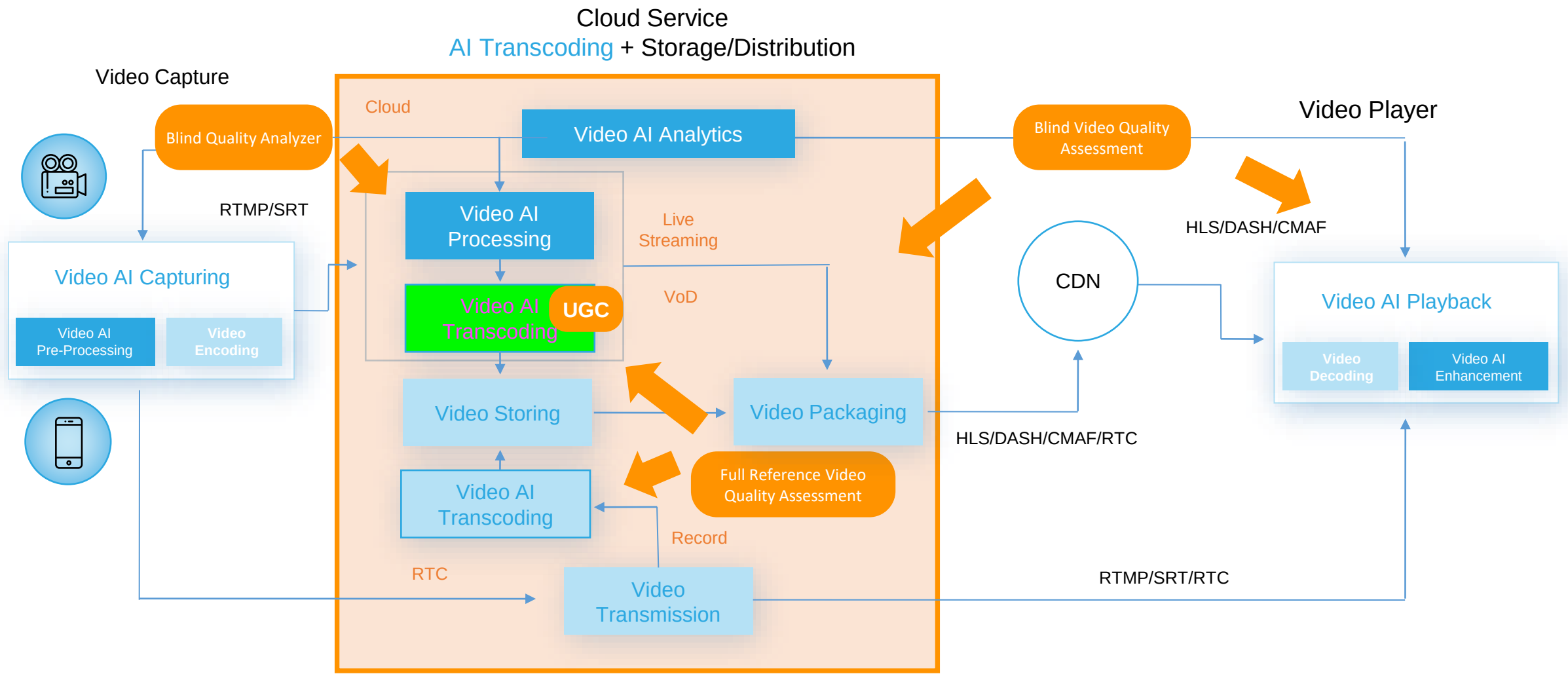
Traditional Video Encoding by Intelligent Handling



Allocate *bits* to the most **perceptually significant areas**.

An Example

Transcoded by x264 (Open source)
Resolution: 241x136 File size: 1.3MB

x264 file Link

Transcoded by Aurora4 H264 (Visionular)
Resolution: 426x240 File size: 1.3MB

Aurora4 file Link

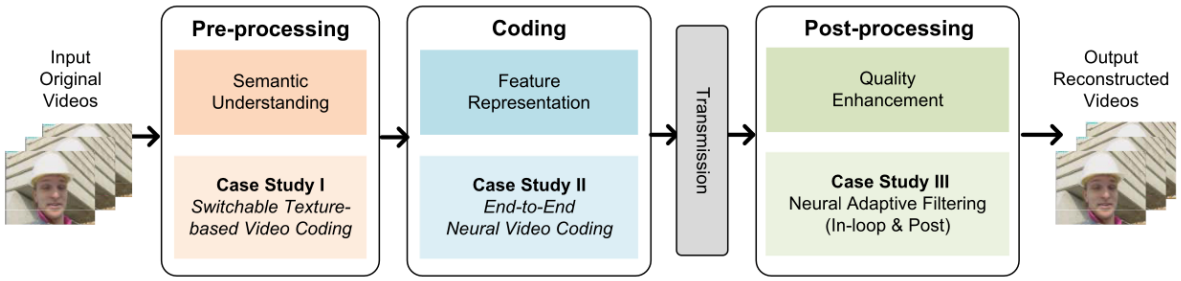
Example **1:3**

Source Video (From customer)
Resolution: 640x360 File size: 2.0MB

Source file Link

Encoding with Intelligent Optimization: Much higher resolution with superior visual quality can be achieved while maintaining the same bitrate level.

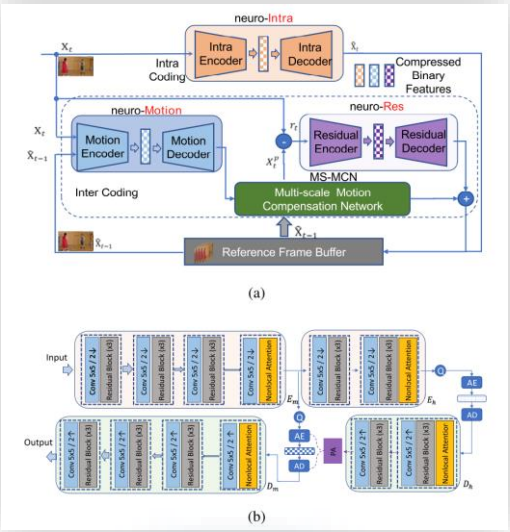
End-to-End Neural Video Coding (E2E-NVC)



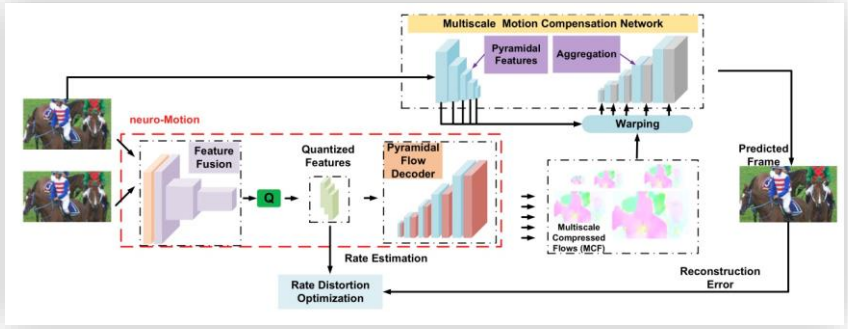
DNN-based techniques used in preprocessing, coding, and post-processing of a practical video compression system

Hybrid-Based Coding Framework → End-to-End Learned Video Compression

From Predictive Coding to Conditional Coding



Dandan Ding, Zhan Ma, Di Chen, Qingshuang Chen, Zoe Liu, and Fengqing Zhu, "**Advances In Video Compression System Using Deep Neural Network: A Review And Case Studies**", in *The Proceedings of The IEEE (invited paper)*, vol. 109, no. 9, September 2021, pp 1494-1520



Neuro Intro

Neuro Inter

TABLE I
BD-RATE FOR PSNR (INTRA PERIOD 32). THE ANCHOR IS HM.

	HM	JM	VTM	VTM*	x264	x265	DVC_Pro	MLVC	RLVC	DCVC	Ours
UVG	0.0	108.1	−28.9	4.6	176.8	109.2	137.7	66.5	140.1	67.3	**−9.0**
MCL-JCV	0.0	95.4	−31.2	−7.2	143.3	84.4	99.3	66.8	124.8	42.8	**−3.2**
MCL-JCV-26	0.0	101.9	−31.0	−6.4	161.0	93.6	92.0	56.1	115.8	37.3	**−9.7**
HEVC Class B	0.0	96.9	−28.8	−8.2	144.6	76.1	123.7	61.4	122.6	56.0	**−5.3**
HEVC Class C	0.0	56.6	−29.0	−3.8	79.8	46.2	124.0	124.1	118.9	76.9	**15.1**
HEVC Class D	0.0	50.0	−26.5	−3.5	72.0	43.8	93.6	96.1	81.2	52.8	**−5.4**
HEVC Class E	0.0	80.5	−29.1	−10.0	153.2	60.3	283.0	138.8	246.2	156.8	**18.5**
HEVC Class RGB	0.0	102.4	−29.7	−1.7	151.9	82.8	102.1	82.1	114.2	51.9	**−14.4**

†Unless otherwise specified, we configure JM, HM, and VTM with the highest-compression-ratio settings for low-delay coding. ‡VTM* uses one reference frame instead of the default four frames in VTM. Note that our scheme uses one reference frame for motion estimation.

TABLE II
BD-RATE FOR MS-SSIM (INTRA PERIOD 32). THE ANCHOR IS HM.

	HM	JM	VTM	VTM*	x264	x265	DVC_Pro	MLVC	RLVC	DCVC	Ours
UVG	0.0	105.6	−27.0	2.3	169.9	87.9	36.2	64.7	49.4	9.2	**−25.5**
MCL-JCV	0.0	108.5	−30.4	−5.8	141.0	71.9	7.8	50.3	34.5	−16.3	**−38.3**
MCL-JCV-26	0.0	113.4	−30.3	−6.5	152.0	74.3	0.7	44.2	23.3	−18.8	**−40.5**
HEVC Class B	0.0	112.4	−26.9	−4.2	150.3	71.1	23.5	50.2	28.3	0.9	**−40.8**
HEVC Class C	0.0	61.3	−27.9	−3.4	89.9	53.5	17.0	53.1	30.0	−8.9	**−42.4**
HEVC Class D	0.0	52.4	−25.9	−3.0	80.0	49.7	−7.8	40.4	0.2	−24.2	**−52.6**
HEVC Class E	0.0	90.9	−27.8	−7.8	184.5	55.0	110.1	106.1	87.1	38.0	**−40.9**
HEVC Class RGB	0.0	107.4	−27.2	−3.9	135.9	64.9	18.3	51.8	21.5	3.3	**−43.4**

Xihua Sheng, Jiahao Li, Bin Li, Li Li, Dong Liu, and Yan Lu, "**Temporal Context Mining for Learned Video Compression**", in *IEEE Transactions on Multimedia*, November 2022, pp 1-12, doi: 10.1109/TMM.2022.3220421.