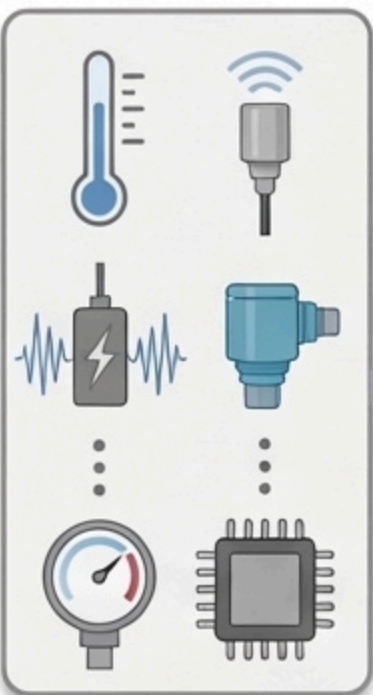


Sensors/Data Acquisition



Sensors/Data Acquisition

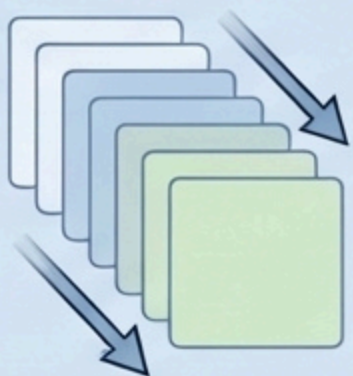
$y_k$

**Sampling**

Sample period  $T_s$ ,  
read  $y_k$

$y_k$

**Sliding Window Buffer**  
( $L$  samples,  
stride  $S$ )



$Y_w$

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

$z_w \rightarrow \tilde{z}_w$

$T_{\text{feat}}$

$\tilde{z}_w$

**Model Inference / Classifier**  
 $g_{\theta}(\cdot)$

$\mathbf{p}_w$ :  
Probabilities

$T_{\text{inf}}$

$\mathbf{p}_w$

**Decision Logic & Alarm Generation**

Decision  
 $\hat{f}_w$

Alarm/  
Warning  
Output



Diagnosis  
State  
Update

Alarm to  
User/Operator

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