8135**	**0.8001**	0.6994	**0.7010**	0.7387	**0.7450**	**0.8485**	126	0.0000	0.0000	0.4779	**0.7780**	0.4152	**0.5666**	0.0052	**0.4328**	**0.6184**
2	0.0277	0.0258	**0.8151**	**0.8173**	0.5120	0.2433	0.0068	0.0329	**0.7367**	127	0.0194	0.0141	**0.8026**	0.2723	0.0183	0.0000	0.0159	0.0257	**0.0453**
3	0.0276	0.0258	**0.8236**	**0.8207**	0.5215	**0.7002**	**0.5890**	0.5385	**0.7385**	128	0.0194	0.0141	**0.6531**	**0.5518**	0.6670	0.0000	0.6232	**0.7212**	**0.8582**
4	0.0085	0.0057	0.3549	**0.8241**	0.6422	**0.5817**	0.7129	0.6560	**0.8320**	129	0.0194	0.0141	0.3065	**0.7143**	**0.2692**	0.0000	0.1314	0.2905	**0.5724**
5	0.0000	0.0000	**0.7399**	**0.8024**	0.0170	0.0343	**0.0395**	**0.0142**	0.0135	130	0.0230	0.0123	0.5119	**0.7987**	**0.4559**	0.0000	0.3388	0.5457	**0.7514**
6	0.0000	0.0000	**0.8217**	**0.8731**	0.0369	0.0796	0.0255	0.0478	0.0695	131	0.0194	0.0140	0.3263	**0.6173**	0.4608	0.0000	0.1243	**0.5239**	**0.7560**
7	0.0000	0.0000	0.7758	**0.9031**	0.0942	**0.0218**	0.0869	0.0375	0.0818	132	0.0000	0.0000	**0.7774**	0.6899	**0.2128**	0.0000	0.0320	0.0653	**0.5743**
8	0.0107	0.0000	0.2626	**0.8759**	0.1723	**0.6203**	**0.6325**	0.2600	0.0590	133	0.0000	0.0276	**0.8093**	0.7389	0.0349	0.0000	0.1130	**0.1896**	0.0620
9	**0.0210**	0.0000	**0.5495**	0.3002	0.1336	0.0731	0.1427	0.0970	**0.6618**	134	0.0000	0.0000	0.5721	**0.5544**	**0.6699**	0.0438	0.5843	0.5442	**0.8403**
10	0.0302	0.0000	**0.8153**	**0.8436**	0.0516	**0.0217**	**0.6083**	0.2708	**0.6225**	135	0.0000	0.0076	**0.8190**	0.5579	**0.1018**	0.0000	**0.0534**	0.0393	0.0260
11	0.0583	0.0086	**0.8559**	**0.8097**	0.7123	**0.9450**	**0.7459**	0.7430	**0.8329**	136	0.0000	0.0000	**0.6774**	**0.6873**	0.5080	0.0000	0.3307	**0.5079**	**0.7832**
12	0.0700	0.0115	**0.7828**	**0.8257**	0.5218	**0.9190**	0.4958	**0.4867**	**0.6634**	137	0.0000	0.0092	0.2937	0.4101	**0.4727**	0.0000	0.1824	0.4712	**0.7799**
13	0.0000	0.0000	**0.7907**	**0.7755**	0.3112	0.2579	0.0072	**0.1064**	**0.6546**	138	0.0000	0.0105	**0.7710**	0.6507	0.0416	0.0000	0.0550	**0.1376**	**0.2857**
14	0.0000	0.0000	**0.7673**	**0.8362**	**0.3163**	**0.7625**	0.0050	0.0770	**0.6180**	139	0.0000	0.0000	**0.5939**	**0.7189**	0.6799	0.0000	0.6285	**0.6034**	**0.8422**
15	0.0039	0.0147	**0.8079**	**0.8059**	0.4133	0.0151	**0.5261**	0.4846	0.0010	140	0.0000	**0.9506**	**0.3790**	**0.7618**	0.8232	0.0000	0.8001	0.8121	**0.9109**
16	0.0000	0.0000	**0.6460**	**0.7322**	**0.6039**	**0.4923**	0.5165	0.5201	0.0064	141	0.0000	0.0000	0.3818	**0.6067**	**0.7638**	0.0529	0.6652	0.7750	**0.8810**
17	0.0000	0.0000	**0.6413**	**0.6153**	0.4472	**0.5763**	0.4331	**0.4389**	**0.5730**	142	0.0000	0.0000	**0.7003**	**0.5994**	0.6186	0.0000	0.5264	**0.4919**	**0.8221**
18	0.0000	0.0000	**0.6175**	**0.7324**	0.0791	**0.5621**	0.0050	**0.4278**	**0.6362**	143	0.0000	0.0088	0.4980	**0.7446**	**0.5946**	0.0825	0.1688	0.0358	0.0202
19	0.0130	0.0141	0.6659	**0.7759**	0.0596	0.0000	0.1038	0.0258	**0.0293**	144	0.0000	0.0000	**0.6963**	0.2636	**0.5759**	0.0000	0.1204	0.1261	0.0261
20	0.0419	0.0000	**0.7055**	**0.8153**	0.7025	0.0466	0.6263	**0.7180**	**0.8643**	145	0.0176	0.0017	**0.7779**	**0.8057**	0.3860	**0.5948**	**0.3973**	0.4083	0.0115
21	0.0000	0.0069	0.3444	0.5216	**0.1391**	0.0123	0.1085	0.2371	**0.5595**	146	0.0189	0.0017	**0.8334**	**0.7827**	0.2115	0.1112	0.0669	**0.1910**	0.0000
22	0.0235	**0.0062**	**0.5092**	**0.6765**	0.5545	0.0000	0.4153	0.5278	**0.7539**	147	**0.5235**	0.0017	0.7796	**0.8241**	0.1375	**0.5962**	**0.3090**	0.1655	0.0026
23	0.0125	0.0000	**0.6049**	**0.8157**	0.4633	0.0000	0.1995	**0.5319**	**0.7685**	148	0.0161	0.0018	**0.5929**	0.4537	0.3253	0.0579	0.2379	**0.2975**	**0.6475**
24	0.0105	0.0149	**0.8218**	0.7446	**0.3375**	0.0000	0.0245	0.0526	0.0773	149	0.0095	0.0019	0.4007	**0.4618**	0.3110	0.0977	**0.4732**	0.5294	**0.6442**
25	0.0309	**0.0140**	**0.7891**	0.6206	0.0251	0.0310	0.1452	0.1686	0.0618	150	0.0095	0.0019	**0.5081**	**0.5956**	**0.5893**	**0.1279**	0.0097	0.0086	0.0070
26	0.0152	0.0157	**0.7641**	**0.5581**	**0.6273**	0.0306	**0.5789**	0.5397	0.1019	151	0.1167	0.1496	**0.8630**	**0.7377**	0.6464	**0.6451**	0.6700	**0.6631**	**0.7373**
27	0.4626	0.0428	**0.7661**	**0.3428**	**0.0275**	0.0000	0.0273	**0.0459**	**0.0534**	152	0.0094	0.0000	**0.6659**	**0.5048**	**0.6958**	0.0542	**0.7307**	0.0149	0.0110
28	0.0000	0.0091	**0.5813**	**0.7418**	0.6303	**0.8619**	0.3585	0.5413	**0.7952**	153	0.0124	0.0000	**0.7099**	**0.5700**	**0.7579**	0.0243	0.7928	0.7314	**0.8782**
29	0.0000	0.0104	**0.8135**	**0.7476**	**0.4764**	0.0430	0.1843	0.4433	**0.7697**	154	0.0111	0.0000	**0.8211**	0.4185	**0.2801**	0.0564	0.1410	0.0843	0.0061
30	0.0191	0.0000	**0.7201**	0.2208	0.0189	0.0000	0.0767	**0.1260**	**0.2586**	155	0.0129	0.0000	0.3343	0.4456	0.5593	0.0303	**0.6037**	0.1868	**0.6787**
31	0.0470	0.0221	**0.5488**	0.3956	0.7021	0.0480	0.5773	**0.5934**	**0.8447**	156	0.0055	0.3735	**0.8284**	0.6057	**0.4145**	0.0000	0.2067	0.1407	**0.7277**
32	0.0076	**0.6255**	**0.7515**	**0.4692**	0.8118	0.0000	**0.8287**	0.8131	**0.9216**	157	0.0055	0.0000	**0.7787**	**0.7421**	0.0126	0.0000	0.0173	**0.0371**	0.0429
33	0.0000	0.0000	**0.6443**	**0.8202**	**0.7652**	0.0000	0.6201	**0.7634**	**0.8551**	158	0.0055	0.0000	**0.6233**	**0.7368**	**0.4039**	0.0000	0.1757	0.2691	0.0333
34	0.0000	0.0000	**0.6326**	0.3477	0.5383	0.0000	0.5119	**0.4994**	**0.8094**	159	0.0055	0.0000	**0.8557**	0.3388	**0.1937**	0.0000	**0.1690**	0.0886	0.0295
35	0.0000	0.0000	**0.7900**	**0.8353**	**0.6380**	0.0086	0.3171	0.0345	**0.7630**	160	0.0055	0.5982	**0.5265**	**0.5719**	**0.3709**	0.0000	0.5538	0.3113	**0.7298**
36	0.0000	0.0193	0.3553	**0.7667**	**0.5083**	0.0000	0.1054	0.1185	0.0261	161	**0.0237**	0.0000	**0.7876**	**0.7161**	**0.7629**	**0.4797**	0.6690	0.6862	0.0329
37	0.0335	0.0052	**0.7661**	**0.8051**	0.3800	**0.5938**	**0.3975**	0.4078	**0.4202**	162	0.0418	0.0000	0.7315	**0.7283**	0.1416	**0.8041**	**0.6004**	**0.4693**	0.0000
38	0.0238	0.0000	**0.7987**	0.2734	**0.3273**	**0.5611**	0.0324	0.1366	0.0000	163	0.0000	0.0000	**0.7906**	**0.6853**	**0.4736**	**0.7422**	**0.4534**	**0.4637**	0.0106
39	0.0159	0.0017	**0.8205**	**0.7824**	0.1846	0.5067	**0.3103**	0.1651	0.0026	164	0.0000	0.0000	**0.6904**	0.3137	**0.2402**	0.1819	0.0029	0.0307	**0.5316**
40	0.0225	0.0036	**0.6340**	**0.5914**	**0.4562**	0.0602	0.2415	0.2894	**0.6475**	165	0.0000	0.0000	**0.7667**	**0.3451**	0.1003	0.3993	0.0030	0.0033	0.0029
41	0.0174	0.0019	**0.5862**	**0.5604**	0.2756	0.1441	**0.4495**	0.5300	**0.6313**	166	0.0000	0.0000	**0.7952**	0.3143	0.1692	**0.7775**	0.0082	**0.3992**	**0.4736**
42	0.0173	0.0038	0.4063	**0.4515**	0.5951	0.0264	0.0098	**0.5166**	**0.7602**	167	0.0311	0.0337	**0.7528**	**0.5424**	**0.6719**	0.0048	0.5450	0.6117	**0.7471**
43	0.1270	0.1386	**0.7775**	**0.8216**	0.5840	**0.6496**	0.6670	**0.6585**	**0.7302**	168	0.0291	0.0266	**0.7699**	**0.4801**	0.6324	**0.3014**	0.5525	**0.5943**	**0.7340**
44	**0.0087**	0.0000	**0.7108**	**0.6674**	0.6909	0.1131	**0.7336**	0.6664	0.0110	169	0.0223	0.0228	**0.6618**	**0.6961**	0.7984	**0.2585**	0.7588	**0.7714**	**0.8443**
45	0.0128	0.0000	**0.6687**	**0.7690**	0.7434	0.0271	0.7762	**0.7390**	**0.8687**	170	0.0126	0.0077	**0.7007**	**0.6764**	0.1568	**0.4952**	0.0778	**0.2618**	0.0073
46	0.0105	0.0000	**0.3146**	**0.7586**	0.2216	0.0624	**0.1175**	0.0787	0.0192	171	0.0148	0.0077	**0.6363**	**0.4465**	0.7629	**0.0891**	0.7548	**0.7648**	**0.8439**
47	0.0298	0.0000	**0.6587**	**0.7848**	**0.5638**	0.0525	**0.5926**	0.1874	0.0287	172	0.0120	0.0070	**0.6566**	**0.6688**	0.8513	**0.5539**	0.8144	0.8475	**0.8799**
48	0.0000	0.0000	**0.8569**	0.4472	**0.5392**	0.0000	0.1774	0.1623	**0.7137**	173	0.0730	0.0062	0.6541	**0.7497**	0.0664	**0.0062**	0.0354	0.0576	**0.4325**
49	0.0000	0.0000	0.7295	**0.7521**	0.0188	0.0000	0.0105	**0.0370**	0.0268	174	0.0806	0.0068	**0.7166**	**0.7410**	**0.3777**	0.0160	**0.4006**	0.0191	**0.4230**
50	**0.0058**	0.0000	**0.8244**	0.6333	0.1098	0.0000	0.1642	0.1927	**0.7288**	175	0.0975	0.0090	0.2954	**0.7953**	**0.3976**	**0.5344**	0.2178	0.1859	0.0508
51	0.0000	0.0000	0.3128	**0.3230**	**0.1911**	0.0000	0.1495	0.0874	**0.0280**	176	0.0588	**0.0050**	0.2868	0.3195	0.2291	0.0364	0.0509	0.0326	**0.5580**
52	0.0168	0.0110	**0.7756**	**0.8128**	0.3826	0.0000	**0.4698**	0.2736	**0.7199**	177	0.0749	**0.4106**	0.2645	**0.2887**	0.0217	0.0211	**0.3147**	0.0344	0.0067
53	0.0237	**0.0085**	0.3653	**0.9009**	0.7133	**0.5046**	0.0373	0.6856	**0.8681**	178	0.0000	0.0000	**0.7108**	**0.5903**	0.5270	**0.3856**	0.5759	**0.5800**	0.0114
54	0.0419	0.0000	0.7211	**0.7576**	0.3034	**0.7768**	**0.6081**	**0.4747**	0.0000	179	0.0013	0.0000	**0.7704**	**0.5231**	0.5986	**0.3808**	0.6267	**0.6169**	0.0000
55	0.0000	0.0000	**0.7019**	0.4269	0.3525	**0.7500**	**0.4543**	**0.4605**	0.0104	180	0.0704	0.0037	**0.5138**	0.2862	**0.5614**	0.1882	0.0050	0.3961	0.0000
56	0.0000	0.0000	**0.8273**	**0.5236**	0.1142	0.1830	0.0029	**0.0308**	**0.5383**	181	0.0261	0.0032	**0.6214**	**0.7188**	0.6778	0.1882	0.6330	**0.6663**	**0.8110**
57	0.0000	0.0000	**0.7701**	**0.6154**	0.1484	0.4204	0.0030	0.0033	0.0029	182	0.0068	0.0000	**0.4644**	**0.4471**	**0.7311**	**0.4343**	0.6629	0.6697	**0.8039**
58	0.0000	0.0000	**0.7168**	0.3056	0.4063	**0.8218**	0.0028	**0.3968**	**0.4754**	183	0.0000	0.0000	**0.5775**	**0.6051**	**0.7279**	**0.4369**	0.7178	0.7105	**0.8365**
59	0.0167	0.0060	**0.7317**	**0.6210**	0.5847	**0.2370**	0.5372	**0.6057**	0.0050	184	0.0000	0.0013	**0.5290**	**0.6398**	0.7680	**0.1727**	0.7644	**0.7664**	**0.8081**
60	0.0091	0.0076	**0.7324**	**0.6374**	**0.6283**	**0.2005**	0.5597	0.5940	**0.7569**	185	0.0000	0.0000	**0.8193**	0.2995	**0.0128**	0.0012	**0.0576**	0.0396	0.0003
61	0.0045	0.0059	**0.6464**	**0.5031**	0.7849	**0.0987**	0.7587	**0.7723**	**0.8490**	186	0.0000	0.0000	**0.8040**	0.2884	**0.3469**	0.0000	0.0191	0.0037	**0.5266**
62	0.0068	0.0102	**0.7826**	**0.6704**	0.2130	**0.2671**	0.0772	**0.2428**	0.0130	187	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
63	0.0101	0.0106	**0.6343**	**0.4304**	0.7902	0.0182	0.7552	**0.7732**	**0.8584**	188	**0.0000**	**0.0012**	**0.8076**	**0.7076**	**0.0013**	**0.0036**	**0.0003**	**0.0003**	**0.0093**
64	0.0075	**0.7106**	**0.7952**	**0.6465**	0.8280	**0.0826**	0.8120	0.8376	**0.8840**	189	0.0000	0.0013	**0.7443**	0.2935	**0.0035**	0.0017	0.0003	0.0003	0.0188
65	0.0309	0.0000	**0.7503**	0.2808	0.0412	**0.0062**	0.0394	0.0650	0.0268	190	**0.0000**	**0.0000**	**0.3153**	**0.6792**	**0.0013**	**0.0024**	**0.0003**	**0.0007**	**0.0119**
66	0.0622	0.0068	**0.7599**	**0.6146**	**0.2864**	0.0000	0.3186	0.0166	**0.4751**	191	0.0000	0.0012	0.3048	**0.5304**	0.2459	**0.3208**	**0.3968**	0.3965	**0.4167**
67	0.3942	0.0583	**0.8563**	0.6712	**0.5598**	0.0656	0.2983	0.1758	0.0211	192	0.0000	0.0000	**0.7060**	**0.7828**	0.4120	**0.7934**	0.4840	**0.5233**	**0.5520**
68	0.0768	0.0298	**0.5417**	**0.7060**	**0.2556**	0.0165	0.0464	0.0324	0.0202	193	0.0263	0.0159	**0.6863**	**0.5881**	**0.4769**	**0.6287**	0.4226	0.4351	0.0000
69	0.0319	**0.4084**	0.2316	**0.7681**	0.0134	0.0779	**0.2622**	0.0305	0.0355	194	0.0007	0.0004	**0.7113**	**0.7944**	0.4575	**0.2221**	**0.5331**	**0.5251**	0.0066
70	0.0000	0.0000	**0.8058**	**0.5993**	0.4968	**0.3892**	0.5721	**0.5814**	**0.6719**	195	**0.0110**	0.0000	**0.6477**	**0.7041**	0.6366	**0.5165**	0.6861	0.6617	**0.7518**
71	0.0013	0.0000	**0.6381**	**0.5082**	0.5888	**0.3808**	0.6249	**0.6169**	0.0000	196	0.0044	0.0035	**0.6950**	**0.6436**	**0.7068**	**0.4552**	0.6442	0.6557	0.0000
72	0.0743	0.0062	**0.4801**	**0.6123**	**0.4801**	0.1915	0.0051	**0.3955**	0.0000	197	0.0000	0.0000	**0.8119**	0.4650	0.1247	0.0270	**0.2617**	0.1533	0.0030
73	0.0165	0.0023	**0.5194**	**0.4572**	0.6576	**0.1802**	**0.6434**	0.6703	**0.8293**	198	0.0000	0.0000	**0.4999**	**0.6780**	**0.7715**	0.0317	0.7618	0.7693	**0.8051**
74	0.0068	0.0000	**0.5005**	**0.4481**	**0.7412**	**0.4303**	0.6635	0.6692	0.0112	199	0.0000	0.0000	**0.6994**	**0.7036**	**0.5712**	0.0183	0.0142	0.5095	0.0030
75	0.0000	0.0000	**0.4468**	**0.5933**	**0.7628**	**0.4369**	0.7144	0.7082	**0.8330**	200	0.0000	0.0000	**0.8056**	0.7887	0.0075	0.0040	**0.0461**	**0.0256**	0.0116
76	0.0011	0.0020	**0.5679**	**0.5289**	0.7556	**0.0525**	0.7596	**0.7601**	**0.7888**	201	0.0000	0.0000	**0.7934**	0.2833	0.0046	0.0000	**0.1757**	0.0112	0.0204
77	0.0004	0.0000	**0.8237**	0.2928	**0.0122**	0.0040	**0.0468**	0.0673	0.0179	202	0.0000	0.0000	**0.5994**	**0.6621**	0.0283	0.0000	**0.0953**	0.0309	**0.0107**
78	0.0018	0.0010	**0.5972**	**0.7784**	**0.3583**	0.0094	0.0128	0.0041	**0.5258**	203	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
79	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	204	0.0000	0.0000	0.3893	**0.7151**	**0.1098**	0.0000	**0.5618**	0.1165	0.0152
80	0.0023	0.0017	**0.8148**	0.6888	**0.0103**	0.0116	0.0003	0.0003	0.0105	205	0.0000	0.0000	0.5487	**0.6483**	0.1283	0.0000	0.0302	**0.0963**	**0.4936**
81	**0.0008**	**0.0005**	**0.3194**	**0.7456**	**0.0026**	**0.0083**	**0.0003**	**0.0005**	**0.0120**	206	0.0000	0.0000	0.6566	**0.7750**	0.1596	0.0000	**0.4643**	0.0812	**0.5090**
82	**0.0010**	**0.0000**	**0.8191**	**0.7758**	**0.0037**	**0.0028**	**0.0003**	**0.0024**	**0.0004**	207	0.0497	0.3888	0.6990	**0.8290**	**0.1817**	**0.5767**	0.3141	0.0533	**0.4161**
83	0.0016	0.0026	**0.5543**	0.3060	0.1460	0.0089	**0.3961**	**0.3971**	**0.0082**	208	0.0000	0.0000	0.5632	0.3079	**0.2621**	**0.9570**	0.2088	0.0750	**0.3746**
84	0.0000	0.0000	**0.7573**	**0.7919**	0.2147	**0.7949**	0.4855	**0.5236**	**0.5654**	209	0.0000	0.0000	**0.6088**	**0.5988**	0.6129	**0.3659**	**0.6593**	**0.6642**	0.0084
85	0.0330	0.0159	**0.7157**	**0.6478**	0.4302	**0.5239**	0.4081	**0.4354**	0.0000	210	0.0049	0.0005	0.4094	**0.5682**	0.0791	0.0364	0.0498	**0.1511**	**0.4427**
86	0.0000	0.0004	0.3214	**0.6848**	0.4746	**0.2550**	**0.5241**	0.5238	0.0095	211	0.0055	0.0005	**0.6991**	**0.7175**	**0.1810**	**0.4660**	0.0668	0.1392	0.0061
87	**0.0130**	0.0000	**0.7524**	**0.6643**	0.6294	**0.5165**	0.6867	0.6545	**0.7558**	212	**0.0094**	0.0000	**0.2937**	**0.7809**	0.0166	0.0578	0.0094	0.0118	0.0000
88	0.0046	0.0035	**0.4709**	**0.5943**	**0.6663**	**0.4573**	0.6440	0.6583	0.0000	213	0.0005	0.0000	**0.6622**	**0.4246**	0.4884	**0.1766**	0.5189	**0.5149**	**0.5858**
89	0.0000	0.0000	0.4824	**0.7009**	0.1269	0.0092	**0.2682**	0.1329	0.0030	214	0.0000	0.0000	**0.7384**	**0.5997**	0.5520	**0.1467**	**0.5538**	0.5455	**0.6398**
90	0.0000	0.0012	**0.7178**	**0.5683**	0.7732	0.0209	**0.7638**	0.7775	**0.8158**	215	0.0108	0.0000	**0.7374**	**0.7814**	0.5505	**0.1492**	**0.5467**	0.5438	**0.6329**
91	0.0000	0.0000	0.3520	**0.7563**	**0.5705**	0.0133	0.5213	0.5139	0.0051	216	0.0023	0.0000	**0.7381**	**0.6992**	**0.5906**	**0.1580**	0.5475	0.5451	**0.6370**
92	0.0000	0.0009	**0.8043**	0.2860	**0.0125**	0.0040	**0.0448**	0.0259	0.0122	217	0.0000	0.0000	**0.5808**	**0.5934**	0.5500	0.0625	0.5455	**0.5459**	**0.6427**
93	0.0280	0.0260	**0.7017**	**0.4327**	0.7556	**0.2647**	0.7718	**0.7450**	**0.8442**	218	0.0004	0.0000	**0.5873**	**0.5222**	**0.5890**	**0.1531**	0.5470	0.5466	**0.6341**
94	0.0428	0.0190	**0.7895**	**0.6066**	0.6740	**0.2239**	0.7195	**0.6456**	**0.8269**	219	0.0004	0.0000	0.3188	**0.7360**	**0.4153**	**0.3427**	**0.3504**	0.3220	0.0006
95	0.0341	0.0000	0.5363	**0.7483**	0.1221	**0.6368**	**0.6447**	0.2669	**0.6681**	220	0.0011	0.0110	**0.5087**	**0.6907**	**0.5970**	**0.2172**	0.5555	0.5638	**0.6286**
96	0.0000	0.0000	**0.6465**	**0.6951**	**0.6383**	**0.4942**	0.5139	0.5220	**0.7220**	221	0.0107	0.0000	**0.6750**	**0.6448**	**0.6937**	**0.1535**	0.6780	0.6773	**0.7251**
97	0.0272	0.0198	0.5832	**0.8311**	0.2303	0.0929	**0.1360**	0.2657	0.0297	222	0.0000	0.0000	**0.4295**	**0.4801**	**0.5905**	**0.5500**	**0.5797**	0.5562	**0.6010**
98	0.0283	0.0466	**0.3514**	**0.6940**	**0.0557**	0.0000	0.0618	0.0419	0.0279	223	0.0795	0.0159	**0.5759**	**0.4588**	**0.5892**	0.4296	0.5437	0.5566	**0.6531**
99	0.0140	0.0000	**0.6611**	**0.6710**	0.6023	**0.3691**	0.5320	**0.4982**	0.0692	224	0.0000	0.0000	**0.6552**	**0.6152**	0.6031	**0.8802**	0.5943	**0.6297**	**0.5035**
100	0.0266	0.0052	**0.8181**	**0.8041**	0.3888	**0.6178**	**0.3964**	**0.4074**	0.0030	225	0.0623	0.0101	**0.6461**	**0.7484**	**0.4727**	**0.8531**	0.5204	**0.5141**	**0.5765**
101	0.0144	0.0036	**0.4444**	0.3209	**0.4348**	0.0964	0.2457	**0.1234**	0.0048	226	0.0035	0.0000	**0.7049**	**0.5903**	0.5640	**0.8035**	**0.6493**	**0.6367**	**0.6710**
102	0.1216	0.1542	**0.5044**	**0.7705**	0.6469	**0.6460**	**0.6663**	**0.6565**	0.0096	227	0.0018	0.0000	**0.3192**	**0.6906**	0.0414	0.3039	0.0090	**0.0538**	0.0021
103	0.0000	0.0000	**0.8252**	0.4425	0.1097	0.0000	**0.5261**	0.2812	0.0497	228	0.0018	0.0000	**0.3096**	**0.7483**	0.0600	**0.7029**	0.0012	**0.0703**	0.0102
104	0.0000	0.0000	**0.6825**	**0.7155**	0.1003	0.4341	0.0030	0.0033	**0.5360**	229	**0.5285**	0.0000	**0.7788**	0.7716	0.0072	**0.8161**	0.0017	**0.0403**	0.0000
105	0.0690	0.0157	**0.6361**	**0.4880**	**0.7821**	**0.2108**	0.7520	0.7720	**0.8496**	230	0.0141	0.0050	**0.7850**	**0.6666**	0.2056	**0.6656**	0.3731	**0.3794**	0.0070
106	0.0583	0.0100	**0.4705**	**0.6414**	0.7786	**0.2237**	0.7527	**0.7618**	**0.8522**	231	0.0000	0.0000	**0.5107**	**0.5422**	**0.5628**	0.3789	0.0094	**0.4765**	**0.6463**
107	0.0762	0.0180	**0.4623**	**0.5970**	**0.2703**	**0.0491**	0.1083	0.1630	0.0211	232	0.0000	0.0000	**0.5421**	**0.6799**	**0.5851**	**0.5656**	0.4781	0.4724	0.0000
108	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	233	0.0053	0.0000	**0.8388**	0.8284	**0.0126**	**0.3826**	0.0205	**0.0352**	0.0101
109	0.0276	0.0260	**0.4579**	**0.5782**	0.7561	**0.2665**	0.7589	**0.7453**	**0.8508**	234	0.0174	0.0000	**0.8019**	0.6600	0.0067	**0.8726**	0.0009	**0.0066**	0.0122
110	0.0275	0.0258	**0.6221**	**0.7413**	0.0312	0.2475	0.0085	0.5459	**0.7330**	235	0.0011	0.0000	0.3221	**0.6843**	**0.0147**	**0.3669**	**0.0740**	0.0479	0.0126
111	0.0275	0.0259	**0.5985**	**0.6513**	0.5699	**0.3588**	**0.6620**	0.5392	**0.7415**	236	**0.0017**	0.0000	0.3405	0.7338	0.0786	**0.8057**	0.0209	0.0067	**0.2936**
112	0.0251	0.2241	**0.7203**	**0.4818**	0.6575	**0.2125**	0.7187	**0.6889**	**0.8337**	237	0.0017	0.0000	**0.5723**	**0.6253**	**0.7921**	**0.6389**	0.7680	**0.7805**	**0.8020**
113	0.0104	0.0000	0.7947	**0.7949**	0.0326	0.0238	**0.1467**	0.0146	0.0135	238	0.0039	0.0000	**0.6429**	**0.7282**	0.3917	**0.5556**	0.4899	**0.5163**	**0.5829**
114	**0.0104**	0.0000	**0.8486**	0.3259	0.0437	0.0795	0.1767	0.0473	**0.4702**	239	0.0000	0.0000	**0.5868**	0.2875	0.0163	0.0346	0.0875	**0.1542**	**0.0048**
115	**0.0104**	0.0000	**0.8253**	0.3156	0.0572	0.0659	0.1855	0.0370	0.0532	240	0.0000	0.0000	**0.3119**	**0.4816**	**0.2179**	0.0346	0.0684	0.0595	0.0038
116	0.0104	0.0000	**0.8319**	**0.7668**	0.1188	**0.5810**	**0.6463**	0.2884	0.0515	241	0.0000	0.0000	**0.5975**	**0.5374**	**0.7922**	**0.0645**	**0.6232**	0.6253	**0.7260**
117	0.0104	0.0000	0.6263	**0.6905**	0.1588	0.1881	**0.5256**	0.1049	**0.6618**	242	0.0030	0.0026	**0.7417**	**0.7701**	0.4130	0.0224	**0.3747**	0.3845	**0.5717**
118	**0.0104**	0.0000	0.4933	**0.6270**	0.0263	0.0556	0.6653	0.2770	**0.6747**	243	0.0031	0.0031	**0.7785**	**0.8024**	0.0444	0.0293	**0.0565**	0.1397	**0.2960**
119	0.0672	0.0000	**0.7110**	**0.6595**	0.7382	**0.8580**	**0.7410**	0.7402	**0.8234**	244	0.0007	0.0026	**0.6083**	**0.4696**	0.3422	0.0856	**0.3420**	0.3569	**0.5202**
120	0.0874	0.0115	**0.8259**	0.4332	0.4982	**0.8909**	**0.5014**	0.4896	**0.6817**	245	0.0007	0.0026	**0.7328**	**0.6763**	0.4141	**0.5017**	**0.4295**	0.4737	**0.5233**
121	0.0000	0.0000	**0.7976**	**0.7308**	**0.5070**	0.2579	0.0074	0.1149	**0.6079**	246	0.0057	**0.7302**	**0.6869**	**0.7149**	0.4123	**0.5583**	0.3957	**0.4725**	**0.5318**
122	0.0000	0.0000	**0.7892**	0.3257	**0.1757**	0.2583	0.0052	0.0772	**0.6111**	247	0.0294	0.0105	**0.5386**	0.3023	0.1815	0.1343	0.0006	**0.0984**	**0.3730**
123	0.0064	0.0819	**0.6387**	**0.6003**	**0.4809**	**0.2006**	0.4657	**0.5155**	0.0045	248	0.0000	0.0000	**0.2179**	**0.8021**	0.0204	0.0057	**0.0244**	0.0177	0.0469
124	0.0000	0.0000	**0.7475**	**0.4898**	0.5683	**0.4942**	**0.5151**	0.5216	**0.7229**	249	0.0000	0.0000	**0.7602**	**0.6202**	**0.2093**	0.0000	0.0207	0.0237	0.0511
125	0.0000	0.0000	**0.7934**	**0.6369**	0.5433	**0.5841**	0.4318	**0.4403**	**0.5787**	250	0.0000	0.0000	0.4967	**0.7598**	**0.0264**	0.0000	0.0111	**0.0311**	0.0589

TABLE XX

THE TEST V_ROC OF TIME SERIES ANOMALY DETECTION IN UCR 250 SUB-DATASETS. THE BEST RESULTS ARE IN **BOLD**.

UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector
1	0.5062	0.5054	**0.7106**	**0.7015**	0.8519	**0.6337**	0.6990	**0.7163**	**0.9673**
2	0.5099	0.5090	**0.7120**	**0.7173**	0.7759	0.6258	0.4983	0.5045	**0.9382**
3	0.5099	0.5090	**0.7196**	**0.7171**	0.7835	**0.6350**	**0.7088**	0.6754	**0.9379**
4	0.4923	0.4907	0.7306	**0.7185**	0.6616	**0.5459**	0.7331	0.7192	**0.9150**
5	0.0000	0.0000	**0.6794**	**0.7043**	0.5028	0.5175	**0.5095**	**0.5023**	0.5077
6	0.0000	0.0000	**0.7154**	**0.7601**	0.5059	0.5384	0.5038	0.5075	0.5137
7	0.0000	0.0000	0.7258	**0.7877**	0.5166	**0.5071**	0.5124	0.5053	0.5161
8	0.4993	0.0000	0.6591	**0.7769**	0.5303	**0.5675**	**0.7161**	0.5452	0.5115
9	**0.5046**	0.0000	**0.7624**	0.6905	0.5191	0.5325	0.5163	0.5133	**0.7904**
10	0.5088	0.0000	**0.7180**	**0.7368**	0.5068	**0.5042**	**0.6872**	0.5495	**0.7898**
11	0.5228	0.4967	**0.7499**	**0.7019**	0.7452	**0.8207**	**0.7388**	0.7232	**0.9392**
12	0.5242	0.5024	**0.6829**	**0.7222**	0.6730	**0.7981**	0.6872	**0.6655**	**0.8617**
13	0.0000	0.0000	**0.6921**	**0.6802**	0.5973	0.6882	0.4993	**0.5201**	**0.8631**
14	0.0000	0.0000	**0.6755**	**0.7389**	**0.6304**	**0.6968**	0.4986	0.5172	**0.8606**
15	0.5009	0.5028	**0.7070**	**0.7078**	0.7783	0.5067	**0.8431**	0.8112	0.4980
16	0.0000	0.0000	**0.7325**	**0.7274**	**0.7484**	**0.6934**	0.6632	0.6505	0.4980
17	0.0000	0.0000	**0.7069**	**0.7289**	0.7160	**0.6907**	0.6651	**0.6675**	**0.8633**
18	0.0000	0.0000	**0.6996**	**0.7368**	0.5197	**0.6948**	0.4987	**0.6672**	**0.8613**
19	0.5030	0.5030	0.6944	**0.7020**	0.5101	0.0000	0.5162	0.5029	**0.5054**
20	0.5044	0.0000	**0.6809**	**0.7247**	0.6819	0.5084	0.6146	**0.6951**	**0.9200**
21	0.0000	0.4998	0.7347	0.7158	**0.5318**	0.5029	0.5207	0.5685	**0.7837**
22	0.5038	**0.4952**	**0.6791**	**0.6899**	0.6580	0.0000	0.5959	0.6363	**0.8757**
23	0.4986	0.0000	**0.6872**	**0.7106**	0.6279	0.0000	0.5280	**0.6818**	**0.8676**
24	0.5011	0.5022	**0.7229**	0.6864	**0.5893**	0.0000	0.5033	0.5073	0.5139
25	0.5108	**0.5017**	**0.7096**	0.6799	0.5035	0.5125	0.5334	0.5364	0.5119
26	0.4927	0.4927	**0.6947**	**0.6968**	**0.6599**	0.5008	**0.6065**	0.5861	0.5079
27	0.5184	0.5163	**0.7089**	**0.7390**	**0.5056**	0.0000	0.5043	**0.5095**	**0.5133**
28	0.0000	0.4941	**0.6898**	**0.6806**	0.7110	**0.9964**	0.5605	0.6185	**0.8750**
29	0.0000	0.4942	**0.7153**	**0.6790**	**0.6105**	0.5122	0.5193	0.5752	**0.8650**
30	0.5078	0.0000	**0.7235**	0.6321	0.5028	0.0000	0.5145	**0.5334**	**0.6375**
31	0.5052	0.4908	**0.6916**	0.6830	0.7099	0.5070	0.6102	**0.6055**	**0.9004**
32	0.4748	**0.5857**	**0.7272**	**0.6250**	0.7356	0.0000	**0.7583**	0.7117	**0.9482**
33	0.0000	0.0000	**0.6813**	**0.7321**	**0.7335**	0.0000	0.6004	**0.7503**	**0.9057**
34	0.0000	0.0000	**0.6715**	0.6848	0.6425	0.0000	0.5740	**0.5881**	**0.9002**
35	0.0000	0.0000	**0.7157**	**0.7373**	**0.6858**	0.4933	0.5490	0.5027	**0.8688**
36	0.0000	0.4939	0.6810	**0.7203**	**0.5978**	0.0000	0.5110	0.5110	0.5048
37	0.5158	0.5016	**0.7036**	**0.7410**	0.7479	**0.5503**	**0.7370**	0.7491	**0.7929**
38	0.5104	0.0000	**0.7203**	0.6762	**0.6586**	**0.6322**	0.5082	0.5544	0.0000
39	0.5073	0.5002	**0.7231**	**0.7261**	0.6100	0.5248	**0.7475**	0.5981	0.5019
40	0.5086	0.4991	**0.6961**	**0.7230**	**0.6535**	0.5287	0.5610	0.5882	**0.8840**
41	0.5058	0.4981	**0.7074**	**0.7019**	0.5952	0.5787	**0.6542**	0.6994	**0.8848**
42	0.5036	0.4968	0.7164	**0.7006**	0.7411	0.5083	0.4987	**0.6406**	**0.9234**
43	0.5678	0.5767	**0.6896**	**0.7238**	0.7221	**0.6433**	0.8100	**0.7885**	**0.8999**
44	**0.4961**	0.0000	**0.7224**	**0.6864**	0.7438	0.5188	**0.7791**	0.7059	0.4991
45	0.4949	0.0000	**0.7103**	**0.6891**	0.7486	0.5020	0.7296	**0.7122**	**0.9474**
46	0.5026	0.0000	**0.7082**	**0.6750**	0.5584	0.5293	**0.5282**	0.5166	0.5036
47	0.5109	0.0000	**0.7001**	**0.6975**	**0.7848**	0.5234	**0.7898**	0.5518	0.5044
48	0.0000	0.0000	**0.7528**	0.7073	**0.6736**	0.0000	0.5179	0.5261	**0.8580**
49	0.0000	0.0000	**0.6885**	**0.6883**	0.5030	0.0000	0.5014	**0.5088**	0.5083
50	**0.4965**	0.0000	**0.7204**	0.7408	0.5132	0.0000	0.5233	0.5348	**0.8610**
51	0.0000	0.0000	0.7085	**0.7163**	**0.6134**	0.0000	0.5563	0.5312	**0.5074**
52	0.5020	0.4992	**0.7142**	**0.7756**	0.5913	0.0000	**0.5944**	0.5502	**0.8619**
53	0.4883	**0.4817**	0.6820	**0.8026**	0.6739	**0.7031**	0.5013	0.6479	**0.9235**
54	0.5127	0.0000	0.7383	**0.7590**	0.5588	**0.7306**	**0.7686**	**0.6234**	0.0000
55	0.0000	0.0000	**0.7244**	0.7160	0.6445	**0.7286**	**0.6399**	**0.6429**	0.5002
56	0.0000	0.0000	**0.7366**	**0.6903**	0.5377	0.6044	0.4980	**0.5060**	**0.8628**
57	0.0000	0.0000	**0.7174**	**0.7316**	0.5634	0.7101	0.4981	0.4982	0.4981
58	0.0000	0.0000	**0.6914**	0.7004	0.7316	**0.7565**	0.4982	**0.6864**	**0.8245**
59	0.5042	0.4985	**0.7018**	**0.6803**	0.7536	**0.5332**	0.7180	**0.7707**	0.4980
60	0.5007	0.4990	**0.7028**	**0.6794**	**0.7375**	**0.5277**	0.7449	0.7212	**0.9385**
61	0.4948	0.4946	**0.7082**	**0.6896**	0.8388	**0.5212**	0.7812	**0.8027**	**0.9659**
62	0.5020	0.5016	**0.7172**	**0.6866**	0.6090	**0.5138**	0.5234	**0.6230**	0.5034
63	0.4974	0.4961	**0.7143**	**0.6888**	0.8174	0.5019	0.7053	**0.7604**	**0.9690**
64	0.4936	**0.7040**	**0.7456**	**0.6890**	0.8048	**0.5062**	0.7956	0.8350	**0.9733**
65	0.5133	0.0000	**0.6904**	0.6777	0.5065	**0.5009**	0.5063	0.5136	0.5054
66	0.5289	0.5014	**0.7005**	**0.7115**	**0.6021**	0.0000	0.6342	0.5016	**0.7271**
67	0.5641	0.5234	**0.7509**	0.6404	**0.6933**	0.5287	0.5606	0.5325	0.5054
68	0.5362	0.5118	**0.7236**	**0.6646**	**0.5724**	0.5054	0.5077	0.5046	0.5019
69	0.5160	**0.5074**	0.6459	**0.6714**	0.5018	0.5418	**0.6171**	0.5066	0.5204
70	0.0000	0.0000	**0.7194**	**0.6902**	0.7162	**0.6215**	0.7341	**0.7503**	**0.9147**
71	0.4975	0.0000	**0.7240**	**0.7253**	**0.8021**	**0.6202**	0.7393	**0.7567**	0.0000
72	0.5374	0.5002	**0.7037**	**0.7013**	**0.6991**	0.6249	0.4980	**0.6246**	0.0000
73	0.5017	0.4949	**0.7068**	**0.6708**	0.7169	**0.5407**	**0.7249**	0.7746	**0.9453**
74	0.4971	0.0000	**0.7034**	**0.6805**	**0.8709**	**0.6504**	0.7294	0.7183	0.4991
75	0.0000	0.0000	**0.6916**	**0.6762**	**0.8710**	**0.6551**	0.7627	0.7353	**0.9513**
76	0.4965	0.4964	**0.7146**	**0.7035**	0.7891	**0.5021**	0.7341	**0.7526**	**0.9805**
77	0.5002	0.0000	**0.7210**	0.6954	**0.5190**	0.5019	**0.5856**	0.5842	0.5043
78	0.5000	0.4995	**0.7118**	**0.6977**	**0.7043**	0.5039	0.5037	0.4990	**0.8954**
79	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
80	0.5010	0.5004	**0.7135**	0.7008	**0.5045**	0.5057	0.4976	0.4976	0.5036
81	**0.5003**	**0.5001**	**0.7158**	**0.7034**	**0.4988**	**0.5041**	**0.4977**	**0.4977**	**0.5107**
82	**0.5004**	**0.0000**	**0.7173**	**0.7060**	**0.4996**	**0.5014**	**0.4980**	**0.4988**	**0.5022**
83	0.5004	0.5002	**0.7084**	0.7084	0.5975	0.5041	**0.8442**	**0.8581**	**0.5029**
84	0.0000	0.0000	**0.7460**	**0.7133**	0.5853	**0.7858**	0.7454	**0.7575**	**0.8602**
85	0.5138	0.5054	**0.7000**	**0.7233**	0.7101	**0.5653**	0.6758	**0.6917**	0.0000
86	0.0000	0.4981	0.7075	**0.7222**	0.6742	**0.5249**	**0.6784**	0.6901	0.5000
87	**0.5022**	0.0000	**0.7119**	**0.7214**	0.7709	**0.6825**	0.8343	0.8018	**0.9508**
88	0.4969	0.4967	**0.7002**	**0.6965**	**0.7667**	**0.6622**	0.6808	0.7229	0.0000
89	0.0000	0.0000	0.7263	**0.7300**	0.5583	0.5034	**0.6601**	0.5749	0.4984
90	0.0000	0.4953	**0.6904**	**0.6999**	0.8499	0.5052	**0.8051**	0.8645	**0.9739**
91	0.0000	0.0000	0.7062	**0.6947**	**0.7331**	0.5045	0.6807	**0.7461**	0.4986
92	0.0000	0.5004	**0.7029**	0.6877	**0.5205**	0.5020	**0.5824**	0.5386	0.5088
93	0.5063	0.5053	**0.7087**	**0.6990**	0.7907	**0.6249**	0.7312	**0.7144**	**0.9672**
94	0.5092	0.4973	**0.6916**	**0.6107**	0.7136	**0.5276**	0.7653	**0.7006**	**0.9148**
95	0.5116	0.0000	0.6741	**0.6878**	0.5167	**0.6600**	**0.7684**	0.5455	**0.7922**
96	0.0000	0.0000	**0.7095**	**0.7011**	**0.7607**	**0.6934**	0.6618	0.6535	**0.9147**
97	0.5104	0.5066	0.7339	**0.7566**	0.5619	0.5485	**0.5332**	0.5820	0.5034
98	0.5129	0.5218	**0.7418**	**0.6993**	**0.5141**	0.0000	0.5150	0.5082	0.5044
99	0.4943	0.0000	**0.6839**	**0.7599**	0.6577	**0.5470**	0.6000	**0.5886**	0.5051
100	0.5123	0.5016	**0.7212**	**0.7081**	0.7386	**0.5654**	**0.7369**	**0.7489**	0.4986
101	0.5045	0.4991	**0.7281**	0.6751	**0.6827**	0.5491	0.5625	**0.5321**	0.4981
102	0.5643	0.5886	**0.6920**	**0.7274**	0.7481	**0.6402**	**0.8087**	**0.7869**	0.4998
103	0.0000	0.0000	**0.7369**	0.7348	0.5170	0.0000	**0.6460**	0.5540	0.5064
104	0.0000	0.0000	**0.7061**	**0.6832**	0.5390	0.7231	0.4981	0.4982	**0.8610**
105	0.5286	0.5001	**0.6859**	**0.6593**	**0.8220**	**0.5470**	0.7497	0.8069	**0.9655**
106	0.5231	0.4977	**0.7085**	**0.6882**	0.8468	**0.5565**	0.7046	**0.7409**	**0.9681**
107	0.5335	0.5038	**0.6795**	**0.6155**	**0.5549**	**0.5192**	0.5145	0.5288	0.5058
108	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
109	0.5062	0.5054	**0.6895**	**0.6867**	0.7859	**0.6265**	0.7226	**0.7168**	**0.9665**
110	0.5099	0.5090	**0.7094**	**0.7159**	0.5050	0.6312	0.4987	0.6743	**0.9391**
111	0.5099	0.5090	**0.7101**	**0.7097**	0.7282	**0.6331**	**0.7640**	0.6756	**0.9379**
112	0.4999	0.5936	**0.7217**	**0.6995**	0.6742	**0.5269**	0.7646	**0.7467**	**0.9162**
113	0.5050	0.0000	0.7315	**0.7454**	0.5061	0.5119	**0.5667**	0.5024	0.5083
114	**0.5022**	0.0000	**0.7461**	0.7169	0.5070	0.5384	0.5370	0.5074	**0.7173**
115	**0.5022**	0.0000	**0.7263**	0.7085	0.5109	0.5308	0.5479	0.5051	0.5154
116	0.4993	0.0000	**0.7259**	**0.6732**	0.5164	**0.5550**	**0.7695**	0.5528	0.5095
117	0.4993	0.0000	0.6718	**0.7250**	0.5250	0.5277	**0.6666**	0.5145	**0.7904**
118	**0.4993**	0.0000	0.6799	**0.7571**	0.5032	0.5219	0.7353	0.5512	**0.7907**
119	0.5281	0.0000	**0.7465**	**0.7278**	0.7754	**0.8173**	**0.7198**	0.7218	**0.9395**
120	0.5345	0.5024	**0.7493**	0.7497	0.6893	**0.8161**	**0.6758**	0.6653	**0.8639**
121	0.0000	0.0000	**0.7132**	**0.6880**	**0.7175**	0.6882	0.4994	0.5225	**0.8597**
122	0.0000	0.0000	**0.7267**	0.7234	**0.5546**	0.6904	0.4987	0.5172	**0.8608**
123	0.5016	0.5021	**0.7183**	**0.6862**	**0.8447**	**0.5053**	0.8087	**0.8368**	0.4996
124	0.0000	0.0000	**0.7249**	**0.6830**	0.7392	**0.6934**	**0.6627**	0.6565	**0.9144**
125	0.0000	0.0000	**0.6990**	**0.7146**	0.7864	**0.6948**	0.6706	**0.6715**	**0.8634**
126	0.0000	0.0000	0.7001	**0.7241**	0.6815	**0.6949**	0.4987	**0.6709**	**0.8637**
127	0.5061	0.5030	**0.7238**	0.6695	0.5018	0.0000	0.5011	0.5030	**0.5068**
128	0.4938	0.4907	**0.7198**	**0.6897**	0.6561	0.0000	0.6278	**0.7011**	**0.9203**
129	0.5061	0.5029	0.7021	**0.6804**	**0.5789**	0.0000	0.5324	0.5932	**0.7850**
130	0.5034	0.4979	0.7240	**0.6990**	**0.6123**	0.0000	0.5618	0.6480	**0.8756**
131	0.5018	0.4986	0.7176	**0.7240**	0.6327	0.0000	0.5133	**0.6813**	**0.8652**
132	0.0000	0.0000	**0.7320**	0.6793	**0.5393**	0.0000	0.5045	0.5095	**0.7413**
133	0.0000	0.5072	**0.7189**	0.6825	0.5055	0.0000	0.5240	**0.5441**	0.5121
134	0.0000	0.0000	0.7382	**0.7160**	**0.6711**	0.5078	0.6037	0.5862	**0.9045**
135	0.0000	0.5018	**0.7383**	0.6876	**0.5322**	0.0000	**0.5122**	0.5075	0.5064
136	0.0000	0.0000	**0.6757**	**0.7226**	0.6339	0.0000	0.5447	**0.6036**	**0.8741**
137	0.0000	0.4934	0.6848	0.6843	**0.6224**	0.0000	0.5190	0.5851	**0.8645**
138	0.0000	0.5027	**0.6865**	0.6586	0.5073	0.0000	0.5114	**0.5410**	**0.6410**
139	0.0000	0.0000	**0.6998**	**0.7104**	0.6797	0.0000	0.6552	**0.6096**	**0.9003**
140	0.0000	**0.9493**	**0.6362**	**0.7257**	0.7332	0.0000	0.6932	0.7070	**0.9470**
141	0.0000	0.0000	0.7001	**0.6522**	**0.7179**	0.5016	0.6297	0.7712	**0.9067**
142	0.0000	0.0000	**0.6604**	**0.6981**	0.6810	0.0000	0.5975	**0.5861**	**0.9021**
143	0.0000	0.4933	**0.6984**	**0.6538**	**0.6639**	0.5330	0.5197	0.5028	0.5022
144	0.0000	0.0000	**0.7277**	0.6498	**0.6268**	0.0000	0.5138	0.5121	0.5048
145	0.5078	0.4998	**0.7105**	**0.7419**	**0.7535**	**0.5758**	**0.7390**	0.7491	0.5029
146	0.5080	0.4994	**0.7473**	**0.7078**	0.6038	0.5599	0.5220	**0.5811**	0.0000
147	**0.5143**	0.5002	0.7181	**0.7199**	0.5932	**0.5522**	**0.7473**	0.5993	0.5015
148	0.5052	0.4982	**0.7330**	0.7187	0.6014	0.5274	0.5633	**0.5928**	**0.8833**
149	0.5018	0.4981	0.7491	**0.6928**	0.6078	0.5504	**0.6662**	0.7011	**0.8829**
150	0.4996	0.4959	**0.7010**	**0.7074**	**0.7473**	**0.5655**	0.4987	0.4986	0.4984
151	0.5607	0.5850	**0.7648**	**0.7326**	0.7464	**0.6394**	0.8171	**0.7991**	**0.8989**
152	0.4965	0.0000	**0.7116**	**0.7249**	**0.6929**	0.5198	**0.7662**	0.4991	0.4993
153	0.4947	0.0000	**0.7308**	**0.6903**	**0.7088**	0.5006	0.7434	0.7050	**0.9481**
154	0.5028	0.0000	**0.7186**	0.6847	**0.5961**	0.5258	0.5365	0.5186	0.4995
155	0.5033	0.0000	0.7230	0.7358	0.7503	0.5121	**0.7891**	0.5528	**0.8306**
156	0.4965	0.5798	**0.7441**	0.7254	**0.6019**	0.0000	0.5188	0.5201	**0.8584**
157	0.5017	0.0000	**0.7348**	**0.6874**	0.5011	0.0000	0.5026	**0.5089**	0.5075
158	0.4965	0.0000	**0.6812**	**0.7111**	**0.5871**	0.0000	0.5228	0.5558	0.5041
159	0.5021	0.0000	**0.7505**	0.7297	**0.6276**	0.0000	**0.5593**	0.5314	0.5062
160	0.4964	0.6602	**0.6753**	**0.7376**	**0.5988**	0.0000	0.6425	0.5631	**0.8595**
161	**0.4883**	0.0000	**0.7632**	**0.7259**	**0.7341**	**0.6811**	0.6292	0.6420	0.5013
162	0.5127	0.0000	0.7390	**0.7600**	0.5224	**0.7598**	**0.7634**	**0.6182**	0.0000
163	0.0000	0.0000	**0.7130**	**0.7086**	**0.6849**	**0.7094**	**0.6387**	**0.6443**	0.5004
164	0.0000	0.0000	**0.7065**	0.7101	**0.5996**	0.6028	0.4980	0.5060	**0.8622**
165	0.0000	0.0000	**0.7084**	**0.7368**	0.5398	0.6931	0.4981	0.4982	0.4984
166	0.0000	0.0000	**0.7186**	0.7099	0.5837	**0.7185**	0.4997	**0.6884**	**0.8230**
167	0.5103	0.5070	**0.7197**	**0.6768**	**0.8124**	0.4990	0.7158	0.7767	**0.9383**
168	0.5092	0.5049	**0.7068**	**0.6793**	0.7475	**0.5754**	0.7386	**0.7255**	**0.9410**
169	0.5021	0.4994	**0.7054**	**0.6828**	0.8057	**0.5798**	0.7956	**0.7994**	**0.9654**
170	0.5045	0.5011	**0.7087**	**0.6858**	0.5911	**0.5174**	0.5250	**0.6318**	0.5019
171	0.4994	0.4951	**0.6882**	**0.6805**	0.8240	**0.5126**	0.7056	**0.7487**	**0.9680**
172	0.4953	0.4922	**0.7044**	**0.6852**	0.8495	**0.9912**	0.8014	0.8377	**0.9732**
173	0.5337	0.5009	0.6502	**0.6582**	0.5143	**0.5009**	0.5056	0.5115	**0.7381**
174	0.5376	0.5014	**0.7099**	**0.6806**	**0.6715**	0.5060	**0.7036**	0.5021	**0.7267**
175	0.5434	0.4992	0.6854	**0.7050**	**0.5935**	**0.5515**	0.5379	0.5350	0.5083
176	0.5259	**0.4996**	0.6839	0.7153	0.5668	0.5156	0.5086	0.5046	**0.7925**
177	0.5369	**0.5081**	0.6699	**0.6947**	0.5044	0.5106	**0.6453**	0.5078	0.5006
178	0.0000	0.0000	**0.6912**	**0.6845**	**0.7570**	**0.6204**	0.7358	**0.7473**	0.5005
179	0.4975	0.0000	**0.7045**	**0.6870**	**0.8018**	**0.6202**	0.7435	**0.7567**	0.0000
180	0.5351	0.4990	**0.7011**	0.6861	**0.7581**	0.6220	0.4980	0.6246	0.0000
181	0.5058	0.4949	**0.7059**	**0.7064**	0.7763	0.5674	0.7079	**0.7508**	**0.9465**
182	0.4971	0.0000	**0.7156**	**0.6616**	**0.8242**	**0.6546**	0.7194	0.7144	**0.9515**
183	0.0000	0.0000	**0.6795**	**0.6986**	**0.7329**	**0.6550**	0.7704	0.7413	**0.9522**
184	0.0000	0.4963	**0.7051**	**0.7042**	0.7763	**0.5896**	0.7365	**0.7646**	**0.9812**
185	0.0000	0.0000	**0.7169**	0.7020	**0.5202**	0.5006	**0.6024**	0.5528	0.5006
186	0.0000	0.0000	**0.7081**	0.6902	**0.7175**	0.0000	0.5068	0.4988	**0.8953**
187	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
188	**0.0000**	**0.5003**	**0.7066**	**0.6870**	**0.4981**	**0.5018**	**0.4976**	**0.4976**	**0.5015**
189	0.0000	0.5003	**0.7134**	0.6965	**0.4995**	0.5008	0.4977	0.4976	0.5057
190	**0.0000**	**0.0000**	**0.7117**	**0.7133**	**0.4981**	**0.5012**	**0.4981**	**0.4978**	**0.5082**
191	0.0000	0.5000	0.7038	**0.7051**	0.6622	**0.5146**	**0.8413**	0.8505	**0.8623**
192	0.0000	0.0000	**0.6784**	**0.7091**	0.6972	**0.7843**	0.7454	**0.7592**	**0.8653**
193	0.5106	0.5054	**0.6859**	**0.6883**	**0.7117**	**0.6400**	0.6871	0.6944	0.0000
194	0.4983	0.4981	**0.7074**	**0.7272**	0.7019	**0.5095**	**0.6846**	**0.6939**	0.4992
195	**0.5012**	0.0000	**0.6956**	**0.7102**	0.8035	**0.6825**	0.8233	0.8116	**0.9478**
196	0.4971	0.4967	**0.6965**	**0.7143**	**0.8687**	**0.6600**	0.6851	0.7243	0.0000
197	0.0000	0.0000	**0.7215**	0.7171	0.5546	0.5126	**0.6497**	0.5828	0.4985
198	0.0000	0.0000	**0.6983**	**0.7001**	**0.8771**	0.5109	0.8128	0.8624	**0.9732**
199	0.0000	0.0000	**0.7073**	**0.6741**	**0.7446**	0.5071	0.5011	0.7353	0.4972
200	0.0000	0.0000	**0.7043**	0.6912	0.5043	0.5020	**0.5830**	**0.5391**	0.5063
201	0.0000	0.0000	**0.7158**	0.6857	0.4993	0.0000	**0.6756**	0.5030	0.5066
202	0.0000	0.0000	**0.7120**	**0.6436**	0.5097	0.0000	**0.5469**	0.5118	**0.5019**
203	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
204	0.0000	0.0000	0.6714	**0.6770**	**0.5440**	0.0000	**0.8840**	0.5474	0.5032
205	0.0000	0.0000	0.7068	**0.6497**	0.5472	0.0000	0.5093	**0.5352**	**0.8520**
206	0.0000	0.0000	0.7305	**0.7029**	0.5502	0.0000	**0.6460**	0.5194	**0.8131**
207	0.5223	0.5153	0.7155	**0.7248**	**0.5878**	**0.5473**	0.6856	0.5225	**0.8130**
208	0.0000	0.0000	0.7769	0.6875	**0.6285**	**0.8603**	0.6065	0.5326	**0.8089**
209	0.0000	0.0000	**0.6920**	**0.6897**	0.8099	**0.6027**	**0.8400**	**0.8430**	0.5001
210	0.5017	0.4997	0.7017	**0.6918**	0.5383	0.5162	0.5222	**0.5954**	**0.8562**
211	0.5020	0.4997	**0.6952**	**0.6935**	**0.6011**	**0.5116**	0.5324	0.5881	0.5014
212	**0.5040**	0.0000	**0.6941**	**0.6835**	0.5035	0.5298	0.5010	0.5017	0.0000
213	0.4994	0.0000	**0.7113**	**0.7096**	0.7647	**0.5337**	0.7702	**0.7679**	**0.9559**
214	0.0000	0.0000	**0.7025**	**0.6769**	0.7562	**0.5323**	**0.7125**	0.7018	**0.9678**
215	0.5040	0.0000	**0.7125**	**0.7204**	0.7125	**0.5337**	**0.7026**	0.7013	**0.9676**
216	0.4999	0.0000	**0.7031**	**0.7167**	**0.7903**	**0.5359**	0.7018	0.7014	**0.9675**
217	0.0000	0.0000	**0.7009**	**0.6789**	0.7271	0.5318	0.7014	**0.7014**	**0.9677**
218	0.4989	0.0000	**0.7059**	**0.7084**	**0.7703**	**0.5332**	0.7014	0.7014	**0.9675**
219	0.4998	0.0000	0.7106	**0.7138**	**0.7728**	**0.5340**	**0.6606**	0.6403	0.4976
220	0.4993	0.5041	**0.7130**	**0.7096**	**0.8616**	**0.5347**	0.7683	0.7761	**0.9679**
221	0.5028	0.0000	**0.7171**	**0.7150**	**0.8902**	**0.5320**	0.7254	0.7254	**0.9813**
222	0.0000	0.0000	**0.7140**	**0.7050**	**0.8864**	**0.8037**	**0.7860**	0.7482	**0.9590**
223	0.5384	0.5051	**0.7248**	**0.7299**	**0.7926**	0.8035	0.6865	0.6908	**0.9594**
224	0.0000	0.0000	**0.7203**	**0.7078**	0.7634	**0.7927**	0.7300	**0.7637**	**0.9263**
225	0.5307	0.5035	**0.7286**	**0.7113**	**0.7144**	**0.8130**	0.7290	**0.7217**	**0.9370**
226	0.5001	0.0000	**0.6773**	**0.6959**	0.7505	**0.7931**	**0.7754**	**0.7888**	**0.9385**
227	0.4998	0.0000	**0.7174**	**0.7144**	0.5122	0.7085	0.5003	**0.5185**	0.4978
228	0.5007	0.0000	**0.7107**	**0.7116**	0.5373	**0.6705**	0.4979	**0.5418**	0.5033
229	**0.5147**	0.0000	**0.7213**	0.7072	0.5011	**0.7301**	0.4980	**0.5260**	0.0000
230	0.5054	0.5010	**0.7269**	**0.7133**	0.5875	**0.7111**	0.6822	**0.6907**	0.4995
231	0.0000	0.0000	**0.7160**	**0.7290**	**0.7154**	0.7551	0.4994	**0.6581**	**0.9310**
232	0.0000	0.0000	**0.7133**	**0.7251**	**0.7592**	**0.7505**	0.7170	0.6658	0.0000
233	0.5024	0.0000	**0.7337**	0.7333	**0.5182**	**0.7792**	0.5347	**0.5577**	0.5005
234	0.5080	0.0000	**0.7019**	0.6937	0.5012	**0.7766**	0.4978	**0.5016**	0.5068
235	0.5005	0.0000	0.7172	**0.7184**	**0.5227**	**0.7697**	**0.6249**	0.5672	0.5098
236	**0.5005**	0.0000	0.7364	0.7007	0.5497	**0.7745**	0.5127	0.5008	**0.7674**
237	0.4956	0.0000	**0.7052**	**0.7152**	**0.8182**	**0.7686**	0.7899	**0.8372**	**0.9733**
238	0.5008	0.0000	**0.7416**	**0.6973**	0.6898	**0.7474**	0.7629	**0.7877**	**0.9080**
239	0.0000	0.0000	**0.7148**	0.6854	0.5110	0.5176	0.5643	**0.6187**	**0.5019**
240	0.0000	0.0000	**0.7103**	**0.6836**	**0.6806**	0.5177	0.5471	0.5432	0.5017
241	0.0000	0.0000	**0.7020**	**0.6823**	**0.7354**	**0.5163**	**0.7335**	0.7336	**0.9865**
242	0.5007	0.4999	**0.7094**	**0.7128**	0.7694	0.5106	**0.6592**	0.6922	**0.9310**
243	0.5013	0.5005	**0.7156**	**0.7025**	0.5273	0.5148	**0.5336**	0.6308	**0.7835**
244	0.4997	0.4999	**0.7120**	**0.7038**	0.6882	0.5442	**0.6460**	0.6839	**0.9308**
245	0.4996	0.4998	**0.7110**	**0.7004**	0.7415	**0.5442**	**0.7065**	0.7668	**0.9329**
246	0.5020	**0.5021**	**0.7100**	**0.7036**	0.7148	**0.5842**	0.6751	**0.7928**	**0.9334**
247	0.5136	0.5005	**0.7151**	0.7017	0.6305	0.5791	0.4978	**0.5636**	**0.8398**
248	0.0000	0.0000	**0.6327**	**0.7001**	0.5035	0.5022	**0.5031**	0.5029	0.5100
249	0.0000	0.0000	**0.6913**	**0.6945**	**0.5666**	0.0000	0.5026	0.5032	0.5101
250	0.0000	0.0000	0.6596	**0.6845**	**0.5077**	0.0000	0.5022	**0.5067**	0.5068

TABLE XXI
THE TEST V_PR OF TIME SERIES ANOMALY DETECTION IN UCR 250 SUB-DATASETS. THE BEST RESULTS ARE IN **BOLD**.

UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector	UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	AT	TS2Vec	TimesNet	GPT4TS	DCdetector
1	0.0273	0.0256	**0.7813**	**0.7726**	0.6497	**0.7001**	0.5508	**0.5705**	**0.8483**	126	0.0000	0.0000	0.4773	**0.6601**	0.3739	**0.5440**	0.0047	**0.3714**	**0.6299**
2	0.0271	0.0255	**0.7815**	**0.7852**	0.4635	0.2439	0.0061	0.0277	**0.7398**	127	0.0193	0.0140	**0.7012**	0.2440	0.0153	0.0000	0.0129	0.0211	**0.0339**
3	0.0271	0.0255	**0.7879**	**0.7855**	0.4745	**0.6993**	**0.4635**	0.4169	**0.7411**	128	0.0193	0.0140	**0.5770**	**0.5093**	0.5714	0.0000	0.5308	**0.6264**	**0.8620**
4	0.0084	0.0056	0.3121	**0.7906**	0.5520	**0.5818**	0.6415	0.6090	**0.8369**	129	0.0193	0.0140	0.3330	**0.6049**	**0.2540**	0.0000	0.1242	0.2800	**0.5949**
5	0.0000	0.0000	**0.6472**	**0.6370**	0.0131	0.0341	**0.0364**	**0.0113**	0.0324	130	0.0230	0.0123	0.4936	**0.6705**	**0.4123**	0.0000	0.3017	0.4828	**0.7613**
6	0.0000	0.0000	**0.7866**	**0.8230**	0.0306	0.0760	0.0199	0.0421	0.0698	131	0.0193	0.0140	0.3378	**0.5814**	0.4359	0.0000	0.1127	**0.5106**	**0.7677**
7	0.0000	0.0000	0.6491	**0.8454**	0.0861	**0.0199**	0.0793	0.0329	0.0733	132	0.0000	0.0000	**0.6366**	0.5472	**0.1917**	0.0000	0.0275	0.0573	**0.6069**
8	0.0106	0.0000	0.2359	**0.7038**	0.1597	**0.6167**	**0.6176**	0.2405	0.0697	133	0.0000	0.0276	**0.6734**	0.6238	0.0310	0.0000	0.1050	**0.1781**	0.0602
9	**0.0209**	0.0000	**0.5402**	0.2690	0.1202	0.0711	0.1328	0.0888	**0.6862**	134	0.0000	0.0000	0.5280	**0.5081**	**0.5866**	0.0436	0.5001	0.4642	**0.8464**
10	0.0300	0.0000	**0.7876**	**0.8034**	0.0471	**0.0199**	**0.5816**	0.2520	**0.6484**	135	0.0000	0.0071	**0.5959**	0.4717	**0.0952**	0.0000	**0.0453**	0.0301	0.0258
11	0.0577	0.0086	**0.8126**	**0.7736**	0.6101	**0.8601**	**0.6053**	0.5962	**0.8348**	136	0.0000	0.0000	**0.5878**	**0.6131**	0.4727	0.0000	0.2935	**0.4439**	**0.7948**
12	0.1099	0.0114	**0.7541**	**0.7888**	0.4444	**0.8436**	0.4245	**0.4120**	**0.6773**	137	0.0000	0.0087	0.3111	0.4074	**0.4516**	0.0000	0.1683	0.4153	**0.7933**
13	0.0000	0.0000	**0.7630**	**0.7508**	0.2786	0.2531	0.0065	**0.0916**	**0.6657**	138	0.0000	0.0098	**0.7168**	0.5020	0.0353	0.0000	0.0470	**0.1321**	**0.3357**
14	0.0000	0.0000	**0.7453**	**0.8015**	**0.2861**	**0.7566**	0.0045	0.0632	**0.6300**	139	0.0000	0.0000	**0.5491**	**0.6261**	0.6071	0.0000	0.5704	**0.5189**	**0.8489**
15	0.0038	0.0146	**0.7759**	**0.7763**	0.3742	0.0150	**0.4602**	0.4210	0.0017	140	0.0000	**0.9526**	**0.3666**	**0.6764**	0.7067	0.0000	0.6667	0.6863	**0.9139**
16	0.0000	0.0000	**0.5979**	**0.6433**	**0.5343**	**0.4948**	0.4256	0.4151	0.0065	141	0.0000	0.0000	0.3647	**0.5582**	**0.6874**	0.0525	0.5836	0.7410	**0.8857**
17	0.0000	0.0000	**0.5994**	**0.5808**	0.4081	**0.5487**	0.3569	**0.3612**	**0.5847**	142	0.0000	0.0000	**0.5975**	**0.5589**	0.5738	0.0000	0.4633	**0.4349**	**0.8263**
18	0.0000	0.0000	**0.5862**	**0.6455**	0.0662	**0.5411**	0.0045	**0.3656**	**0.6488**	143	0.0000	0.0088	**0.4662**	**0.6421**	**0.5488**	0.0811	0.1607	0.0323	0.0226
19	0.0129	0.0140	0.5602	**0.6793**	0.0529	0.0000	0.0868	0.0211	**0.0267**	144	0.0000	0.0000	**0.6186**	0.2776	**0.5212**	0.0000	0.1157	0.1169	0.0261
20	0.0417	0.0000	**0.6213**	**0.6878**	0.6032	0.0465	0.5214	**0.6195**	**0.8698**	145	0.0175	0.0017	**0.6723**	**0.6975**	**0.3945**	**0.5196**	**0.3857**	0.4028	0.0116
21	0.0000	0.0068	0.3178	0.4922	**0.1289**	0.0123	0.0975	0.2255	**0.5811**	146	0.0186	0.0017	**0.7017**	**0.6826**	0.1987	0.1070	0.0560	**0.1691**	0.0000
22	0.0234	**0.0062**	**0.4812**	**0.5839**	0.4961	0.0000	0.3759	0.4667	**0.7637**	147	**0.5246**	0.0017	0.6777	**0.7181**	0.1454	**0.5503**	**0.3539**	0.1611	0.0087
23	0.0124	0.0000	**0.5683**	**0.6974**	0.4322	0.0000	0.1814	**0.5157**	**0.7786**	148	0.0157	0.0018	**0.5678**	0.4191	0.2682	0.0568	0.1920	**0.2492**	**0.6567**
24	0.0097	0.0150	**0.7383**	0.6083	**0.3176**	0.0000	0.0203	0.0463	0.0665	149	0.0094	0.0019	0.3774	**0.4309**	0.2719	0.0948	**0.3929**	0.4463	**0.6528**
25	0.0301	**0.0139**	**0.7170**	0.5122	0.0214	0.0303	0.1362	0.1561	0.0594	150	0.0094	0.0019	**0.4730**	**0.5262**	**0.5458**	**0.1217**	0.0088	0.0081	0.0070
26	0.0151	0.0156	**0.6351**	**0.5106**	**0.5635**	0.0305	**0.4967**	0.4597	0.0833	151	0.1161	0.1512	**0.7284**	**0.6479**	0.5877	**0.5673**	0.6353	**0.6118**	**0.7439**
27	0.3464	0.0422	**0.6454**	**0.4641**	**0.0228**	0.0000	0.0208	**0.0365**	**0.0431**	152	0.0094	0.0000	**0.6007**	**0.4458**	**0.5568**	0.0531	**0.6446**	0.0140	0.0110
28	0.0000	0.0091	**0.5376**	**0.6527**	0.5912	**0.8116**	0.3220	0.4701	**0.8026**	153	0.0123	0.0000	**0.6238**	**0.5223**	**0.6118**	0.0238	0.6651	0.6056	**0.8790**
29	0.0000	0.0104	**0.7111**	**0.6271**	**0.4421**	0.0428	0.1692	0.3913	**0.7848**	154	0.0110	0.0000	**0.7326**	0.4182	**0.2554**	0.0538	0.1267	0.0725	0.0061
30	0.0182	0.0000	**0.5690**	0.2334	0.0150	0.0000	0.0647	**0.1184**	**0.2992**	155	0.0129	0.0000	0.2952	0.4587	0.5299	0.0296	**0.5947**	0.1714	**0.6967**
31	0.0462	0.0217	**0.5205**	0.3703	0.6431	0.0467	0.5093	**0.5103**	**0.8514**	156	0.0055	0.4017	**0.7191**	0.5539	**0.3691**	0.0000	0.1912	0.1293	**0.7402**
32	0.0076	**0.6274**	**0.6623**	**0.4388**	0.7078	0.0000	**0.7369**	0.6913	**0.9233**	157	0.0054	0.0000	**0.6479**	**0.6338**	0.0099	0.0000	0.0136	**0.0326**	0.0287
33	0.0000	0.0000	**0.5909**	**0.6976**	**0.7025**	0.0000	0.5477	**0.7219**	**0.8583**	158	0.0055	0.0000	**0.5711**	**0.6223**	**0.3580**	0.0000	0.1700	0.2518	0.0320
34	0.0000	0.0000	**0.5751**	0.3524	0.5077	0.0000	0.4431	**0.4416**	**0.8145**	159	0.0054	0.0000	**0.7807**	0.2971	**0.2315**	0.0000	**0.1732**	0.0834	0.0229
35	0.0000	0.0000	**0.6601**	**0.7157**	**0.5822**	0.0086	0.2977	0.0315	**0.7739**	160	0.0055	0.5919	**0.4961**	**0.5326**	**0.3450**	0.0000	0.5147	0.2845	**0.7426**
36	0.0000	0.0192	0.3614	**0.6418**	**0.4650**	0.0000	0.1002	0.1099	0.0261	161	**0.0224**	0.0000	**0.6765**	**0.6388**	**0.6915**	**0.4510**	0.5626	0.5870	0.0329
37	0.0328	0.0052	**0.6726**	**0.7041**	0.3871	**0.5448**	**0.3844**	0.4024	**0.4407**	162	0.0401	0.0000	0.6378	**0.6361**	0.1336	**0.6775**	**0.6105**	**0.4326**	0.0000
38	0.0234	0.0000	**0.6742**	0.2701	**0.2952**	**0.5133**	0.0266	0.1199	0.0000	163	0.0000	0.0000	**0.6795**	**0.5917**	**0.3979**	**0.6462**	**0.3490**	**0.3589**	0.0098
39	0.0157	0.0017	**0.7094**	**0.6587**	0.1784	0.4370	**0.3552**	0.1598	0.0089	164	0.0000	0.0000	**0.5995**	0.2792	**0.2026**	0.1669	0.0027	0.0233	**0.5424**
40	0.0224	0.0036	**0.5734**	**0.5605**	**0.3700**	0.0590	0.1927	0.2411	**0.6579**	165	0.0000	0.0000	**0.6671**	**0.3404**	0.0883	0.4024	0.0028	0.0030	0.0038
41	0.0173	0.0019	**0.5496**	**0.5190**	0.2445	0.1371	**0.3735**	0.4451	**0.6392**	166	0.0000	0.0000	**0.6825**	0.3211	0.1551	**0.6578**	0.0065	**0.3369**	**0.4916**
42	0.0173	0.0038	0.3846	**0.4157**	0.5440	0.0263	0.0089	**0.4195**	**0.7641**	167	0.0305	0.0336	**0.6671**	**0.4897**	**0.5891**	0.0048	0.4573	0.5360	**0.7502**
43	0.1263	0.1402	**0.6661**	**0.7150**	0.5358	**0.5715**	0.6272	**0.6006**	**0.7391**	168	0.0285	0.0420	**0.6534**	**0.4342**	0.5237	**0.2981**	0.4862	**0.4852**	**0.7356**
44	**0.0085**	0.0000	**0.6202**	**0.5916**	0.6086	0.1123	**0.6557**	0.5630	0.0110	169	0.0218	0.0228	**0.5887**	**0.6140**	0.6799	**0.2638**	0.6570	**0.6630**	**0.8457**
45	0.0126	0.0000	**0.5971**	**0.6560**	0.6485	0.0265	0.6485	**0.6143**	**0.8704**	170	0.0126	0.0077	**0.6079**	**0.5778**	0.1536	**0.4195**	0.0582	**0.2261**	0.0090
46	0.0104	0.0000	**0.2802**	**0.6768**	0.1878	0.0600	**0.1051**	0.0673	0.0184	171	0.0147	0.0077	**0.5802**	**0.4079**	0.6871	**0.0885**	0.5643	**0.6079**	**0.8445**
47	0.0279	0.0000	**0.5894**	**0.6997**	**0.5636**	0.0506	**0.5844**	0.1706	0.0279	172	0.0119	0.0070	**0.5824**	**0.5893**	0.7537	**0.5537**	0.6951	0.7369	**0.8802**
48	0.0000	0.0000	**0.7189**	0.4202	**0.4925**	0.0000	0.1610	0.1500	**0.7262**	173	0.0700	0.0061	0.5151	**0.6962**	0.0594	**0.0061**	0.0301	0.0503	**0.4649**
49	0.0000	0.0000	**0.6082**	**0.6582**	0.0145	0.0000	0.0084	**0.0324**	0.0306	174	0.0743	0.0068	**0.5758**	**0.6447**	**0.3913**	0.0159	**0.4306**	0.0154	**0.4576**
50	**0.0058**	0.0000	**0.7229**	0.5851	0.1002	0.0000	0.1584	0.1806	**0.7402**	175	0.0914	0.0089	0.2623	**0.6725**	**0.3667**	**0.4554**	0.1970	0.1735	0.0491
51	0.0000	0.0000	0.3600	**0.4689**	**0.2194**	0.0000	0.1527	0.0825	**0.0242**	176	0.0883	**0.0049**	0.3132	0.3202	0.2120	0.0358	0.0442	0.0276	**0.5818**
52	0.0167	0.0110	**0.6582**	**0.6691**	0.3494	0.0000	**0.4166**	0.2481	**0.7315**	177	0.0696	**0.2991**	0.2400	**0.2747**	0.0163	0.0210	**0.2832**	0.0248	0.0082
53	0.0224	**0.0085**	0.3398	**0.7761**	0.6243	**0.4708**	0.0354	0.5925	**0.8722**	178	0.0000	0.0000	**0.6241**	**0.5395**	**0.4819**	**0.3746**	0.4779	**0.4892**	0.0098
54	0.0401	0.0000	0.6316	**0.6557**	0.2871	**0.6569**	**0.6195**	**0.4388**	0.0000	179	0.0013	0.0000	**0.6576**	**0.4939**	**0.5629**	**0.3711**	0.5301	**0.5304**	0.0000
55	0.0000	0.0000	**0.6063**	0.3917	0.3179	**0.6508**	**0.3501**	**0.3564**	0.0095	180	0.0701	0.0037	**0.4858**	0.2590	**0.5010**	0.1875	0.0046	0.3113	0.0000
56	0.0000	0.0000	**0.6869**	**0.4956**	0.0908	0.1689	0.0027	**0.0233**	**0.5495**	181	0.0260	0.0031	**0.5464**	**0.6410**	0.6018	0.1877	0.5166	**0.5714**	**0.8123**
57	0.0000	0.0000	**0.6384**	**0.5828**	0.1318	0.4176	0.0028	0.0030	0.0030	182	0.0068	0.0000	**0.4312**	**0.4083**	**0.6702**	**0.4288**	0.5469	0.5463	**0.8051**
58	0.0000	0.0000	**0.6122**	0.2719	0.3845	**0.6892**	0.0026	**0.3342**	**0.4909**	183	0.0000	0.0000	**0.5355**	**0.5445**	**0.5987**	**0.4314**	0.6316	0.6026	**0.8380**
59	0.0167	0.0060	**0.6295**	**0.5636**	0.5095	**0.2246**	0.4573	**0.5282**	0.0050	184	0.0000	0.0013	**0.4830**	**0.5678**	0.5877	**0.1666**	0.5523	**0.5747**	**0.8082**
60	0.0091	0.0076	**0.6419**	**0.5704**	**0.5138**	**0.1982**	0.4957	0.4808	**0.7600**	185	0.0000	0.0000	**0.7716**	0.4236	**0.0235**	0.0012	**0.1084**	0.0575	0.0036
61	0.0045	0.0059	**0.5862**	**0.4621**	0.7073	**0.0976**	0.6434	**0.6670**	**0.8497**	186	0.0000	0.0000	**0.6887**	0.2610	**0.3072**	0.0000	0.0154	0.0030	**0.5336**
62	0.0068	0.0101	**0.6664**	**0.5753**	0.1908	**0.2634**	0.0564	**0.2114**	0.0113	187	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
63	0.0100	0.0105	**0.5740**	**0.3966**	0.6858	0.0181	0.5642	**0.6210**	**0.8582**	188	**0.0000**	**0.0012**	**0.7446**	**0.5801**	**0.0008**	**0.0036**	**0.0002**	**0.0002**	**0.0042**
64	0.0075	**0.7112**	**0.6853**	**0.5836**	0.7048	**0.0820**	0.6892	0.7321	**0.8843**	189	0.0000	0.0013	**0.6107**	0.5119	**0.0023**	0.0017	0.0002	0.0002	0.0090
65	0.0303	0.0000	**0.6512**	0.3340	0.0349	**0.0061**	0.0337	0.0573	0.0238	190	**0.0000**	**0.0000**	**0.2801**	**0.5390**	**0.0008**	**0.0024**	**0.0003**	**0.0005**	**0.0116**
66	0.0597	0.0068	**0.6579**	**0.5407**	**0.2757**	0.0000	0.3221	0.0131	**0.5085**	191	0.0000	0.0012	0.2772	**0.5078**	0.2017	**0.3039**	**0.4013**	0.4102	**0.4275**
67	0.3647	0.0574	**0.7352**	0.5453	**0.5294**	0.0645	0.2695	0.1641	0.0300	192	0.0000	0.0000	**0.5954**	**0.6805**	0.3685	**0.6691**	0.4531	**0.4766**	**0.5625**
68	0.0737	0.0289	**0.5049**	**0.5631**	**0.2314**	0.0164	0.0403	0.0275	0.0160	193	0.0244	0.0141	**0.5866**	**0.5436**	**0.4020**	**0.5412**	0.3536	0.3717	0.0000
69	0.0315	**0.2944**	0.3066	**0.7244**	0.0099	0.0761	**0.2344**	0.0220	0.0448	194	0.0007	0.0004	**0.6307**	**0.6611**	0.3862	**0.2213**	**0.3957**	**0.4041**	0.0060
70	0.0000	0.0000	**0.6812**	**0.5451**	0.4328	**0.3775**	0.4746	**0.4926**	**0.6767**	195	**0.0110**	0.0000	**0.5819**	**0.6183**	0.5917	**0.4950**	0.6242	0.6070	**0.7547**
71	0.0013	0.0000	**0.5855**	**0.4842**	**0.5595**	**0.3711**	0.5248	**0.5304**	0.0000	196	0.0044	0.0035	**0.6216**	**0.5883**	**0.6919**	**0.4434**	0.5049	0.5462	0.0000
72	0.0740	0.0062	**0.4373**	**0.5504**	**0.4178**	0.1909	0.0047	**0.3107**	0.0000	197	0.0000	0.0000	**0.7182**	0.4973	0.1074	0.0268	**0.2486**	0.1346	0.0030
73	0.0164	0.0023	**0.4881**	**0.4325**	0.5416	**0.1746**	**0.5367**	0.5979	**0.8317**	198	0.0000	0.0000	**0.4582**	**0.5971**	**0.7039**	0.0316	0.6370	0.6837	**0.8056**
74	0.0068	0.0000	**0.4623**	**0.4329**	**0.7204**	**0.4248**	0.5571	0.5500	0.0121	199	0.0000	0.0000	**0.6149**	**0.6015**	**0.4443**	0.0182	0.0114	0.4193	0.0030
75	0.0000	0.0000	**0.4184**	**0.5428**	**0.7413**	**0.4316**	0.6233	0.5962	**0.8351**	200	0.0000	0.0000	**0.7245**	0.7133	0.0075	0.0040	**0.0889**	**0.0435**	0.0102
76	0.0011	0.0020	**0.5216**	**0.4857**	0.5965	**0.0524**	0.5486	**0.5610**	**0.7895**	201	0.0000	0.0000	**0.7075**	0.4413	0.0034	0.0000	**0.2212**	0.0087	0.0150
77	0.0004	0.0000	**0.7740**	0.4593	**0.0223**	0.0039	**0.0909**	0.0904	0.0077	202	0.0000	0.0000	**0.5167**	**0.5049**	0.0214	0.0000	**0.0805**	0.0250	**0.0095**
78	0.0017	0.0010	**0.5494**	**0.6711**	**0.2973**	0.0094	0.0102	0.0033	**0.5330**	203	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
79	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	204	0.0000	0.0000	0.3905	**0.6075**	**0.0935**	0.0000	**0.5813**	0.1017	0.0135
80	0.0023	0.0017	**0.6692**	0.5345	**0.0076**	0.0115	0.0002	0.0002	0.0067	205	0.0000	0.0000	0.5226	**0.5713**	0.1079	0.0000	0.0267	**0.0841**	**0.5063**
81	**0.0008**	**0.0005**	**0.3560**	**0.6276**	**0.0016**	**0.0083**	**0.0002**	**0.0003**	**0.0140**	206	0.0000	0.0000	0.5849	**0.6641**	0.1395	0.0000	**0.4126**	0.0694	**0.5274**
82	**0.0010**	**0.0000**	**0.6658**	**0.6859**	**0.0023**	**0.0027**	**0.0003**	**0.0015**	**0.0054**	207	0.0470	0.3366	0.6089	**0.7397**	**0.1527**	**0.4819**	0.2874	0.0447	**0.4355**
83	0.0016	0.0026	**0.5239**	0.3051	0.1226	0.0089	**0.4042**	**0.4178**	**0.0068**	208	0.0000	0.0000	0.5278	0.3813	**0.2191**	**0.7960**	0.1799	0.0626	**0.3954**
84	0.0000	0.0000	**0.6430**	**0.6840**	0.1862	**0.6703**	0.4545	**0.4752**	**0.5773**	209	0.0000	0.0000	**0.5622**	**0.5309**	0.5296	**0.3583**	**0.5737**	**0.5814**	0.0068
85	0.0304	0.0141	**0.6154**	**0.5916**	0.3861	**0.4482**	0.3400	**0.3693**	0.0000	210	0.0047	0.0005	0.3940	**0.5299**	0.0610	0.0326	0.0378	**0.1349**	**0.4552**
86	0.0000	0.0004	0.3044	**0.6017**	0.3640	**0.2542**	**0.3862**	0.4006	0.0079	211	0.0054	0.0005	**0.5911**	**0.6362**	**0.1481**	**0.3731**	0.0526	0.1257	0.0060
87	**0.0130**	0.0000	**0.6461**	**0.5980**	0.5619	**0.4950**	0.6356	0.5956	**0.7565**	212	**0.0094**	0.0000	**0.3745**	**0.7120**	0.0128	0.0569	0.0073	0.0091	0.0000
88	0.0045	0.0035	**0.4354**	**0.5349**	**0.5814**	**0.4454**	0.5005	0.5470	0.0000	213	0.0005	0.0000	**0.5929**	**0.3856**	0.3788	**0.1718**	0.3890	**0.3859**	**0.5875**
89	0.0000	0.0000	0.4646	**0.6245**	0.1116	0.0091	**0.2605**	0.1221	0.0030	214	0.0000	0.0000	**0.6440**	**0.5223**	0.4057	**0.1459**	**0.3652**	0.3527	**0.6402**
90	0.0000	0.0012	**0.6285**	**0.5172**	0.6834	0.0208	**0.6337**	0.6897	**0.8162**	215	0.0107	0.0000	**0.6433**	**0.6786**	0.3665	**0.1485**	**0.3534**	0.3513	**0.6340**
91	0.0000	0.0000	0.3206	**0.6406**	**0.4318**	0.0132	0.3754	**0.4314**	0.0046	216	0.0023	0.0000	**0.6423**	**0.6202**	**0.4516**	**0.1571**	0.3547	0.3527	**0.6378**
92	0.0000	0.0009	**0.7097**	0.4434	**0.0241**	0.0040	**0.0883**	0.0431	0.0121	217	0.0000	0.0000	**0.5291**	**0.5389**	0.3780	0.0623	0.3530	**0.3534**	**0.6435**
93	0.0275	0.0257	**0.6245**	**0.4008**	0.6520	**0.2637**	0.5939	**0.5686**	**0.8451**	218	0.0004	0.0000	**0.5288**	**0.4690**	**0.4327**	**0.1524**	0.3545	0.3541	**0.6350**
94	0.0426	0.0188	**0.6905**	**0.5212**	0.6084	**0.2218**	0.6759	**0.5899**	**0.8317**	219	0.0004	0.0000	0.3122	**0.6304**	**0.3405**	**0.3199**	**0.2180**	0.1935	0.0006
95	0.0339	0.0000	0.5113	**0.6442**	0.1115	**0.6272**	**0.6573**	0.2462	**0.6973**	220	0.0011	0.0109	**0.4629**	**0.6075**	**0.5267**	**0.2114**	0.4245	0.4325	**0.6288**
96	0.0000	0.0000	**0.5944**	**0.6044**	**0.5570**	**0.4958**	0.4225	0.4191	**0.7273**	221	0.0107	0.0000	**0.6038**	**0.5762**	**0.6340**	**0.1529**	0.4637	0.4631	**0.7253**
97	0.0271	0.0198	0.5500	**0.7110**	0.2147	0.0921	**0.1283**	0.2551	0.0208	222	0.0000	0.0000	**0.3811**	**0.4321**	**0.5638**	**0.4701**	**0.4511**	0.4165	**0.6018**
98	0.0275	0.0456	**0.3968**	**0.5360**	**0.0497**	0.0000	0.0535	0.0326	0.0193	223	0.0774	0.0154	**0.5181**	**0.4036**	**0.5028**	0.3499	0.3660	0.3827	**0.6540**
99	0.0139	0.0000	**0.5904**	**0.6160**	0.5462	**0.3527**	0.4670	**0.4400**	0.0557	224	0.0000	0.0000	**0.5661**	**0.5464**	0.4738	**0.7224**	0.4207	**0.4768**	**0.5070**
100	0.0261	0.0052	**0.7074**	**0.6917**	0.3815	**0.5670**	**0.3832**	**0.4020**	0.0038	225	0.0609	0.0098	**0.5652**	**0.6526**	**0.3714**	**0.7007**	0.3649	**0.3602**	**0.5791**
101	0.0143	0.0036	**0.4510**	0.3146	**0.3904**	0.0926	0.1959	**0.1053**	0.0048	226	0.0034	0.0000	**0.6065**	**0.5241**	0.4430	**0.6792**	**0.5145**	**0.5206**	**0.6736**
102	0.1210	0.1558	**0.4687**	**0.6554**	0.5775	**0.5682**	**0.6260**	**0.5982**	0.0119	227	0.0018	0.0000	**0.2949**	**0.6101**	0.0310	0.2720	0.0069	**0.0422**	0.0021
103	0.0000	0.0000	**0.6995**	0.4167	0.1015	0.0000	**0.4877**	0.2570	0.0441	228	0.0018	0.0000	**0.3376**	**0.6173**	0.0528	**0.5990**	0.0010	**0.0598**	0.0082
104	0.0000	0.0000	**0.6040**	**0.6292**	0.0873	0.4283	0.0028	0.0030	**0.5495**	229	**0.5285**	0.0000	**0.6665**	0.6647	0.0054	**0.7291**	0.0013	**0.0366**	0.0000
105	0.0675	0.0157	**0.5780**	**0.4551**	**0.6912**	**0.2076**	0.6105	0.6710	**0.8508**	230	0.0135	0.0049	**0.6531**	**0.5974**	0.1713	**0.5945**	0.3135	**0.3255**	0.0049
106	0.0579	0.0099	**0.4318**	**0.5759**	0.7122	**0.2170**	0.5624	**0.6003**	**0.8525**	231	0.0000	0.0000	**0.4756**	**0.4863**	**0.4453**	0.3636	0.0080	**0.3658**	**0.6484**
107	0.0734	0.0179	**0.4596**	**0.4973**	**0.2534**	**0.0479**	0.0972	0.1517	0.0337	232	0.0000	0.0000	**0.4868**	**0.5879**	**0.4975**	**0.5089**	0.4291	0.3725	0.0000
108	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	233	0.0049	0.0000	**0.7700**	0.7571	**0.0221**	**0.3750**	0.0395	**0.0639**	0.0054
109	0.0271	0.0257	**0.4191**	**0.5238**	0.6493	**0.2654**	0.5829	**0.5707**	**0.8512**	234	0.0160	0.0000	**0.7700**	0.4954	0.0044	**0.7995**	0.0006	**0.0047**	0.0107
110	0.0270	0.0256	**0.5699**	**0.6464**	0.0275	0.2483	0.0074	0.4169	**0.7342**	235	0.0011	0.0000	0.2847	**0.5009**	**0.0268**	**0.3182**	**0.1347**	0.0742	0.0139
111	0.0270	0.0256	**0.5356**	**0.5819**	0.4830	**0.3692**	**0.5418**	0.4167	**0.7441**	236	**0.0016**	0.0000	0.4653	0.6051	0.0665	**0.6595**	0.0193	0.0049	**0.3210**
112	0.0249	0.2143	**0.6274**	**0.4655**	0.5671	**0.2122**	0.6755	**0.6448**	**0.8377**	237	0.0017	0.0000	**0.5262**	**0.5524**	**0.6603**	**0.5696**	0.6241	**0.6735**	**0.8027**
113	0.0104	0.0000	**0.6778**	**0.6635**	0.0238	0.0237	**0.1554**	0.0116	0.0360	238	0.0039	0.0000	**0.5791**	**0.6193**	0.3149	**0.4983**	0.4049	**0.4368**	**0.5887**
114	**0.0104**	0.0000	**0.6840**	0.4460	0.0356	0.0761	0.1651	0.0416	**0.5059**	239	0.0000	0.0000	**0.5417**	0.3306	0.0141	0.0344	0.0694	**0.1258**	**0.0043**
115	**0.0104**	0.0000	**0.7425**	0.3357	0.0517	0.0632	0.1784	0.0324	0.0729	240	0.0000	0.0000	**0.2785**	**0.4603**	**0.1933**	0.0345	0.0526	0.0483	0.0036
116	0.0104	0.0000	**0.7518**	**0.6480**	0.1066	**0.5416**	**0.6586**	0.2672	0.0559	241	0.0000	0.0000	**0.5394**	**0.4859**	**0.5700**	**0.0642**	**0.4010**	0.4031	**0.7262**
117	0.0104	0.0000	0.5317	**0.5994**	0.1450	0.2219	**0.5087**	0.0964	**0.6862**	242	0.0030	0.0026	**0.6499**	**0.6467**	0.3601	0.0223	**0.2497**	0.2816	**0.5749**
118	**0.0104**	0.0000	0.4953	**0.5743**	0.0227	0.0529	0.6181	0.2573	**0.6991**	243	0.0030	0.0030	**0.6793**	**0.6971**	0.0347	0.0292	**0.0427**	0.1488	**0.3165**
119	0.0670	0.0000	**0.6267**	**0.5876**	0.6442	**0.7014**	**0.5821**	0.5939	**0.8259**	244	0.0007	0.0025	**0.5479**	**0.4421**	0.2636	0.0815	**0.2247**	0.2632	**0.5229**
120	0.1276	0.0114	**0.6841**	0.4489	0.4357	**0.7084**	**0.4195**	0.4138	**0.6929**	245	0.0007	0.0026	**0.6306**	**0.6189**	0.3308	**0.4231**	**0.3046**	0.3703	**0.5251**
121	0.0000	0.0000	**0.7108**	**0.6313**	**0.4758**	0.2531	0.0067	0.0992	**0.6205**	246	0.0057	**0.7302**	**0.6135**	**0.6214**	0.3007	**0.4842**	0.2520	**0.3878**	**0.5346**
122	0.0000	0.0000	**0.6611**	0.3221	**0.1498**	0.2539	0.0047	0.0634	**0.6236**	247	0.0292	0.0105	**0.5038**	0.2710	0.1577	0.1327	0.0005	**0.0804**	**0.3894**
123	0.0064	0.0815	**0.5776**	**0.5643**	**0.4531**	**0.1828**	0.4145	**0.4522**	0.0036	248	0.0000	0.0000	**0.2934**	**0.7297**	0.0151	0.0053	**0.0205**	0.0135	0.0394
124	0.0000	0.0000	**0.6469**	**0.4856**	0.5159	**0.4956**	**0.4244**	0.4221	**0.7277**	249	0.0000	0.0000	**0.6833**	**0.5131**	**0.1973**	0.0000	0.0183	0.0202	0.0545
125	0.0000	0.0000	**0.7221**	**0.5817**	0.5102	**0.5546**	0.3610	**0.3655**	**0.5905**	250	0.0000	0.0000	0.4372	**0.6965**	**0.0238**	0.0000	0.0087	**0.0254**	0.0401

TABLE XXII
THE TEST F1-PA-10 OF TIME SERIES ANOMALY DETECTION IN UCR 250 SUB-DATASETS. THE BEST RESULTS ARE IN **BOLD**.

UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	TS2Vec	DCdetector	UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	TS2Vec	DCdetector
1	0.0920	0.1968	0.1940	0.1961	**0.3301**	0.1650	126	0.0501	0.0285	0.0630	**0.0789**	0.0614	0.0464
2	0.0328	0.0627	0.1040	0.0936	0.0303	**0.1592**	127	0.0262	0.0191	**0.1259**	0.0950	0.0360	0.0000
3	**0.3396**	0.1791	0.1233	0.1153	0.1774	0.0816	128	0.3641	0.3405	0.3447	**0.4189**	0.3845	0.0361
4	0.3135	**0.4158**	0.3228	0.3350	0.3604	0.0552	129	0.1557	0.0881	0.0864	0.1095	**0.4167**	0.2041
5	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	130	**0.4591**	0.2391	0.2220	0.2810	0.3220	0.3089
6	0.0921	0.1023	**0.2892**	0.1752	0.0958	0.1595	131	0.7939	0.2755	0.2327	0.2147	**0.9630**	0.2515
7	0.0726	**0.1408**	0.0734	0.1360	0.0520	0.0000	132	0.0534	0.0405	0.0929	0.0942	0.0284	**0.2765**
8	0.4068	**0.8889**	0.1616	0.1875	0.6076	0.0068	133	0.4122	0.0424	0.1770	0.1824	**0.8182**	0.0000
9	0.1742	0.0757	0.1687	0.1912	0.0978	**0.3299**	134	**0.5136**	0.3629	0.3931	0.3680	0.4398	0.4935
10	0.1463	0.2652	0.2013	0.2177	0.1406	**0.2991**	135	0.0142	0.0045	0.0198	**0.0630**	0.0048	0.0000
11	0.2749	0.3112	0.2111	0.2195	**0.3266**	0.1377	136	0.2233	0.3222	0.3284	0.2464	**0.3769**	0.0195
12	0.1101	**0.1446**	0.1270	0.1017	0.1364	0.0779	137	0.2101	0.2494	0.3208	**0.3333**	0.2500	0.0173
13	0.0508	0.0423	0.1041	0.0838	0.0538	**0.1091**	138	0.0305	0.0068	0.0513	0.0396	0.0086	**0.1105**
14	0.0367	0.0304	0.0619	**0.1036**	0.0523	0.0182	139	0.4005	0.2536	**0.4051**	0.3575	0.2768	0.0495
15	0.0588	0.0308	0.0346	0.0308	**0.0859**	0.0045	140	0.7435	**1.0000**	0.5774	0.4931	0.8995	0.0606
16	0.2043	**0.2201**	0.1653	0.1245	0.1478	0.1106	141	0.5144	0.5954	0.4533	0.4802	**0.6939**	0.0598
17	0.1013	**0.1420**	0.0907	0.1007	0.0922	0.0131	142	**0.9873**	0.3634	0.3236	0.3157	0.3617	0.0240
18	0.0282	0.0281	0.0630	**0.0957**	0.0370	0.0350	143	0.1190	0.0990	0.3049	0.2742	0.2337	**0.3556**
19	0.0240	0.0195	0.0824	**0.0949**	0.0311	0.0000	144	0.1291	0.0874	0.2872	0.3961	0.1147	**0.4020**
20	0.3509	0.3500	0.3944	0.4000	0.3800	**0.4277**	145	0.7519	**0.9709**	0.0426	0.0460	0.1145	0.0058
21	0.1560	0.0893	0.1387	0.1192	**0.2507**	0.2350	146	0.0172	0.0426	0.0501	0.0380	**0.0507**	0.0000
22	**0.5742**	0.2458	0.2396	0.2171	0.3728	0.2208	147	0.1563	**0.2857**	0.0147	0.0367	0.0435	0.0180
23	0.7939	0.3377	0.2577	0.2755	**0.8560**	0.0272	148	**0.1079**	0.1051	0.0775	0.1025	0.0782	0.0874
24	0.0455	0.0390	0.1429	0.1087	0.0277	**0.2500**	149	0.0777	**0.1349**	0.0984	0.0864	0.0911	0.0449
25	0.2477	0.0421	0.0871	0.1337	**0.4286**	0.0000	150	0.0406	0.0666	0.1481	**0.1735**	0.0910	0.0221
26	**0.4576**	0.3421	0.3680	0.3363	0.3116	0.3680	151	0.1497	**0.4520**	0.2125	0.1765	0.3216	0.2842
27	0.0169	0.0047	**0.0232**	0.0154	0.0062	0.0000	152	0.1151	0.0990	0.2565	**0.2677**	0.0946	0.2603
28	0.2347	0.3563	0.2534	0.2846	**0.3821**	0.0193	153	0.1077	0.2126	0.2938	0.3692	0.1475	**0.3856**
29	0.2161	0.2394	**0.3173**	0.2420	0.2156	0.0359	154	0.0282	0.0676	0.0811	**0.1075**	0.0705	0.0197
30	0.0309	0.0068	0.0285	0.0109	0.0116	**0.1361**	155	0.1005	0.1156	0.1141	0.1278	**0.1356**	0.0244
31	0.4000	0.2433	**0.4665**	0.4261	0.2873	0.0485	156	**0.6667**	0.0473	0.1900	0.1650	0.0582	0.3606
32	0.7766	**0.9433**	0.5563	0.5611	0.8829	0.0426	157	**0.0326**	0.0074	0.0135	0.0115	0.0161	0.0000
33	0.5371	**0.6367**	0.5405	0.4670	0.5965	0.0599	158	0.3660	**0.9327**	0.1954	0.1660	0.1514	0.1155
34	**0.9451**	0.2876	0.2958	0.3319	0.3804	0.0231	159	0.0043	0.0084	**0.1235**	0.0115	0.0183	0.0105
35	0.1308	0.0999	**0.3278**	0.2763	0.2589	0.0402	160	0.0779	0.0393	**0.1982**	0.1792	0.1179	0.1640
36	0.1217	0.0782	**0.3886**	0.3368	0.1114	0.0469	161	0.3343	0.2781	0.4425	0.4334	0.2967	**0.4695**
37	0.9434	**1.0000**	0.0417	0.0488	0.2058	0.0277	162	0.0316	0.0753	0.1501	0.1818	**0.4155**	0.0000
38	**0.0584**	0.0566	0.0459	0.0515	0.0505	0.0000	163	**0.4587**	0.2545	0.1038	0.0920	0.2836	0.0095
39	0.3822	**0.3871**	0.0272	0.0233	0.0675	0.0000	164	0.0576	0.0928	0.0558	0.0547	**0.1141**	0.0175
40	**0.1286**	0.1048	0.0840	0.0945	0.0724	0.0097	165	0.0276	0.0238	**0.0539**	0.0512	0.0355	0.0094
41	0.0703	0.1281	**0.1292**	0.0976	0.1085	0.0104	166	0.0796	0.0755	0.0658	0.0591	0.0353	**0.0858**
42	0.0390	0.0684	0.1318	0.1407	0.0892	**0.1718**	167	0.1439	0.1027	0.1009	0.1108	0.1631	**0.1854**
43	0.1347	**0.4451**	0.1628	0.2122	0.3995	0.2235	168	**0.2240**	0.1185	0.1285	0.1233	0.1112	0.1322
44	0.1196	0.1117	0.2318	0.2297	0.0903	**0.2479**	169	0.2195	**0.6202**	0.2235	0.2196	0.2885	0.3397
45	0.1157	0.2195	0.3357	0.3117	0.1631	**0.3543**	170	**0.9205**	0.0598	0.0504	0.0510	0.1561	0.0025
46	0.0293	0.0617	0.0808	**0.0915**	0.0595	0.0000	171	**0.4760**	0.1971	0.2123	0.2332	0.2848	0.1879
47	0.0941	0.1177	0.1257	0.1169	**0.1330**	0.0184	172	**0.6135**	0.2384	0.2600	0.2934	0.3170	0.0255
48	**0.3619**	0.2487	0.1867	0.1667	0.0988	0.2419	173	0.0771	0.0844	0.0532	0.0506	0.0971	**0.2353**
49	0.0186	0.0070	0.0148	**0.0754**	0.0116	0.0000	174	0.0135	0.0138	0.0360	0.0780	0.0347	**0.1701**
50	0.6025	**0.6599**	0.2672	0.2059	0.1462	0.0258	175	0.3861	0.2857	0.1395	0.1038	**0.4184**	0.0000
51	0.0055	0.0099	**0.0173**	0.0097	0.0163	0.0000	176	0.0535	0.0565	0.0692	**0.1053**	0.0465	0.0817
52	0.1511	**1.0000**	0.2481	0.1748	0.1186	0.0207	177	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
53	0.3732	0.3047	0.4583	0.4208	0.2888	**0.5946**	178	0.3094	**0.3500**	0.1173	0.1168	0.2564	0.0357
54	0.0316	0.0866	0.1387	0.2027	**0.3533**	0.0000	179	0.9302	**0.9950**	0.1877	0.1546	0.3137	0.0000
55	**0.4762**	0.2768	0.1075	0.1497	0.2674	0.0127	180	0.0674	0.0632	**0.1028**	0.0777	0.0850	0.0000
56	0.0498	**0.0855**	0.0436	0.0597	0.0825	0.0168	181	0.0623	0.1665	0.1729	**0.1995**	0.1841	0.0202
57	0.0193	0.0204	**0.0563**	0.0556	0.0330	0.0097	182	0.0388	0.1537	0.1770	0.1750	**0.2033**	0.0211
58	**0.0786**	0.0769	0.0593	0.0361	0.0340	0.0256	183	0.1154	0.1454	0.2121	0.2219	0.1910	**0.3497**
59	0.0527	0.1143	0.1222	0.1153	0.0476	**0.1667**	184	0.2821	**0.6905**	0.1358	0.1337	0.2840	0.1954
60	0.1399	0.1380	0.1189	0.1361	**0.1419**	0.0149	185	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
61	**0.2884**	0.2462	0.2727	0.2120	0.2147	0.2623	186	0.0100	0.0117	0.0216	**0.0308**	0.0111	0.0067
62	**0.0690**	0.0616	0.0376	0.0494	0.0564	0.0327	187	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
63	0.1660	0.1969	0.2215	0.2261	**0.2568**	0.0221	188	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
64	**0.5364**	0.2659	0.2738	0.3022	0.2633	0.3932	189	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
65	0.0955	**0.1367**	0.0984	0.0938	0.0666	0.0000	190	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
66	0.0137	0.0141	0.0613	0.0762	0.0248	**0.2083**	191	0.0078	0.0020	0.0146	0.0094	0.0149	**0.0180**
67	**0.3584**	0.1538	0.1366	0.1299	0.3205	0.0576	192	**0.2291**	0.2281	0.1043	0.0956	0.2079	0.0276
68	0.0581	0.0475	**0.0796**	0.0624	0.0559	0.0000	193	0.0431	0.0505	0.0598	**0.0650**	0.0359	0.0000
69	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	194	0.1514	**0.4995**	0.0779	0.0861	0.1312	0.0106
70	0.3359	**0.3620**	0.1242	0.1074	0.2471	0.0617	195	0.1130	0.1448	**0.1754**	0.1406	0.1414	0.1069
71	0.9238	**0.9926**	0.1536	0.1548	0.3268	0.0000	196	0.0553	0.0751	0.1372	**0.1638**	0.1083	0.0000
72	0.0657	0.0629	**0.1009**	0.0897	0.0856	0.0000	197	0.1250	0.0501	0.0564	0.0363	0.1302	**0.1722**
73	0.0878	0.1858	0.1836	0.2005	**0.3033**	0.0321	198	0.1835	0.1711	0.1806	0.1829	**0.2541**	0.0989
74	0.0604	0.1758	0.1871	0.1932	**0.2101**	0.0249	199	0.0645	0.0647	0.0739	**0.0747**	0.0538	0.0549
75	0.1879	0.1600	**0.2369**	0.2344	0.1984	0.0977	200	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
76	0.1656	**0.5710**	0.1359	0.1423	0.1259	0.1330	201	**0.6818**	0.0138	0.0048	0.0197	0.0163	0.0000
77	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	202	**0.0319**	0.0142	0.0096	0.0144	0.0055	0.0213
78	0.0101	0.0109	0.0254	**0.0342**	0.0138	0.0171	203	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
79	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	204	0.4531	**0.9589**	0.0381	0.0401	0.0265	0.0000
80	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	205	0.0658	0.0256	0.0521	0.0463	0.0186	**0.0768**
81	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	206	0.0489	0.0805	0.0337	0.0611	0.0613	**0.0872**
82	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	207	0.0086	0.0264	0.0198	0.0200	0.0498	**0.0618**
83	0.0080	0.0028	**0.0111**	0.0087	0.0070	0.0005	208	0.0342	**0.0346**	0.0253	0.0217	0.0315	0.0213
84	**0.2268**	0.2227	0.0866	0.0843	0.1992	0.0634	209	0.1017	0.0738	0.0754	0.0999	**0.1130**	0.0636
85	0.0416	**0.0515**	0.0439	0.0467	0.0336	0.0000	210	0.0506	**0.0686**	0.0210	0.0177	0.0535	0.0431
86	0.1596	**0.4936**	0.0830	0.0761	0.1480	0.0111	211	**0.1090**	0.0720	0.0205	0.0199	0.0853	0.0027
87	0.1235	0.1431	0.1369	**0.1508**	0.1381	0.0935	212	0.0127	0.0148	0.0301	**0.0476**	0.0091	0.0000
88	0.0771	0.0765	0.1632	**0.1681**	0.1257	0.0000	213	**0.3879**	0.0653	0.0360	0.0340	0.0612	0.0691
89	**0.1064**	0.0512	0.0407	0.0428	0.0954	0.0376	214	0.0138	0.0533	0.0477	0.0496	0.0377	**0.0629**
90	0.1838	0.1744	0.1729	0.1757	**0.2249**	0.1346	215	0.0357	**0.0579**	0.0411	0.0430	0.0232	0.0281
91	0.0617	0.0645	**0.0755**	0.0755	0.0584	0.0493	216	0.0449	**0.0605**	0.0473	0.0584	0.0474	0.0361
92	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	217	0.0082	0.0278	**0.0506**	0.0465	0.0447	0.0492
93	0.0809	0.2155	0.1879	0.1853	**0.3326**	0.1252	218	0.0165	0.0619	0.0496	0.0493	**0.0691**	0.0349
94	0.4515	**0.5038**	0.3487	0.3210	0.4415	0.4566	219	**0.0653**	0.0591	0.0222	0.0167	0.0641	0.0023
95	0.5517	**0.8571**	0.1825	0.2735	0.7273	0.3735	220	**0.6229**	0.0672	0.0400	0.0474	0.0895	0.0540
96	0.2045	**0.2288**	0.1234	0.1639	0.1158	0.0530	221	0.0481	**0.1076**	0.0813	0.0932	0.0942	0.0586
97	0.1765	0.0916	0.1463	0.1863	**0.2426**	0.1325	222	**0.1348**	0.0961	0.0540	0.0612	0.0675	0.0137
98	**0.0148**	0.0046	0.0079	0.0145	0.0048	0.0000	223	0.0474	0.0592	0.0788	**0.0805**	0.0376	0.0221
99	**0.9598**	0.3804	0.3638	0.3246	0.5345	0.4777	224	0.0505	0.0453	**0.0697**	0.0656	0.0561	0.0146
100	0.9709	**0.9901**	0.0303	0.0360	0.5102	0.0608	225	0.0592	0.0329	0.0567	0.0486	**0.0954**	0.0122
101	**0.1507**	0.1227	0.0971	0.0885	0.0751	0.0692	226	0.5204	**0.5629**	0.0933	0.0660	0.1913	0.0150
102	0.1349	**0.4056**	0.2339	0.1921	0.3756	0.0165	227	**0.1178**	0.1047	0.0437	0.0444	0.0681	0.0108
103	0.1048	**1.0000**	0.1872	0.1444	0.1167	0.0316	228	**0.1064**	0.0611	0.0108	0.0087	0.0266	0.0000
104	0.0347	0.0267	0.0461	**0.0576**	0.0364	0.0088	229	**0.1143**	0.0692	0.0050	0.0040	0.0187	0.0000
105	**0.3026**	0.2497	0.2328	0.2244	0.2422	0.0252	230	0.1281	**0.1290**	0.0665	0.0422	0.1038	0.0027
106	**0.3158**	0.1959	0.2217	0.2259	0.2402	0.1727	231	0.0568	0.0514	**0.1072**	0.0887	0.0482	0.0445
107	**0.3268**	0.2445	0.1534	0.2646	0.2203	0.0301	232	0.0458	0.0506	0.0950	0.0907	**0.1051**	0.0000
108	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	233	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
109	0.0764	0.2272	0.2121	0.1920	**0.3301**	0.1308	234	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
110	0.0271	0.0758	**0.1113**	0.0964	0.0269	0.0188	235	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
111	**0.3997**	0.2270	0.1093	0.1198	0.1776	0.1211	236	0.0012	0.0015	0.0062	0.0053	0.0026	**0.0385**
112	0.3925	0.4635	0.3711	0.3549	**0.5348**	0.4751	237	**0.2322**	0.2296	0.1795	0.1772	0.1817	0.1488
113	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	238	0.0886	**0.0955**	0.0547	0.0515	0.0684	0.0067
114	0.0796	0.0879	0.0732	0.0923	0.0884	**0.3934**	239	0.0000	0.0051	0.0021	0.0014	**0.0164**	0.0006
115	0.0710	0.1360	0.0751	0.1543	0.0544	**0.1784**	240	0.0000	0.0003	0.0022	0.0029	0.0033	**0.0065**
116	0.4683	**0.8276**	0.1905	0.2388	0.6154	0.2243	241	0.0000	0.0056	0.0466	0.0496	**0.0508**	0.0392
117	0.2202	0.0763	0.1765	0.1067	0.0923	**0.3650**	242	0.0211	0.0255	0.0288	0.0311	**0.0318**	0.0092
118	0.1206	0.1758	0.1996	0.1893	0.1277	**0.3692**	243	0.0245	0.0087	0.0154	0.0144	**0.0602**	0.0146
119	0.1974	0.3173	0.2449	0.2310	**0.3264**	0.1266	244	0.0318	0.0209	0.0275	0.0215	0.0217	**0.0508**
120	0.0910	0.1476	0.0989	0.1587	**0.1591**	0.0228	245	**0.0525**	0.0274	0.0277	0.0200	0.0356	0.0109
121	0.0220	0.0365	0.1046	**0.1173**	0.0646	0.0169	246	0.0478	**0.0972**	0.0338	0.0282	0.0500	0.0122
122	0.0136	0.0259	**0.0790**	0.0704	0.0459	0.0178	247	0.0017	0.0076	0.0076	0.0101	0.0146	**0.0320**
123	0.0724	0.0308	0.0260	0.0225	**0.2552**	0.0042	248	0.0000	0.0017	**0.0364**	0.0139	0.0134	0.0000
124	0.1669	**0.2382**	0.1445	0.1399	0.1210	0.0167	249	0.0471	0.0485	**0.1145**	0.0547	0.0930	0.0684
125	0.0911	**0.1384**	0.0711	0.0675	0.0917	0.0509	250	**0.4138**	0.3750	0.0209	0.0047	0.1644	0.0000

TABLE XXIII
THE TEST F1-PA-50 OF TIME SERIES ANOMALY DETECTION IN UCR 250 SUB-DATASETS. THE BEST RESULTS ARE IN **BOLD**.

UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	TS2Vec	DCdetector	UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	TS2Vec	DCdetector
1	0.0307	0.0616	0.0529	0.0563	**0.0676**	0.0285	126	0.0139	0.0149	0.0184	**0.0168**	**0.0193**	0.0183
2	0.0256	**0.0349**	0.0250	0.0255	0.0244	**0.0252**	127	0.0253	0.0156	**0.0273**	0.0195	**0.0340**	0.0000
3	**0.0524**	0.0333	0.0239	0.0256	0.0290	0.0191	128	0.1124	**0.1677**	0.1049	**0.1033**	0.1059	0.0361
4	**0.1410**	**0.1373**	0.0962	0.0945	0.1086	0.0552	129	**0.0925**	0.0572	0.0280	0.0312	**0.0833**	0.0460
5	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	130	**0.1056**	**0.1297**	0.0637	0.0597	0.0579	0.0481
6	**0.0812**	0.0696	**0.0516**	0.0755	0.0406	0.0483	131	0.1351	0.0514	0.0574	0.0576	**0.2378**	0.0583
7	0.0345	**0.0457**	0.0199	0.0323	0.0324	0.0000	132	0.0419	0.0387	0.0210	0.0250	0.0185	**0.0976**
8	0.0837	**0.1538**	0.0496	0.0551	0.0870	0.0068	133	0.1298	0.0384	0.0255	0.0252	**0.2273**	0.0000
9	**0.1007**	0.0389	0.0371	0.0419	0.0343	**0.0467**	134	**0.1763**	0.1479	0.1190	0.1067	0.0830	0.1242
10	0.0646	**0.0848**	0.0381	0.0600	0.0541	**0.0408**	135	**0.0115**	0.0039	0.0114	**0.0108**	0.0041	0.0000
11	**0.0824**	0.0800	0.0586	0.0639	**0.0495**	0.0466	136	0.1060	**0.1136**	0.0660	0.0697	**0.0550**	0.0195
12	0.0508	**0.0526**	0.0264	0.0263	0.0513	0.0169	137	0.1127	**0.1216**	0.0663	**0.0708**	0.0529	0.0173
13	0.0276	**0.0300**	0.0273	0.0275	0.0298	**0.0179**	138	0.0217	0.0058	0.0513	0.0101	0.0059	**0.0870**
14	0.0142	**0.0256**	0.0201	**0.0167**	0.0221	0.0182	139	0.1528	**0.2028**	**0.1223**	0.1151	0.1420	0.0495
15	0.0071	0.0129	0.0063	0.0067	**0.0138**	0.0045	140	0.2065	**0.3272**	0.1906	0.2125	0.1954	0.0606
16	0.0413	**0.0400**	0.0305	0.0294	**0.0461**	0.0200	141	0.1915	0.1906	**0.1963**	0.1635	**0.1470**	0.0598
17	0.0349	**0.0409**	0.0162	0.0156	**0.0901**	0.0131	142	**0.3456**	0.1385	0.0935	0.0914	0.0841	0.0240
18	0.0143	0.0147	0.0172	**0.0159**	0.0204	**0.0331**	143	0.0593	0.0683	0.0787	0.0838	**0.0905**	**0.0597**
19	0.0200	0.0147	0.0255	**0.0313**	0.0243	0.0000	144	0.0865	0.0620	0.0860	0.0854	0.0740	**0.3710**
20	0.1181	**0.1267**	0.1150	0.1104	0.1060	**0.0840**	145	0.1957	**0.3288**	0.0426	0.0460	0.1017	0.0058
21	**0.0884**	0.0573	0.0246	0.0253	**0.0697**	0.0368	146	0.0086	**0.0132**	0.0118	0.0117	**0.0129**	0.0000
22	**0.1034**	**0.1220**	0.0554	0.0574	0.0723	0.0741	147	0.0833	**0.1132**	0.0051	0.0101	0.0435	0.0024
23	0.1341	0.0496	0.0588	0.0580	**0.1780**	0.0272	148	**0.0257**	0.0184	0.0231	0.0198	**0.0308**	0.0122
24	0.0380	0.0372	0.0313	0.0273	0.0186	**0.0533**	149	0.0144	**0.0339**	0.0245	0.0249	0.0203	0.0138
25	0.1132	0.0380	0.0303	0.0293	**0.1271**	0.0000	150	0.0252	0.0343	0.0411	**0.0404**	**0.0607**	0.0221
26	**0.1804**	0.1204	0.1022	0.1042	0.0941	0.1377	151	0.0374	**0.0737**	0.0420	0.0417	**0.0837**	0.0630
27	**0.0139**	0.0041	**0.0093**	0.0053	0.0041	0.0000	152	**0.0791**	0.0622	0.0577	**0.0606**	0.0737	0.0363
28	**0.1066**	0.1028	0.0725	0.0674	**0.0879**	0.0193	153	0.0683	0.0820	0.0877	0.0815	**0.0971**	**0.0625**
29	0.1095	**0.1214**	**0.0703**	0.0717	0.0574	0.0359	154	0.0169	0.0188	**0.0263**	**0.0226**	0.0230	0.0197
30	0.0219	0.0058	0.0076	0.0066	0.0055	**0.1053**	155	0.0244	0.0225	0.0235	0.0229	**0.0258**	0.0244
31	0.1549	**0.2036**	**0.1278**	0.1169	0.1155	0.0485	156	**0.2779**	0.0467	0.0530	0.0405	0.0483	**0.3094**
32	0.2100	**0.2732**	0.1878	0.2050	0.2089	0.0426	157	**0.0126**	0.0061	0.0058	0.0067	0.0118	0.0000
33	**0.1995**	**0.1686**	0.1798	0.1575	0.1427	0.0599	158	0.3660	**0.9327**	0.0443	0.0484	0.0504	0.0126
34	**0.2855**	0.1412	0.0935	0.0930	0.1114	0.0231	159	0.0029	0.0040	**0.0315**	0.0047	0.0061	0.0031
35	0.0612	0.0623	**0.0790**	0.0786	**0.0830**	0.0402	160	0.0402	0.0389	**0.0531**	0.0459	**0.0664**	0.0266
36	0.0848	0.0679	**0.1109**	0.0787	0.0687	0.0469	161	0.1743	0.1534	0.1570	0.1630	**0.1882**	**0.0620**
37	0.2500	**0.3429**	0.0417	0.0163	0.1290	0.0227	162	0.0297	0.0318	0.0807	0.0811	**0.1146**	0.0000
38	**0.0145**	**0.0159**	0.0126	0.0122	0.0100	0.0000	163	**0.1351**	0.0478	0.0219	0.0202	0.0392	0.0095
39	0.1176	**0.1224**	0.0117	0.0059	0.0247	0.0000	164	0.0100	**0.0217**	0.0106	0.0123	**0.0132**	0.0175
40	**0.0237**	0.0182	0.0211	0.0246	**0.0289**	0.0097	165	0.0165	0.0117	**0.0127**	0.0149	**0.0181**	0.0094
41	0.0144	**0.0283**	**0.0234**	0.0219	0.0213	0.0104	166	0.0143	0.0131	0.0233	0.0085	0.0115	**0.0238**
42	0.0247	0.0342	0.0443	0.0445	**0.0598**	**0.0290**	167	0.0228	0.0202	0.0276	0.0287	**0.0379**	**0.0222**
43	0.0369	**0.0680**	0.0431	0.0490	**0.0754**	0.0334	168	**0.0360**	0.0211	0.0263	0.0276	0.0355	0.0180
44	**0.0790**	0.0611	0.0641	0.0582	0.0715	**0.0348**	169	**0.1447**	**0.1016**	0.0554	0.0567	0.0592	0.0596
45	0.0736	0.0842	0.0800	0.0841	**0.1021**	**0.0490**	170	**0.3462**	0.0334	0.0092	0.0098	0.0433	0.0025
46	0.0175	0.0183	0.0206	**0.0367**	0.0184	0.0000	171	**0.0952**	0.0746	0.0535	0.0545	0.0573	0.0431
47	0.0244	0.0230	0.0244	**0.0290**	**0.0229**	0.0184	172	**0.1351**	0.0977	0.0754	0.0724	0.0731	0.0255
48	**0.1891**	0.0474	0.0456	0.0506	0.0388	0.0387	173	0.0162	0.0211	0.0189	**0.0506**	0.0172	**0.0358**
49	**0.0107**	0.0065	0.0071	**0.0104**	0.0079	0.0000	174	0.0131	0.0135	0.0171	0.0183	0.0184	**0.0482**
50	**0.1453**	**0.1058**	0.0564	0.0491	0.0750	0.0258	175	0.0600	0.0476	0.0453	0.0438	**0.0941**	0.0000
51	0.0028	0.0040	**0.0051**	0.0034	**0.0053**	0.0000	176	0.0210	0.0212	0.0255	**0.0193**	0.0216	**0.0313**
52	0.0462	**0.4636**	0.0563	0.0430	0.0560	0.0207	177	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
53	0.1746	0.1484	0.1658	0.1601	**0.1895**	**0.1045**	178	0.0481	**0.0757**	0.0206	0.0221	0.0566	0.0077
54	0.0297	0.0322	0.0695	0.0793	**0.0831**	0.0000	179	0.1673	**0.2846**	0.0266	0.0266	0.0796	0.0000
55	**0.0967**	0.0381	0.0210	0.0191	0.0347	0.0127	180	0.0130	0.0158	**0.0215**	0.0263	**0.0266**	0.0000
56	0.0096	**0.0130**	0.0114	0.0119	0.0102	**0.0168**	181	0.0411	0.0518	0.0462	**0.0461**	**0.0562**	0.0202
57	0.0121	0.0126	**0.0125**	0.0108	**0.0143**	0.0097	182	0.0295	0.0451	0.0493	0.0504	**0.0550**	0.0211
58	**0.0113**	0.0135	0.0104	0.0090	0.0120	**0.0256**	183	0.0645	0.0608	0.0575	0.0582	0.0660	**0.0855**
59	0.0227	0.0286	0.0253	0.0240	**0.0318**	**0.0240**	184	0.0505	**0.1079**	0.0313	0.0313	0.0645	0.0278
60	0.0249	0.0258	**0.0268**	0.0266	**0.0228**	0.0149	185	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
61	**0.0781**	0.0621	0.0563	0.0576	0.0611	0.0473	186	**0.0100**	0.0064	0.0065	**0.0065**	0.0066	0.0067
62	**0.0287**	0.0320	0.0118	0.0115	**0.0450**	0.0054	187	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
63	0.0488	0.0543	0.0549	0.0547	**0.0552**	0.0221	188	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
64	**0.0752**	**0.0933**	0.0723	0.0739	0.0741	0.0785	189	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
65	0.0170	**0.0237**	**0.0455**	0.0217	0.0194	0.0000	190	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
66	0.0133	0.0137	0.0131	0.0260	0.0147	**0.0526**	191	0.0035	0.0015	0.0026	0.0024	0.0149	**0.0180**
67	**0.0511**	0.0383	0.0341	0.0433	0.0476	**0.0576**	192	**0.0380**	**0.0583**	0.0188	0.0198	0.0488	0.0157
68	0.0223	0.0212	**0.0214**	0.0185	**0.0296**	0.0000	193	0.0342	**0.0357**	0.0186	**0.0130**	0.0294	0.0000
69	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	194	0.0360	**0.0952**	0.0165	0.0156	0.0640	0.0106
70	0.0630	**0.0748**	0.0235	0.0215	0.0525	0.0123	195	0.0192	**0.0413**	**0.0317**	0.0324	0.0298	0.0210
71	0.1667	**0.2857**	0.0289	0.0252	0.0735	0.0000	196	0.0212	**0.0440**	0.0374	**0.0377**	0.0357	0.0000
72	0.0158	0.0175	**0.0217**	0.0218	**0.0227**	0.0000	197	0.0217	0.0104	0.0190	0.0112	0.0179	**0.0223**
73	0.0488	0.0540	0.0457	0.0435	**0.0680**	0.0321	198	0.0320	**0.0628**	0.0397	0.0404	**0.0330**	0.0243
74	0.0335	0.0459	0.0514	0.0496	**0.0536**	0.0249	199	**0.0218**	0.0209	0.0157	**0.0158**	0.0155	0.0134
75	0.0524	0.0576	**0.0586**	0.0576	**0.0615**	0.0229	200	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
76	0.0421	**0.0780**	0.0323	0.0315	0.0325	0.0169	201	**0.1290**	0.0051	0.0019	0.0032	0.0060	0.0000
77	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	202	**0.0166**	0.0073	0.0041	0.0062	0.0025	0.0098
78	0.0092	0.0072	0.0086	**0.0074**	0.0062	**0.0171**	203	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
79	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	204	0.1250	**0.2118**	0.0083	0.0154	0.0089	0.0000
80	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	205	**0.0289**	0.0118	0.0126	0.0106	0.0130	**0.0154**
81	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	206	0.0158	0.0215	0.0142	0.0142	0.0111	**0.0244**
82	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	207	0.0051	0.0137	0.0060	0.0200	0.0096	**0.0278**
83	0.0036	0.0015	**0.0025**	0.0022	**0.0046**	0.0005	208	0.0085	**0.0087**	0.0067	0.0060	0.0062	**0.0213**
84	**0.0384**	0.0590	0.0136	0.0165	**0.0696**	0.0175	209	0.0170	0.0155	0.0155	0.0162	**0.0192**	0.0091
85	0.0339	**0.0354**	0.0280	0.0129	0.0336	0.0000	210	0.0114	**0.0074**	0.0045	0.0069	0.0070	**0.0218**
86	0.0359	**0.0811**	0.0174	0.0160	0.0386	0.0111	211	**0.0151**	0.0078	0.0045	0.0052	**0.0278**	0.0027
87	0.0256	**0.0429**	0.0331	**0.0322**	0.0340	0.0244	212	0.0054	0.0052	0.0042	**0.0476**	0.0062	0.0000
88	0.0243	0.0407	**0.0425**	**0.0394**	0.0394	0.0000	213	**0.0701**	0.0609	0.0060	0.0070	0.0257	0.0167
89	**0.0188**	0.0109	0.0104	0.0122	0.0150	**0.0279**	214	0.0126	**0.0130**	0.0096	0.0096	0.0120	**0.0072**
90	0.0322	**0.0613**	0.0410	0.0407	**0.0378**	0.0173	215	**0.0120**	**0.0112**	0.0102	0.0098	0.0088	0.0059
91	**0.0208**	0.0185	**0.0173**	0.0151	0.0173	0.0088	216	0.0449	**0.0556**	0.0097	0.0094	0.0474	0.0063
92	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	217	0.0062	0.0098	**0.0097**	**0.0103**	0.0095	0.0075
93	0.0309	0.0595	0.0524	0.0592	**0.0698**	0.0306	218	0.0056	0.0090	**0.0105**	0.0103	**0.0097**	0.0065
94	0.1233	**0.1447**	0.0889	0.0936	0.0984	0.1083	219	**0.0653**	0.0074	0.0034	0.0070	0.0080	0.0023
95	0.0993	**0.2022**	0.0546	0.0430	0.1124	0.0467	220	**0.1038**	0.0511	0.0108	0.0103	0.0254	0.0177
96	0.0452	**0.0374**	0.0309	0.0292	**0.0467**	0.0161	221	0.0156	**0.0200**	0.0193	0.0194	0.0185	0.0102
97	**0.0907**	0.0587	0.0269	0.0293	**0.0619**	0.0156	222	**0.0169**	**0.0170**	0.0148	0.0129	0.0160	0.0137
98	**0.0118**	0.0040	0.0056	0.0064	0.0042	0.0000	223	0.0183	0.0156	0.0192	**0.0190**	**0.0227**	0.0164
99	**0.3403**	0.1383	0.0891	0.0939	0.0863	0.0741	224	**0.0171**	0.0148	**0.0156**	0.0156	0.0159	0.0146
100	0.2034	**0.3000**	0.0303	0.0323	0.1111	0.0148	225	0.0162	**0.0211**	0.0095	0.0096	**0.0109**	0.0122
101	**0.0260**	0.0179	0.0231	0.0244	**0.0272**	0.0145	226	0.0991	**0.1085**	0.0192	0.0132	0.0473	0.0150
102	0.0389	**0.0734**	0.0369	0.0421	**0.0803**	0.0165	227	**0.0233**	0.0217	0.0092	0.0086	0.0134	0.0093
103	0.0442	**0.5935**	0.0570	0.0483	0.0557	0.0316	228	**0.0400**	0.0169	0.0018	0.0014	0.0040	0.0000
104	0.0157	0.0109	0.0124	**0.0165**	0.0154	0.0088	229	**0.0800**	0.0267	0.0010	0.0009	0.0038	0.0000
105	**0.0632**	**0.0637**	0.0557	0.0583	0.0576	0.0252	230	0.0149	**0.0171**	0.0093	0.0105	0.0169	0.0027
106	**0.0492**	**0.0668**	0.0533	0.0542	0.0532	0.0231	231	0.0318	**0.0336**	**0.0205**	0.0214	0.0209	0.0189
107	**0.0475**	0.0447	0.0456	0.0427	0.0419	0.0301	232	0.0296	**0.0323**	0.0200	0.0214	**0.0241**	0.0000
108	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	233	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
109	0.0307	0.0574	0.0552	0.0584	**0.0812**	0.0281	234	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
110	0.0267	**0.0344**	**0.0248**	0.0244	0.0232	0.0188	235	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
111	**0.0566**	0.0524	0.0255	0.0247	0.0287	0.0208	236	0.0012	0.0014	0.0019	0.0022	0.0014	**0.0385**
112	0.1261	**0.1373**	0.0844	0.0935	**0.0927**	0.0722	237	**0.0504**	**0.0523**	0.0410	0.0416	0.0398	0.0175
113	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	238	**0.0181**	**0.0156**	0.0157	0.0101	0.0124	0.0067
114	**0.0744**	0.0669	0.0249	0.0230	0.0469	**0.0594**	239	0.0000	**0.0033**	0.0004	0.0005	**0.0024**	0.0001
115	0.0370	0.0539	0.0526	0.0309	0.0248	**0.0575**	240	0.0000	0.0003	0.0006	0.0006	0.0007	**0.0009**
116	0.0865	**0.1622**	0.0452	0.0506	0.0976	0.0480	241	0.0000	0.0056	0.0103	0.0102	**0.0205**	0.0055
117	**0.1111**	0.0407	0.0349	0.0436	0.0321	**0.0455**	242	0.0041	0.0083	0.0058	0.0056	**0.0052**	**0.0086**
118	0.0508	**0.0743**	0.0390	0.0493	0.0530	**0.0490**	243	0.0060	0.0042	**0.0154**	0.0144	**0.0071**	0.0059
119	0.0609	**0.0722**	0.0561	0.0603	**0.0502**	0.0435	244	0.0065	**0.0097**	0.0061	0.0051	0.0044	**0.0096**
120	0.0361	0.0504	0.0266	0.0299	**0.0508**	0.0177	245	**0.0234**	0.0158	0.0051	0.0077	**0.0287**	0.0109
121	0.0220	0.0319	0.0299	**0.0256**	**0.0322**	0.0169	246	0.0078	**0.0152**	0.0052	0.0053	**0.0184**	0.0122
122	0.0136	**0.0227**	**0.0189**	0.0192	0.0202	0.0178	247	0.0011	0.0036	0.0022	0.0023	0.0029	**0.0320**
123	0.0090	0.0142	0.0064	0.0066	**0.1160**	0.0042	248	0.0000	0.0017	**0.0117**	0.0036	**0.0118**	0.0000
124	0.0402	**0.0376**	0.0260	0.0322	**0.0463**	0.0167	249	0.0164	0.0268	**0.0345**	0.0155	0.0212	0.0233
125	0.0601	**0.0384**	0.0253	0.0163	**0.0917**	0.0168	250	**0.0833**	0.0741	0.0040	0.0030	0.0513	0.0000

TABLE XXIV
THE TEST F1-PA-90 OF TIME SERIES ANOMALY DETECTION IN UCR 250 SUB-DATASETS. THE BEST RESULTS ARE IN **BOLD**.

UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	TS2Vec	DCdetector	UCR ID	SPOT	DSPOT	LSTM-VAE	DONUT	TS2Vec	DCdetector
1	0.0277	0.0374	0.0297	0.0316	**0.0676**	0.0285	126	0.0127	0.0130	0.0100	**0.0157**	**0.0102**	**0.0183**
2	0.0210	**0.0247**	0.0147	0.0143	0.0186	**0.0252**	127	0.0239	0.0129	**0.0267**	0.0178	**0.0232**	0.0000
3	**0.0431**	0.0333	0.0149	0.0145	0.0290	0.0191	128	0.0703	**0.1282**	0.0643	**0.0644**	0.0679	0.0361
4	**0.1410**	**0.1373**	0.0522	0.0511	0.1086	0.0552	129	**0.0504**	0.0318	0.0154	0.0244	**0.0833**	0.0460
5	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	130	**0.0657**	**0.0716**	0.0341	0.0345	0.0579	0.0481
6	**0.0556**	0.0385	**0.0516**	**0.0755**	0.0259	0.0483	131	0.1351	0.0463	0.0326	0.0358	**0.2378**	0.0583
7	0.0212	**0.0320**	0.0130	**0.0323**	0.0198	0.0000	132	0.0315	0.0278	0.0154	0.0250	0.0165	**0.0976**
8	0.0684	**0.1538**	0.0496	0.0311	0.0870	0.0068	133	0.0921	0.0304	0.0219	0.0221	**0.2273**	0.0000
9	**0.0564**	0.0238	0.0239	0.0250	0.0255	**0.0467**	134	**0.0957**	0.0815	0.0642	0.0605	0.0628	**0.1242**
10	0.0360	**0.0453**	0.0313	0.0329	0.0329	**0.0408**	135	**0.0090**	0.0038	**0.0114**	**0.0108**	0.0039	0.0000
11	**0.0491**	**0.0707**	0.0324	0.0334	**0.0491**	0.0466	136	0.0566	**0.0769**	0.0428	0.0425	**0.0550**	0.0195
12	0.0508	**0.0526**	0.0206	0.0157	0.0513	0.0169	137	0.0606	**0.0644**	0.0441	**0.0446**	0.0428	0.0173
13	0.0196	**0.0188**	**0.0204**	0.0160	0.0155	**0.0179**	138	0.0144	0.0044	0.0513	0.0092	0.0045	**0.0870**
14	0.0122	**0.0150**	0.0108	**0.0126**	0.0128	**0.0182**	139	0.0837	**0.1114**	**0.0712**	0.0684	0.0922	0.0495
15	0.0066	0.0074	0.0054	0.0060	**0.0096**	0.0045	140	0.1244	**0.3272**	0.1175	0.1188	0.1954	0.0606
16	0.0413	**0.0400**	0.0187	0.0212	**0.0461**	0.0200	141	0.1176	0.1383	**0.1075**	0.1042	**0.1470**	0.0598
17	0.0335	**0.0409**	0.0145	0.0145	**0.0901**	0.0131	142	**0.2353**	0.0916	0.0521	0.0539	0.0625	0.0240
18	0.0132	0.0134	0.0172	**0.0151**	0.0150	**0.0266**	143	0.0440	0.0493	0.0473	0.0490	**0.0578**	**0.0597**
19	0.0163	0.0127	0.0145	**0.0313**	0.0159	0.0000	144	0.0651	0.0514	0.0557	0.0630	0.0532	**0.3710**
20	0.0648	**0.0773**	0.0643	0.0647	0.0656	**0.0840**	145	0.1957	**0.3288**	0.0426	0.0460	0.1017	0.0058
21	**0.0481**	0.0306	0.0182	0.0155	**0.0604**	0.0368	146	0.0063	**0.0080**	0.0064	0.0081	**0.0129**	0.0000
22	**0.0787**	**0.0708**	0.0386	0.0385	0.0622	0.0741	147	0.0833	**0.1132**	0.0034	0.0101	0.0435	0.0024
23	0.1341	0.0495	0.0324	0.0362	**0.1780**	0.0272	148	**0.0169**	0.0156	0.0142	0.0132	**0.0166**	0.0122
24	0.0284	0.0212	0.0313	0.0159	0.0153	**0.0533**	149	0.0120	**0.0339**	0.0134	0.0134	0.0149	0.0138
25	0.0656	0.0310	0.0303	0.0222	**0.0879**	0.0000	150	0.0229	0.0245	0.0218	**0.0229**	**0.0405**	0.0221
26	**0.1024**	0.0686	0.0644	0.0643	0.0641	**0.1377**	151	0.0277	**0.0737**	0.0420	0.0230	**0.0826**	0.0630
27	**0.0111**	0.0038	**0.0056**	0.0039	0.0039	0.0000	152	**0.0552**	0.0450	0.0339	**0.0357**	**0.0588**	0.0363
28	**0.0563**	0.0658	0.0418	0.0408	**0.0879**	0.0193	153	0.0482	0.0539	0.0497	0.0487	**0.0676**	**0.0625**
29	0.0604	**0.0650**	**0.0496**	0.0441	0.0501	0.0359	154	0.0113	0.0126	**0.0263**	**0.0159**	0.0125	0.0197
30	0.0146	0.0043	0.0069	0.0050	0.0045	**0.1053**	155	0.0131	0.0167	0.0140	0.0205	**0.0192**	**0.0244**
31	0.0846	**0.1098**	**0.0716**	0.0706	0.0882	0.0485	156	**0.1612**	0.0378	0.0286	0.0321	0.0325	**0.1950**
32	0.1224	**0.2732**	0.1176	0.1200	0.1975	0.0426	157	**0.0126**	0.0051	0.0045	0.0062	0.0110	0.0000
33	**0.1144**	**0.1400**	0.0999	0.1017	**0.1427**	0.0599	158	0.2290	**0.6707**	0.0281	0.0324	0.0390	0.0126
34	**0.2731**	0.0849	0.0536	0.0558	0.0680	0.0231	159	0.0023	0.0040	**0.0315**	0.0040	0.0061	0.0031
35	0.0448	0.0497	**0.0539**	0.0468	**0.0805**	0.0402	160	0.0275	0.0270	**0.0319**	0.0286	**0.0522**	0.0266
36	**0.0640**	0.0532	**0.0584**	0.0530	0.0521	0.0469	161	**0.1151**	0.1077	0.0941	0.0964	**0.1132**	**0.0620**
37	0.2500	**0.3429**	0.0417	0.0163	0.1290	0.0227	162	0.0294	0.0298	0.0473	0.0463	**0.1022**	0.0000
38	**0.0131**	**0.0092**	0.0126	0.0077	0.0100	0.0000	163	**0.0833**	0.0478	0.0219	0.0153	0.0392	0.0095
39	0.1176	**0.1224**	0.0117	0.0056	0.0247	0.0000	164	0.0100	**0.0217**	0.0079	0.0071	**0.0132**	0.0175
40	**0.0156**	0.0158	0.0122	0.0132	**0.0165**	0.0097	165	0.0094	0.0076	**0.0096**	0.0078	**0.0095**	0.0094
41	0.0121	**0.0283**	**0.0150**	0.0153	0.0174	0.0104	166	0.0143	0.0131	0.0233	0.0067	0.0115	**0.0238**
42	0.0228	0.0244	0.0229	0.0228	**0.0363**	**0.0290**	167	0.0198	0.0149	0.0155	0.0148	**0.0379**	**0.0222**
43	0.0262	**0.0680**	0.0238	0.0490	**0.0734**	0.0334	168	**0.0360**	0.0158	0.0159	0.0152	0.0355	0.0180
44	**0.0586**	0.0450	0.0346	0.0356	0.0571	**0.0348**	169	**0.1447**	**0.1016**	0.0325	0.0319	0.0350	0.0596
45	0.0489	0.0533	0.0474	0.0476	**0.0659**	**0.0490**	170	**0.3462**	0.0191	0.0076	0.0098	0.0433	0.0025
46	0.0118	0.0126	0.0113	**0.0367**	0.0130	0.0000	171	**0.0952**	0.0436	0.0311	0.0311	0.0385	0.0431
47	0.0131	0.0211	0.0244	**0.0290**	**0.0167**	0.0184	172	**0.1351**	0.0526	0.0434	0.0423	0.0607	0.0255
48	**0.1208**	0.0454	0.0270	0.0268	0.0276	0.0387	173	0.0162	0.0211	0.0111	**0.0506**	0.0160	**0.0358**
49	**0.0078**	0.0058	0.0040	**0.0104**	0.0061	0.0000	174	0.0087	0.0115	0.0105	0.0183	0.0121	**0.0482**
50	**0.1254**	**0.1058**	0.0386	0.0279	0.0406	0.0258	175	0.0600	0.0476	0.0268	0.0245	**0.0941**	0.0000
51	0.0023	0.0040	**0.0039**	0.0025	**0.0053**	0.0000	176	0.0155	0.0159	0.0145	**0.0157**	0.0162	**0.0313**
52	0.0278	**0.4636**	0.0423	0.0284	0.0522	0.0207	177	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
53	0.1110	0.1079	0.0950	0.0950	**0.1243**	**0.1045**	178	0.0467	**0.0757**	0.0177	0.0152	0.0566	0.0077
54	0.0294	0.0298	0.0364	0.0436	**0.0633**	0.0000	179	0.1673	**0.2846**	0.0266	0.0227	0.0796	0.0000
55	**0.0780**	0.0381	0.0141	0.0183	0.0347	0.0127	180	0.0120	0.0121	**0.0137**	**0.0140**	**0.0139**	0.0000
56	0.0063	**0.0130**	0.0104	0.0087	0.0102	**0.0168**	181	0.0227	**0.0380**	0.0247	**0.0256**	**0.0289**	0.0202
57	0.0078	0.0075	**0.0071**	0.0094	**0.0092**	**0.0097**	182	0.0263	0.0290	0.0283	0.0270	**0.0298**	0.0211
58	**0.0113**	0.0135	0.0088	0.0057	0.0077	**0.0256**	183	0.0391	0.0377	0.0336	0.0334	0.0340	**0.0855**
59	0.0143	0.0151	0.0190	0.0147	**0.0318**	**0.0240**	184	0.0505	**0.1079**	0.0175	0.0178	0.0645	0.0278
60	0.0154	0.0163	**0.0194**	0.0156	**0.0190**	0.0149	185	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
61	**0.0781**	0.0353	0.0323	0.0325	0.0324	0.0473	186	**0.0100**	0.0064	0.0065	**0.0037**	0.0054	0.0067
62	**0.0287**	0.0203	0.0118	0.0115	**0.0450**	0.0054	187	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
63	**0.0368**	0.0328	0.0315	0.0310	**0.0338**	0.0221	188	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
64	**0.0752**	**0.0704**	0.0426	0.0427	0.0458	**0.0785**	189	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
65	0.0170	**0.0237**	**0.0455**	0.0136	0.0145	0.0000	190	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
66	0.0110	0.0118	0.0108	0.0260	0.0138	**0.0526**	191	0.0026	0.0013	0.0017	0.0014	0.0149	**0.0180**
67	**0.0511**	0.0214	0.0283	0.0240	0.0476	**0.0576**	192	**0.0380**	**0.0583**	0.0188	0.0198	0.0488	0.0157
68	0.0164	0.0159	**0.0130**	0.0121	**0.0165**	0.0000	193	0.0342	**0.0357**	0.0186	**0.0101**	0.0294	0.0000
69	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	194	0.0295	**0.0952**	0.0134	0.0096	0.0640	0.0106
70	0.0472	**0.0748**	0.0235	0.0133	0.0525	0.0123	195	0.0178	**0.0212**	**0.0201**	0.0185	0.0194	0.0210
71	0.1667	**0.2857**	0.0234	0.0215	0.0735	0.0000	196	0.0212	**0.0256**	0.0218	**0.0219**	0.0235	0.0000
72	0.0120	0.0122	**0.0134**	0.0131	**0.0132**	0.0000	197	0.0171	0.0104	0.0190	0.0071	0.0179	**0.0223**
73	0.0251	0.0372	0.0254	0.0253	**0.0382**	0.0321	198	0.0229	**0.0329**	0.0233	0.0231	**0.0305**	0.0243
74	0.0266	0.0271	0.0275	0.0276	**0.0296**	0.0249	199	**0.0138**	0.0114	0.0109	**0.0093**	0.0101	0.0134
75	**0.0412**	0.0351	**0.0333**	0.0336	**0.0335**	0.0229	200	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
76	0.0313	**0.0780**	0.0175	0.0178	0.0176	0.0169	201	**0.1290**	0.0027	0.0012	0.0027	0.0040	0.0000
77	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	202	**0.0095**	0.0039	0.0022	0.0062	0.0021	**0.0098**
78	0.0087	0.0058	0.0086	**0.0074**	0.0038	**0.0171**	203	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
79	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	204	0.1250	**0.2118**	0.0073	0.0154	0.0064	0.0000
80	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	205	**0.0171**	0.0073	0.0075	0.0093	0.0104	**0.0154**
81	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	206	0.0099	0.0215	0.0109	0.0142	0.0094	**0.0244**
82	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	207	0.0033	0.0137	0.0054	0.0200	0.0096	**0.0278**
83	0.0028	0.0013	**0.0025**	0.0015	**0.0046**	0.0005	208	0.0085	**0.0087**	0.0060	0.0046	0.0051	**0.0213**
84	**0.0384**	0.0590	0.0131	0.0165	**0.0696**	0.0175	209	0.0142	0.0143	0.0097	0.0123	**0.0192**	0.0091
85	0.0339	**0.0354**	0.0280	0.0077	0.0336	0.0000	210	0.0067	**0.0074**	0.0026	0.0069	0.0070	**0.0139**
86	0.0286	**0.0811**	0.0107	0.0091	0.0386	0.0111	211	**0.0151**	0.0078	0.0043	0.0049	**0.0278**	0.0027
87	0.0183	**0.0227**	0.0189	**0.0187**	0.0192	**0.0244**	212	0.0031	0.0032	0.0042	**0.0476**	0.0042	0.0000
88	0.0216	**0.0236**	**0.0219**	**0.0221**	0.0223	0.0000	213	**0.0701**	0.0609	0.0050	0.0045	0.0257	0.0167
89	**0.0155**	0.0109	0.0060	0.0122	0.0150	**0.0208**	214	0.0126	**0.0130**	0.0085	0.0057	0.0071	**0.0072**
90	0.0226	**0.0326**	0.0231	0.0230	**0.0257**	0.0173	215	**0.0077**	**0.0066**	0.0058	0.0074	0.0064	0.0059
91	**0.0121**	0.0103	**0.0091**	0.0098	0.0097	0.0088	216	0.0449	**0.0556**	0.0075	0.0067	0.0474	0.0063
92	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	217	0.0055	0.0056	**0.0055**	**0.0055**	0.0058	**0.0075**
93	0.0276	0.0374	0.0306	0.0314	**0.0698**	0.0306	218	0.0054	0.0079	**0.0056**	0.0057	**0.0092**	0.0065
94	0.1233	**0.1447**	0.0498	0.0521	0.0891	0.1083	219	**0.0653**	0.0074	0.0025	0.0070	0.0080	0.0023
95	0.0993	**0.2022**	0.0294	0.0377	0.1124	0.0467	220	**0.1038**	0.0511	0.0058	0.0065	0.0254	0.0177
96	0.0452	**0.0338**	0.0176	0.0247	**0.0467**	0.0161	221	0.0103	**0.0124**	0.0106	0.0108	0.0122	0.0102
97	**0.0485**	0.0314	0.0196	0.0280	**0.0461**	0.0156	222	**0.0169**	**0.0163**	0.0076	0.0070	0.0091	0.0137
98	**0.0090**	0.0038	0.0043	0.0042	0.0039	0.0000	223	0.0119	0.0112	0.0105	**0.0106**	**0.0147**	**0.0164**
99	**0.2308**	0.0904	0.0528	0.0563	0.0863	0.0741	224	**0.0104**	0.0104	**0.0095**	0.0089	0.0135	**0.0146**
100	0.2034	**0.3000**	0.0303	0.0323	0.1111	0.0148	225	0.0162	**0.0211**	0.0069	0.0069	**0.0109**	0.0122
101	**0.0185**	0.0149	0.0125	0.0129	**0.0151**	0.0145	226	0.0991	**0.1085**	0.0192	0.0106	0.0473	0.0150
102	0.0267	**0.0734**	0.0331	0.0241	**0.0803**	0.0165	227	**0.0233**	0.0217	0.0065	0.0061	0.0119	0.0093
103	0.0271	**0.5935**	0.0313	0.0293	0.0541	0.0316	228	**0.0400**	0.0169	0.0018	0.0014	0.0040	0.0000
104	0.0083	0.0076	0.0072	**0.0165**	0.0093	0.0088	229	**0.0800**	0.0267	0.0010	0.0008	0.0038	0.0000
105	**0.0376**	**0.0336**	0.0328	0.0326	0.0318	0.0252	230	0.0149	**0.0171**	0.0091	0.0076	0.0169	0.0027
106	**0.0410**	**0.0344**	0.0306	0.0313	0.0297	0.0231	231	0.0182	**0.0178**	**0.0119**	0.0116	0.0136	**0.0189**
107	**0.0458**	0.0329	0.0248	0.0427	0.0367	0.0301	232	0.0168	**0.0178**	0.0115	0.0113	**0.0129**	0.0000
108	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	233	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
109	0.0275	0.0374	0.0305	0.0319	**0.0812**	0.0281	234	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
110	0.0265	**0.0340**	**0.0149**	0.0164	0.0185	0.0188	235	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
111	**0.0566**	0.0524	0.0145	0.0158	0.0287	0.0208	236	0.0012	0.0012	0.0012	0.0012	0.0012	**0.0385**
112	0.1261	**0.1373**	0.0514	0.0518	**0.0927**	0.0722	237	**0.0467**	**0.0523**	0.0228	0.0231	0.0245	0.0175
113	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	238	**0.0181**	**0.0156**	0.0157	0.0059	0.0124	0.0067
114	**0.0529**	0.0391	0.0140	0.0183	0.0277	**0.0594**	239	0.0000	**0.0021**	0.0004	0.0003	**0.0024**	0.0001
115	0.0229	0.0366	0.0526	0.0207	0.0179	**0.0575**	240	0.0000	0.0003	0.0003	0.0004	0.0007	**0.0008**
116	0.0748	**0.1622**	0.0440	0.0506	0.0976	0.0480	241	0.0000	0.0056	0.0058	0.0058	**0.0140**	0.0055
117	**0.0699**	0.0251	0.0259	0.0255	0.0247	**0.0455**	242	0.0033	0.0051	0.0055	0.0056	**0.0035**	**0.0086**
118	0.0301	**0.0394**	0.0313	0.0276	0.0365	**0.0490**	243	0.0039	0.0023	**0.0154**	0.0144	**0.0071**	0.0059
119	0.0609	**0.0719**	0.0326	0.0325	**0.0502**	0.0435	244	0.0039	**0.0059**	0.0061	0.0029	0.0031	**0.0096**
120	0.0361	0.0504	0.0219	0.0188	**0.0508**	0.0177	245	**0.0234**	0.0158	0.0038	0.0077	**0.0287**	0.0109
121	0.0188	0.0209	**0.0294**	**0.0256**	**0.0166**	0.0169	246	0.0060	**0.0127**	0.0036	0.0048	**0.0184**	0.0122
122	0.0127	**0.0140**	**0.0111**	0.0104	0.0122	**0.0178**	247	0.0011	0.0021	0.0012	0.0017	0.0029	**0.0320**
123	0.0090	0.0074	0.0037	0.0066	**0.1160**	0.0042	248	0.0000	0.0013	**0.0117**	0.0028	**0.0086**	0.0000
124	0.0402	**0.0370**	0.0190	0.0204	**0.0463**	0.0167	249	0.0123	0.0150	**0.0345**	0.0088	0.0212	0.0233
125	0.0311	**0.0384**	0.0253	0.0163	**0.0917**	0.0168	250	**0.0833**	0.0741	0.0038	0.0021	0.0513	0.0000

TABLE XXV

THE TEST RESULTS OF TIME SERIES ANOMALY DETECTION ON SEVEN REAL-WORLD MULTIVARIATE DATASETS. THE BEST RESULTS ARE IN BOLD. THE BEST MODEL IN THE CORRESPONDING DATASET IS IN UNDERLINE AND **BOLD**. "-" INDICATES THAT THE METRIC COULD NOT BE OBTAINED DUE TO THE EXCESSIVE TIME REQUIRED TO COMPUTE IT FROM THE MODEL'S OUTPUT. IN ADDITION, LSTM-VAE, DOUNT, AND TS2VEC ARE UNABLE TO PRODUCE TEST RESULTS ON THE PSM AND SWAT DATASETS DUE TO MEMORY ERRORS. FURTHERMORE, SPOT AND DSPOT CAN NOT OBTAIN TEST RESULTS ON MULTIVARIATE DATASETS BECAUSE THE ORIGINAL CODE PROVIDED BY THE AUTHORS DOES NOT INCLUDE SETTINGS FOR MULTIVARIATE SCENARIOS.

The SMD Dataset

Models	F1	P	R	F1-PA-10	F1-PA-50	F1-PA-90	Aff-P	Aff-R	R_A_R	R_A_P	V_ROC	V_PR
LSTM-VAE	0.5002	0.9964	0.3339	0.4244	0.1040	0.0911	**0.8785**	0.2177	0.7460	0.3208	0.7484	0.3188
DONUT	0.4965	**0.9964**	0.3306	0.4247	0.1043	0.0915	0.8763	0.2143	0.7405	0.3136	0.7440	0.3130
AT	0.8259	0.8694	0.7864	-	-	-	-	-	-	-	-	-
TS2Vec	**0.8571**	0.9447	0.7843	**0.4477**	**0.1149**	**0.1128**	0.7972	0.6678	0.5579	0.2971	0.5546	0.2740
TimesNet	0.8031	0.8577	0.7551	-	-	-	-	-	-	-	-	-
GPT4TS	0.8421	0.8731	0.8133	-	-	-	-	-	-	-	-	-
DCdetector	0.8453	0.7971	**0.8997**	0.3086	0.1073	0.0735	0.5096	**0.9480**	**0.7989**	**0.7186**	**0.7547**	**0.6767**

The MSL Dataset

Models	F1	P	R	F1-PA-10	F1-PA-50	F1-PA-90	Aff-P	Aff-R	R_A_R	R_A_P	V_ROC	V_PR
LSTM-VAE	0.3936	0.9643	0.2472	0.5800	**0.2383**	**0.1915**	0.5296	0.4924	0.5060	0.1361	0.5054	0.1279
DONUT	0.3936	**0.9648**	0.2472	0.5907	0.2373	0.1913	0.5310	0.4924	0.5056	0.1354	0.5054	0.1278
AT	0.8683	0.9083	0.8318	-	-	-	0.6569	0.5020	0.8436	0.8246	0.8010	0.7860
TS2Vec	0.8748	0.9473	0.8126	0.5852	0.2192	0.1907	0.5402	0.8830	0.5860	0.3798	0.5808	0.3504
TimesNet	0.8014	0.8834	0.7334	-	-	-	0.6764	0.3371	0.7691	0.7590	0.7004	0.6952
GPT4TS	0.8114	0.8865	0.7480	-	-	-	**0.6820**	0.3752	0.7786	0.7628	0.7154	0.7050
DCdetector	**0.9563**	0.9256	**0.9892**	**0.6719**	0.1608	0.1596	0.5177	**0.9738**	**0.9224**	**0.9012**	**0.9150**	**0.8949**

The SMAP Dataset

Models	F1	P	R	F1-PA-10	F1-PA-50	F1-PA-90	Aff-P	Aff-R	R_A_R	R_A_P	V_ROC	V_PR
LSTM-VAE	0.6863	0.9896	0.5253	**0.7123**	0.3311	0.2433	0.4700	0.5768	0.4659	0.0679	0.4648	0.0657
DONUT	0.6864	**0.9899**	0.5253	0.7059	**0.3347**	**0.2439**	0.4804	0.5745	0.4660	0.0677	0.4650	0.0655
AT	0.9435	0.9451	0.9420	-	-	-	0.6920	0.4431	0.9424	0.9266	0.8713	0.8648
TS2Vec	0.7013	0.9467	0.5569	0.5450	0.3114	0.2433	0.4024	0.6587	0.5280	0.2378	0.5172	0.2087
TimesNet	0.6705	0.9209	0.5271	-	-	-	0.7317	0.1699	0.6549	0.6710	0.6016	0.6234
GPT4TS	0.6750	0.9117	0.5359	-	-	-	**0.7844**	0.2190	0.6697	0.6747	0.6200	0.6311
DCdetector	**0.9606**	0.9367	**0.9857**	0.6729	0.1701	0.1701	0.5109	**0.9886**	**0.9645**	**0.9424**	**0.9517**	**0.9313**

The PSM Dataset

Models	F1	P	R	F1-PA-10	F1-PA-50	F1-PA-90	Aff-P	Aff-R	R_A_R	R_A_P	V_ROC	V_PR
AT	0.9632	0.9687	0.9577	-	-	-	0.6776	0.4548	0.9338	0.9434	0.8651	0.8942
TimesNet	0.9183	0.9850	0.8600	-	-	-	**0.8416**	0.5546	0.8162	0.8704	0.7761	0.8406
GPT4TS	0.9706	**0.9860**	0.9557	-	-	-	0.8361	0.5706	**0.9383**	**0.9540**	0.8575	0.8963
DCdetector	**0.9744**	0.9699	**0.9789**	**0.8144**	**0.2443**	**0.2442**	0.5244	**0.8173**	0.9292	0.9385	**0.8739**	**0.8974**

The SWAT Dataset

Models	F1	P	R	F1-PA-10	F1-PA-50	F1-PA-90	Aff-P	Aff-R	R_A_R	R_A_P	V_ROC	V_PR
AT	0.9466	0.9219	0.9726	-	-	-	**0.6967**	0.5510	0.9674	0.9378	0.9398	0.9135
TimesNet	0.9265	0.9201	0.9330	-	-	-	0.6646	0.4193	0.8999	0.8834	0.8101	0.8037
GPT4TS	0.9284	0.9218	0.9352	-	-	-	0.6579	0.4320	0.9108	0.8902	0.8278	0.8170
DCdetector	**0.9588**	**0.9325**	**0.9867**	**0.6906**	**0.3289**	**0.2364**	0.5352	**0.9622**	**0.9758**	**0.9497**	**0.9677**	**0.9426**

The NIPS_TS_Swan Dataset

Models	F1	P	R	F1-PA-10	F1-PA-50	F1-PA-90	Aff-P	Aff-R	R_A_R	R_A_P	V_ROC	V_PR
LSTM-VAE	0.7387	**0.9997**	0.5857	**0.7833**	0.6286	0.4992	0.8722	0.0020	0.8282	0.5284	0.8266	0.5239
DONUT	0.7387	**0.9997**	0.5857	0.7820	0.6308	**0.4995**	0.8722	0.0020	0.8298	0.5315	**0.8281**	0.5269
AT	0.7346	0.9701	0.5911	-	-	-	-	-	-	-	-	-
TS2Vec	**0.7545**	0.9938	**0.6081**	0.7650	**0.6441**	0.4991	**0.9159**	**0.0604**	0.7654	0.5930	0.7485	0.5623
TimesNet	0.7438	0.9930	0.5945	-	-	-	-	-	-	-	-	-
GPT4TS	0.7389	0.9956	0.5874	-	-	-	-	-	-	-	-	-
DCdetector	0.4009	0.8824	0.2594	0.3879	0.3015	0.2990	0.4751	0.0386	**0.8416**	**0.9124**	0.8259	**0.8981**

The NIPS_TS_Water Dataset

Models	F1	P	R	F1-PA-10	F1-PA-50	F1-PA-90	Aff-P	Aff-R	R_A_R	R_A_P	V_ROC	V_PR
LSTM-VAE	0.5155	**0.9625**	0.3521	0.4053	0.1321	0.1136	0.6465	0.2356	0.5575	0.1587	0.5461	0.1403
DONUT	0.5150	0.9590	0.3521	0.3779	0.1062	0.1062	0.6458	0.2948	0.5489	0.1505	0.5394	0.1339
AT	0.1821	0.1504	0.2307	-	-	-	0.5199	0.4796	0.5556	0.1603	0.5476	0.1492
TS2Vec	0.7736	0.9206	0.6671	**0.9035**	**0.6459**	**0.5086**	0.7530	0.6161	0.5428	0.3035	0.5433	0.2817
TimesNet	0.7048	0.6079	0.8385	-	-	-	**0.8654**	0.7332	0.7261	0.6211	0.7276	0.6080
GPT4TS	**0.7844**	0.6994	**0.8928**	-	-	-	0.8372	0.8647	**0.7264**	**0.6513**	**0.7505**	**0.6657**
DCdetector	0.3694	0.3277	0.4233	0.1086	0.0166	0.0166	0.5124	**0.8886**	0.5954	0.2852	0.5873	0.2774

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