

Table 8: The computational complexity of the feature extraction and image construction steps for each sample. “All steps” refers to the entire process through which a single sample undergoes, from event detection to full transformation into a 3-channel load signature. The total sample counts for the five datasets PLAID 2014, PLAID 2017, PLAID 2018S, PLAID 2018A, and Whited are 1074, 1793, 1876, 1314, and 1259, respectively.

Computational complexity	state detection	VMD	WPD	WMDF	All steps
Time (seconds)	0.07s	0.043s	0.0005s	0.282s	1.474s