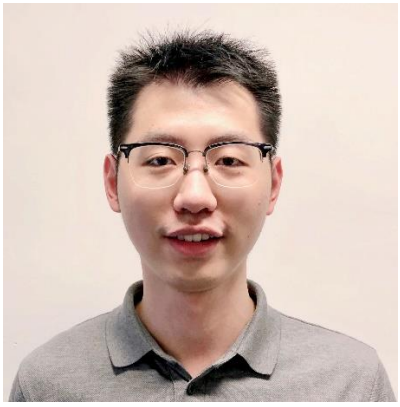
PhD Oral Defense

Date: **23 August 2021 (Monday)** **Time:** **9:30 am**

Thesis Title

Deep Networks for Face Recognition and Retrieval Based on Learning Eigen-filters and Binary Code Representations



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Abstract

This thesis explores novel ideas in the tradeoff between efficiency and accuracy concerning face recognition and retrieval tasks. In the first part, we propose an alternative unsupervised three-stage approach for filter learning. It learns filters in multiple structures inspired by variations of CNNs' convolution operations. Our method is efficient computationally in both the training and inference stage, while it performs comparably to deep learning methods for face recognition. In the second part, we aim to learn binary code representations for efficient face image retrieval. We first propose a center-based deep hashing framework that integrates hashing learning and class center learning for discriminative face image retrieval. A novel regularization term is imposed to enlarge the Hamming distance between pairwise class centers for inter-class separability. Secondly, we incorporate product quantization into a deep network for scalable face image retrieval. To enhance the quantization informativeness and reduce codewords redundancy, we novelly use predefined orthonormal vectors as codewords. Besides, a tailored loss function is designed to maximize the discriminability in each subspace. Experiments show that the proposed methods outperform all the compared deep hashing/quantization methods with significant superiority. Moreover, the proposed orthonormal codewords consistently improve both models' standard retrieval performance and generalization ability.