NeurIPS Thursday

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1 Morning Poster Session

1.1 Fair Algorithms for Clustering

Summary: This work focus on fair clustering. Their work based on Chierichetti et al. (NIPS 2017). Their main contributions are:

- Provide a more generalized and tunable notion of fairness in clustering.
- Develop an algorithm for converting a *vanilla* clustering into an almost *fair* clustering, which can handle overlapping groups.

They run simulations, perform reasonable experiments and compare this methods with alternative methods to verify the effectiveness of the proposed method.

1.2 Learning elementary structures for 3D shape generation

Summary: This work extends shape interpolation to three dimension. They propose to represent shapes as the deformation and combination of learnable elementary 3D structures, which are primitives resulting from training over a collection of shape. They demonstrate that the learned elementary 3D structures lead to clear improvements in 3D shape generation and matching.

2 Afternoon Poster Session

2.1 Surfing: Iterative Optimization Over Incrementally Trained Deep Networks

Summary: The optimization problem

$$f_\theta(x) = \frac{1}{2} \|AG_\theta(x) - Ay\|^2$$

is usually non-convex, where $A \in \mathbb{R}^{m \times n}$ is a matrix, $y \in \mathbb{R}^n$ is the true signal ($m << n$), G_θ is the generative network. Therefore, gradient descent cannot always find global minimum. Their contributions are

- Propose a novel algorithm that outperforms gradient descent;
- Theoretical analysis that ensures convergence under certain conditions.

2.2 KerGM: Kernelized Graph Matching

Graph matching (GM), which aims at finding the optimal correspondence between nodes of two given graphs, is a longstanding problem due to its nonconvex objective function and binary constraints. They provide a unifying view for two typical graph matching formulations: the Koopmans-Beckmann's QAP (quadratic assignment problem) and the Lawler's QAP. Furthermore, they develop the entropy-regularized Frank-Wolfe (EnFW) algorithm for optimizing QAPs, which is extremely fast in practice.

Comments: I was attracted by the image in their poster. However, this paper is also theoretical and solid. In the experiments, their method achieves higher accuracy and requires less time.

2.3 Extending Stein's Unbiased Risk Estimator to Train Deep Denoisers with Correlated Pairs of Noisy Images

Summary: This paper proposes a extended SURE (eSURE) method which take advantage of having multiple noise realizations per image to achieve better performance in denoising. The similar Noise2Noise method requires zero-mean noise and two noise realizations per image to train DNNs. There is no clear assumption on independence or uncorrelated property of two realizations. However, the proposed eSURE method can train deep denoisers with correlated pairs of noise realizations per image and applied it to the case with two uncorrelated realizations per image to achieve better performance than SURE based method and comparable results to Noise2Noise.

Comments: I cannot understand the tables in the poster. please explain the contents of the tables.

2.4 Quadratic Video Interpolation

Summary: State-of-art methods assume uniform motion between consecutive frames and apply linear models. However, the motion in real scenarios can be complex and non-uniform, and the uniform assumption often leads to inaccurate results. The existing models are mainly developed based on two consecutive frames, where the higher-order motion information has not been well exploited. Their proposed methods utilize more than two neighboring frames with quadratic flow prediction which can synthesize high-quality intermediate frames. This method exploits the acceleration information from neighboring frames of a video for non-linear video frame interpolation, and facilitates end-to-end training.

Comments: The images presenting the results are easy to understand.

2.5 Screening Sinkhorn Algorithms for Regularized Optimal Transport

Summary: This paper propose the Screening Sinkhorn algorithm to accelerate the convergence rate of computing regularized optimal transport plan. Their basic idea is providing a lower bound for dual components of Sinkhorn divergence. They illustrate the efficiency of Screenhorn on complex tasks such as dimensionality reduction and domain adaptation involving regularized optimal transport.

2.6 Why Can't I Dance in the Mall? Learning to Mitigate Scene Bias in Action Recognition

Summary: Most existing methods for classifying human behavior by images depend on the scene, such as basketball courts, restaurants, etc. However, human behavior does not depend entirely on the scene. They can dance in the basketball court instead of playing basketball. In this paper, they propose to mitigate scene bias for video representation learning with two ideas. Specifically, they augment the standard cross-entropy loss for action classi- fication with 1) an adversarial loss for scene types and 2) a human mask confusion loss for videos where the human actors are masked out. These two losses encourage learning representations that are unable to predict the scene types and the correct actions when there is no evidence.

Comments: The idea is natural. They provide both adequate theoretical analysis and convincing experiment to support their method. The presentation of the results is also clear and easy to understand. Overall, it is a well-execute paper.