

Sensors/Data Acquisition



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Sampling

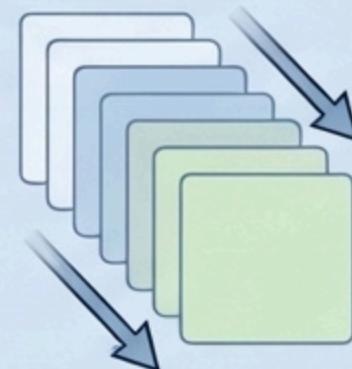
Sample period T_s ,
read y_k

y_k

Sliding Window Buffer (L samples, stride S)

y_k

\mathbf{Y}_w



Edge Device

Feature Extraction $\phi(\cdot)$ & Normalization

T_{feat}

$\mathbf{z}_w \rightarrow \tilde{\mathbf{z}}_w$

Model Inference / Classifier $g_\theta(\cdot)$

\mathbf{p}_w : Probabilities
 T_{inf}

$\tilde{\mathbf{z}}_w$

Decision Logic & Alarm Generation

Decision
 \hat{f}_w

Alarm/Warning Output



Diagnosis State
Alarm to User/Operator Update

Real-time processing constraint: $T_{\text{feat}} + T_{\text{inf}} \leq S T_s$