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LARGE SCALE PERSON RE-IDENTIFICATION USING PART BASED DEEP HASHING

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Abstract: **It is important to perform real time search while Large scale Person re-identification on a large gallery. The conventional methods use to focus on discriminative learning which is probabilistic approach of learning. In this proposed project we attempt to use deep learning while integrating it with hashing which provides a framework to evaluate productivity, precision and reliability of Large scale Person re-identification. We use augmentation for creating artificial training images through different ways of processing or combination of multiple processing such as random rotation, shifts, shear and flips etc. We propose Part based deep Hashing (PDH) in which augmented images are the input of deep learning architecture. All the augmented images have different identity. We are using whole image and use it for training deep hashing architecture. We use a ternion loss function which calculates the hamming distance of the pedestrian image. The hamming distance of the images with same identity is smaller than the one with different identity. In this project we use standard large scale dataset specifically Market-1501 & Market-1501 +500K.**

Keywords: *Deep learning, hashing, part-based, large-scale person re-identification.*

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I INTRODUCTION

This paper encompasses large-scale person re-identification, which has gained special importance in the field of surveillance and monitoring, cross-camera tracking and anomaly detection. On a given image, the system finds and matches in a inter-camera image database for the boxes that contain the same person. Matching scenarios is challenging due to the various effects like lighting, position and view point.

The system attempts to stay between image classification [1], [2] and retrieval [3], [4]. Previous works usually worked with both image classification and retrieval. There are two major disadvantages of the previous work: efficiency and CNN models for effective descriptors. Also, computational power has been a issue in person re-id works. Some previous successful methods used brute-force feature matching strategies, which obtain good matching rate. However, these possess some task of image retrieval. Both tasks have the same mission: finding the image that has the same object/pedestrian as the query. The is resolved by the usage of image retrieval techniques. Hashing problem due computational efficiency. Person re-id as a special, known for fast Approximate Nearest Neighbour (ANN) search, is a good option for the solution. The basic idea of hashing method is to construct a series of hash functions which map the visual feature of image into a binary feature vector so that visually similar images are mapped into similar binary codes. Deep neural networks have obtained high accuracy over traditional hashing in recent times.

II LITERATURE SURVEY

A. Conventional method for Person re- identification:

Re-identification of a person is extraordinary and reliable information in finding matches of pedestrians across cross-camera views (feature representation) [5],[6]. The pair wise bunch distribution relationship between pedestrian images is used and the person re-identification problem is solved by a group matching strategy. Patch matching is embrace for re-identifying and unmatched patches degrades the ranking.[5]. Zhao et al. [6] proposes different weights to rare colours on the basis of important information among walker images. The ranking model based on common

features cannot represent the specific variation of different camera angles.

B. Deep learning Method

In earlier approaches, filter pairing neural network (FPNN)[7] worked on asymmetric, photometric and geometric transforms, 3-D blocking and environmental disorder. All the important parts are combined, which increases the component strength when working with others. In existing works handcrafted features methods are used. The learned filter uses an encoding photometric transforms. The deep architecture helps to make a mixture of complex geometric and photometric transforms. However deep learning is using the advantages of CNN framework which maximize the feature representation alone. [5],[6]

C. Hashing Method

Supervised and unsupervised hashing are two main ways, such as Spectral Hashing (SH) [8], Iterative Quantization (ITQ) [9], Semi-supervised Hashing (SSH) [10], Minimal Loss Hashing (MLH) [11], Robust Discrete Spectral Hashing (RDSH) [12], Zero-shot Hashing (ZSH) [13], and Kernel Supervised Hashing (KSH)[14].The deep hashing method maps the raw input into hash layer and then convert it into hash codes.

The deep hashing has been exploits in image retrieval, and augmentation is used to improve performance of person identification. Our work departs from previous person re-id works. The hashing method we apply on the Market-1501 and Market-1501+500K [16] datasets will create hash codes which will increase the performance of the system.

D. Rank list generation

The previous do not considered the efficiency. Which is a major issue of person feature detection scope.

III PROPOSED SYSTEM

We propose a system which uses image classification for person re-identification. In the proposed system images of one person are identified from the training dataset and the CNN is trained over these images. In the training phase every Image is partitioned into equal parts, which are further provided to different CNNs respectively. This part based approach provides more accuracy over one whole image.

As, the different cameras at different cross section gives the variation in the pedestrian images which enhance discriminative learning ability. Basic idea is to break the image into parts and train the deep model instead of training it with whole image.

Person re-identification system uses deep Convolutional Neural Network (CNN) hashing framework which is described as follows:

Hash codes are generated for pedestrian image in the binary form [15]. This hash code is created by the hash layer which guarantees the compact binary output. The feature extraction and matching is performed within the CNN which is trained already. According to Deep Hashing method we are training the deep CNN model for each part which generates a hash layer. The training of CNN keeps on updating the parameters of the hash layer which is then used for generating hash codes for images. In the similar way corresponding testing parts are processed by the trained part based deep CNN model. The final result is the list of hash codes for their respective images which serve as a binary representation of features of a person.

We need to merge multiple images which serves as query images into a single query as there exists multiple images of same identity in a single camera. This further improves the accuracy. In the part based approach we are unaware of the benefit of particular parts in person re-identification. Although we are training CNN separately for each part, it becomes complex to combine the results of each part. The solution to this lies in uniform standardization of result throughout the process and for each part. The trained images are compared with the pedestrian images for the final results. The architecture re-identification. They use the traditional methods of distance calculation such as Euclidean or Cosine distance which is inefficient under large dataset and high feature dimension images. In our paper we are using Hamming distance for the similarity calculation. Rank list will be generated based upon that. This method of distance calculation makes it efficient and accurate for the re-identification. This method is efficient upon a large dataset which have thousands of images and have large

of proposed method.

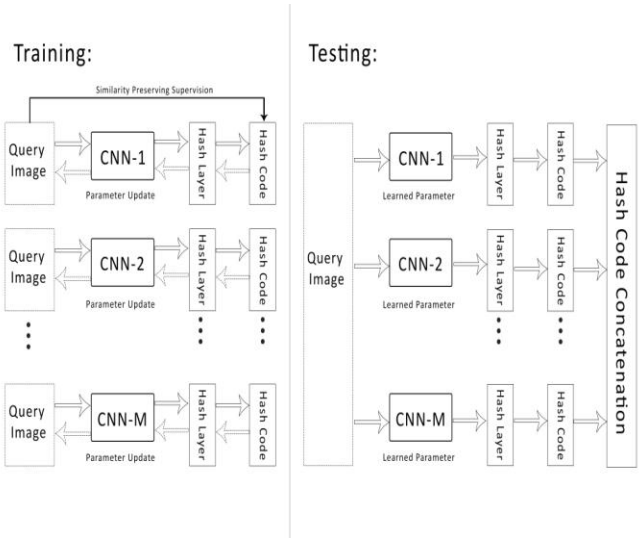

Figure 1: Block Diagram

IV CONCLUSION AND FUTURE WORK

Part-based and Deep Hashing framework improves the efficiency and increases the accuracy of large-scale person re-identification, which generates hash codes for pedestrian images. The triad based deep hashing end-to-end framework is used to jointly optimize the representation image features so that hashing function learns to represent features efficiently. A logical idea used is to utilize the local part instead of the entire image to train the deep model. Multiple queries which merges query images is robust in the sense pedestrians changes which results in improvement of performance of the system. Our system generates a binary sequence which represents every pedestrian image which uses the deep CNN, which 1) discriminate between different identities effectively, 2) combines spatial constraint, and 3) improves efficiency in terms of both memory and speed.

In future scope the live feed from cameras can be used in which only partial image of the subject person is available. The part based person re-identification can be very useful as it will have specially trained CNN models for that part.

REFERENCES

[1] Y. Yan, F. Nie, W. Li, C. Gao, Y. Yang, and D. Xu, "Image classification by cross-media active learning with privileged information," IEEE Transactions on Multimedia, vol. 18, no. 12, pp. 2494–2502, 2016.

[2] Y. Yang, Z. Ma, A. G. Hauptmann, and N. Sebe, "Feature selection for multimedia analysis by sharing information among multiple tasks," IEEE Transactions on Multimedia, vol. 15, no. 3, pp. 661–669, 2013.

[3] Y.Yang, Y.-T. Zhuang, F. Wu, and Y.-H. Pan, "Harmonizing hierarchical manifolds for multimedia document semantics understanding and crossmedia retrieval," IEEE Transactions on Multimedia, vol. 10, no. 3, pp. 437–446, 2008.

[4] Y. Yang, F. Nie, D. Xu, J. Luo, Y. Zhuang, and Y. Pan, "A multimedia retrieval framework based on semi-supervised ranking and relevance feedback," IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 34, no. 4, pp. 723–742, 2012.

[5] R. Zhao, W. Ouyang, and X. Wang, "Person re-identification by salience matching," in Proc. ICCV, 2013, pp. 2528–2535. [12] ——, "Unsupervised salience learning for person re-identification," in Proc. CVPR, 2013, pp. 3586–3593.

[6] L. Zheng, S. Wang, L. Tian, F. He, Z. Liu, and Q. Tian, "Query-adaptive latefusionforimagesearchandpersonre-identification,"inProc.CVPR, 2015, pp. 1741–1750.

[7] W. Li, R. Zhao, T. Xiao, and X. Wang, "Deepreid: Deep filter pairing neural network for person re-identification," in Proc. CVPR, 2014, pp. 152–159.

[8] Y. Weiss, A. Torralba, and R. Fergus, "Spectral hashing." in Proc. NIPS, 2008, pp. 1753–1760.

[9] Y. Gong and S. Lazebnik, "Iterative quantization: a procrustean approach to learning binary codes for large-scale image retrieval." in Proc. CVPR, 2011, pp. 2916–2929.

[10] J. Wang, S. Kumar, and S. F. Chang, "Semi-supervised hashing for scalable image retrieval," in Proc. CVPR, 2010, pp. 3424–3431.

[11] M. Norouzi, "Minimal loss hashing for compact binary codes." in Proc. ICML, 2011, pp. 353–360.

[12] Y. Yang, F. Shen, H. T. Shen, H. Li, and X. Li, "Robust discrete spectral hashing for large-scale image semantic indexing," IEEE Transactions on Big Data, vol. 1, no. 4, pp. 162–171, 2015.

[13] Y. Yang, W. Chen, Y. Luo, F. Shen, J. Shao, and H. T. Shen, "Zeroshot hashing via transferring supervised knowledge," in Proc. ACM International Conference on Multimedia, 2016, pp. 1286–1295.

[14] W. Liu, J. Wang, R. Ji, Y. G. Jiang, and S. F. Chang, "Supervised hashing with kernels," in Proc. CVPR, 2012, pp. 2074–2081.

[15] K. Lin, H.-F. Yang, J.-H. Hsiao, and C.-S. Chen, "Deep learning of binary hash codes for fast image retrieval," in Proc. CVPR Workshops, 2015, pp. 27–35.

[16] Zheng, Liang and Shen, Liyue and Tian, Lu and Wang, Shengjin and Wang, Jingdong and Tian, Qi, "Scalable Person Re-identification: A Benchmark", in Computer Vision, IEEE International Conference, 2015.