

# Robust, Real-Time 3D Tracking of Multiple Objects with Similar Appearances (Supplementary Material)

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## Abstract

*This document lists the set of symbols used in the main paper.*

## 1. Notations

The set of symbols is listed in Table 4.

Table 4: Notations in the main paper.

|                          |  |
|--------------------------|--|
| $\mathcal{L}$            | Set of labels  |
| $m$                      | Number of targets detected   |
| $\mathcal{G}$            | Track graph  |
| $\mathcal{V}$            | Set of foreground region nodes in track graph  |
| $\mathcal{E}$            | Set of edges in track graph  |
| $t$                      | Current time   |
| $\mathcal{V}^t$          | Foreground region nodes given at $t$   |
| $i$                      | Foreground region node at $t$ (i.e., $i \in \mathcal{V}^t$ )   |
| $j$                      | Foreground region node at $(t - 1)$ (i.e., $j \in \mathcal{V}^{t-1}$ )   |
| $\mathcal{X}_i$          | Set of 3D coordinates of foreground voxels constructing $i$  |
| $\mathcal{L}_i$          | Set of labels of candidates to which $i$ can belong  |
| $i_s$                    | Foreground region detected as newly tracked object in TS 3   |
| $i_u$                    | Artifact regions that appear without being identified in TS 3  |
| $s$                      | Newly created object index   |
| $u$                      | Newly created artifact index   |
| $\mathcal{T}_k$          | $k$ th merging group   |
| $\mathcal{T}$            | Set of indices of merging groups (i.e., $\mathcal{T} = \{\mathcal{T}_k\}_{k \in \mathcal{K}}$ )  |
| $\mathcal{K}$            | Set of indices of merging groups   |
| $\mathbf{x}$             | 3D coordinates of foreground voxel   |
| $l$                      | Target index (i.e., $l \in \mathcal{L}$ )  |
| $\boldsymbol{\mu}_l^t$   | 3D position of $l$ at $t$  |
| $\hat{t}$                | Particular previous time (i.e., $\hat{t} < t$ )  |
| $\mathcal{X}$            | Set of 3D coordinates of all foreground voxels   |
| $\Theta$                 | Set of all model parameters (i.e., $\Theta = \{\pi_l, \boldsymbol{\mu}_l^t\}_{l \in \mathcal{L}}$ )  |
| $\gamma_{\mathbf{x}, l}$ | Responsibility that component $l$ takes for explaining the observation $\mathbf{x}$  |
| $\Theta^{\text{old}}$    | Current estimate in E and M steps  |
| $\Theta^{\text{new}}$    | Revised estimate in E and M steps  |
| $\bar{l}$                | Isolated target index  |
| $\bar{l}$                | Index of target that interacts with others   |
| $\bar{\mathcal{L}}$      | Set of labels $\bar{l}$ (i.e., $\bar{l} \in \bar{\mathcal{L}}$ )   |
| $\bar{\Theta}$           | Set of model parameters of $\bar{\mathcal{L}}$ (i.e., $\bar{\Theta} = \{\pi_{\bar{l}}, \boldsymbol{\mu}_{\bar{l}}^t\}_{\bar{l} \in \bar{\mathcal{L}}}$ ) |