A Multilayer-Based Framework for Online Background Subtraction with Freely Moving Cameras Supplementary Materials

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This supplementary document includes the following sections:

1. Baseline Description
2. More Comparison Results

1. Baseline Description

For the baseline, we have devised a simpler segmentation strategy that derives from binary segmentation with slight modification. The problem of multilayer segmentation is considered as a combination of multiple classical foreground/background binary segmentation tasks that process concurrently. For each binary segmentation, we pick only one foreground layer and ignore the rest. The classical binary segmentation problem arises with respect to the chosen layer and the background layer. The final labeling is accomplished with the following strategy:

- For the pixels that are labeled as background in all binary segmentation tasks, we label them as background;
- For the pixels that are labeled as foreground in one task and background in others, we assign to them the label of the corresponding foreground layer;
- For the pixels that are labeled as foreground in multiple tasks, we compare the probabilities of foreground in these tasks and assign to them the label with the highest probability.

2. More Comparison Results

Besides the result shown in main paper, we add more results of performance comparison with state-of-the-art methods to demonstrate the outstanding ability of our framework to segment foreground objects.

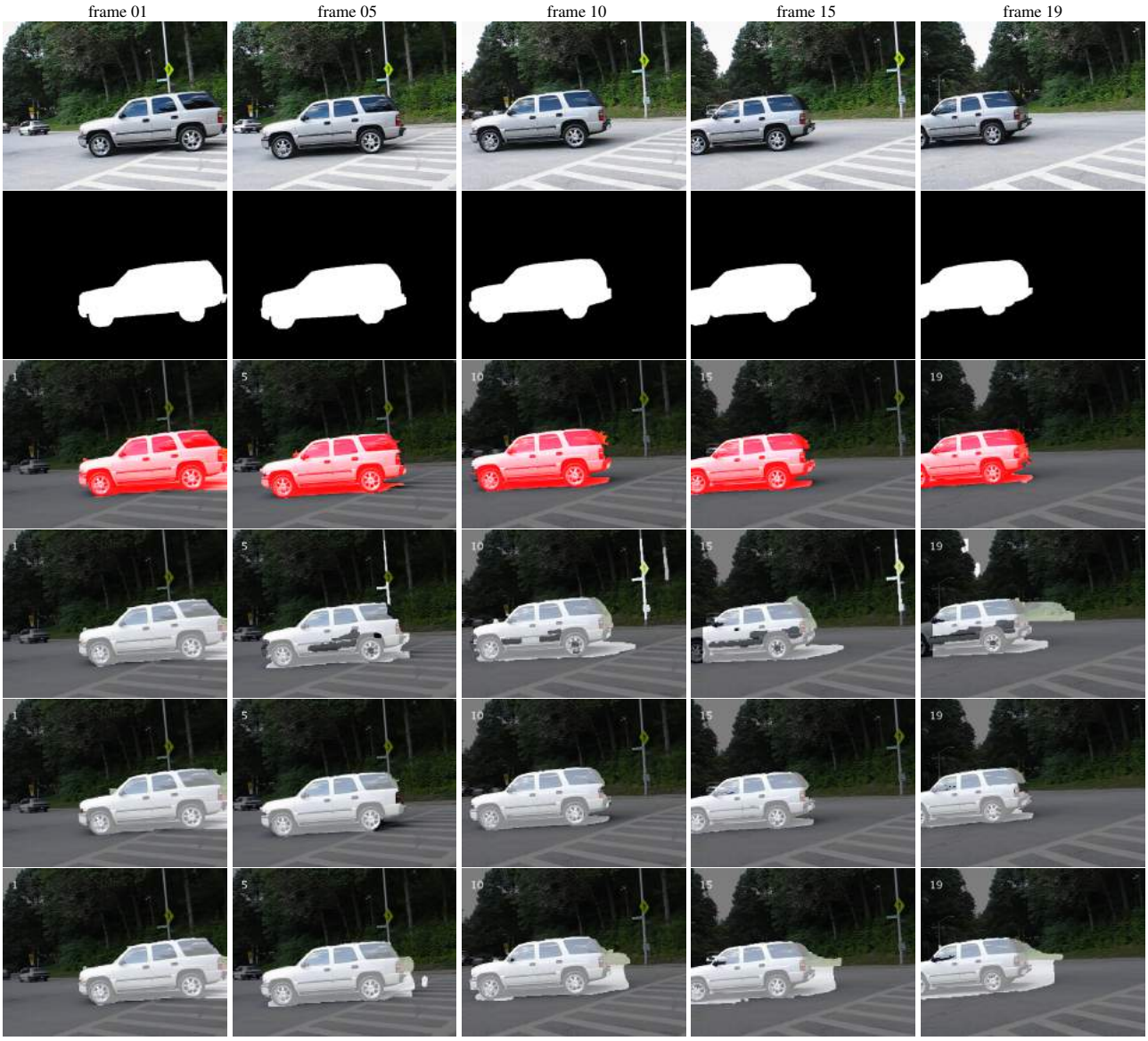

Figure 1: The result comparison on the sequence: **cars1**. Row1: Original image; Row2: Groundtruth; Row3: our MLBS; Row4: GBS; Row5: OMCBS; Row6: GBSSP.

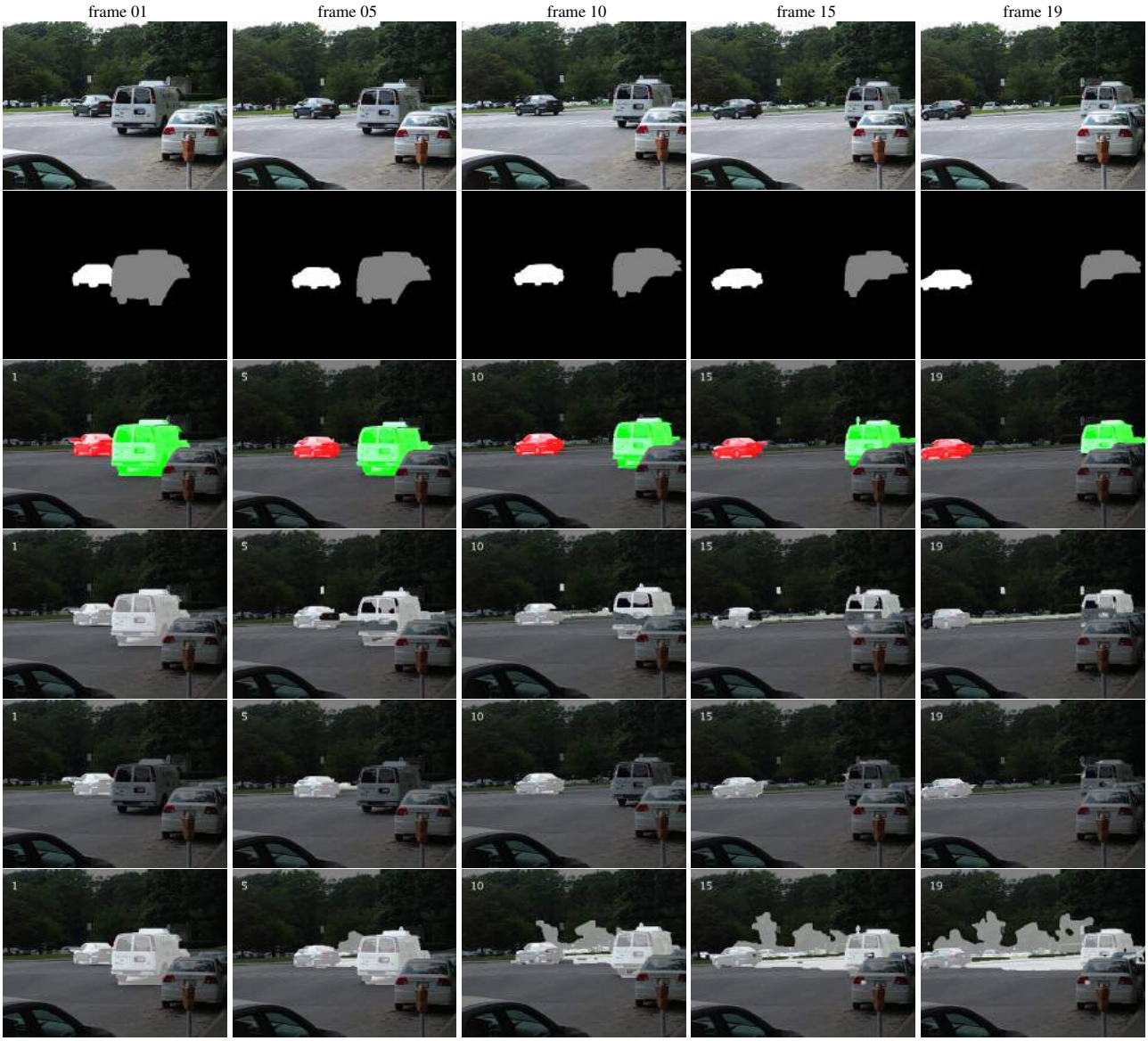

Figure 2: The result comparison on the sequence: **cars3**. Row1: Original image; Row2: Groundtruth; Row3: our MLBS; Row4: GBS; Row5: OMCBS; Row6: GBSSP.

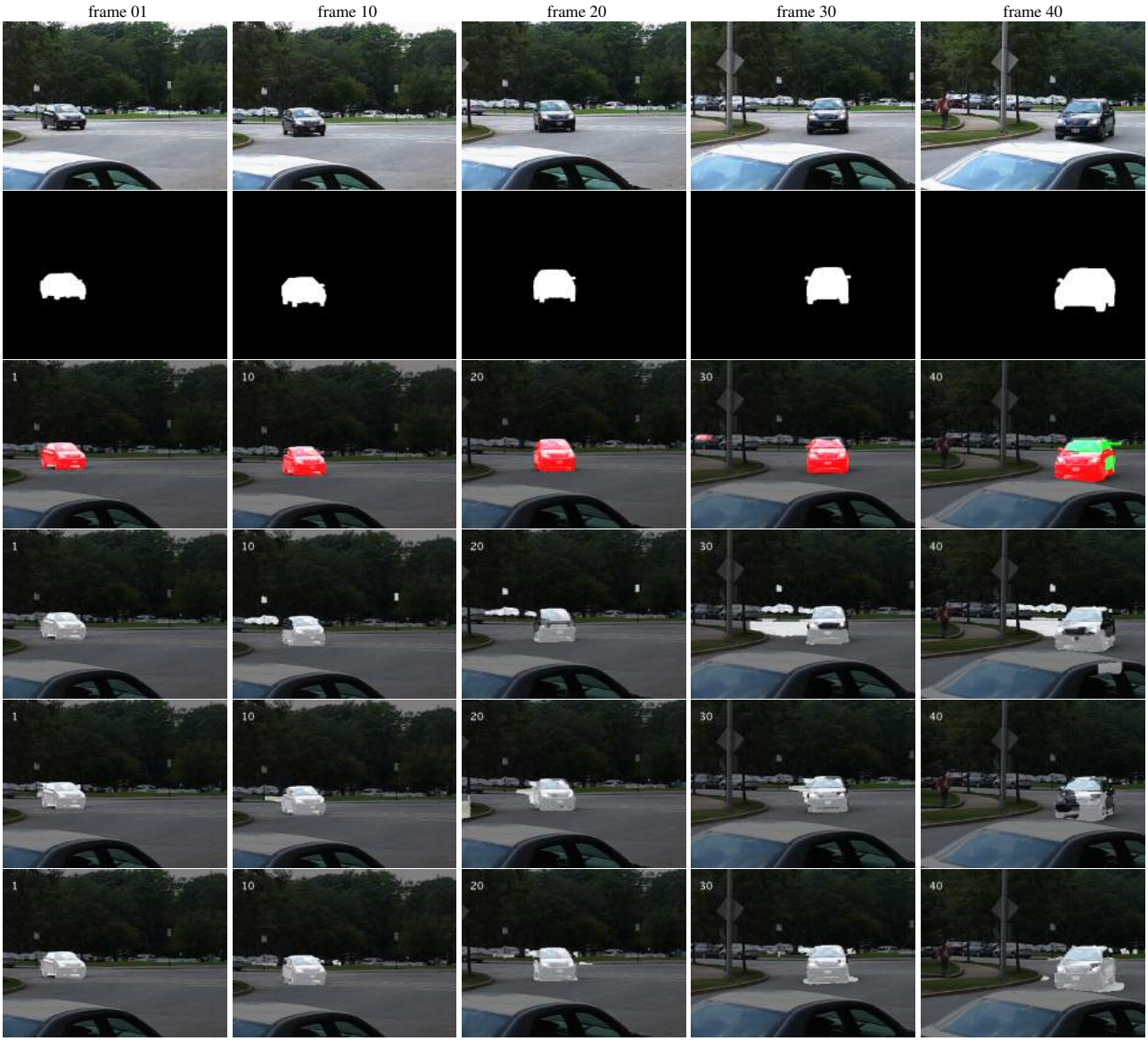

Figure 3: The result comparison on the sequence: **cars4**. Row1: Original image; Row2: Groundtruth; Row3: our MLBS; Row4: GBS; Row5: OMCBS; Row6: GBSSP.

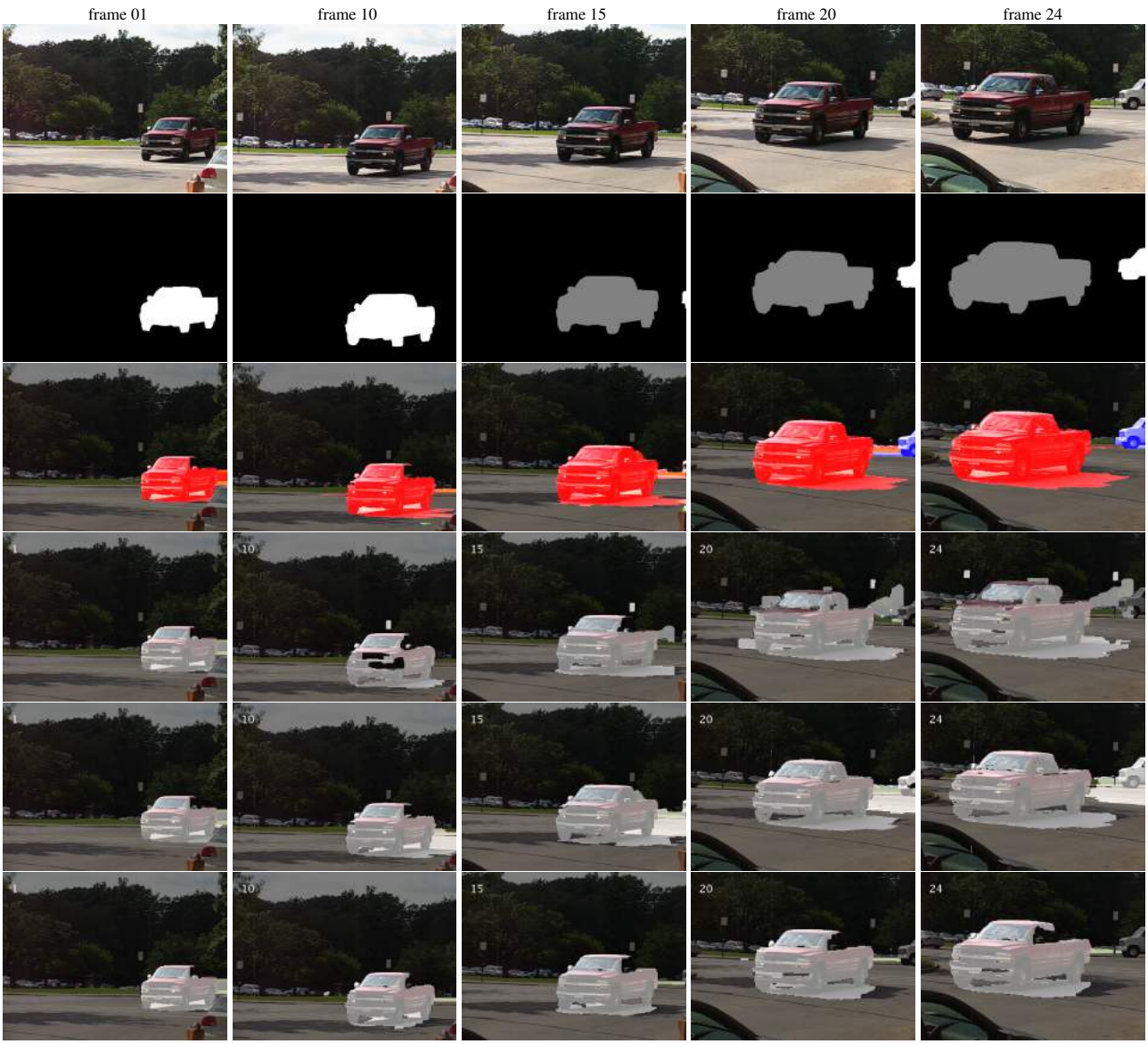

Figure 4: The result comparison on the sequence: **cars8**. Row1: Original image; Row2: Groundtruth; Row3: our MLBS; Row4: GBS; Row5: OMCBS; Row6: GBSSP.

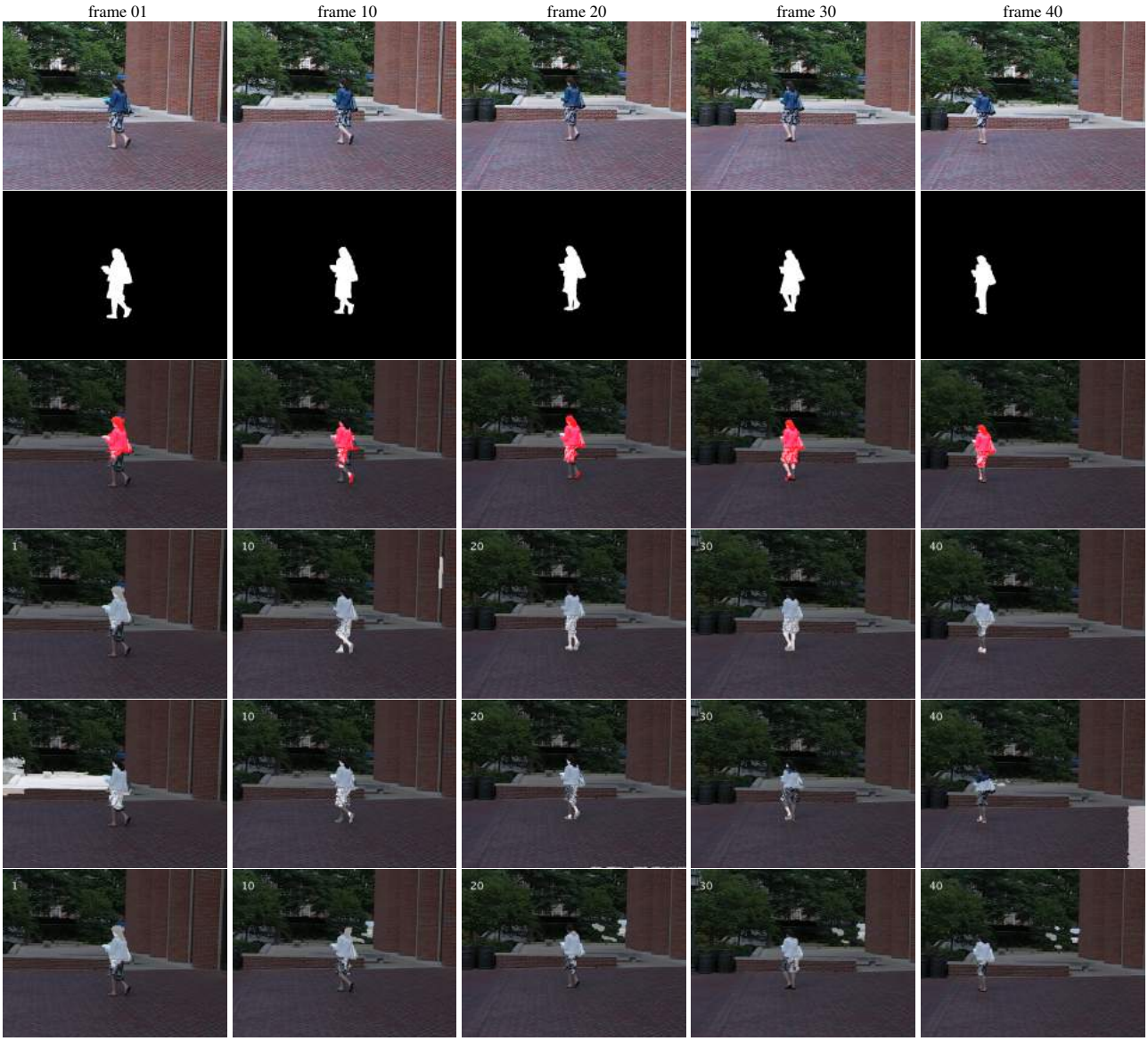

Figure 5: The result comparison on the sequence: **people1**. Row1: Original image; Row2: Groundtruth; Row3: our MLBS; Row4: GBS; Row5: OMCBS; Row6: GBSSP.

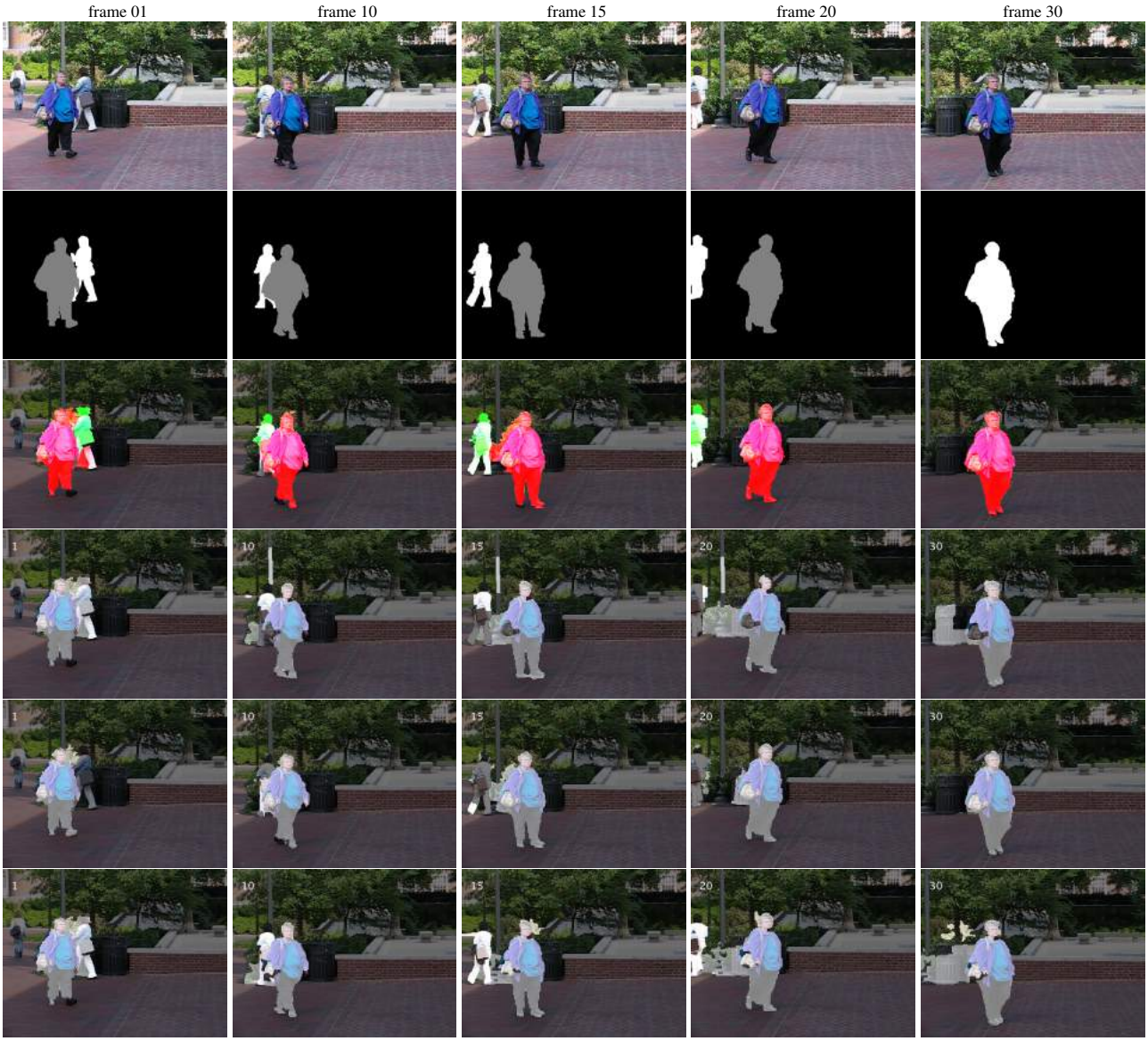

Figure 6: The result comparison on the sequence: **people2**. Row1: Original image; Row2: Groundtruth; Row3: our MLBS; Row4: GBS; Row5: OMCBS; Row6: GBSSP.

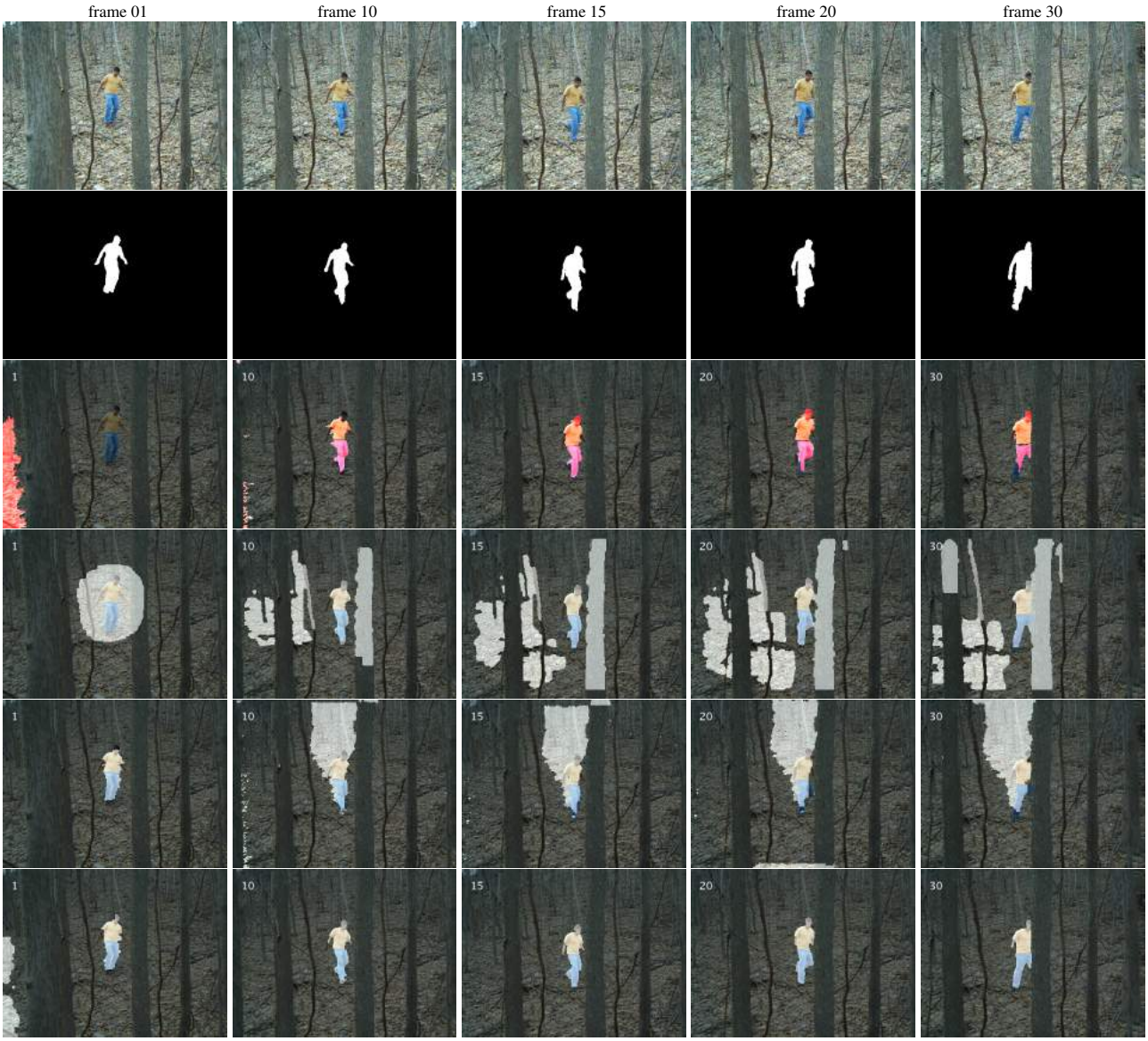

Figure 7: The result comparison on the sequence: **forest**. Row1: Original image; Row2: Groundtruth; Row3: our MLBS; Row4: GBS; Row5: OMCBS; Row6: GBSSP.

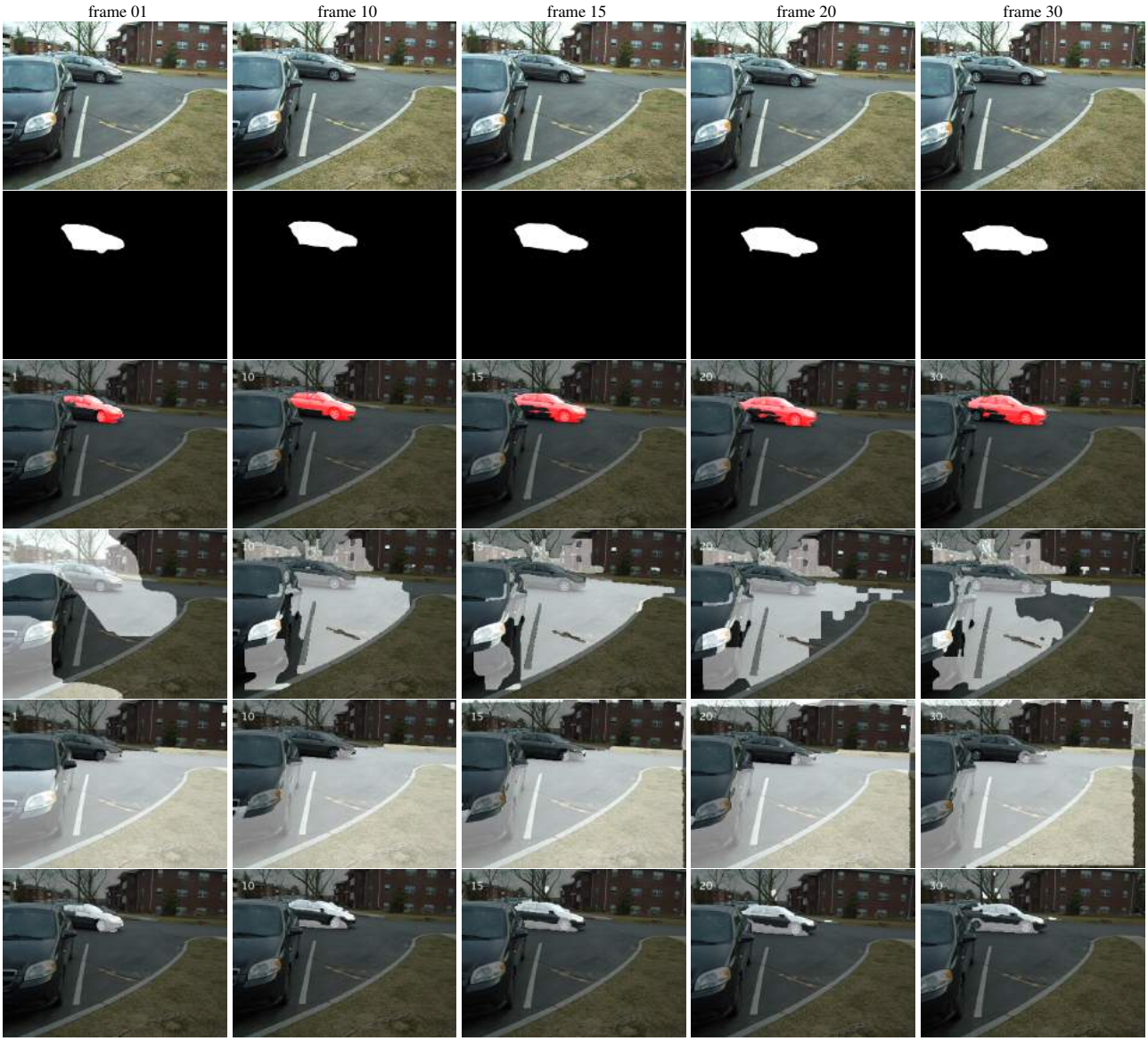

Figure 8: The result comparison on the sequence: **parking**. Row1: Original image; Row2: Groundtruth; Row3: our MLBS; Row4: GBS; Row5: OMCBS; Row6: GBSSP.

Figure 9: The result comparison on the sequence: **traffic**. Row1: Original image; Row2: Groundtruth; Row3: our MLBS; Row4: GBS; Row5: OMCBS; Row6: GBSSP.