



# Multiple Object Tracking

## MOT 16

Number of Train / Test videos: 7 + 7

Number of Train / Test Images: 5,316 / 5,919



Fig. 1: An overview of the *MOT16* dataset. Top: Training sequences; bottom: test sequences.

| Name           | FPS | Resolution | Length        |
|----------------|-----|------------|---------------|
| MOT16-02       | 30  | 1920x1080  | 600 (00:20)   |
| MOT16-04       | 30  | 1920x1080  | 1,050 (00:35) |
| MOT16-05       | 14  | 640x480    | 837 (01:00)   |
| MOT16-09       | 30  | 1920x1080  | 525 (00:18)   |
| MOT16-10       | 30  | 1920x1080  | 654 (00:22)   |
| MOT16-11       | 30  | 1920x1080  | 900 (00:30)   |
| MOT16-13       | 25  | 1920x1080  | 750 (00:30)   |
| Total training |     |            | 5,316 (03:35) |

MOT16 Train Set

| Name          | FPS | Resolution | Length        |
|---------------|-----|------------|---------------|
| MOT16-01      | 30  | 1920x1080  | 450 (00:15)   |
| MOT16-03      | 30  | 1920x1080  | 1,500 (00:50) |
| MOT16-06      | 14  | 640x480    | 1,194 (01:25) |
| MOT16-07      | 30  | 1920x1080  | 500 (00:17)   |
| MOT16-08      | 30  | 1920x1080  | 625 (00:21)   |
| MOT16-12      | 30  | 1920x1080  | 900 (00:30)   |
| MOT16-14      | 25  | 1920x1080  | 750 (00:30)   |
| Total testing |     |            | 5,919 (04:08) |

MOT16 Test Set

# Multiple Object Tracking

## Image Classification with MOT 16

Classes: [Person, Car, Bicycle, Motorbike, etc.]

Number of Train / Test Annotation Images: 199,967 / 276,565

| Sequence | Annotation classes |                   |       |         |           |                       |               |            |                        |               |            | Total   |
|----------|--------------------|-------------------|-------|---------|-----------|-----------------------|---------------|------------|------------------------|---------------|------------|---------|
|          | Pedestrian         | Person on vehicle | Car   | Bicycle | Motorbike | Non motorized vehicle | Static person | Distractor | Occluder on the ground | Occluder full | Reflection |         |
| MOT16-01 | 6,395              | 346               | 0     | 341     | 0         | 0                     | 4,790         | 900        | 3,150                  | 0             | 0          | 15,922  |
| MOT16-02 | 17,833             | 1,549             | 0     | 1,559   | 0         | 0                     | 5,271         | 1,200      | 1,781                  | 0             | 0          | 29,193  |
| MOT16-03 | 104,556            | 70                | 1,500 | 12,060  | 1,500     | 0                     | 6,000         | 0          | 24,000                 | 13,500        | 0          | 163,186 |
| MOT16-04 | 47,557             | 0                 | 1,050 | 11,550  | 1,050     | 0                     | 4,798         | 0          | 23,100                 | 18,900        | 0          | 108,005 |
| MOT16-05 | 6,818              | 315               | 196   | 315     | 0         | 11                    | 0             | 16         | 0                      | 0             | 0          | 7,671   |
| MOT16-06 | 11,538             | 150               | 0     | 118     | 0         | 0                     | 269           | 238        | 109                    | 0             | 0          | 12,422  |
| MOT16-07 | 16,322             | 0                 | 0     | 0       | 0         | 0                     | 2,023         | 0          | 1,920                  | 0             | 0          | 20,265  |
| MOT16-08 | 16,737             | 0                 | 0     | 0       | 0         | 0                     | 1,715         | 2,719      | 6,875                  | 0             | 0          | 28,046  |
| MOT16-09 | 5,257              | 0                 | 0     | 0       | 0         | 0                     | 0             | 1,575      | 1,050                  | 0             | 948        | 8,830   |
| MOT16-10 | 12,318             | 0                 | 25    | 0       | 0         | 0                     | 1,376         | 470        | 2,740                  | 0             | 0          | 16,929  |
| MOT16-11 | 9,174              | 0                 | 0     | 0       | 0         | 0                     | 0             | 306        | 596                    | 0             | 0          | 10,076  |
| MOT16-12 | 8,295              | 0                 | 0     | 0       | 0         | 0                     | 1,012         | 765        | 1,394                  | 0             | 0          | 11,464  |
| MOT16-13 | 11,450             | 0                 | 4,484 | 103     | 0         | 0                     | 0             | 4          | 2,542                  | 680           | 0          | 19,263  |
| MOT16-14 | 18,483             | 0                 | 1,563 | 0       | 0         | 0                     | 712           | 47         | 4,062                  | 393           | 0          | 25,260  |
| Total    | 292,733            | 2,430             | 8,818 | 26,046  | 2,550     | 11                    | 27,966        | 8,238      | 73,319                 | 33,473        | 948        | 476,532 |

TABLE 3: Overview of the types of annotations currently found in the MOT16 benchmark.



Video Example) MOT 16 - 04

# Image Classification with difference images

## Image Classification Input Data



INPUTS



Model



# Image Classification with difference images

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**MOT Dataset Problem:** MOT 16 Example: MOT16-04

Class Imbalanced problem

Null Images (static images)



# Image Classification with difference images

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## Image Classification Study

- Create MOT difference images dataset for image classification(Null Data Filtering, Data Labelling)
- Class Imbalanced Problem
- Train Base Models (ResneXt, ShufflNet)