

Pseudo-HFOs Elimination in iEEG Recordings Using a Robust Residual-based Dictionary Learning Framework

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Supplementary Materials:

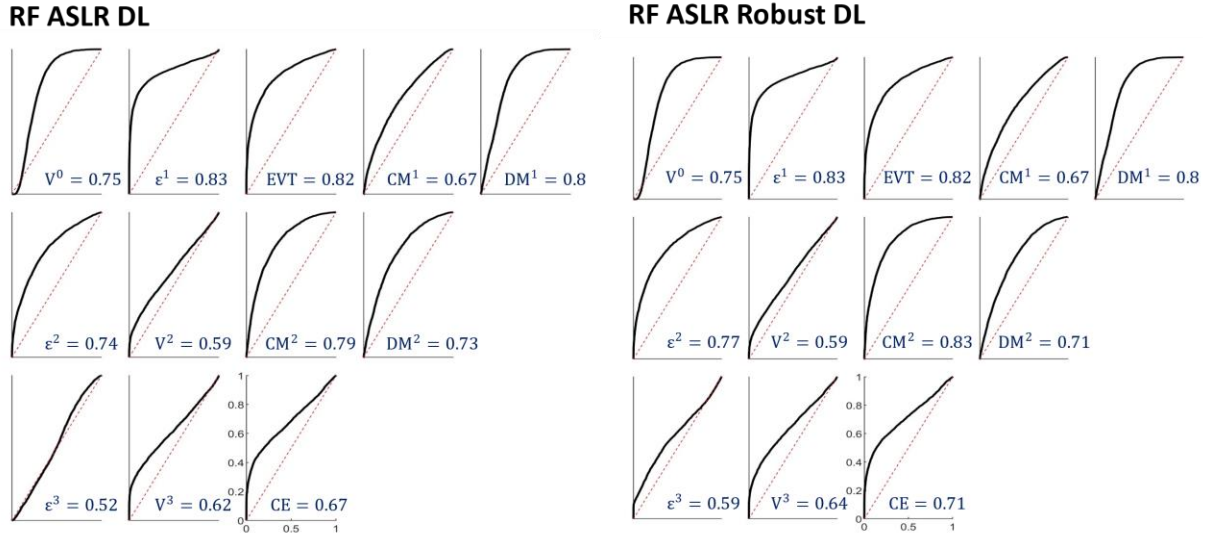


Fig. S1. ROC curves of all features: The left panel displays the ROC curves of features extracted based on OMP representation, while the right panel presents the ROC curves of features extracted using robust Huber regression. The AUC value for each corresponding feature is shown next to each subplot.

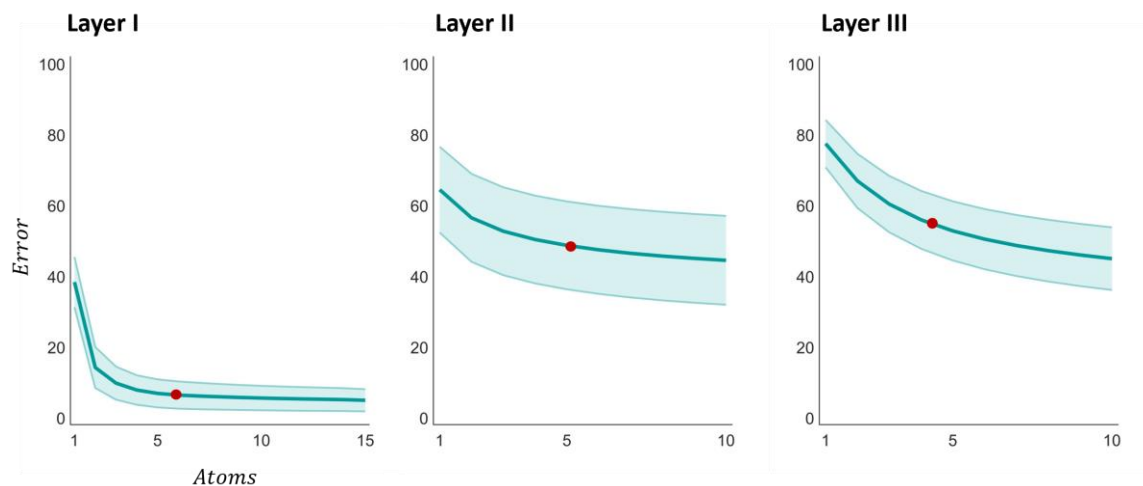


Fig. S2. For each layer of representation, the shaded plot shows the approximation error versus sparsity level within the local representation, indicating the number of atoms used to represent each segment during the ASLR. We used 6, 5, and 4 atoms for each layer, respectively. These values were chosen based on the balance between sparsity level and low approximation error observed in the shaded plots. This scheme ensures that the chosen sparsity levels accurately represent the majority of signals in real-HFOs.

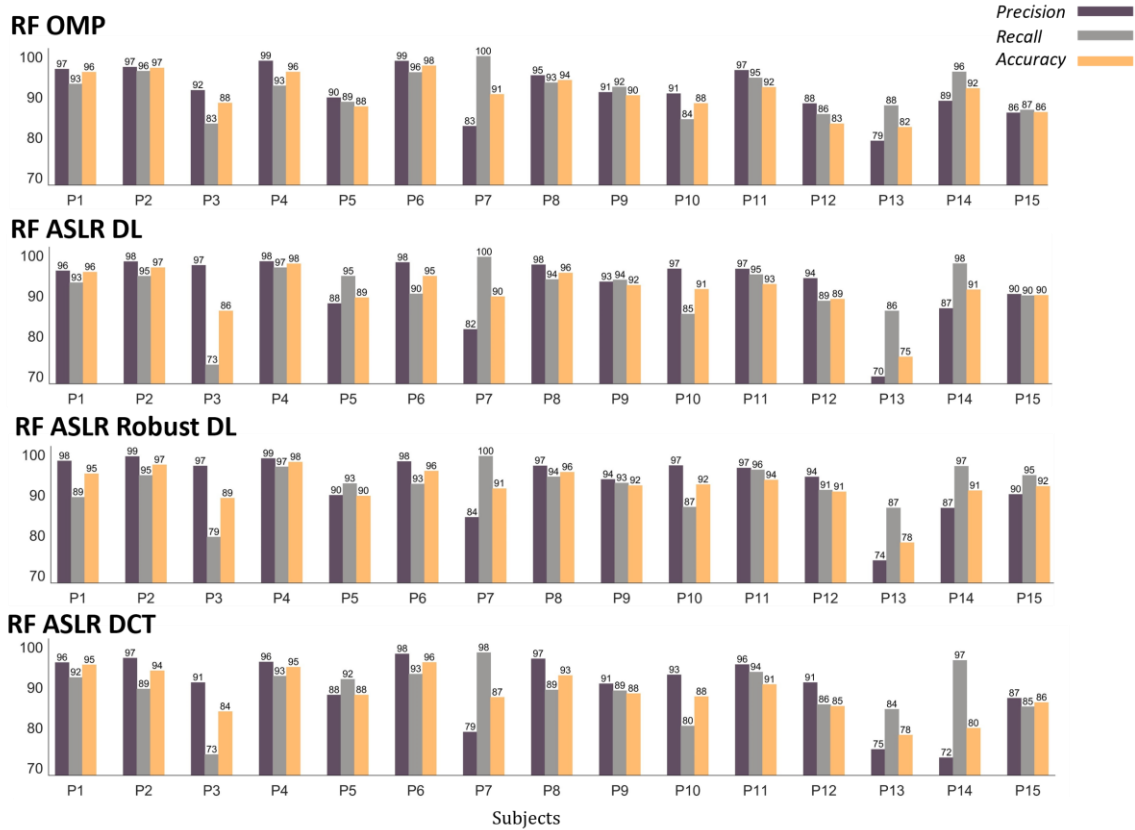


Fig. S3. Detailed analysis of classification results for different methods, presented in terms of precision, recall, and accuracy for each subject.

Table S1. Computational time*

Method		Average Processing Time (ms per Event)
RF-OMP	Step 0. Initial detection	9 ms/Event
	Step 1. Feature extraction	37 ms/Event
	Step 2. Prediction	<1 ms/Event
	Total	~46 ms/Event
RF ASLR DL	Step 0. Initial detection	9 ms/Event
	Step 1. Feature extraction	108 ms/Event
	Step 2. Prediction	<1 ms/Event
	Total	~117 ms/Event
RF ASLR DL Robust	Step 0. Initial detection	9 ms/Event
	Step 1. Feature extraction	1741 ms/Event
	Step 2. Prediction	<1 ms/Event
	Total	~1750 ms/Event
RF ASLR DCT	Step 0. Initial detection	9 ms/Event
	Step 1. Feature extraction	94 ms/Event
	Step 2. Prediction	<1 ms/Event
	Total	~103 ms/Event

* **Hardware:** Intel(R) Xeon(R) w9-3475X 2.21 GHz, 512 GB installed RAM, **Environment:** MATLAB 2022b, MATHWORKS, Natick/USA