MULTI-PERSON TRACKING IN A CLASSROOM ENVIRONMENT

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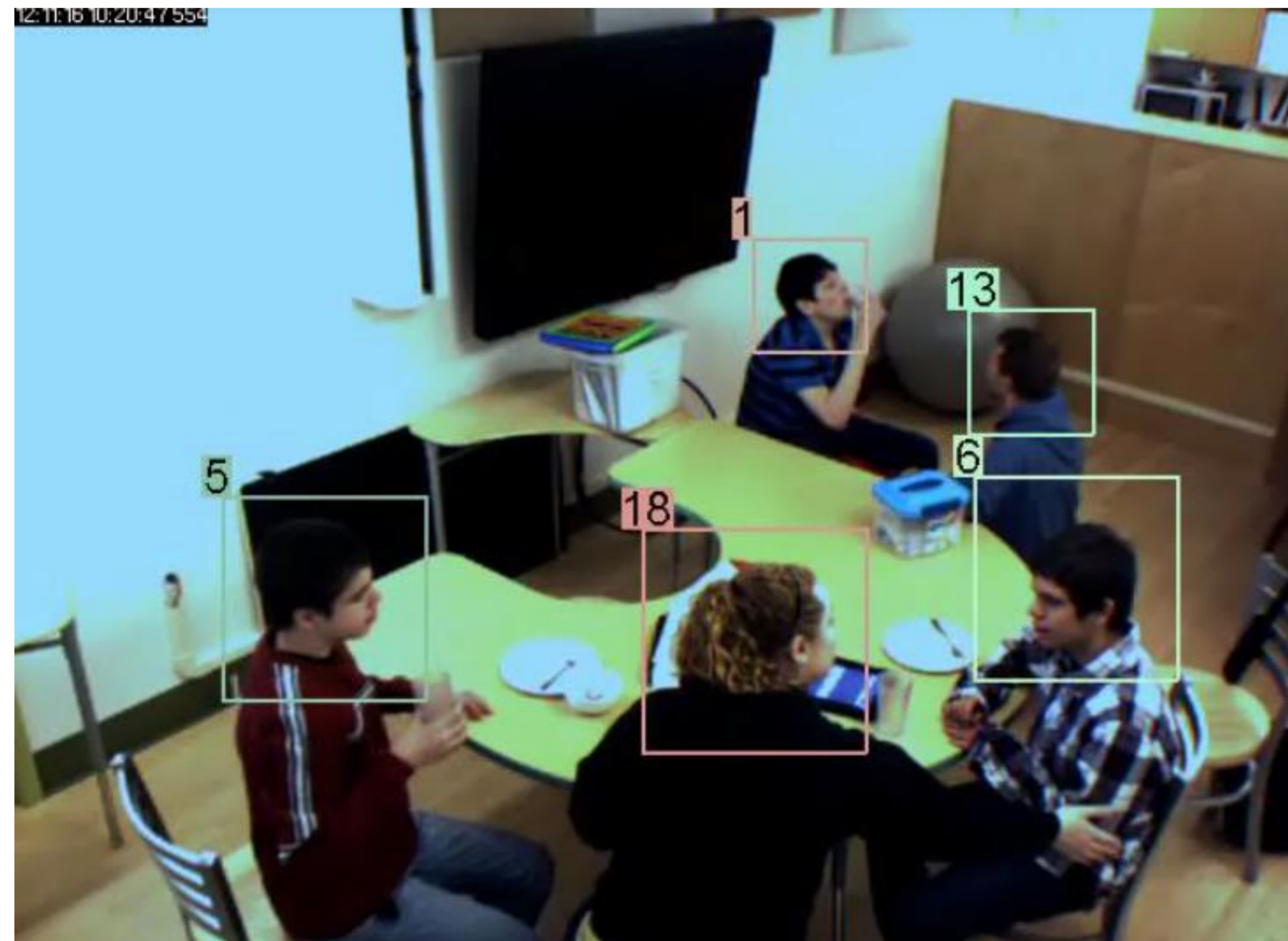Georgia Institute of Technology

Background

- In order to understand people's behavior recorded in video, we first need to locate each person in each video frame and link the locations of each person in different frames to generate the most likely tracks of the people.
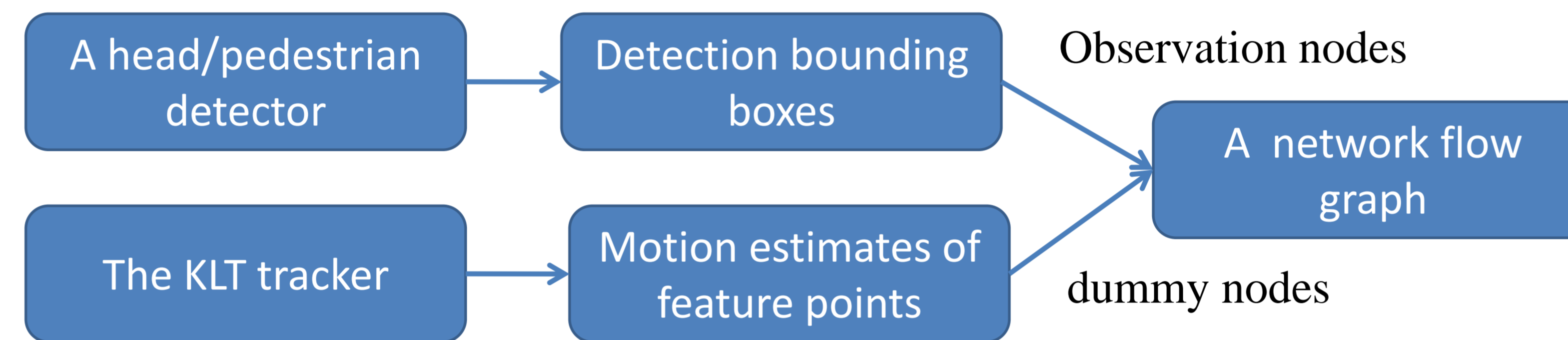- These tasks can be done by a multi-person tracking algorithm.

Motivation

Previous works in this domain has shown good results in surveillance videos of pedestrians walking along the street, but they do not work well in other videos captured in more complicated scenarios like in a classroom environment.
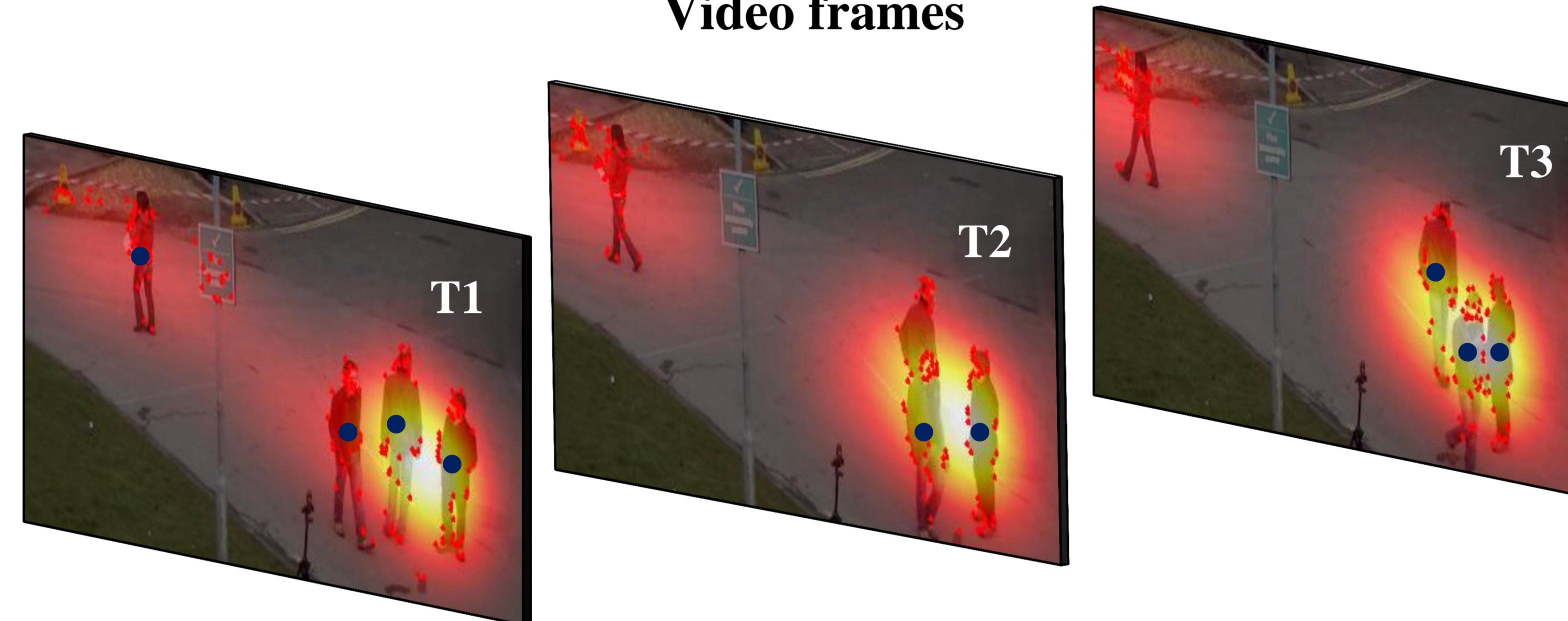
Goal

The goal of this research project is to make a multi-target tracking algorithm work well in video sequences in which people randomly move in the scene by exploiting scene constraints
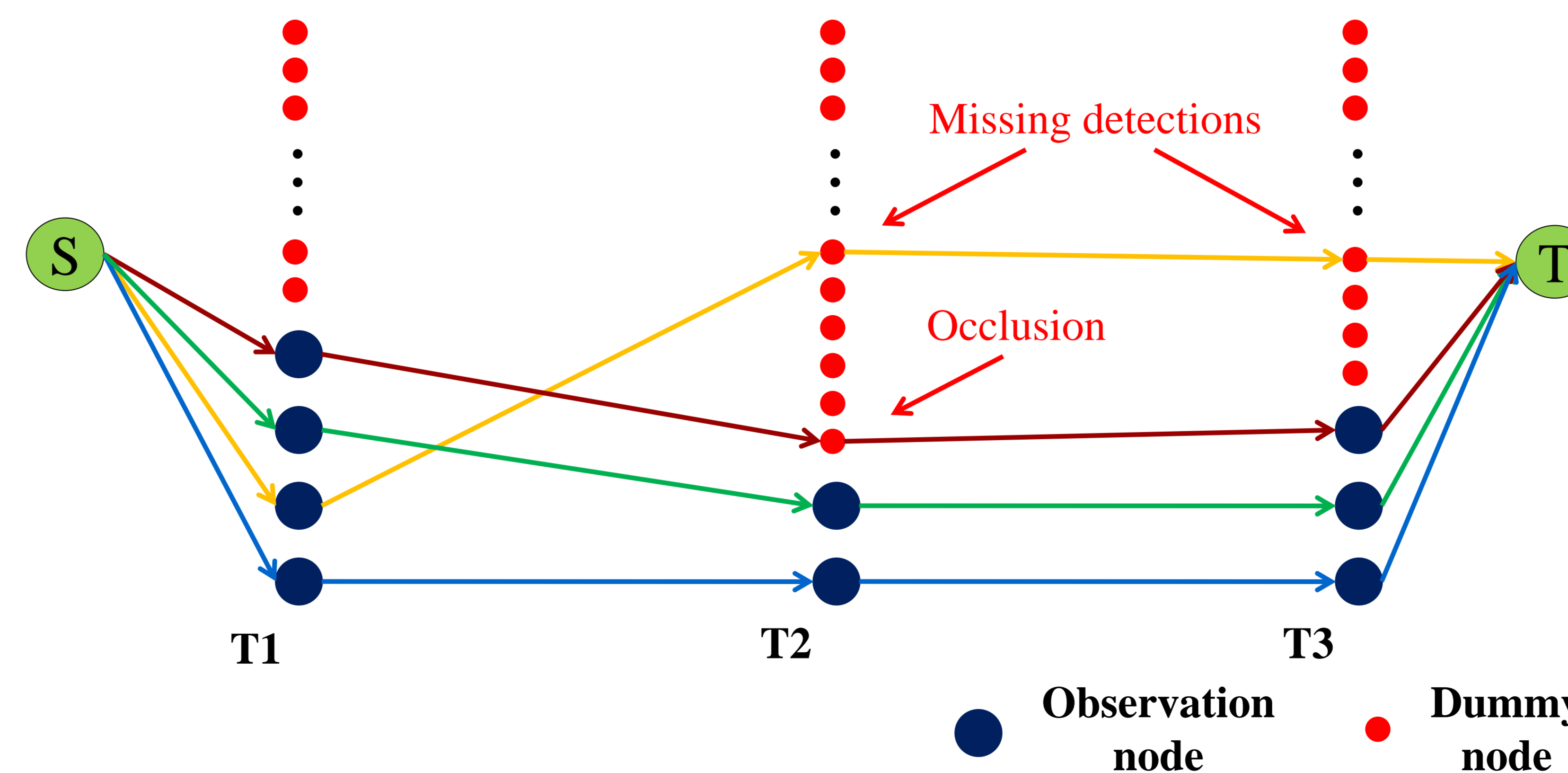
Method

Video frames

T1   T2   T3

The network flow graph

Missing detections

Occlusion

S   T

T1   T2   T3

Observation node   Dummy node

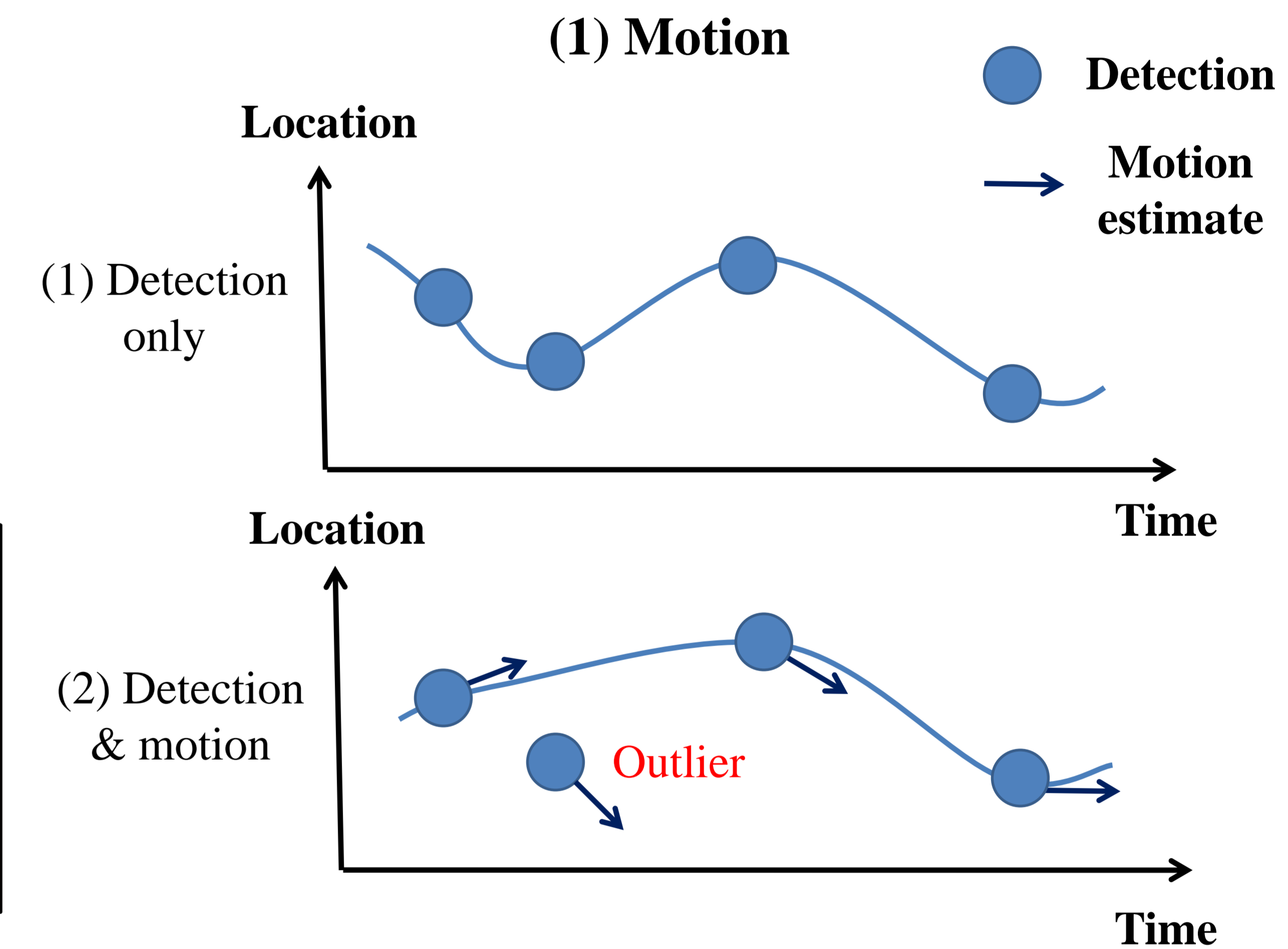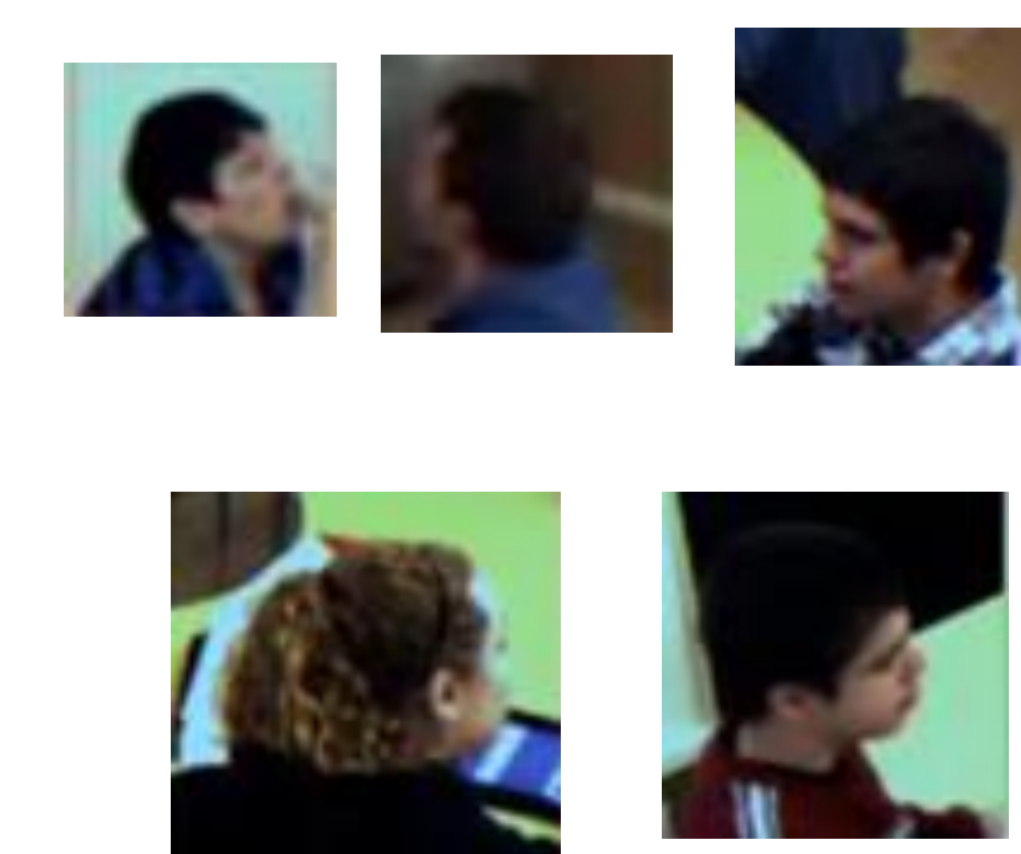**The cost function**

$$c_i = \alpha \cdot \mathbf{1}(i = observation) + \beta \cdot \mathbf{1}(i = dummy)$$

$$c_{ij} = \gamma \cdot \exp(-\left\| (location(i) + motion\_estimate(i)) - location(j) \right\|^2)$$

Why are the scene constraints important?

(1) Motion

Detection

Motion estimate

Location

(1) Detection only

Location

(2) Detection & motion

Outlier

Time

(2) Appearance & The number of people

(3) Scene layout
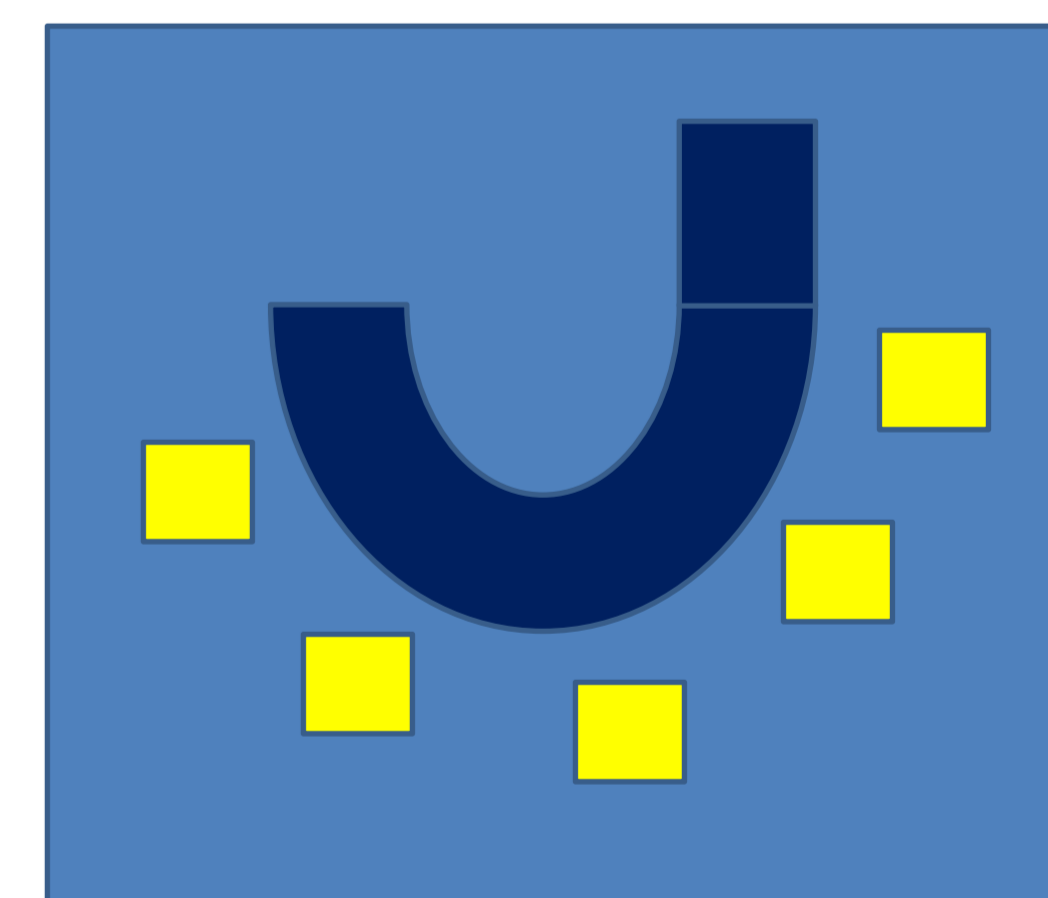
Future work

- We will incorporate the appearance and scene layout information into our current framework
- More dummy nodes will be added to handle the case when a target leaves or enters the scene.
- Evaluation results will be generated using the Center for Discovery videos and other multi-target tracking datasets