

CLARE-GAN: GENERATION OF CLASS-SPECIFIC TIME SERIES

Anonymous authors

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A APPENDIX

A.1 IMPLEMENTATION DETAILS

We compare ClaRe-GAN to the state-of-the-art generative models C-RNN-GAN, RCGAN and TimeGAN. In order to enable a fair comparison between the algorithms, we use the same type and number of layer for the recurrent Generators and Discriminators: 2-layer LSTM with 100 hidden units. For ClaRe-GAN, 3 scales for the discriminator and $\lambda_{GAN} = 1$, $\lambda_{adv}^c = 1$, $\lambda_c = 0.01$ and $\lambda_{ms} = 1e - 5$. To implement the existing methods, we use the publicly available codes:

- C-RNN-GAN <https://github.com/olofmogren/c-rnn-gan>
- RCGAN <https://github.com/ratschlab/RGAN>
- TimeGAN <https://github.com/jsyoon0823/TimeGAN>

It is to be noted that, we will also make our code available in case of acceptance. In the following, we present the time series for the different datasets and the t-sne results. For the conditional GANs, ClaRe-GAN and RCGAN, and for the real dataset we visualize the different classes separately.

Table 1: Summary of the characteristics of the used datasets. The datasets are publicly available in the UEA & UCR Time Series Classification Repository.

Dataset	Length	Number of classes	Size
ItalyPowerDemand	24	2	1096
TwoLeadECG	82	2	1192
FreezerRegularTrain	301	2	2878
Yoga	425	2	3300
DistalPhalanxTW	80	6	539

A.2 DISTALPHALANXTW RESULTS

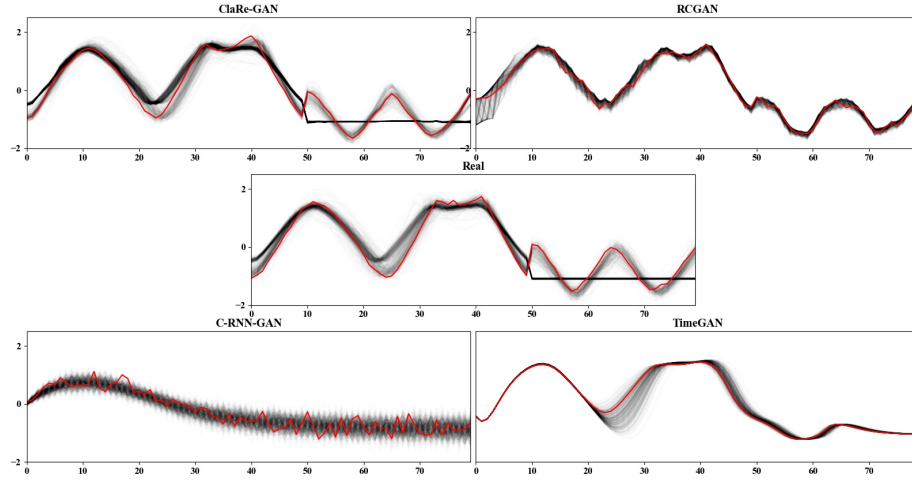


Figure 1: Illustration of the real and generated time series by ClaRe-GAN, RCGAN, C-RNN-GAN and TimeGAN for the DistalPhalanxTW dataset. The time series are depicted in black. The red line presents an example time-series for each subplot.

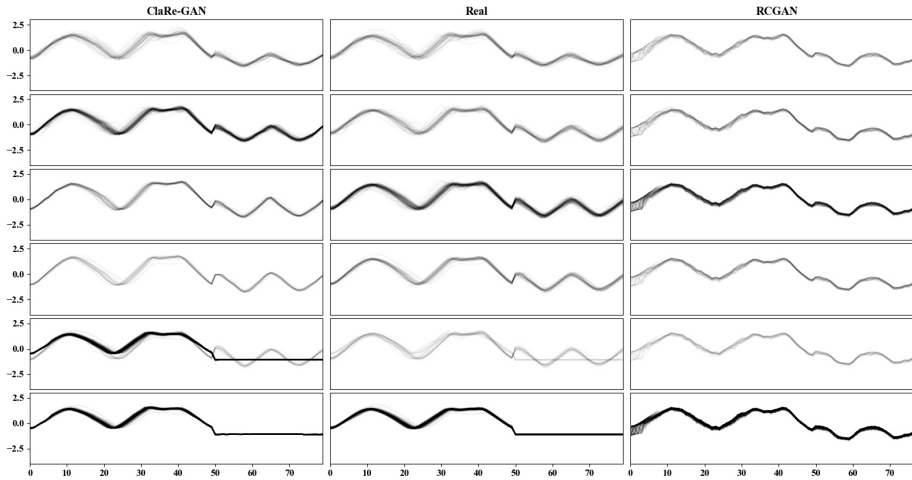


Figure 2: Illustration of the classes generated by ClaRe-GAN, the classes of the real dataset and the classes generated by RCGAN for the DistalPhalanxTW dataset.

A.3 TWOLEADECG RESULTS

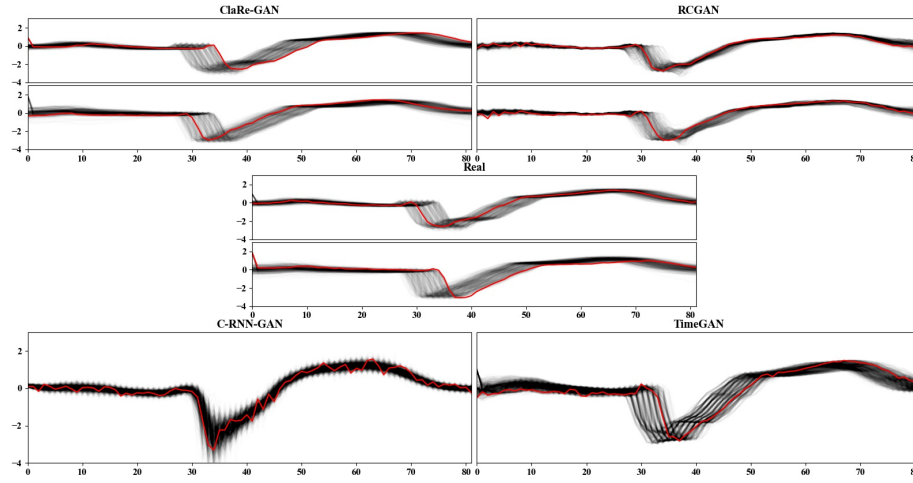


Figure 3: Illustration of the real and generated time series by ClaRe-GAN, RCGAN, C-RNN-GAN and TimeGAN for the TwoLeadECG dataset. The time series are depicted in black. The red line presents an example time-series for each subplot. For the conditional GANs, ClaRe-GAN and RCGAN, and the real dataset we visualize the time series of each class separately.

A.4 ITALYPOWERDEMAND RESULTS

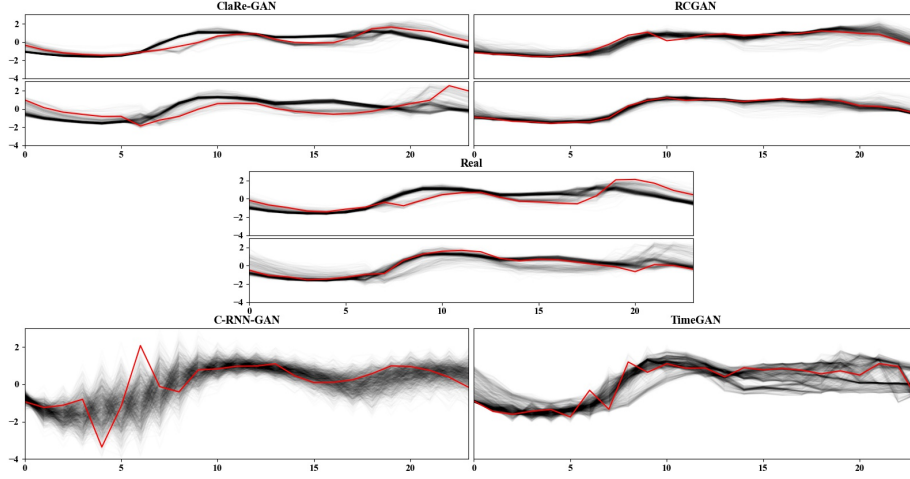


Figure 4: Illustration of the real and generated time series by ClaRe-GAN, RCGAN, C-RNN-GAN and TimeGAN for the ItalyPowerDemand dataset. The time series are depicted in black. The red line presents an example time-series for each subplot. For the conditional GANs, ClaRe-GAN and RCGAN, and the real dataset we visualize the time series of each class separately.

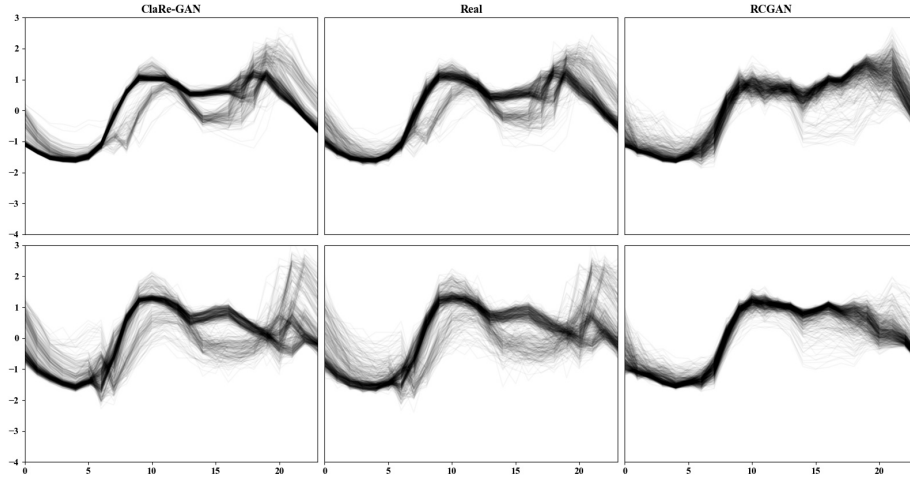


Figure 5: Illustration of the classes generated by ClaRe-GAN, the classes of the real dataset and the classes generated by RCGAN for the ItalyPowerDemand dataset.

A.5 FREEZERREGULARTRAIN RESULTS

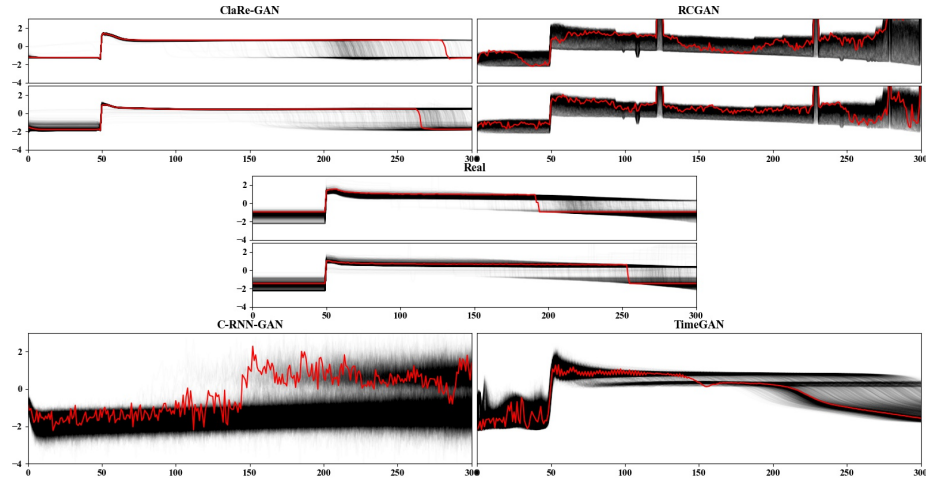


Figure 6: Illustration of the real and generated time series by ClaRe-GAN, RCGAN, C-RNN-GAN and TimeGAN for the FreezerRegularTrain dataset. The time series are depicted in black. The red line presents an example time-series for each subplot. For the conditional GANs, ClaRe-GAN and RCGAN, and the real dataset we visualize the time series of each class separately.

A.6 T-SNE RESULTS

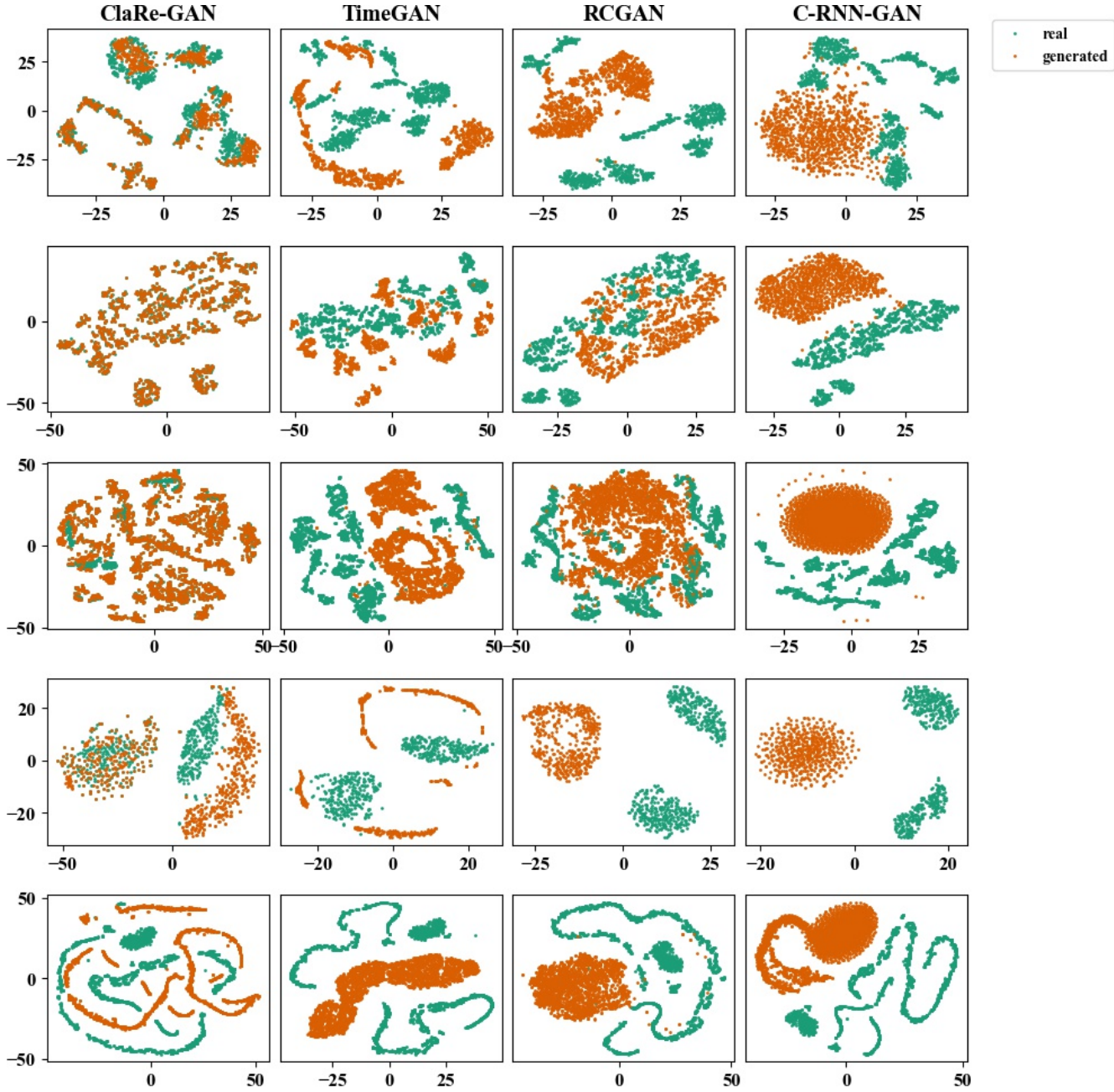


Figure 7: Comparison of the real (depicted in green) and generated (depicted in orange) dataset with PCA. Each row corresponds to a specific dataset and each column to a method. The results are presented in the following order (top to bottom): ItalyPowerDemand, TwoLeadECG, Yoga, DistalPhalanxTW and FreezerRegularTrain.