Boost Video Frame Interpolation via Motion Adaptation

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**Contributions**
- Optimization-based VFI: improves the generalization ability of existing VFI models towards various unseen video scenarios.
- Steady Adaptation: cycle-consistency adaptation fully utilizes the inter-frame consistency to learn motion characteristics within video sequences.
- Efficient Adaptation: VFIAdapter significantly improves the efficiency of motion adaptation.
- Significant Gain: our boosted VFI models achieve SOTA performance, and even outperform approaches with extra inputs.

**Optimization-based Video Frame Interpolation**

- Limited Generalization
- Pre-trained VFI
- Donor gap
- Low-frame-rate Unseen test data
- Training Set
- Adapter
- Pre-trained VFI

**Qualitative Results**
- Our motivation is to adapt models to unseen motion characteristics via optimisation-based VFI.
- Based on model parameters learnt on a training set, optimisation-based VFI further optimizes the parameters with each given low-frame-rate test video to boost the interpolation performance.

**Video Frame Interpolation Adapter (VFIAdapter)**

- (a) Cycle-consistency adaptation strategy
- (b) Plug-in adapter module

**Experiment Results**
- Quantitative (PSNR/SSIM) comparison with representative methods.
- Adaptive Search (SVM) based video frame interpolation
- Frame Consistency adaptation
- High-quality video
- Interpolation can learn specific motion characteristics by fully utilizing inter-frame consistency within the test sequence.

**Adaptation Cost.**
- The experiments on end-to-end and plug-in adapter finetuning scenarios. After that, we consider two scenarios, namely, end-to-end finetuning (e2e), and flow-based ones: RIFE \[11\] and EDSC \[12\], the proposed plug-in adapter is designed to take as input, but our boosted models can still outperform approaches with extra inputs.

**Ablation study on end-to-end and plug-in adapter finetuning.**
- Motion Field Visualization.