AnimalTrack: A Benchmark for Multi-Animal Tracking in the Wild

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Abstract

Multi-animal tracking (MAT), a multi-object tracking (MOT) problem, is crucial for animal motion and behavior analysis and has many crucial applications such as biology, ecology and animal conservation. Despite its importance, MAT is largely under-explored compared to other MOT problems such as multi-human tracking due to the scarcity of dedicated benchmarks. To address this problem, we introduce *AnimalTrack*, a dedicated benchmark for multi-animal tracking in the wild. Specifically, AnimalTrack consists of 58 sequences from a diverse selection of 10 common animal categories. On average, each sequence comprises of 33 target objects for tracking. In order to ensure high quality, every frame in AnimalTrack is manually labeled with careful inspection and refinement. To our best knowledge, AnimalTrack is the *first* benchmark dedicated to multi-animal tracking. In addition, to understand how existing MOT algorithms perform on AnimalTrack and provide baselines for future comparison, we extensively evaluate 14 state-of-the-art representative trackers. The evaluation results demonstrate that, not surprisingly, most of these trackers become degenerated due to the differences between pedestrians and animals in various aspects (e.g., pose, motion, and appearance), and more efforts are desired to improve multi-animal tracking. We hope that AnimalTrack together with evaluation and analysis will foster further progress on multi-animal tracking. The dataset and evaluation as well as our analysis will be made available upon the acceptance.

Keywords Tracking · Multi-object tracking (MOT) · Multi-animal tracking (MAT) · AnimalTrack · Tracking evaluation

1 Introduction

In this paper, we are interested in multi-animal tracking (MAT), a typical kind of multi-object tracking (MOT) yet heavily under-explored. MAT is critical for understanding and analyzing animal motion and behavior, and thus has a wide range of applications in zoology, biology, ecology, and animal conservation. Despite the importance, MAT is less studied in the tracking community.

Currently, the MOT community mainly focuses on pedestrians and vehicles tracking, with numerous benchmarks introduced in recent years (Dendorfer et al., 2020; Geiger et al., 2012; Milan et al., 2016; Zhu et al., 2021). Compared with MOT on pedestrians and vehicles, MAT is challenging because of several following properties of animals:

- *Uniform appearance* Different from pedestrians and vehicles in existing MOT benchmarks that usually have distinguishable appearances (e.g., color and texture), most animals have uniform appearances that visually look extremely similar (see Fig. 1 for example). As a consequence, it is difficult to leverage their visual features

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