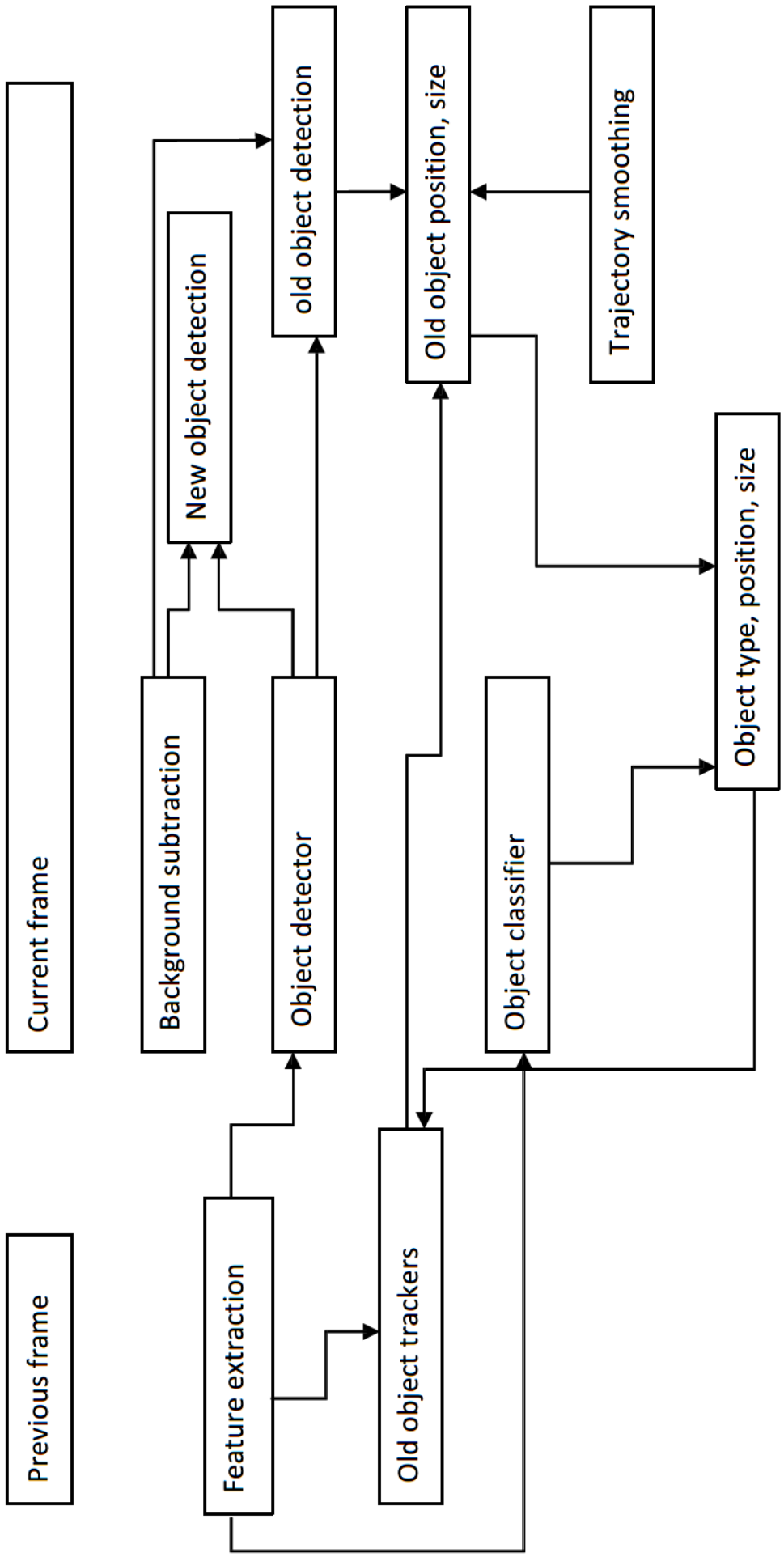

Current frame
Previous frame
Background subtraction
New object detection
Object detector
old object detection
Feature extraction
Old object trackers
Old object position, size
Trajectory smoothing
Object classifier
Object type, position, size

Figure 1

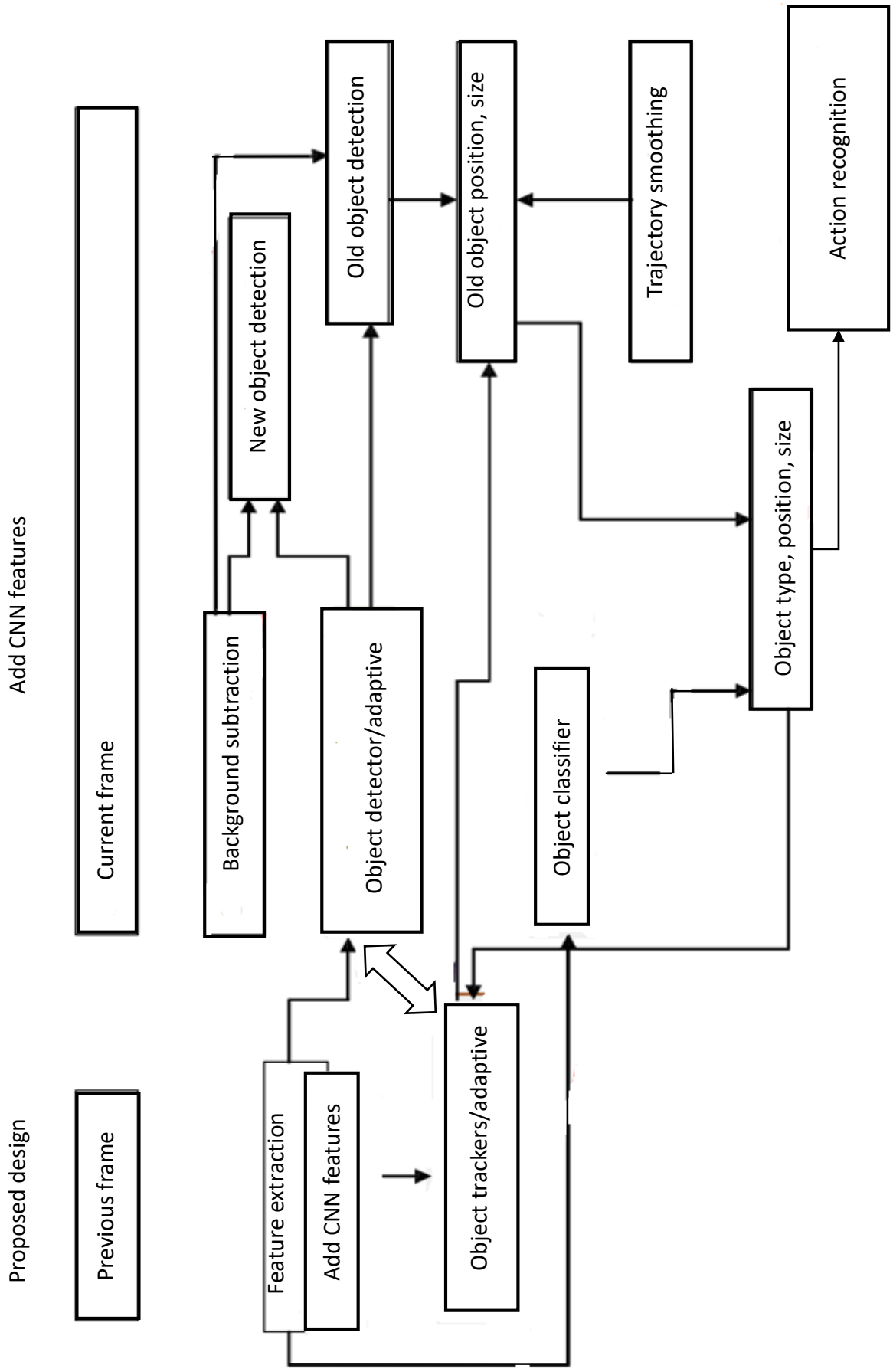

Proposed design
Previous frame
Current frame
Add CNN features
Feature extraction
Add CNN features
Background subtraction
New object detection
Object detector/adaptive
Old object detection
Object trackers/adaptive
Old object position, size
Object classifier
Trajectory smoothing
Object type, position, size
Action recognition

Figure 2