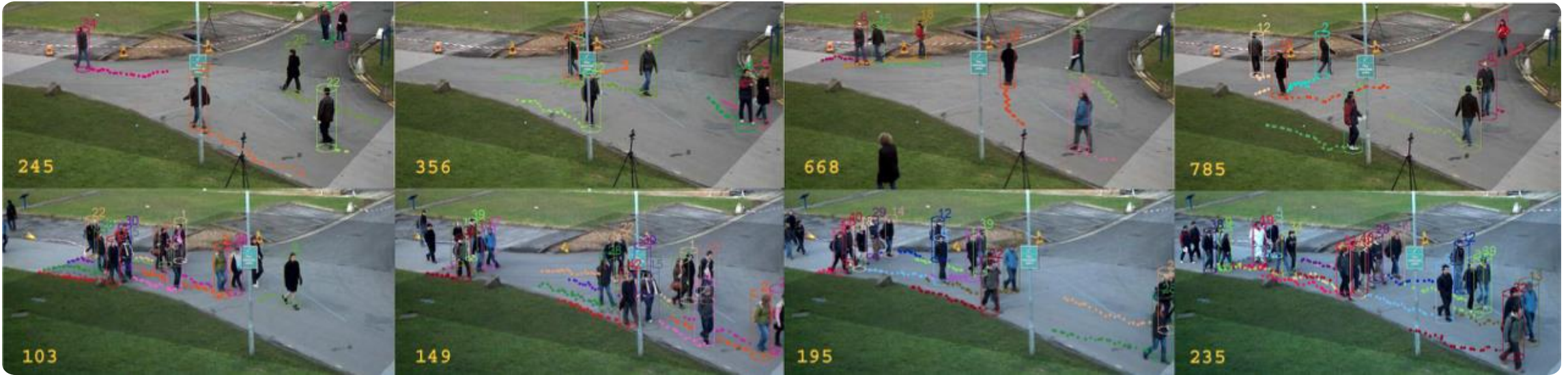


Multiple Object Tracking (MOT)

- Team Name: BlindPC
- Team Members:
 - Siddhant Bansal (2019900091)
 - Piyush Singh (2020701031)
 - Himanshu Kumar (2019201094)
 - Madhav Agarwal (2020900022)



Objective

- Determining the trajectories of multiple object instances in a video;
- Use appearance information with Kalman Filter and a deep association metric.

- Figure credits: Z. Wu, A. Thangali, S. Sclaroff and M. Betke, "Coupling detection and data association for multiple object tracking," CVPR 2012.



Overview of MOT Dataset

Method Overview

- Tracking using appearance information;
- Inputs:
 - Set of object detections from MOT.
 - Appearance descriptor of each bounding box using a CNN.
- Output:
 - Assign unique id to each person and track their movement.
- The figure here shows example input frames for tracking pedestrians.

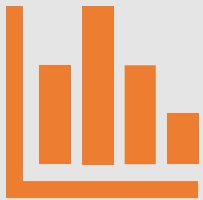


- Figure credits: Brasó, Guillem, and Laura Leal-Taixé. "Learning a neural solver for multiple object tracking." CVPR 2020

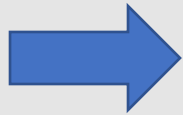
Method Overview

- Kalman Filter is used to estimate the state of the tracker given by an 8-dimensional vector $(x, y, a, h, vx, vy, va, vh)$
- Mahalanobis Distance is used for predicted Kalman state and newly arrived measurements
- Hungarian Algorithm is used to match trackers in consecutive frames.
- Offline pre-training is performed to learn a deep association metric on a large-scale person re-id dataset.

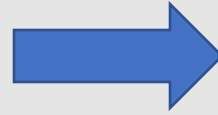
Steps for Multiple Objects Tracking



Object Detection
(Bounding Box)

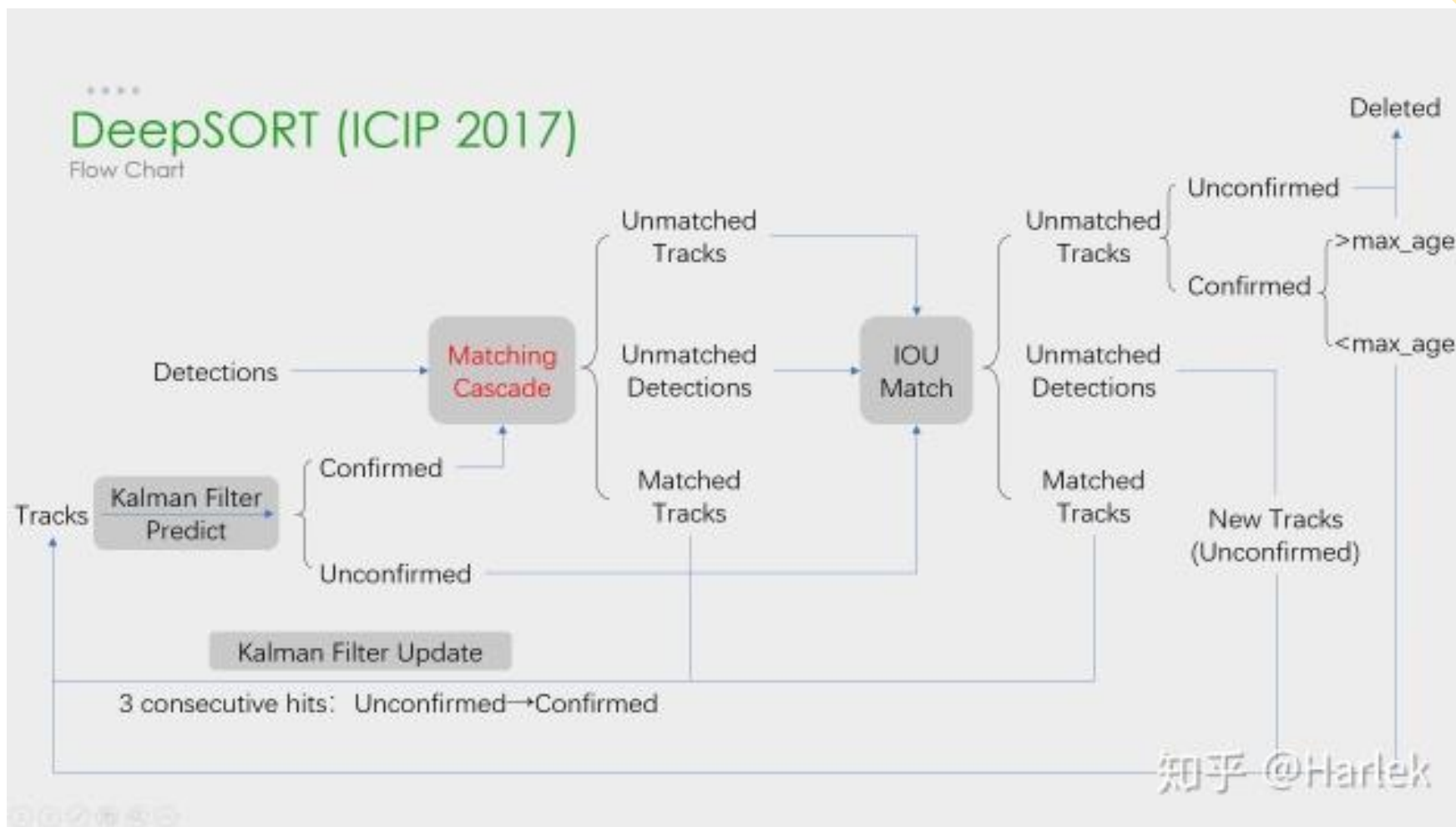


Appearance Descriptor



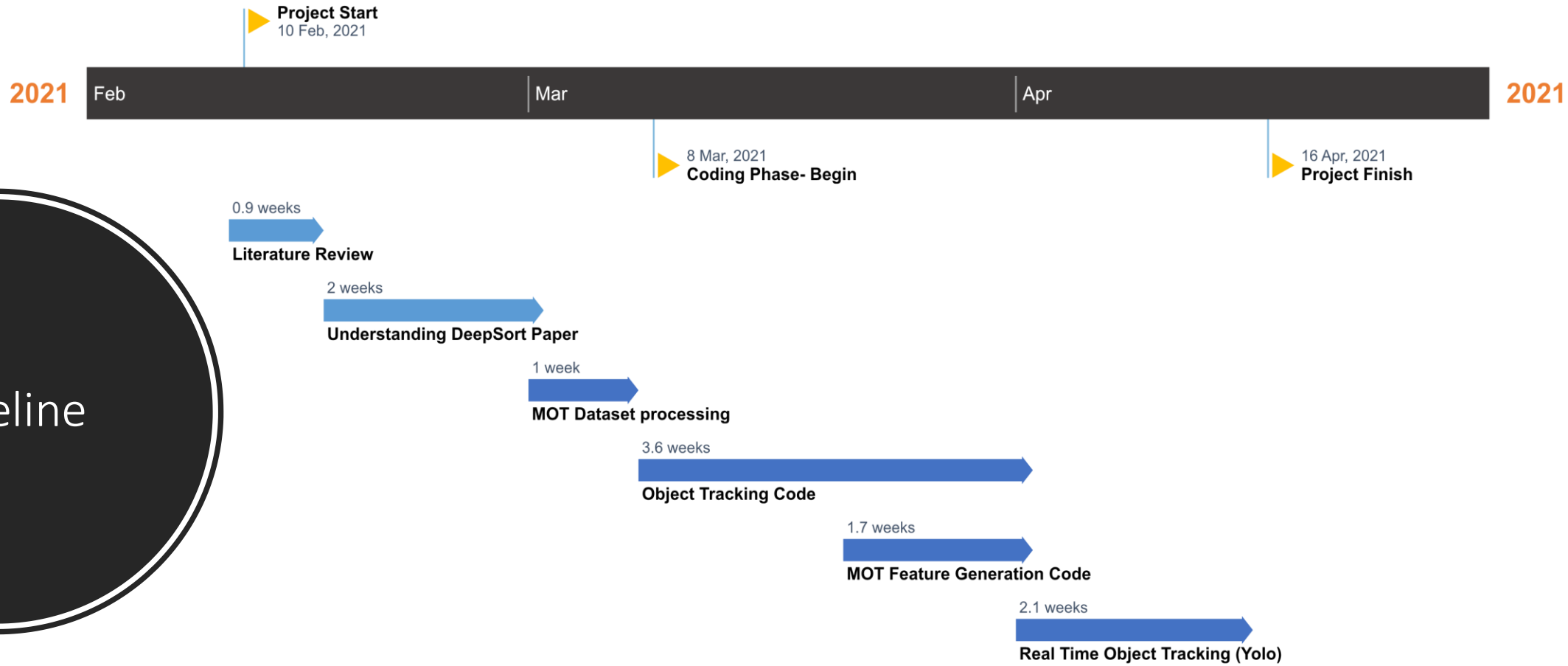
Tracking

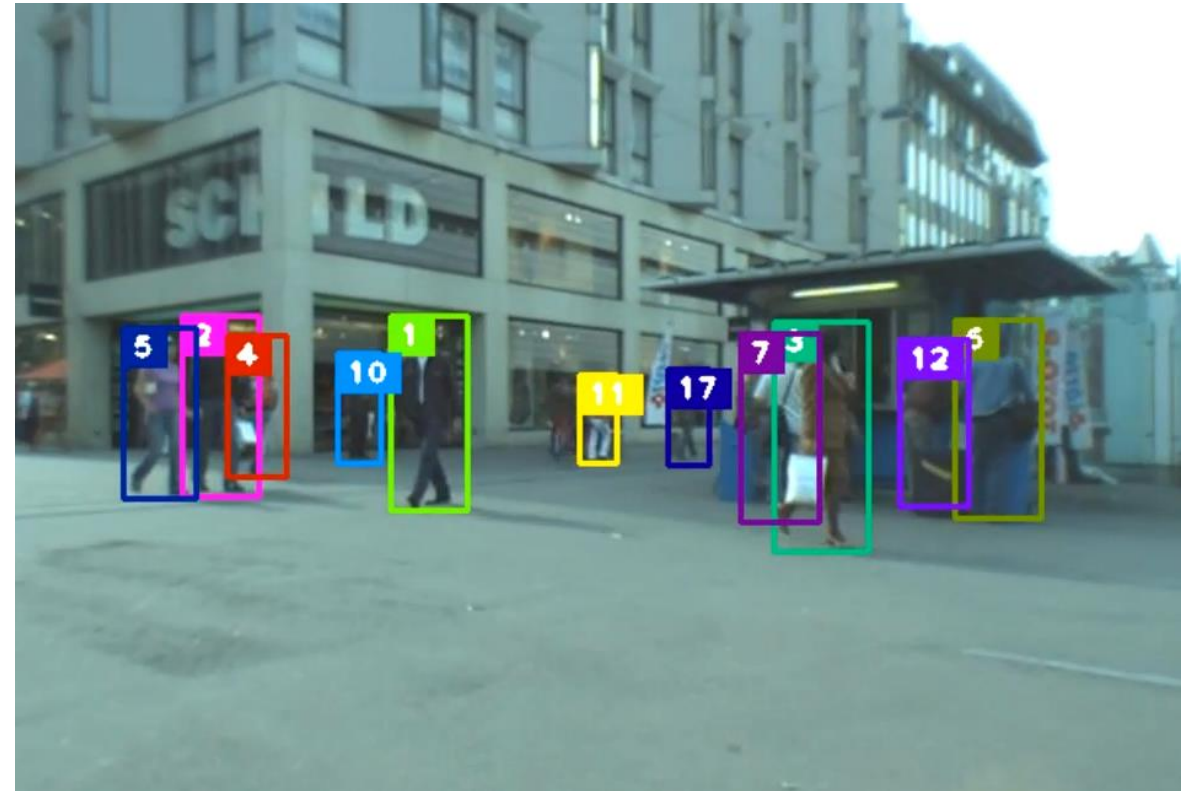
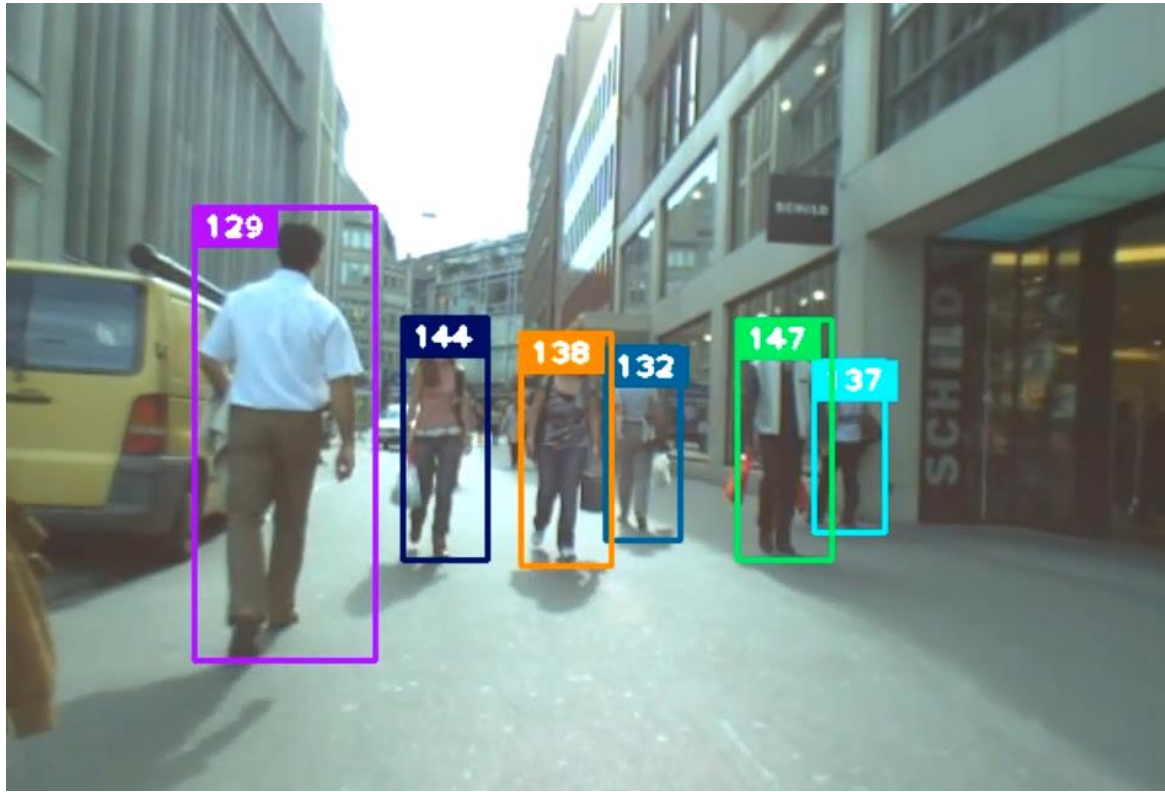
DeepSort: Flow Chart



- Figure credits: <https://www.programmersought.com/article/17005126187/>

Timeline





Results

Some visualization of DeepSort on MOT-16

End Goals

- We will develop an end-to-end code for DeepSort.
- We will integrate the code with a real time object detection framework such as Yolo.
- We aim to come up with some novel methods for improving various parts of the paper.
- We aim to publish this work as a workshop paper in ICCV 2021.