Two-Stage Hyperparameter Tuning and Local Feature Extraction for Improved Person Re-Identification

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- Huafeng Chen,
- S. Ihnatsyeva,
- R. Bohush,
- Shiping Ye
- S. Ablameyko

Abstract

To improve the person re-identification accuracy in videos, a method is proposed for finding the most effective values of hyperparameters of convolutional neural networks when calculating features of images of people. The technique consists of two stages. At the first stage, the size of the image batch and the learning rate are determined at which the maximum accuracy is achieved for the basic re-identification algorithm. At the second stage, various options for adjusting hyperparameters during the training process are investigated, making it possible to increase the accuracy relative to the maximum accuracy values obtained at the first stage. To improve the accuracy of re-identification of people, data augmentation, an extended training sample based on existing sets, and an analysis of local features of images of people are used, which allows replacing descriptors of hidden areas of the human figure. The application of the proposed approach makes it possible to increase the accuracy of person re-identification for CNN ResNet-50 and DenseNet-121 by 27.33 according to the Rank1 metric, by 31.01 according to the mAP metric, and by 33.97 according to the mINP metric relative to the basic re-identification algorithm. A comparison of the proposed algorithm with existing ones is presented when testing on the Occluded-Duke dataset.

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Author information

Authors and Affiliations

1. **Zhejiang Shuren University, 310015, Hangzhou, China**
   Huafeng Chen & Shiping Ye
2. **Euphrosyne Polotsk State University, 211446, Novopolotsk, Republic of Belarus**
   S. Ihnatsyeva & R. Bohush
3. **Belarusian State University, 220030, Minsk, Republic of Belarus**
   S. Ablameyko

4. **United Institute of Informatics Problems, National Academy of Sciences of Belarus, 220012, Minsk, Republic of Belarus**
S. Ablameyko

Corresponding author

Correspondence to R. Bohush.

Ethics declarations

The authors of this work declare that they have no conflicts of interest.

Additional information

Huafeng Chen. Born in 1982. Professor of Zhejiang Shuren University. Graduated from Zhejiang University in 2003. In 2009 he received his PhD in the field of Earth Exploration and Information Technology at the Institute of Space Information and Technique, Zhejiang University. His scientific interests include remote sensing image processing, GIS application, image and video processing, and multiagent system. He has published more than 50 academic articles.

Svetlana Ihnatsyeva. Born in 1990. She received a PhD in the field of image processing in 2025. Researcher and Senior Lecturer at Department of Computing Systems and Networks, Faculty of Information Technology, Polotsk State University. Research interests include intelligent systems, video processing and machine learning. Author of more than 20 scientific papers.

Rykhard Bohush. Graduated from Polotsk State University in 1997. In 2002, he received his Candidate of Sciences degree, and in 2022, he received his Doctor of Sciences degree. Head of Computer Systems and Networks Department of Polotsk State University. His scientific interests include image and video processing, intelligent systems, and machine learning. Author of more than 200 scientific papers.

Shipping Ye. Born in 1967. Professor and Vice President of Zhejiang Shuren University. Graduated from Zhejiang University in 1988. He received his master's degree in computer science and technology from Zhejiang University in 2003. His scientific interests include the application of computer graphics and images and GIS. Author of more than 80 scientific articles. He has taken part in four research projects and was awarded second prize of Zhejiang Provincial

Scientific and Technological Achievement. Two of his teaching research programs won the first prize and second prize of Zhejiang Provincial Teaching Achievement.

Sergey Ablameyko. Born in 1956, DipMath in 1978, PhD in 1984, Doctor of Sciences in 1990, Prof. in 1992. Professor of Belarusian State University. His scientific interests are image analysis, pattern recognition, digital geometry, knowledge-based systems, geographical information systems, and medical imaging. He is on the Editorial Board of *Pattern Recognition and Image Analysis* and many other international and national journals. He is a Fellow of IAPR, Fellow of Belarusian Engineering Academy, Academician of National Academy of Sciences of Belarus, Academician of the European Academy, and others. He was a First Vice-President of International Association for Pattern Recognition IAPR (2006–2008) and President of the Belarusian Association for Image Analysis and Recognition.

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