

DVC: An End-to-end Deep Video Compression Framework

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➤ Objective

Build an end-to-end optimized deep video compression framework

➤ Motivation

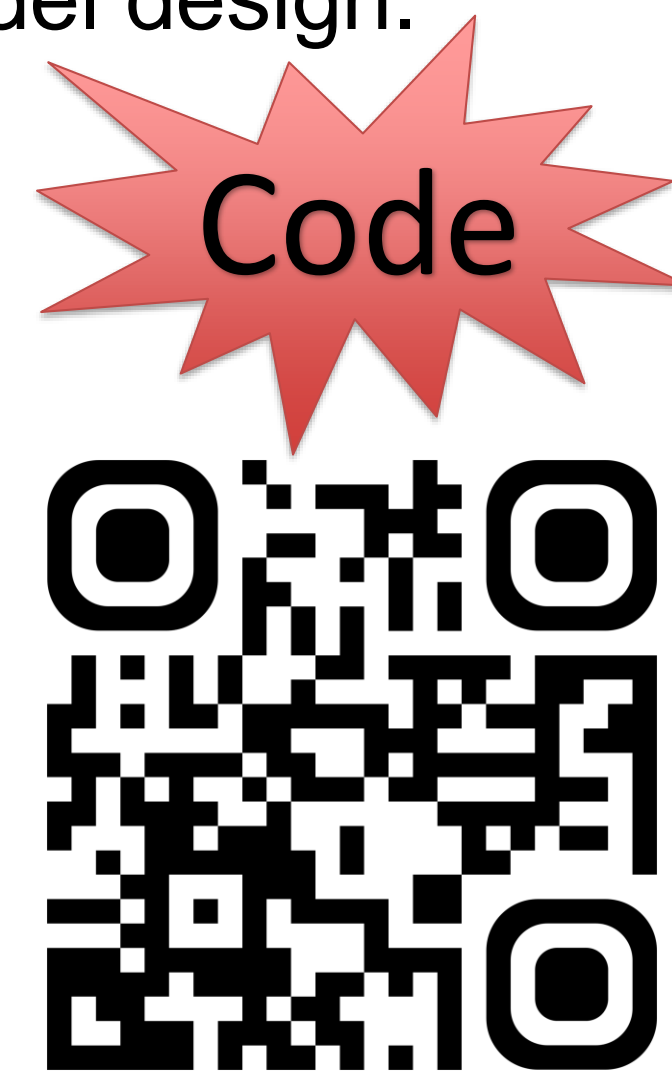
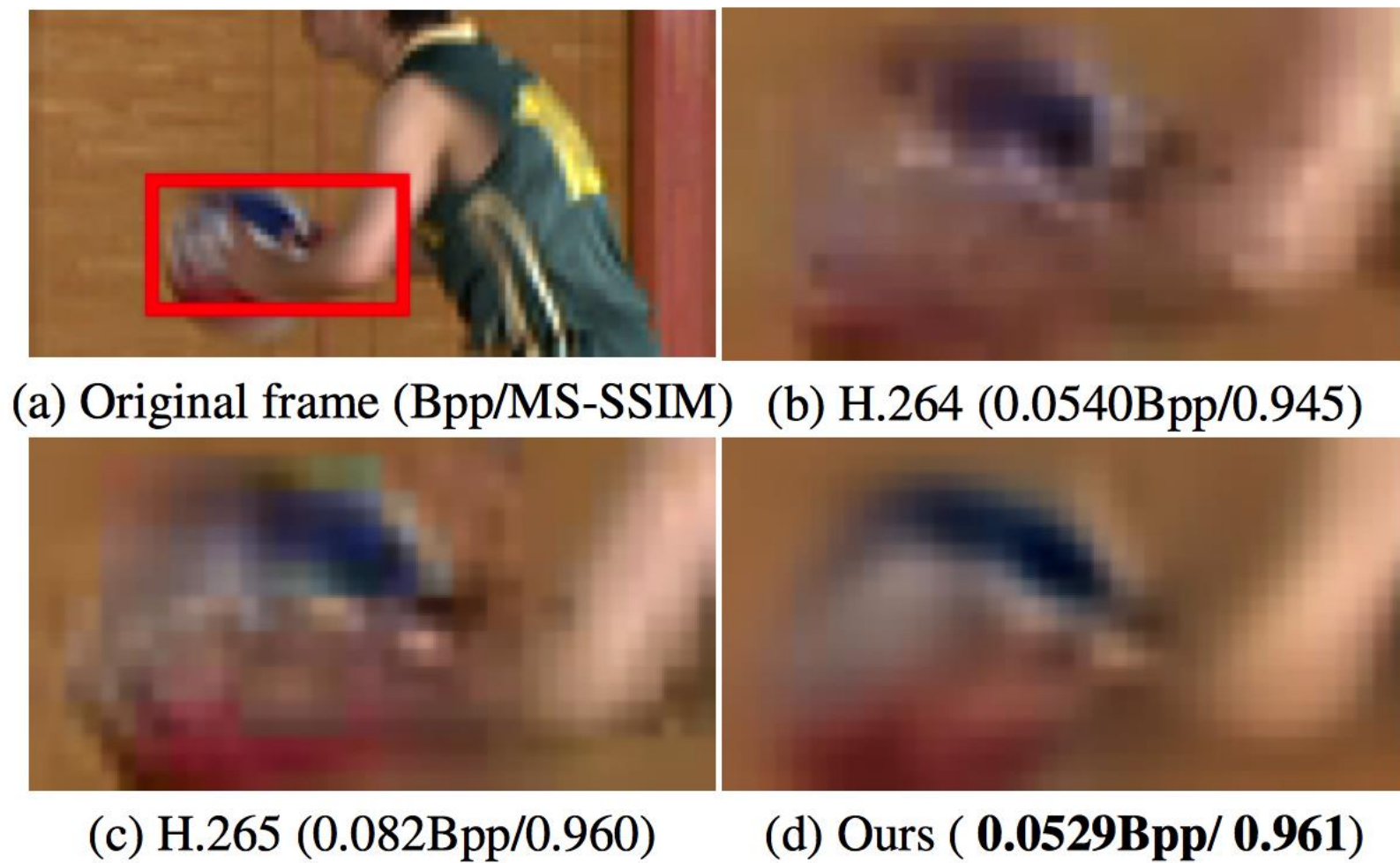
- Traditional video compression uses hand-crafted techniques.
- Deep learning is successfully used for a lot of vision tasks.

➤ Challenge

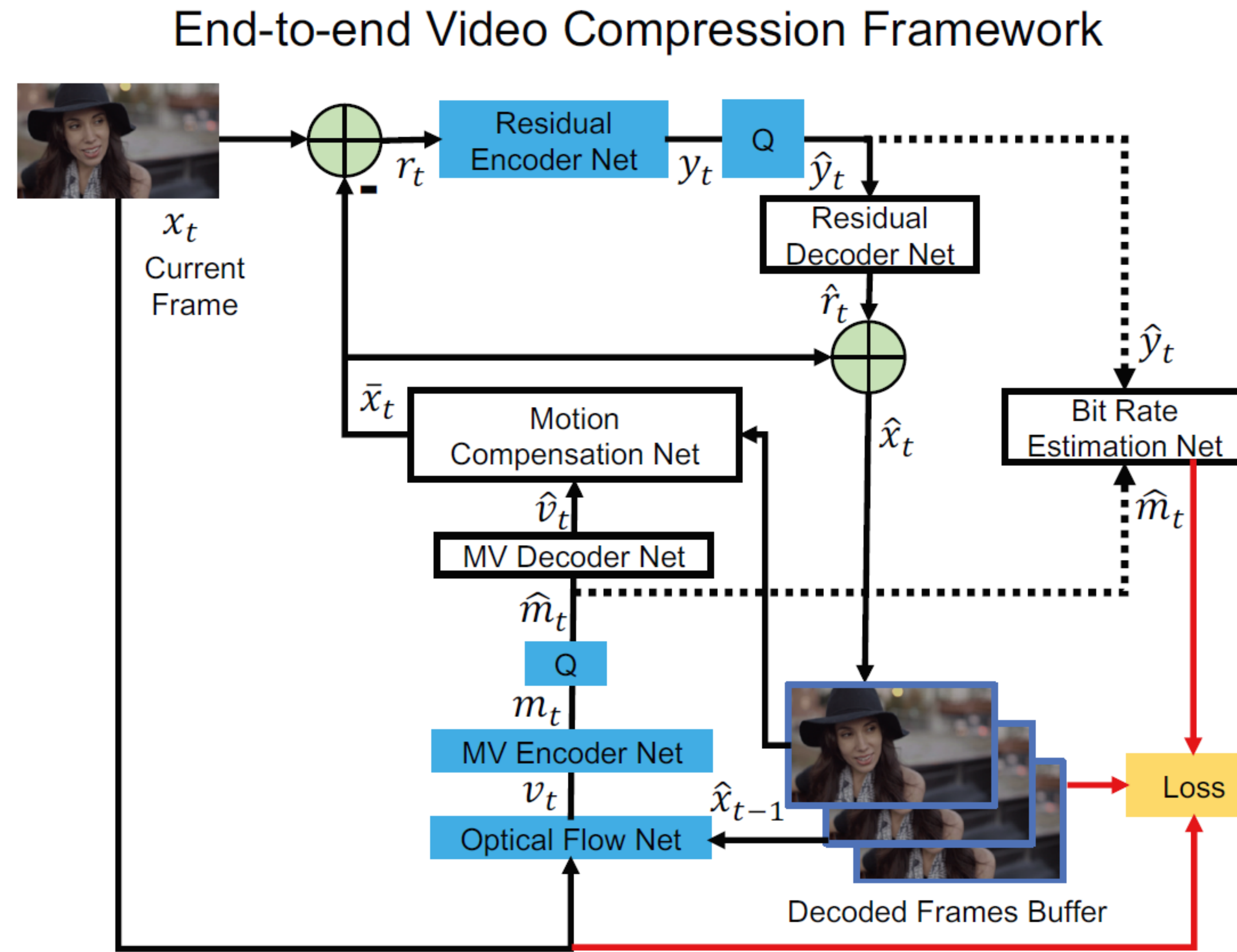
- It remains an open problem to learn how to generate and compress the motion information.
- It is unclear how to build a DNN based video compression system by minimizing the rate-distortion.

➤ Contribution

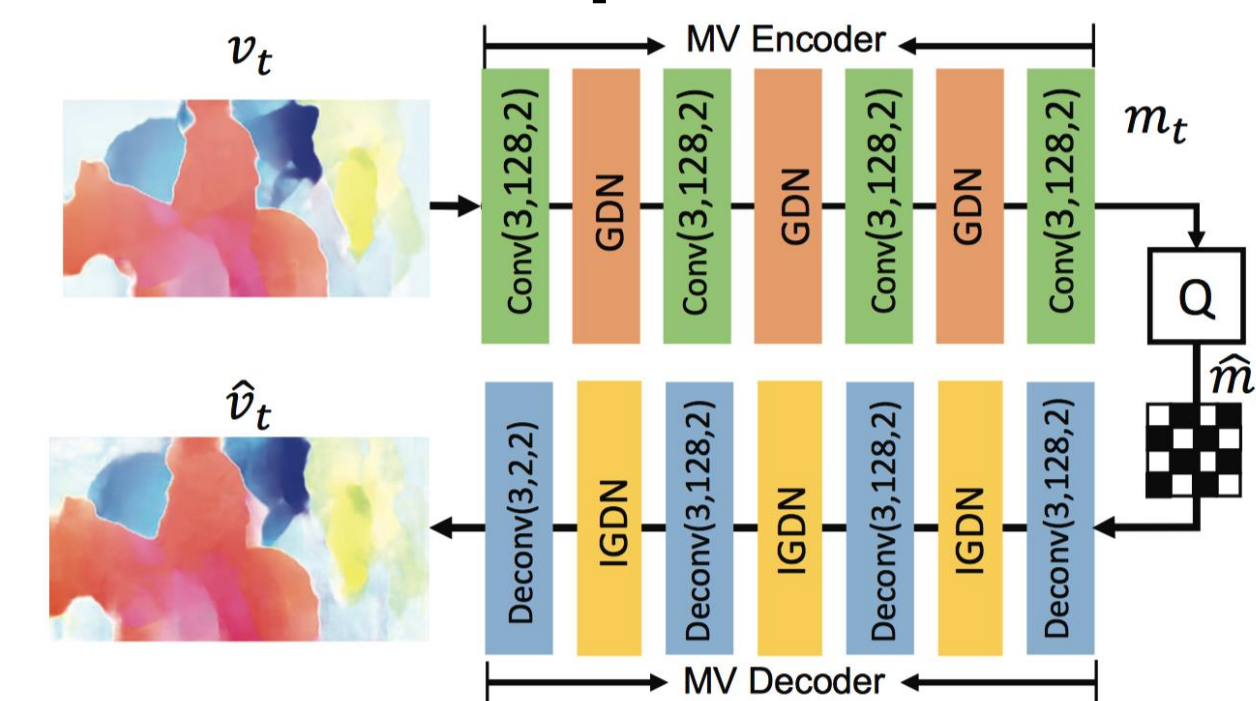
- The **first end-to-end** deep video compression model that jointly learns motion estimation, motion compression, and residual compression.
- This work is a **starting point** for researchers working on video compression, computer vision, and deep model design.



➤ DVC Framework



Motion Compression Net

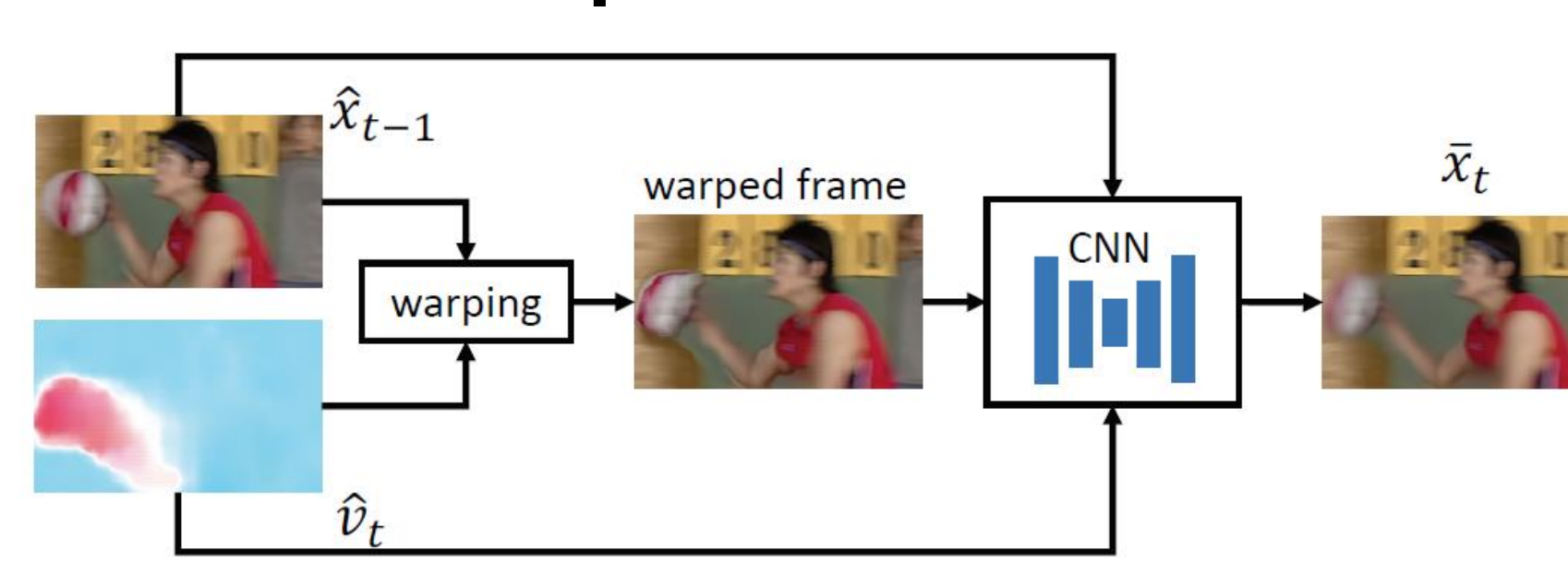


Optimization Loss

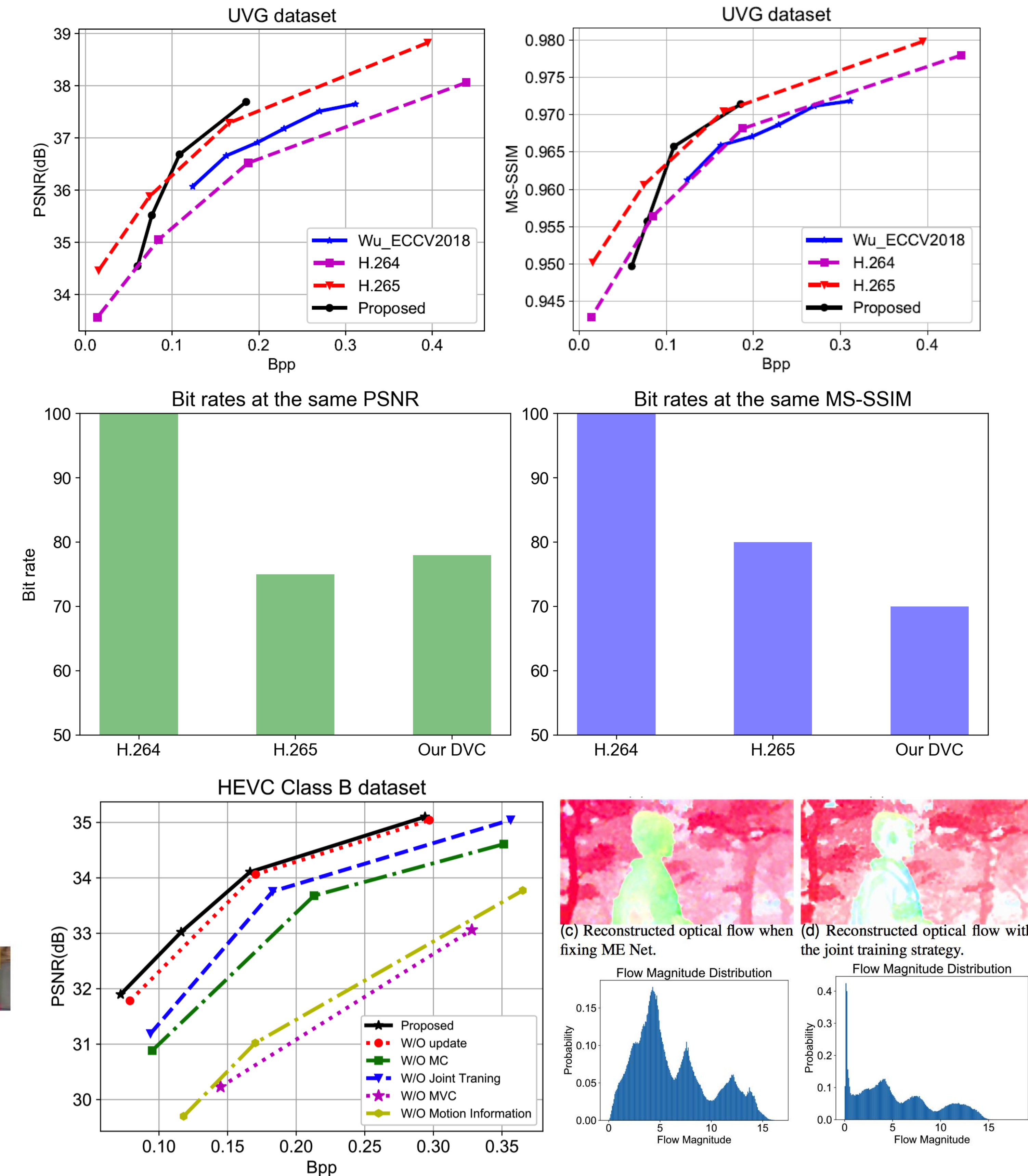
$$\lambda D + R = \lambda d(x_t, \hat{x}_t) + (H(\hat{m}_t) + H(\hat{y}_t)),$$

D and R represent the distortion and coding bits respectively.

Motion Compensation Net



➤ Experimental Results



[1] Anurag Ranjan, Michael J. Black, *Optical Flow Estimation Using a Spatial Pyramid Network*, CVPR18

[2] Johannes Ballé et.al. *Variational Image Compression with a Scale Hyperprior*. ICLR18