

Lost and Found: Overcoming Detector Failures in Online Multi-Object Tracking

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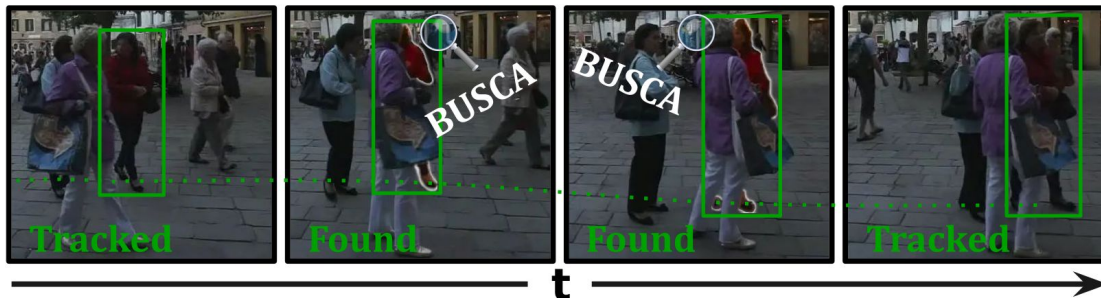
Object detectors are not perfect

Running a **detector** on **every frame** does **not guarantee optimal** results

Online Tracker



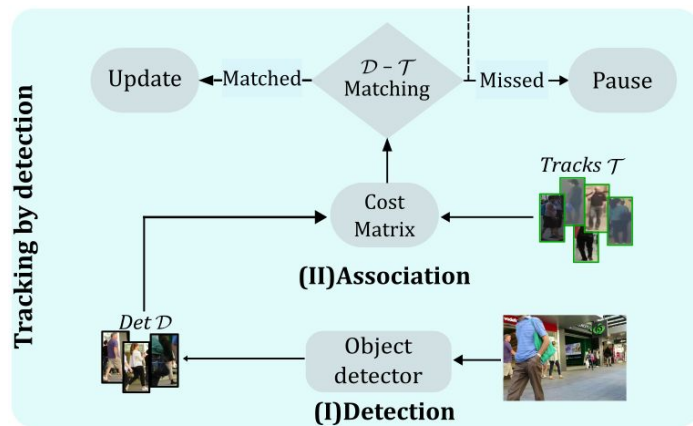
Online Tracker w/ BUSCA



We want to **rescue** those **tracks without detections**

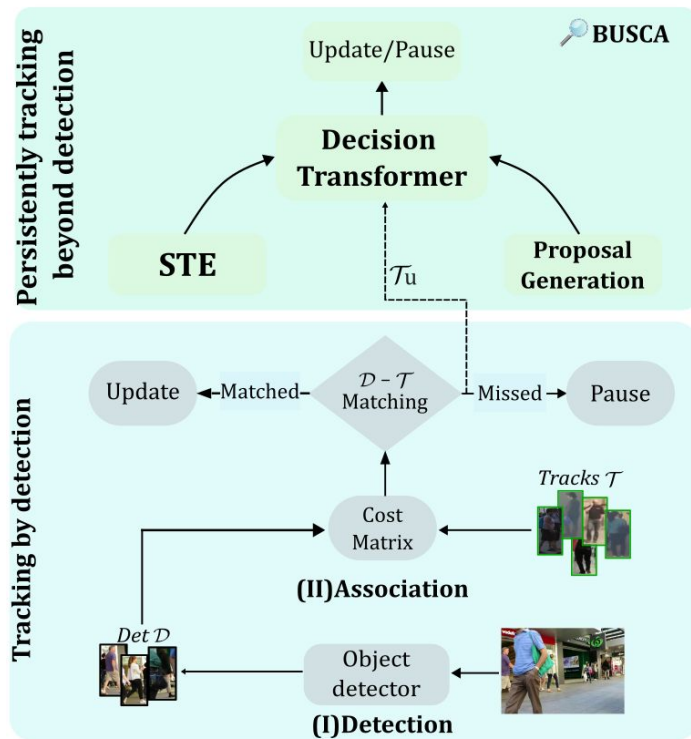
Tracking by Detection

TbD trackers **pause/deactivate** the **track** if it has **no matching detections**



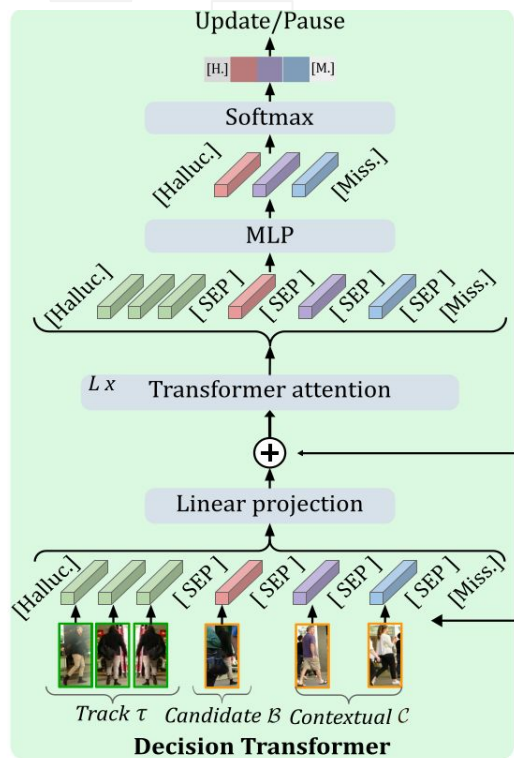
Building Unmatched trajectories Capitalizing on Attention

BUSCA is a **plug-and-play** module that does **not rely on detections**

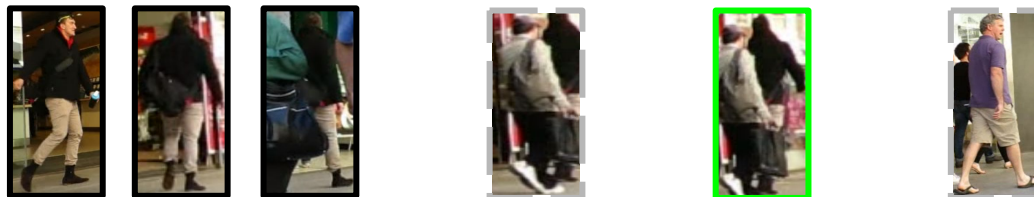
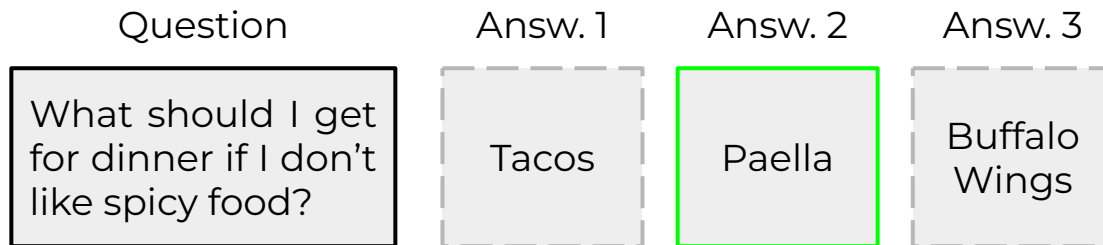


Decision Transformer

We **propose** an **online Transformer**-based architecture to **solve associations**

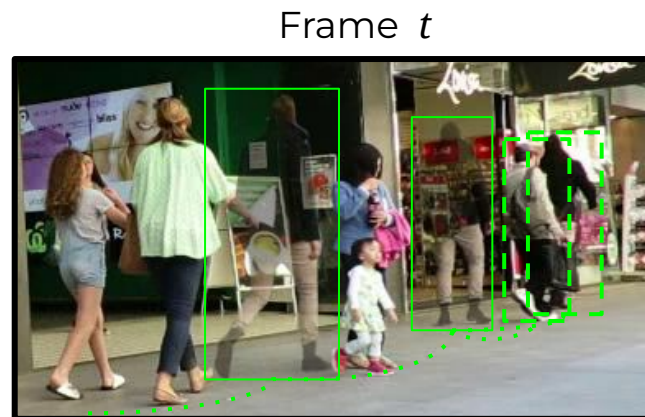
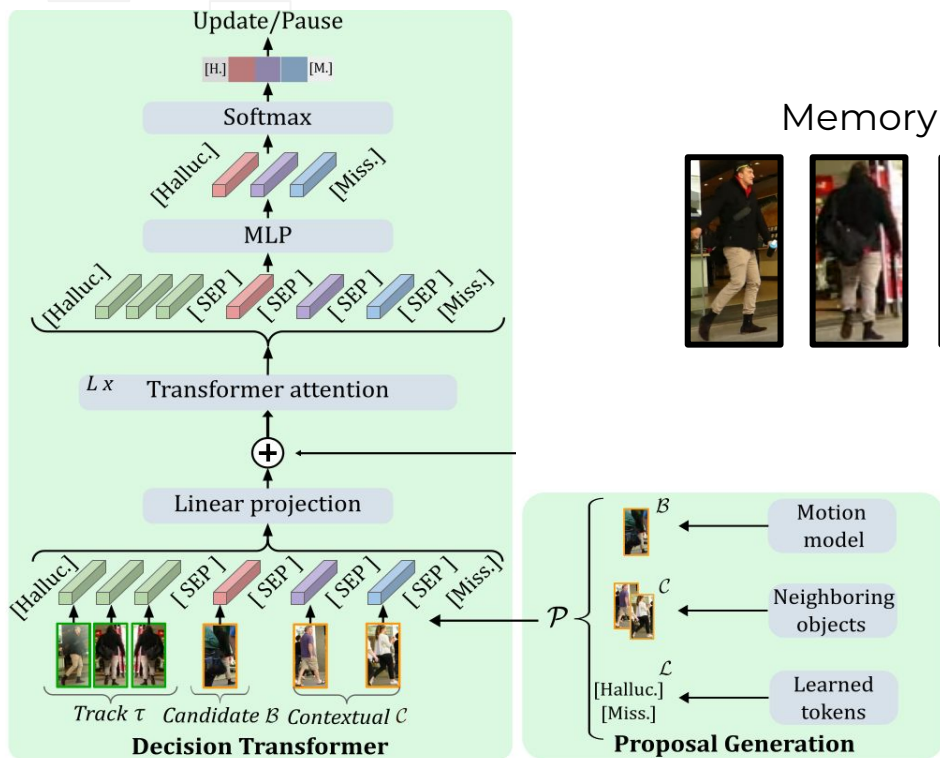


Inspired from **NLP** (multi-choice question-answering)



Proposal Generation

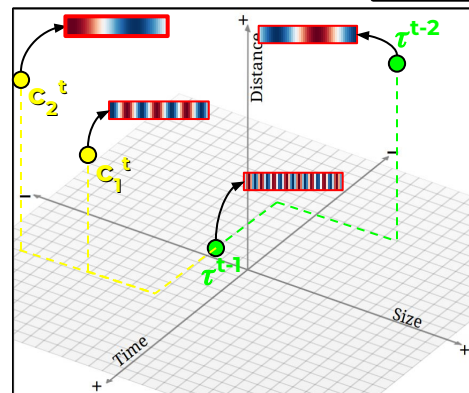
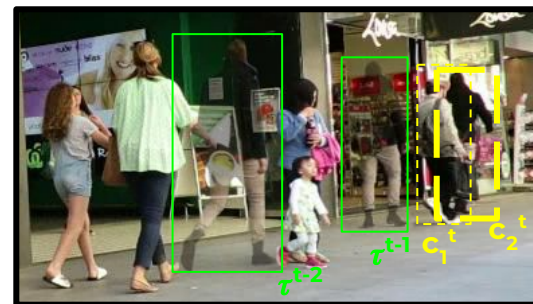
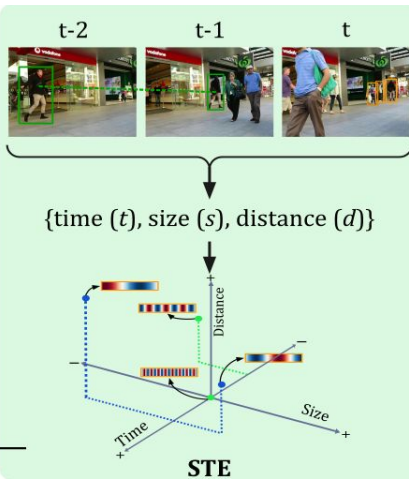
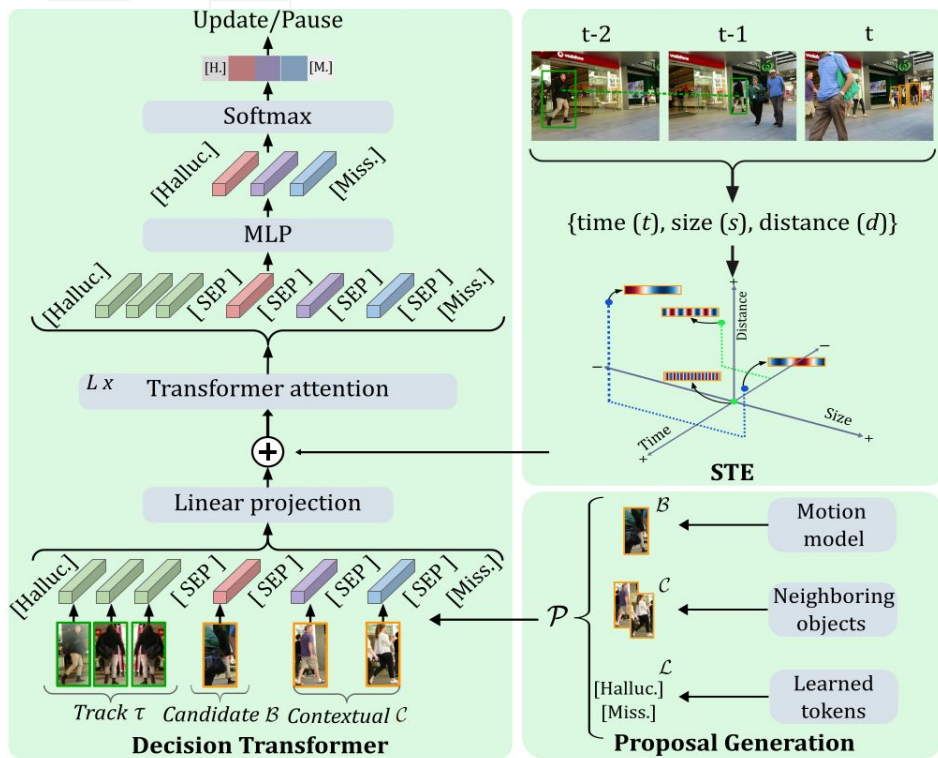
We use **motion predictions**, **nearby objects**, and **learnable tokens** as candidates



Spatiotemporal Encoding

Spatiotemporal encoding enables **relationships** between **motion** and **appearance**

Frame t



Experimental results

	MOT16				MOT17				MOT20			
	MOTA↑	HOTA↑	IDF1↑	IDSW↓	MOTA↑	HOTA↑	IDF1↑	IDSW↓	MOTA↑	HOTA↑	IDF1↑	IDSW↓
MeMOT [6]	72.6	57.4	69.7	845	72.5	56.9	69.0	2724	63.7	54.1	66.1	1938
Decode-MOT [29]	74.7	60.2	73.0	1094	73.2	59.6	72.0	3363	67.2	54.5	69.0	2805
OUTrack [31]	74.2	59.2	71.1	1328	73.5	58.7	70.2	4122	68.6	56.2	69.4	2223
FairMOT [78]	75.7	61.6	75.3	621	73.7	59.3	72.3	3303	61.8	54.6	67.3	5243
SGT [23]	76.8	61.2	73.5	1276	76.3	60.6	72.4	4578	72.8	56.9	70.5	2649
CorrTracker [62]	76.6	61.0	74.3	1709	76.5	60.7	73.6	3369	65.2	–	69.1	5183
CountingMOT [48]	77.6	62.0	75.2	1087	78.0	61.7	74.8	3453	70.2	57.0	72.4	2795
CenterTrack [‡] [83]	69.6	–	60.7	2124	67.8	52.2	64.7	3039	45.8	31.8	36.6	6296
+ BUSCA (ours)	70.4 (+0.8)	55.7 (–)	69.7 (+9.0)	927 (-1197)	68.9 (+1.1)	55.1 (+2.9)	68.8 (+4.1)	2817 (-222)	49.5 (+3.7)	44.2 (+12)	58.0 (+21)	1370 (-4926)
TransCenter [70]	75.7	56.9	65.9	1717	76.2	56.6	65.5	5427	72.9	50.2	57.7	2625
+ BUSCA (ours)	75.7 (+0.0)	61.9 (+5.0)	74.5 (+8.6)	1038 (-679)	76.2 (+0.0)	61.7 (+5.1)	74.1 (+8.6)	3282 (-2145)	73.9 (+1.0)	58.8 (+8.6)	72.4 (+15)	1756 (-869)
GHOST [†] [51]	78.3	63.0	77.4	709	78.7	62.8	77.1	2325	73.7	61.2	75.2	1264
+ BUSCA (ours)	78.5 (+0.2)	63.2 (+0.2)	77.5 (+0.1)	707 (-2)	79.0 (+0.3)	62.9 (+0.1)	77.0 (-0.1)	2295 (-30)	74.2 (+0.5)	61.3 (+0.1)	75.1 (-0.1)	1251 (-13)
StrongSORT [†] [15]	78.3	63.8	78.9	437	78.3	63.5	78.5	1446	72.2	61.5	75.9	1066
+ BUSCA (ours)	78.4 (+0.1)	64.2 (+0.4)	79.5 (+0.6)	434 (-3)	78.6 (+0.3)	63.9 (+0.4)	79.2 (+0.7)	1428 (-18)	72.7 (+0.5)	61.8 (+0.3)	76.3 (+0.4)	1006 (-60)
ByteTrack [*] [77]	78.2	62.8	77.2	892	78.9	62.8	77.1	2363	74.2	60.4	74.5	925
+ BUSCA (ours)	78.5 (+0.3)	63.3 (+0.5)	77.9 (+0.7)	743 (-145)	79.3 (+0.4)	63.1 (+0.3)	77.7 (+0.6)	2358 (-5)	74.5 (+0.3)	60.5 (+0.1)	74.4 (-0.1)	920 (-5)

Any questions?

See you on Tuesday,
October 1st at Session 1!

Poster #248

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