

Table 3.3 – *Continued from previous page*

Eqn #	Metric	Formula	Description
3.2	Multiple Object Tracking Precision (MOTP)	$\text{MOTP} = \frac{\sum_i i_t d_i}{\sum_t c_t}$ <p>Where:</p> <ul style="list-style-type: none"> • $d_t = 1 - IOU$, the distance between the ground truth and predicted bounding boxes for object i in frame t. • c_t, the number of matches in frame t. 	<p>MOTP measured how precisely the system localized and tracked individuals. It was calculated based on the Intersection over Union (IoU) of bounding boxes between detected objects and ground truth. This formula measures the average localization precision across all correctly matched pairs in the video sequence (Fei and Han, 2023). This metric indicated the system's spatial tracking precision within the store layout.</p>
3.3	Identification Precision (IDP)	$\text{IDP} = \frac{\text{IDTP}}{\text{IDTP} + \text{IDFP}}$ <p>Where IDTP and IDFP are the number of valid and false positive IDs, respectively, a high IDP score indicates that customer identities were not incorrectly assigned or merged.</p>	<p>IDP evaluated how accurately the system identified and maintained customer identities during tracking. Simply, it is the accuracy of customer ID identification in each bounding box (Fei and Han, 2023).</p>

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