

Proposal 1

Instigators: Abderrahim Benslimane and Julio Perez, Avignon University, France

Title: Real time and accurate detection of pedestrians with Unnamed Aerial Vehicles

Summary of the proposal

This project is related to objects detection from videos and images taken by mobile Unnamed Aerial Vehicles (UAV). UAV is promising technology to be used to monitor crowded and hostile areas at distance without the near presence of humans.

The detection system will be used on images acquired through thermal cameras, to establish a complete Artificial Intelligence (AI) system for people tracking, social distancing classification, and body temperature monitoring.

AI methods are playing more and more a big role in the detection. Deep learning is an effective method to perform object detection [1] – [6]. These algorithms can be divided into two main categories. One type is two-stage methods which divide detection into two parts, region proposal and classification. These methods can achieve high detection accuracy but consume time. Another one refers to single-stage methods which treat detection as an end-to-end process to directly predict the location and categories of targets.

In this project, we intend to use Yolo as a detection system with some improvements.

With UAVs, the project is to implement a lightweight pedestrian detection network to accurately detect pedestrians by human head detection in real time and then calculate the social distancing between pedestrians on UAV images.

References

1. R. Girshick, "Rich feature hierarchies for accurate object detection and semantic segmentation", IEEE Conference on Computer Vision and Pattern Recognition (CVPR), pp. 580–587, 2015.
2. J. Li, X. Liang, J. Li, Y. Wei, T. Xu, J. Feng, and S. Yan, "Multistage object detection with group recursive learning," IEEE Transactions on Multimedia, vol. 20, no. 7, pp. 1645–1655, 2017.
3. P. Tang, X. Wang, S. Bai, W. Shen, X. Bai, W. Liu, and A. Yuille, "Pcl: Proposal cluster learning for weakly supervised object detection," IEEE transactions on pattern analysis and machine intelligence, vol. 42, no. 1, pp. 176–191, 2018.
4. J. Redmon and A. Farhadi, "Yolov3: An incremental improvement," arXiv preprint arXiv:1804.02767, 2018.
5. J. Redmon and A. Farhadi, "Yolo9000: better, faster, stronger," in Proceedings of the IEEE conference on computer vision and pattern recognition, 2017, pp. 7263– 7271.
6. J. Redmon, S. Divvala, R. Girshick, and A. Farhadi, "You only look once: Unified, real-time object detection," in Proceedings of the IEEE conference on computer vision and pattern recognition, 2016, pp. 779–788.