

Automatic Identification and Monitoring of Wildlife via Computer Vision and IoT

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Abstract : Getting reliable, informative, and up-to-date information about the location, mobility, and behavioural patterns of animals will enhance our ability to research and preserve biodiversity. The fusion of infra-red sensors and camera traps offers an inexpensive way to collect wildlife data in the form of images. However, extracting useful data from these images, such as the identification and counting of animals remains a manual, time-consuming, and costly process. In this paper, we demonstrate that such information can be automatically retrieved by using state-of-the-art deep learning methods. Another major challenge that ecologists are facing is the recounting of one single animal multiple times due to that animal reappearing in other images taken by the same or other camera traps. Nonetheless, such information can be extremely useful for tracking wildlife and understanding its behaviour. To tackle the multiple count problem, we have designed a meshed network of camera traps, so they can share the captured images along with timestamps, cumulative counts, and dimensions of the animal. The proposed method takes leverage of edge computing to support real-time tracking and monitoring of wildlife. This method has been validated in the field and can be easily extended to other applications focusing on wildlife monitoring and management, where the traditional way of monitoring is expensive and time-consuming.

Keywords : computer vision, ecology, internet of things, invasive species management, wildlife management

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