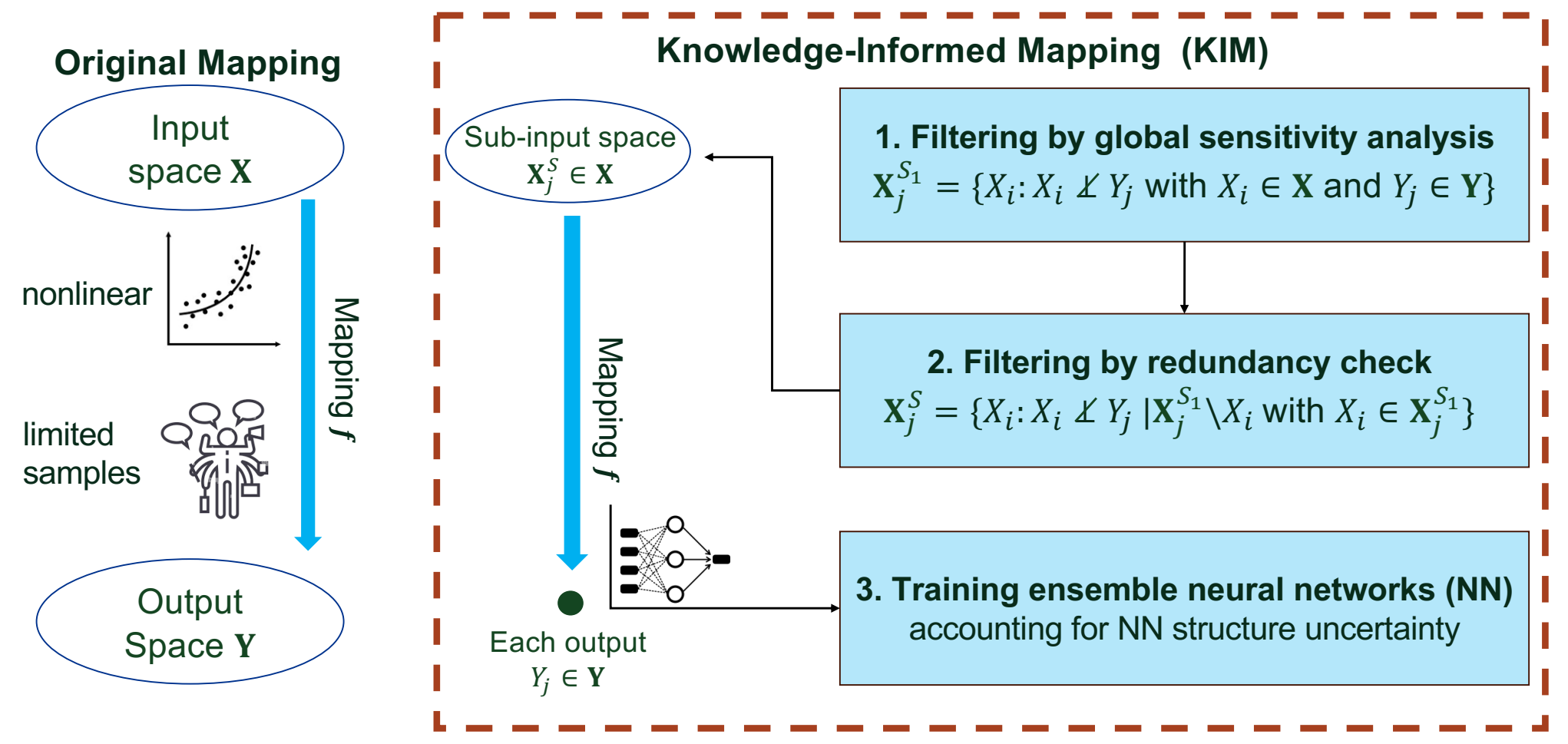
Original Mapping
Input space $\mathbf{X}$
nonlinear
limited samples
Mapping f
Output Space $\mathbf{Y}$
Knowledge-Informed Mapping (KIM)
Sub-input space $\mathbf{X}_j^S \in \mathbf{X}$
Mapping f
Each output $Y_j \in \mathbf{Y}$
1. Filtering by global sensitivity analysis
$\mathbf{X}_j^{S_1} = \{X_i : X_i \not\perp Y_j \text{ with } X_i \in \mathbf{X} \text{ and } Y_j \in \mathbf{Y}\}$
2. Filtering by redundancy check
$\mathbf{X}_j^S = \{X_i : X_i \not\perp Y_j \,|\mathbf{X}_j^{S_1} \backslash X_i \text{ with } X_i \in \mathbf{X}_j^{S_1}\}$
3. Training ensemble neural networks (NN)
accounting for NN structure uncertainty