

# AerialMPTNet: Multi-Pedestrian Tracking in Aerial Imagery Using Temporal and Graphical Features

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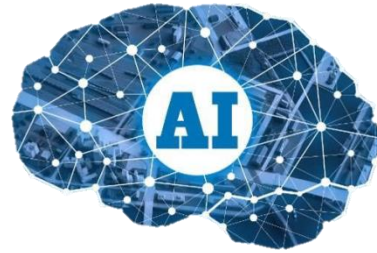
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A large, curved image of the Earth from space occupies the bottom right portion of the slide. It shows a view of the planet's surface with blue oceans, green landmasses, and white clouds. The curvature of the Earth is clearly visible, creating a sense of depth and perspective.

Knowledge for Tomorrow

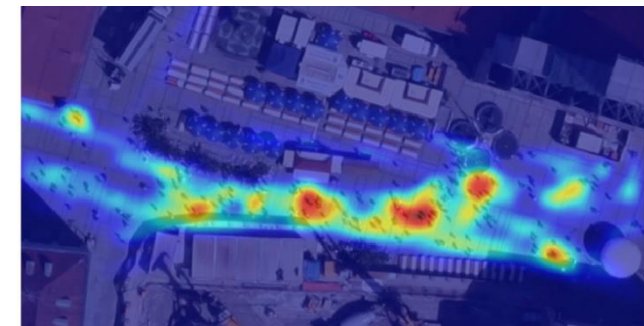




Person tracking (Marienplatz, Munich)



Statistical data analysis



# Challenges and Contributions

- Multiple pedestrian tracking is complex → Automatic methods, e.g., CNNs
- Aerial imagery pedestrian tracking datasets and methods are lacking!
  
- Contributions:
  - **AerialMPT** :
    - Large aerial multi-pedestrian tracking dataset
    - Will be released
  
  - **AerialMPTNet** :
    - CNN-based aerial multi-pedestrian tracking network
    - Outperforms other traditional and DNN-based tracking methods





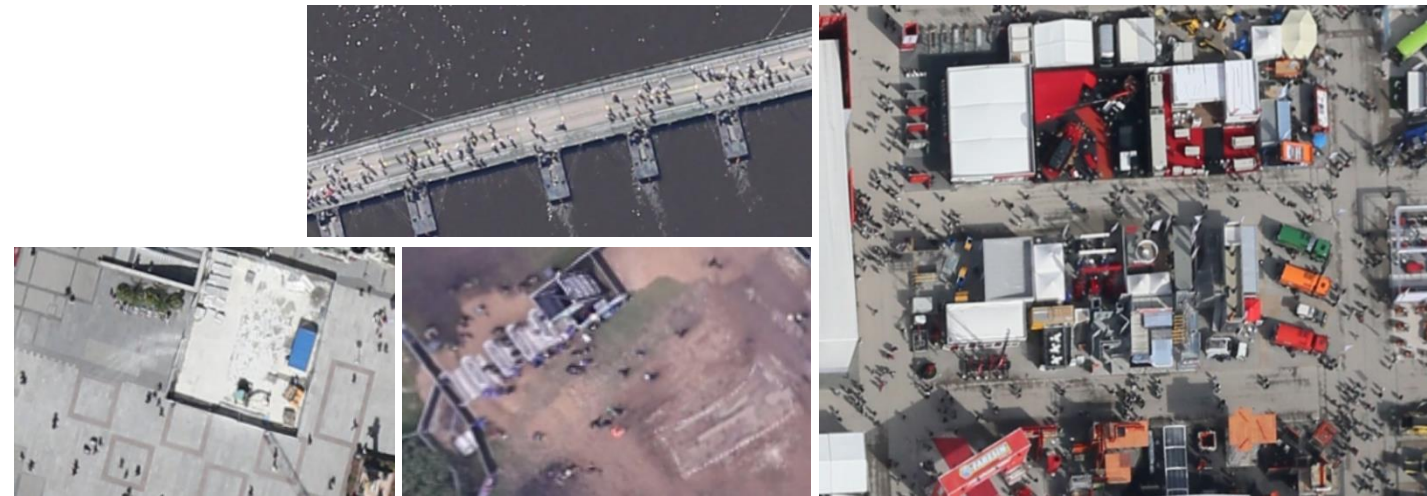
# AerialMPT Dataset

- By DLR's 3K camera system mounted on a helicopter:

# Sequencesbahrn	14 (8 Train/6 Test)
# Frames	307
Avg. length	21.9
# Annotations	44,740
Avg. annotation/frame	145.7
Frame rate	2 fps

- Contributions over KIT AIS:

Better resolution	8-13 vs. 12-15 cm/pixel
Better image quality	Contrast, illumination
More sequences	14 vs. 13
More frames	1.6 X
Longer sequences	21.9 vs. 14.1 frames
More annotations	1.4 X

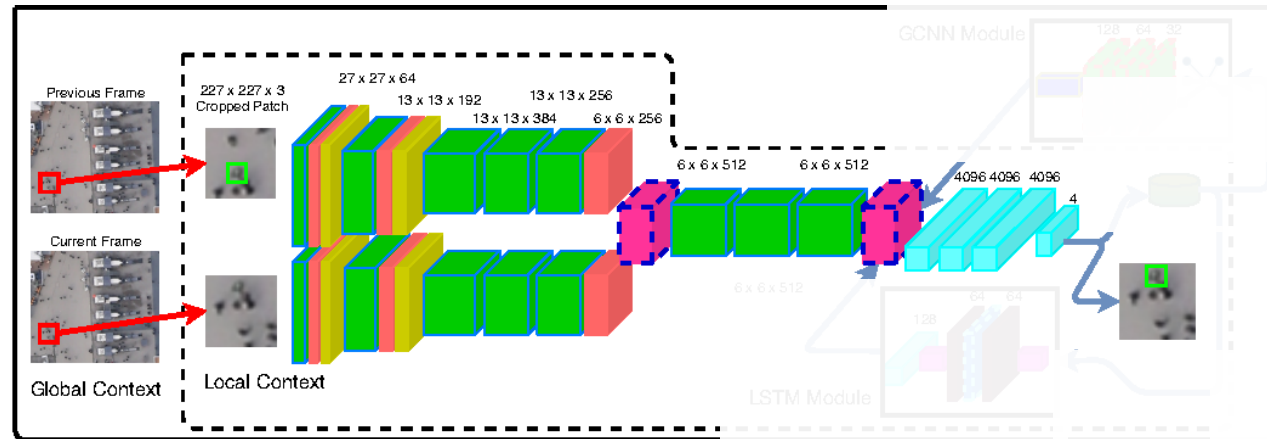


Sample frames from AerialMOT

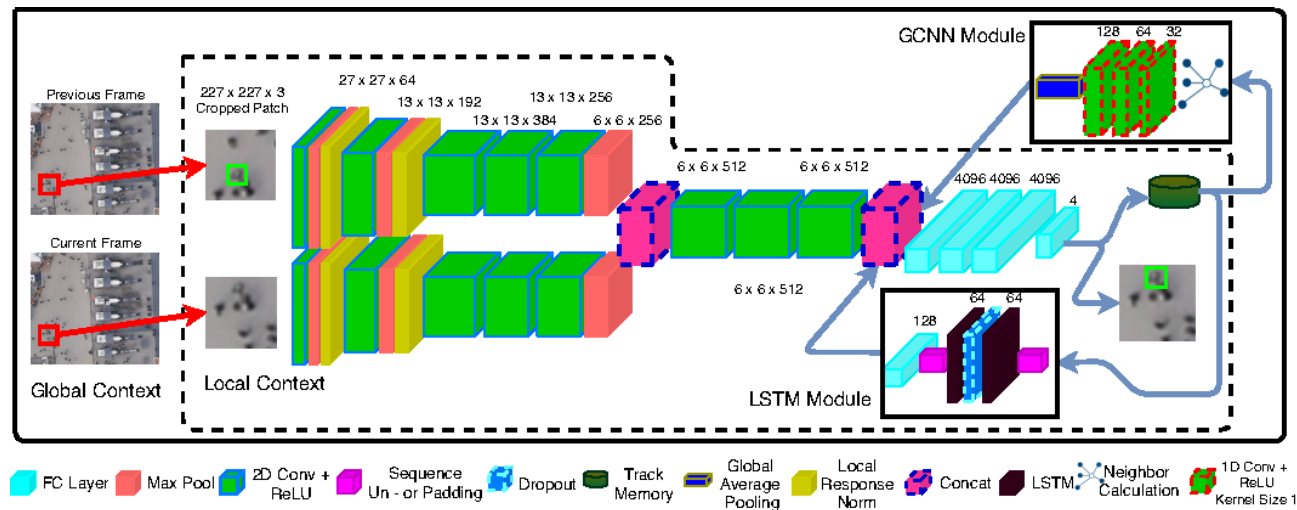


# AerialIMPTNet

SMSOT-CNN (Baseline)

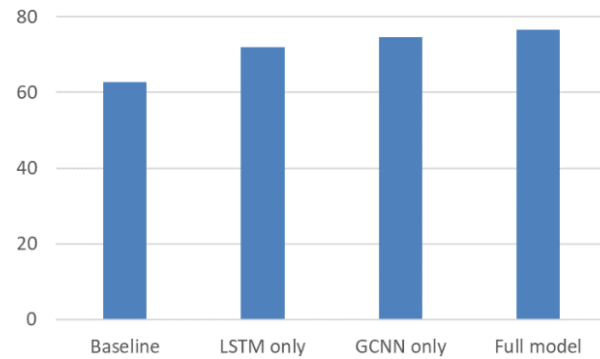


AerialIMPTNet

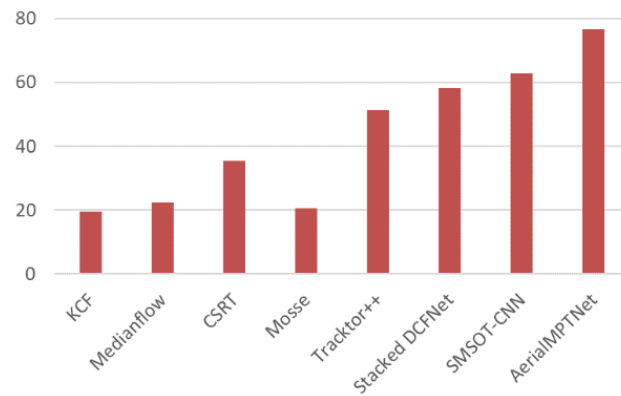


# Results

## ○ Results on AerialMPT:



Ablation study results for the MOTA metric.



MOTA of AerialMPTNet vs. the traditional and DNN-based methods.

## ○ Example tracking:



Karlsplatz, Munich



Marienplatz, Munich



Thank you for your attention!

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