Limitations of Current Generation Coding

- Witnessing a saturation point in compression ratio while introducing significant encoding and decoding latencies.
- Lack the ability to adapt well with varying network conditions resulting in poor user experience.
- High egress and ingest costs while transcoding onto/from CDNs and cloud providers.

Why Deep Video Compression?

- Resurrects the benefits of scalable video compression (SVC) while eliminating the compression overheads.
- Flexible data-driven approach, eliminating the need for hundreds of algorithms and options that need to be tuned to get the best performance.
- Enables software-defined video coding (on-demand codec upgrades, agile code development, royalty-free).

KEY FINDINGS

- Deep learning based SVC with zero compression overheads
- Orders of magnitude decrease in coding latencies
- Fundamentally changing the Internet video delivery path
- Broader applications in rate adaptation based approaches (Coding at physical layer, Erasure codes etc)

Scalable Compression using Code Fusion

- **SVC Primer**: an adaptive coding method to allow clients to stream videos with adaptive bitrates. Traditional SVC has extreme compression overheads and computational issues.
- **Goal**: Design a light-weight SVC technique using DNNs (SDVC) with no compression overheads.
- We use the iterative residual coding technique [1] to compress the video into different layered codes.
- **Challenges**: High 1) Decoding latency, 2) Memory demand
- Our key insight is that the DNNs can learn to fuse different codes efficiently compared to an algorithmic approach.
- We use `code fusion` to learn a decoder that can decode multiple codes together in a single shot.

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Deep learning based scalable compression: a) iterative coding, b) single-shot decoder.