

# Computational and Mathematical Methods in Medicine

## Optimal Length of Heart Rate Variability Data and Forecasting Time for Ventricular Fibrillation Prediction Using Machine Learning

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### Supplementary Tables

**Supplementary Table S 1. Summary of ANN model validation using MVTDB dataset of 10s data length with 0s of forecast time.**

	Precision	Recall	F1-score	Accuracy
VF	0.74	1.00	0.85	0.83
Normal	1.00	0.67	0.80	
Average	0.87	0.83	0.82	

**Supplementary Table S 2. Summary of ANN model validation using MVTDB dataset of 20s data length with 0s of forecast time.**

	Precision	Recall	F1-score	Accuracy
VF	0.78	1.00	0.88	0.86
Normal	1.00	0.71	0.83	
Average	0.89	0.86	0.85	

## Supplementary Figures

The features that were used in this study are provided in the form of heatmap graph in this section. Datasets for the VF and Control datasets are indicated by red and blue line, respectively.

Time domain features for HRV

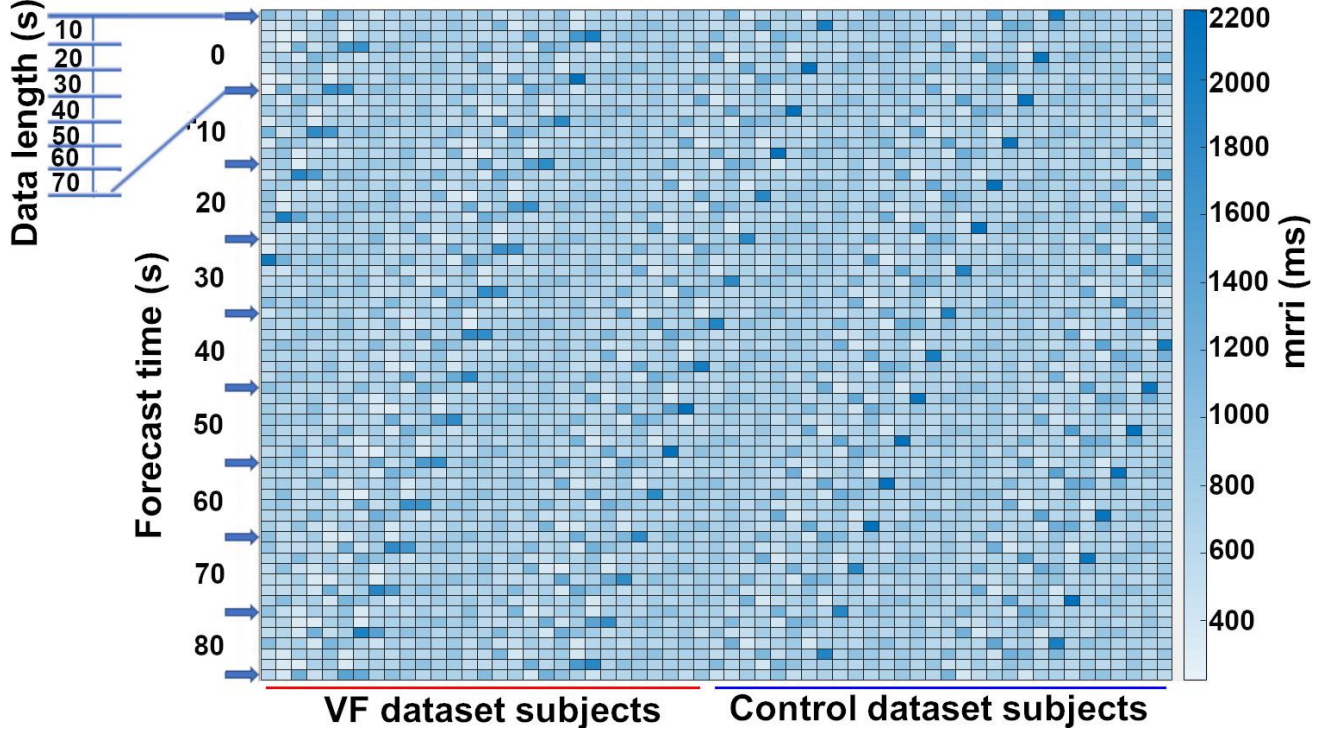


Figure 1. Mean of normal R-peak to normal R-peak (RR) interval (mrrri).

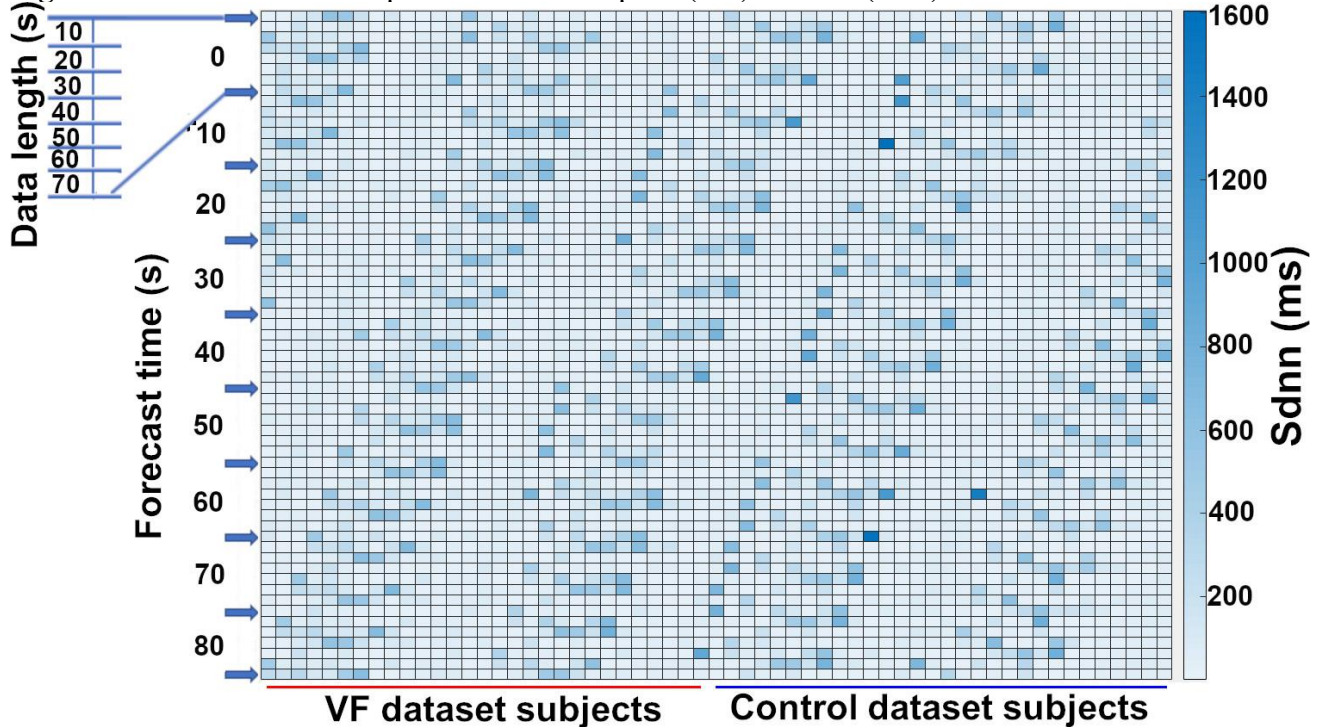


Figure 2. Standard deviation of RR intervals (sdnn).

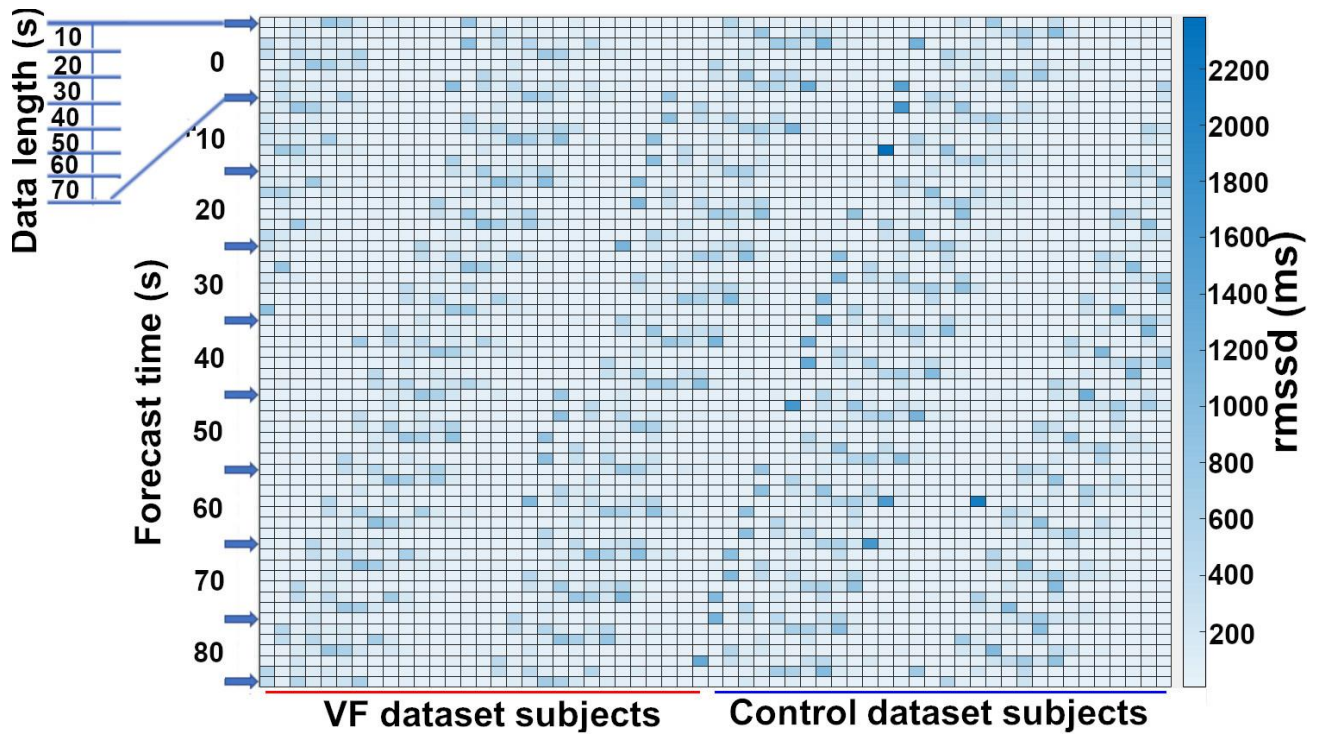


Figure 3. Proportion of interval differences of successive RR intervals greater than 50 ms (pnn50)

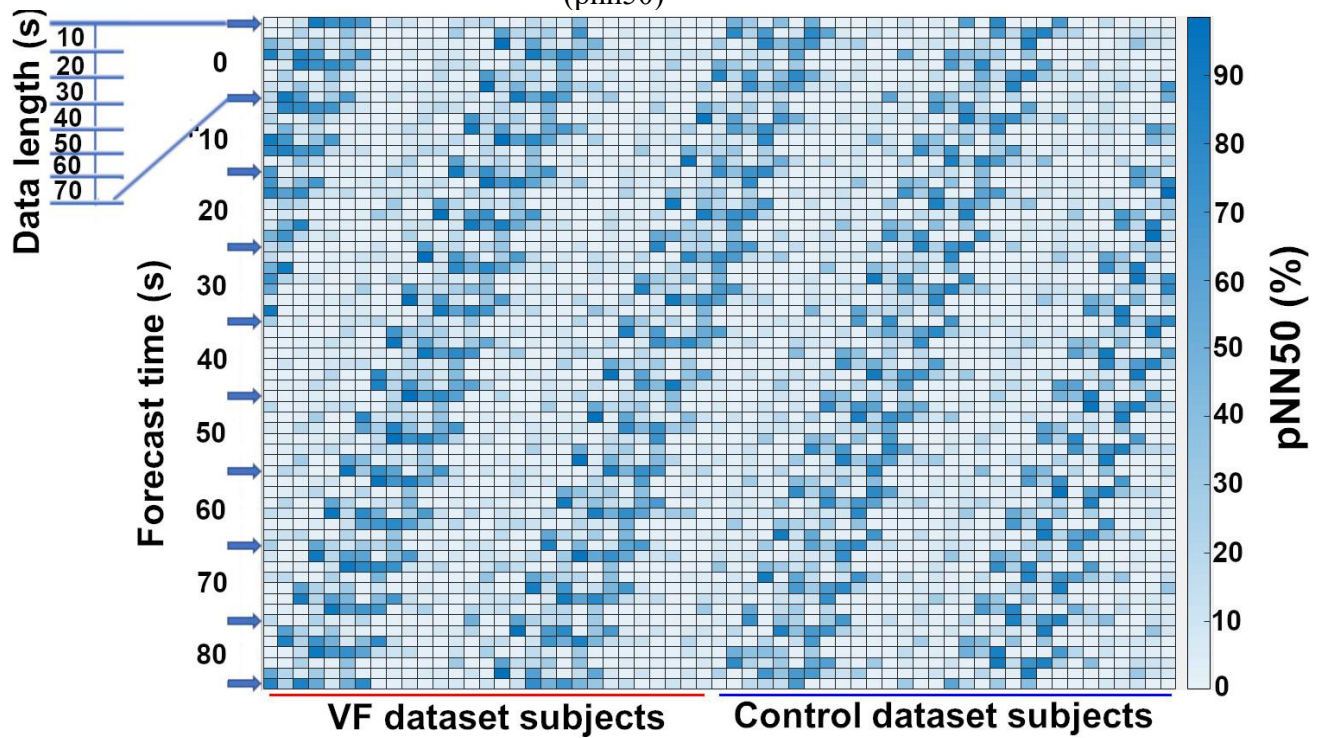


Figure 4. Square root of the mean squared differences of successive NN (RMSSD).

Frequency domain features for HRV

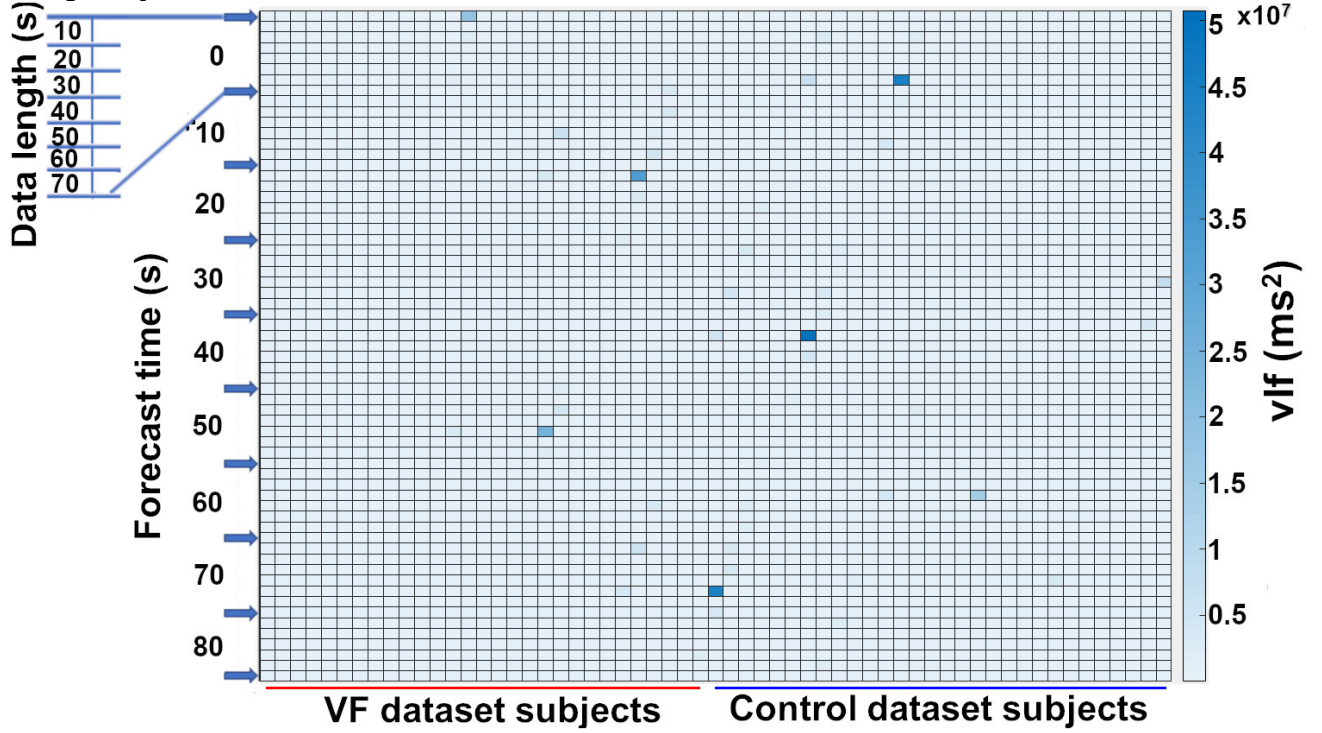


Figure 5. Power in very low frequency range (0–0.04 Hz) (VLF).

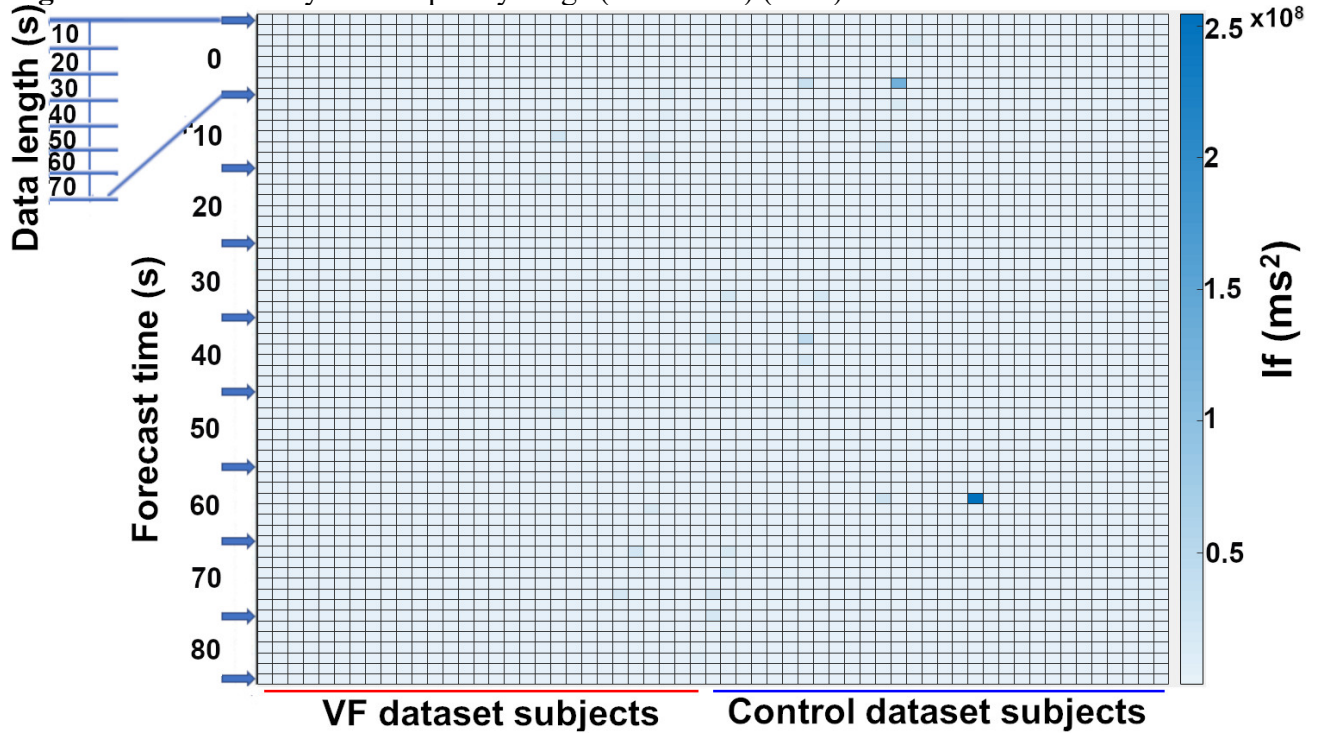


Figure 6. Power in low frequency range (0.04–0.15 Hz) (LF).

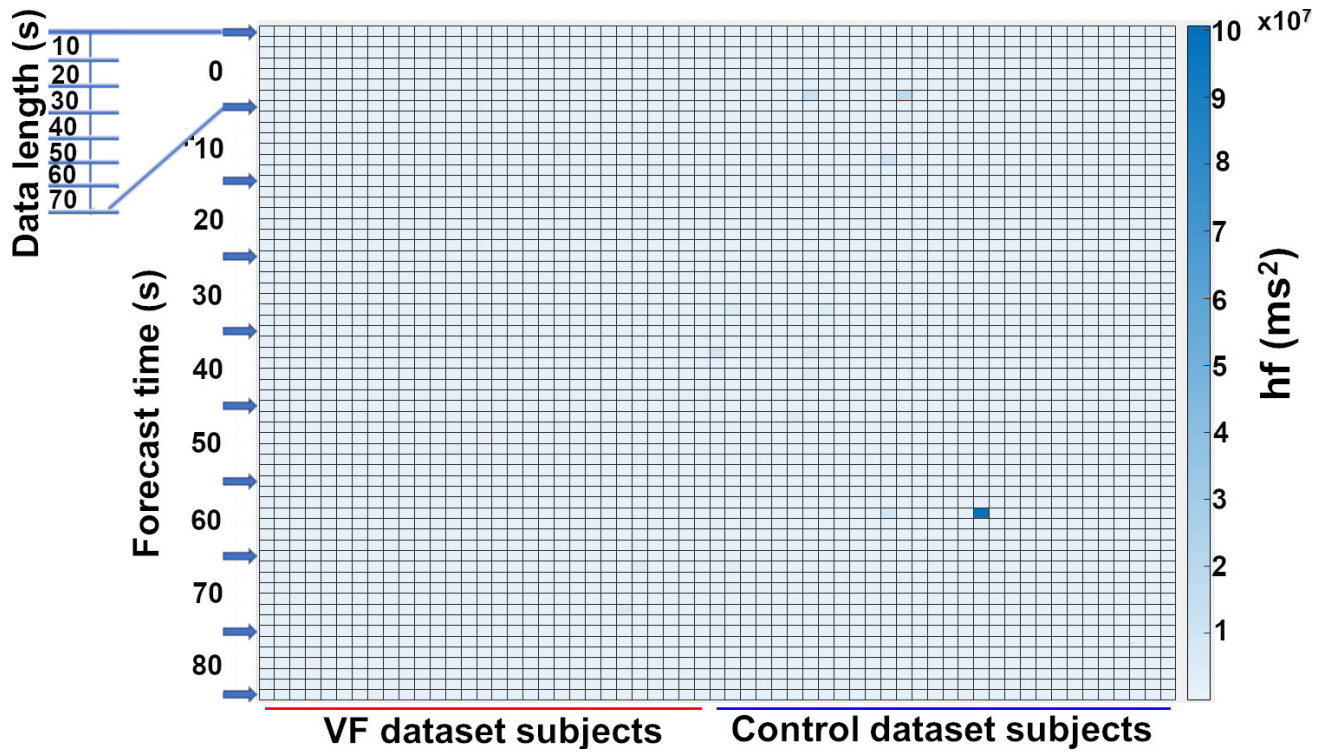


Figure 7. Power in high frequency range (0.15–0.4 Hz) (HF).

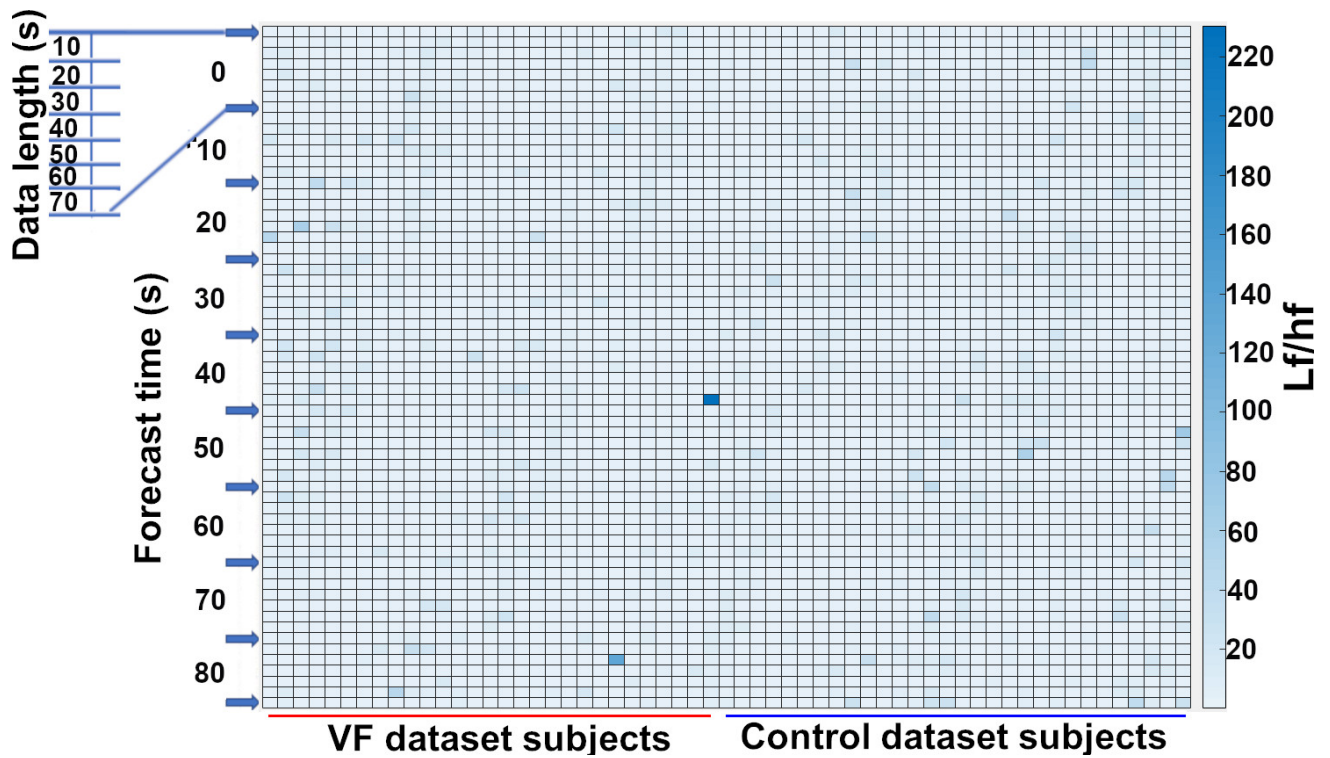
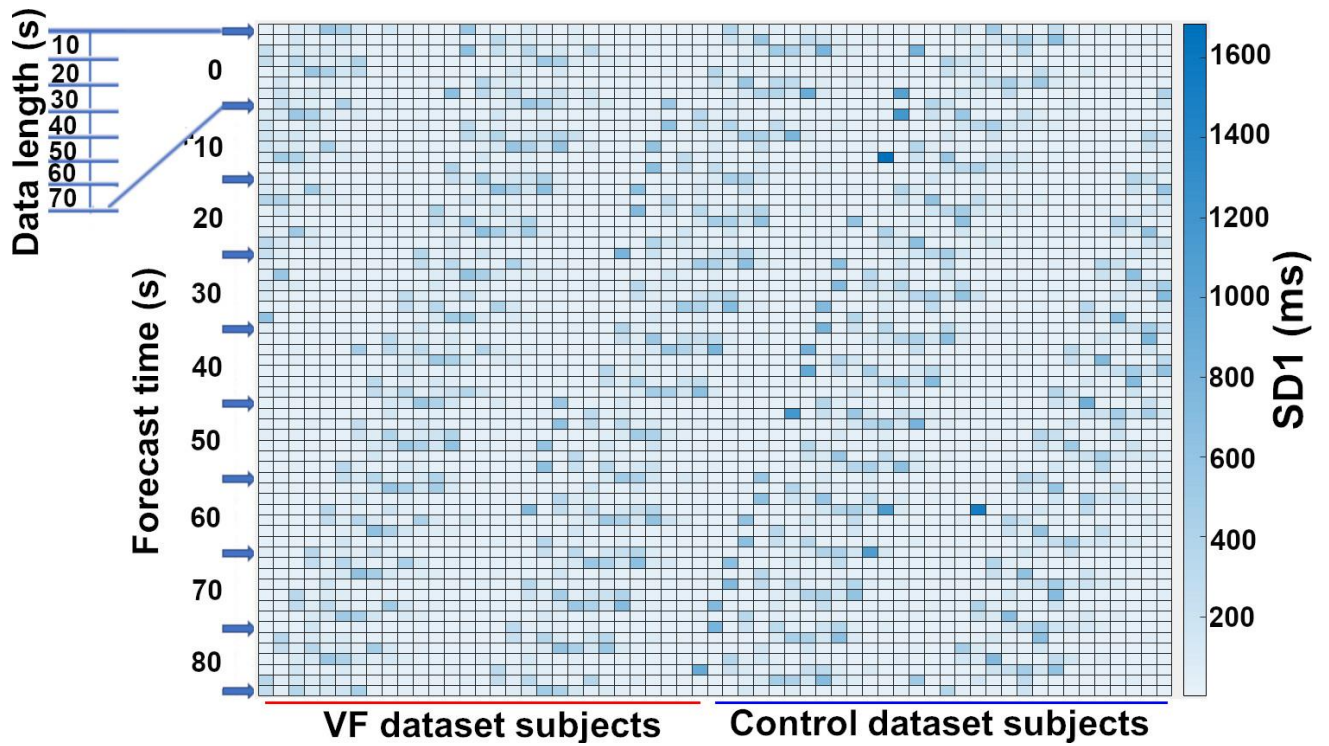
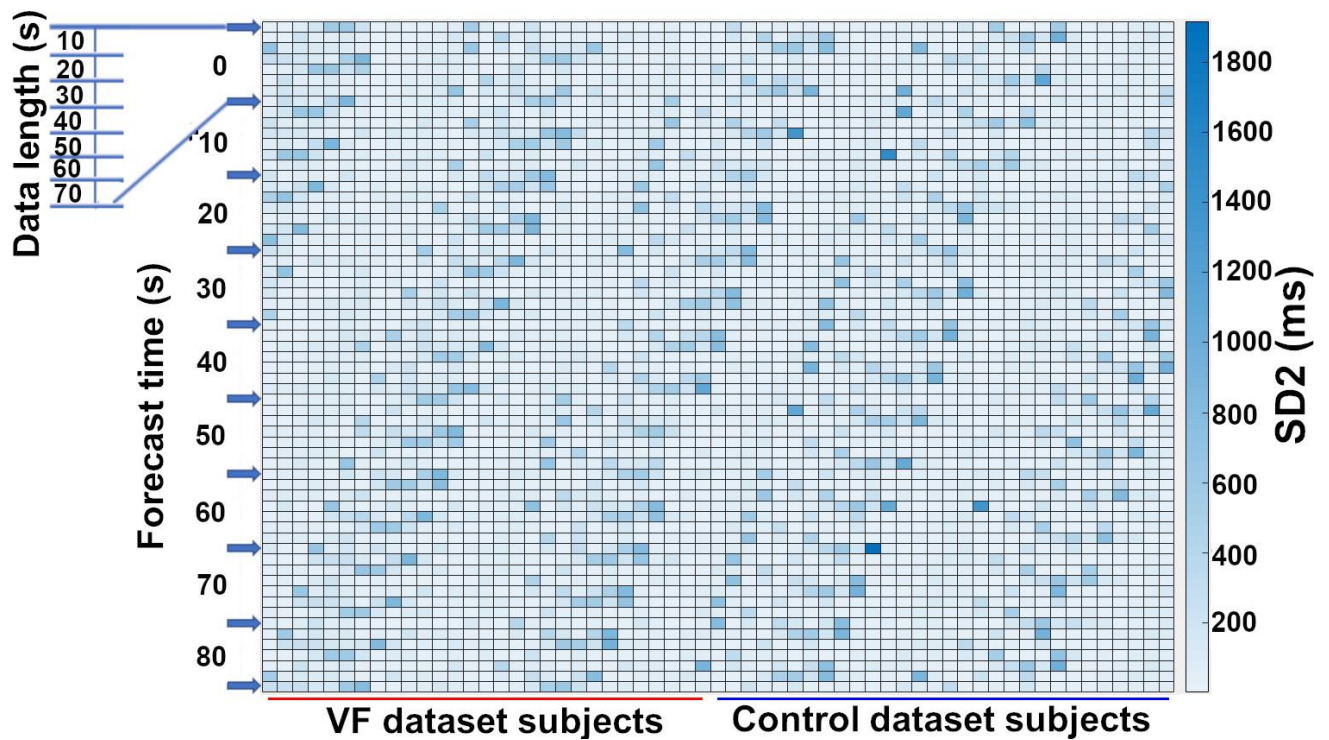


Figure 8. Ratio of LF to HF (LF/HF).

Poincare nonlinear features for HRV



**Figure 9.** Standard deviation of points perpendicular to the axis of line of identity (SD1).



**Figure 10.** Standard deviation of points along the axis of line of identity (SD2).

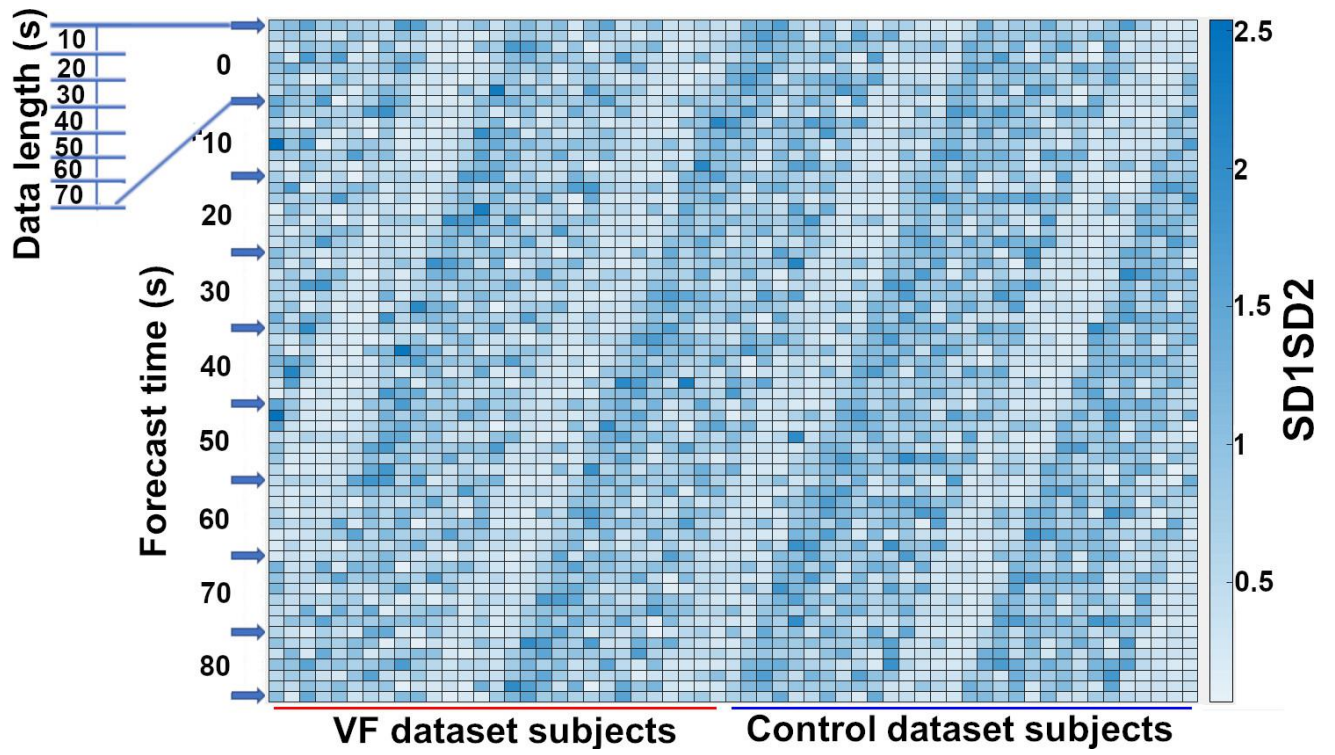


Figure 11. Ratio of SD1 to SD2 ( $SD1/SD2$ ).