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*Supplementary Data*

# Complexity analysis and dynamic characteristics of EEG using MODWT based entropies for identification of seizure onset

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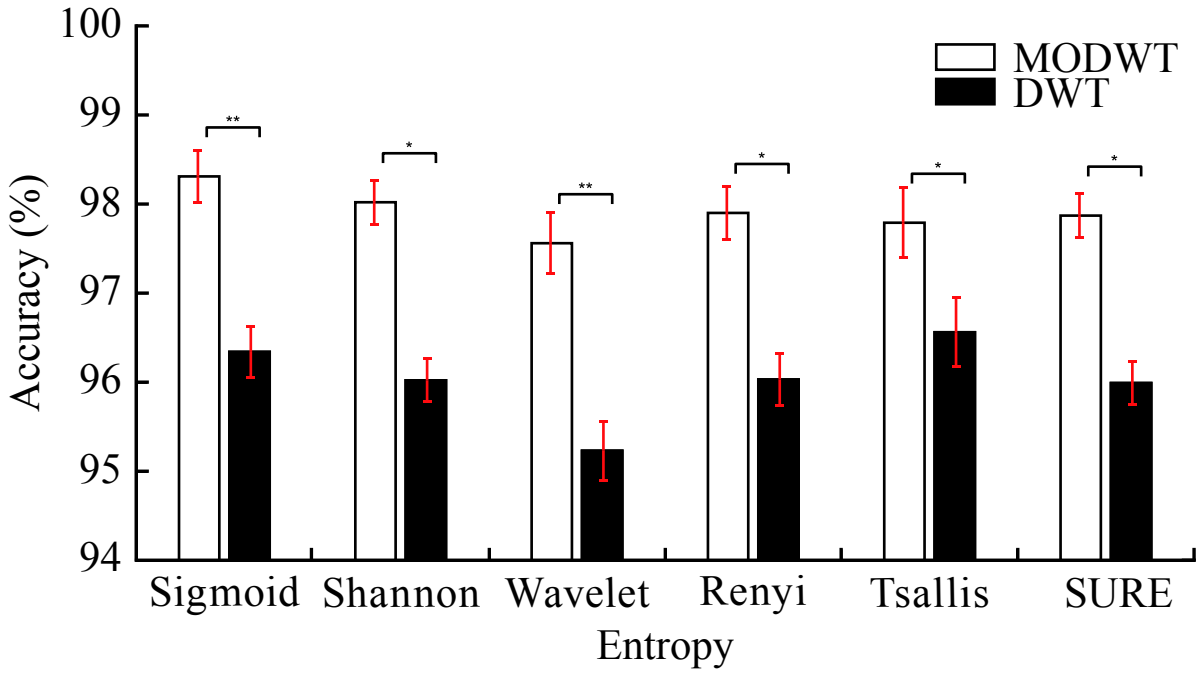


***Supplementary Fig. 1*** **Performance comparison between entropies derived from MODWT and DWT.** **P*<0.05; ***P*<0.01. MODWT: maximal overlap discrete wavelet transform; DWT: discrete wavelet transform; SURE: Stein's unbiased risk estimator.

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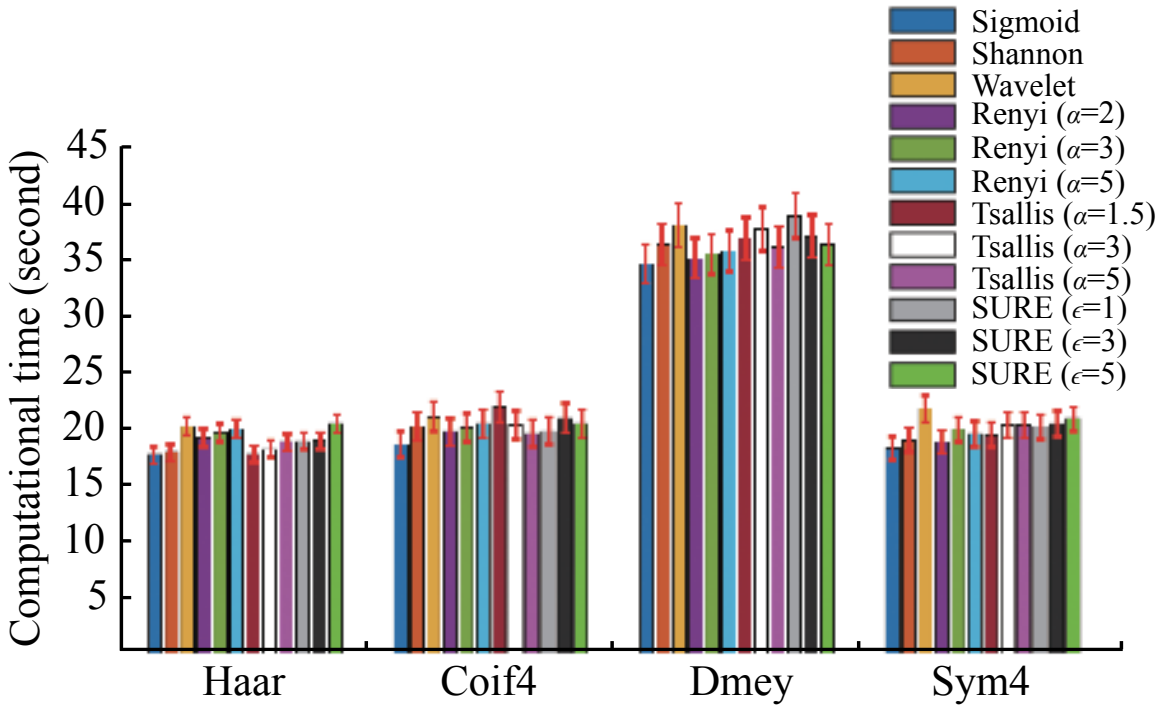
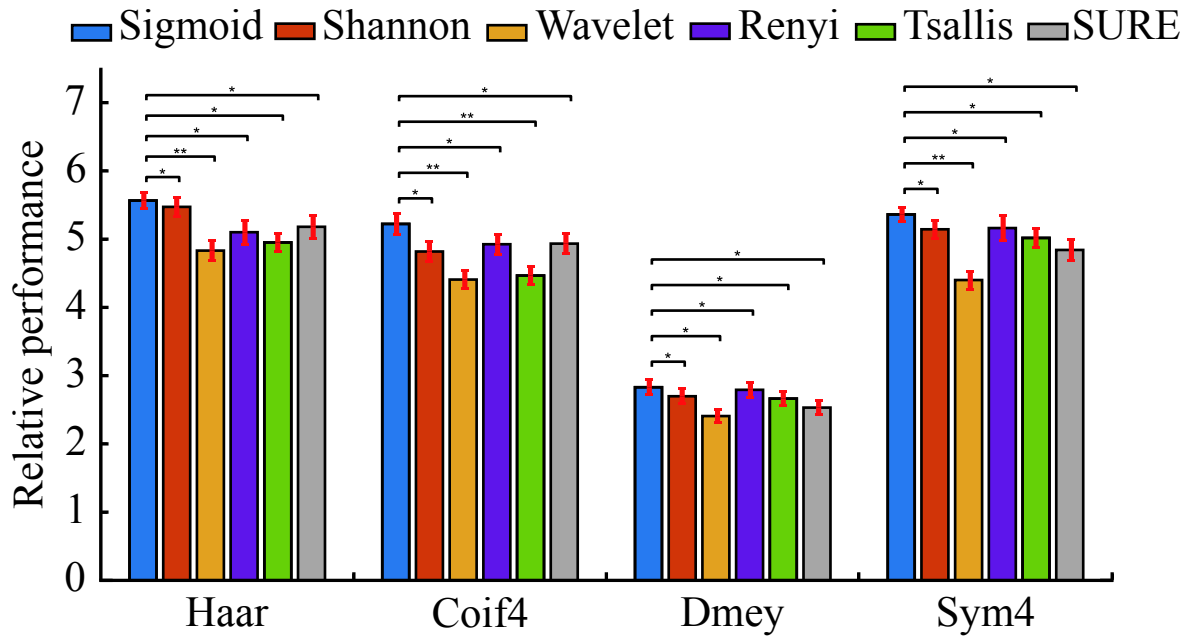
***Supplementary Table 1*** **Performance comparison of epileptic seizure detection methods**

| Authors | EEG database | Duration of EEG (hour) | No. of subjects | No. of channels | No. of seizures | Feature extraction | Classifier | Results (%) |
|---|---|---|---|---|---|---|---|---|
| Li *et al*[23] | UBonn | 1.29 | 5 | NS* | 100 seizure files | MODWT+LND scale parameter and shape parameter | Random forest | Accuracy=100 |
| Ouyang *et al*[24] | Epilepsy Center of the University Hospital of Freiburg, Germany | 509 | 421 | 18 | 161 | MODWT+nonlinear similarity index | Threshold | Accuracy=91.9 |
| Liu *et al*[13] | Epilepsy Center of the University Hospital of Freiburg, Germany | 509 | 421 | 18 | 161 | DWT+relative energy, fluctuation index, coefficient of variation and relative amplitude | SVM | Accuracy=94.86 |
| Vidyaratne *et al*[47] | CHB-MIT | 884 | 23 | 23 | 182 | Harmonic wavelet packet transform fractal dimension, spatial and temporal features | Relevance vector Machine | Sensitivity=96 |
| | UBonn | 1.29 | 5 | NS* | 100 seizure files | | | Accuracy=99.8 |
| Saab *et al*[48] | Epilepsy Telemetry Unit at the Montreal Neurological Institute and Hospital | 652 | 28 | 24 | 126 | DWT+energy, amplitude and variance | Bayes network | Sensitivity=78 |
| Kuhlmann *et al*[49] | Compumedics, Melbourne, Australia | 525 | 21 | 16 | 88 | DWT+energy, amplitude, variance, cross-correlation, and relative derivative | Bayes network | Sensitivity=79 |
| Zandi *et al*[32] | Vancouver General Hospital, Germany | 76 | 14 | 15 | 63 | DWT+combined seizure index | Adaptive thresholding | Sensitivity=90.5 |
| Hopfengärtner *et al*[50] | Epilepsy Center University of Erlangen, Germany | 22 278 | 159 | 19 | 794 | Moving window STFT, averaged and integrated power | Adaptive thresholding | Sensitivity=89.9 |
| Proposed | RMCH, Bengaluru, India | 58 | 115 | 19 | 162 | MODWT+sigmoid entropy | SVM | Accuracy=98.44 |
| | UBonn | 1.29 | 5 | NS* | 100 seizure files | MODWT+sigmoid entropy | SVM | Accuracy=100 |
| | CHB-MIT | 884 | 23 | 23 | 182 | MODWT+sigmoid entropy | SVM | Accuracy=94.51 |




***Supplementary Fig. 2*** **Computational time between different entropies using MODWT for RMCH database.** SURE: Stein's unbiased risk estimator; MODWT: maximal overlap discrete wavelet transform; RMCH: Ramaiah Medical College and Hospitals.




***Supplementary Fig. 3*** **Relative performance obtained for best results among four wavelets and entropies.** **P*<0.05; ***P*<0.01. SURE: Stein's unbiased risk estimator.