

Identity tracking in multi-view camera surveillance system

by Kateřina Jandová

The major goals of the thesis were (1) to research the problem of single object identity tracking within a multi-camera system, (2) suggest and implement a method solving this re-identification problem by finding n-likeliest potential matches within the system for a given object and (3) to evaluate and discuss the results on multiple public benchmark datasets. Solving Re-ID problem is a challenging and time consuming task on its own, all the more so, with the additional spatial-temporal constraints necessary for efficient integration within a complex real-world system. It is safe to say the task this thesis focuses on is a difficult problem.

Within the first half of the thesis, it is explained why the particular chosen neural-network architecture is suitable for this general Re-ID problem, before proposing a novel quadruplet-loss-function with batch-hard samples mining and re-ranking to further improve the accuracy. This claim is then proved in the second half by series of experiments. Considering the outstanding results, outperforming state-of-the-art approaches on multiple datasets, there can be no doubt that the set goals were reached and a suitable solution has been implemented.

Despite having worked on her thesis from abroad, Kateřina Jandová fairly regularly consulted her progress with me, showing great deal of initiative and ability to tackle the task on her own with minimal guidance. Even if it might not be apparent from the thesis itself, the experimentation with training of deep convolutional neural-networks is extremely time consuming and required the student to focus mostly on the re-identification network itself, leaving less time to address the spatial-temporal constraints of the real-world system, where was left some room for improvement.

The strongest two points of the whole thesis are by far the proposal of novel approach to loss-function, changing the key metric used during training of the neural-network, and the subsequent successful training itself. The student clearly shows understanding and knowledge of the theoretical background of her work, as can be seen in sections describing the proposed solution in detail.

Overall the language used is advanced including defined technical terms when necessary, but putting emphasis on covering the complex topics in comprehensible and natural language. I feel like some sections could have been covered in greater detail, like the implementation which mostly discusses the used technologies. The size and extent of the thesis is more than sufficient, covering all goals of the assignment to satisfactory degree.

Kateřina Jandová created a useful library, which offers a major improvement to the current multi-view tracking systems. The quality of her work heavily outweighs the slight lack of detail in certain parts of the written text.

Therefore, I recommend to grade the thesis by **A – excellent**.

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