Low Bitrate Video Coding Scheme Based on Super-Resolution Reconstruction

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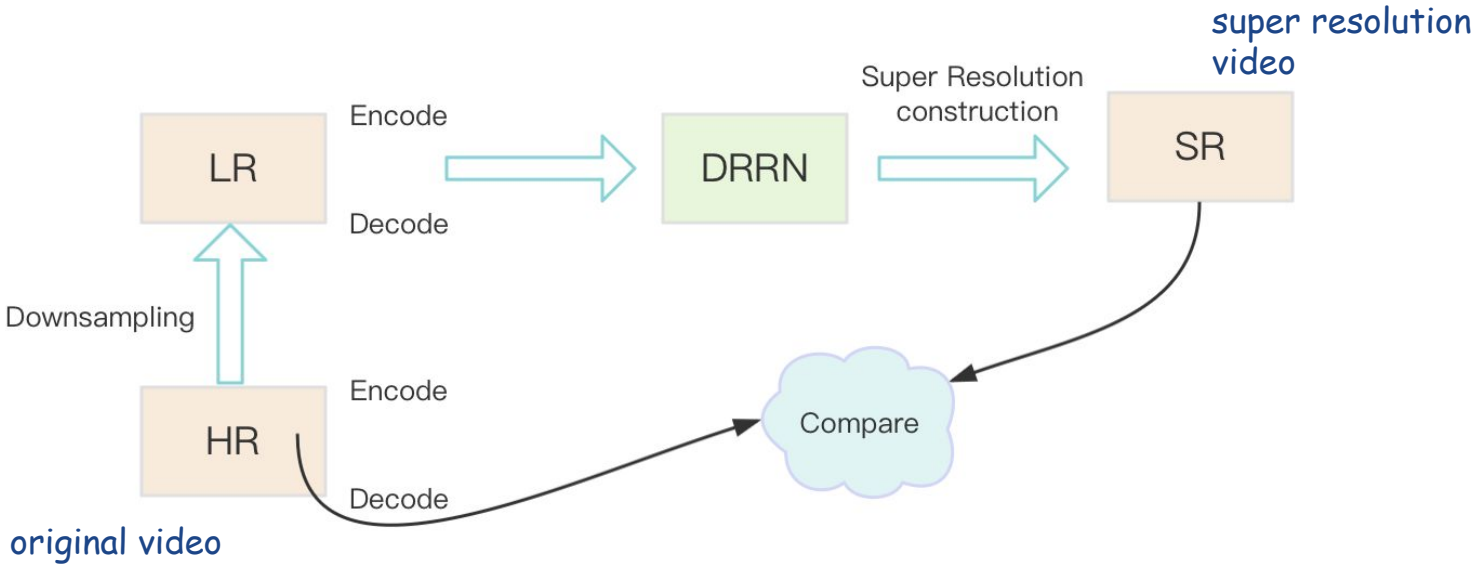
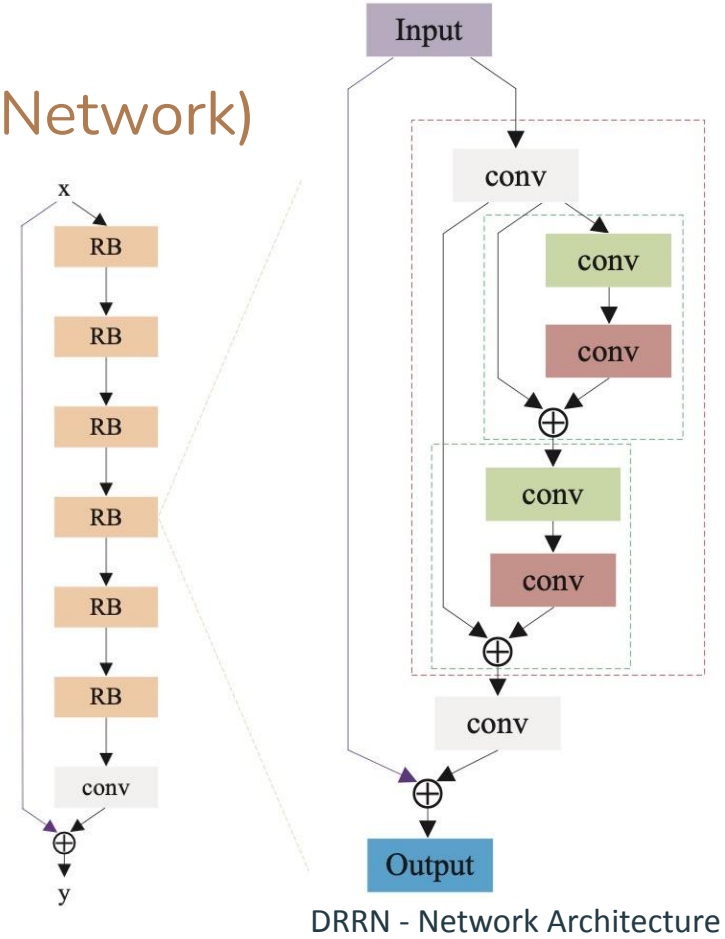
Video Encoding Process:



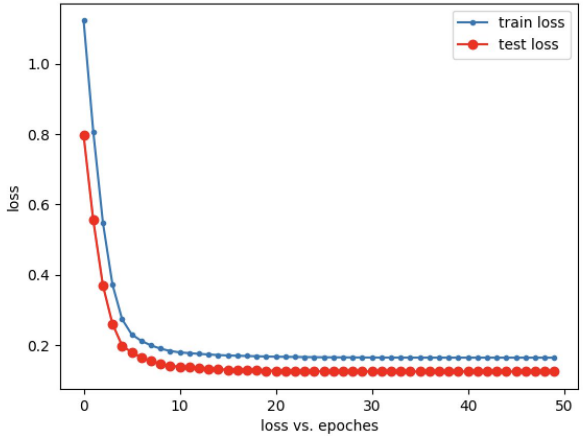
DRRN(Deep Recursive Residual Network)

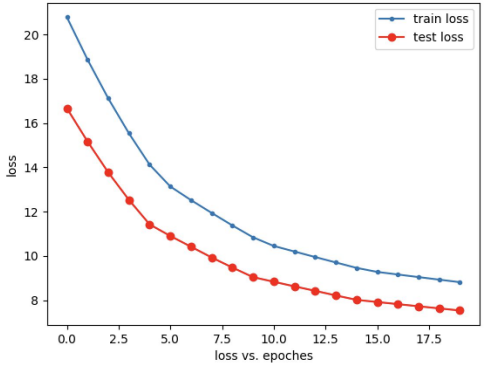
- Recursive learning is used to control the model parameters while increasing the depth.
- Residual learning is adopted, both in global and local manners, to mitigate the difficulty of training very deep networks.



DRRN - Network Architecture

DRRN - Training Process



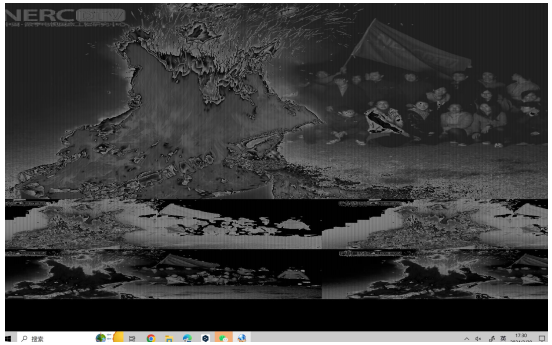


epoch	loss-train set	loss-test set	
1	1.12249E+00	7.95706E-01	
2	8.07134E-01	5.55634E-01	
3	5.49124E-01	3.70410E-01	
4	3.72605E-01	2.60777E-01	
5	2.73801E-01	1.98923E-01	
.....	.....	.....	
46	1.64662E-01	1.25106E-01	**min test set loss**
47	1.64661E-01	1.25105E-01	**1.25102E-01**
48	1.64660E-01	1.25104E-01	**epoch**
49	1.64659E-01	1.25103E-01	**50**
50	1.64657E-01	1.25102E-01	

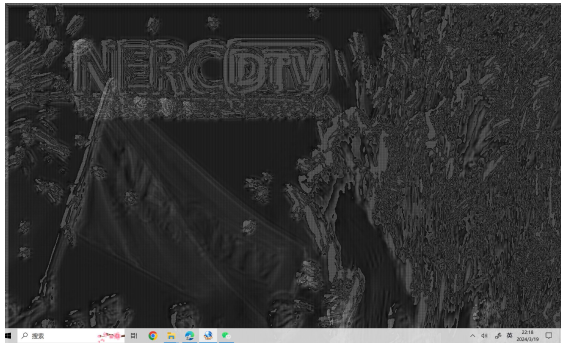
Result(HR vs SR)

		HR			SR(LR)		
	QP	Bitrate	Y-PSNR	Y-msssim	Bitrate	Y-PSNR	Y-msssim
BasketballDrive	22	6253.15	41.79	0.99	6252.75	41.7897	0.994
	27	2398.6	39.92	0.99	2397.4	39.9194	0.99
	32	1220.2	38.55	0.98	1218.6	38.5795	0.985
	37	691.2	37	0.98	688.6	37.0168	0.976
	42	386.1	34.97	0.96	387	35.1073	0.958
RitualDance	22	2971.74	48.6	1	2971.86	48.7384	0.998
	27	1751.88	46.28	1	1756.38	46.5282	0.997
	32	1029.6	43.55	0.99	1028.58	43.8388	0.993
	37	598.5	40.59	0.99	597.6	40.9114	0.987
	42	343.26	37.68	0.98	348.24	38.0855	0.977
CatRobot	22	34438.8	42.79	1	34403.82	42.7817	0.996
	27	9909.06	39.9	0.99	9902.94	39.9532	0.992
	32	5701.62	38.5	0.99	5699.16	38.6404	0.988
	37	3370.32	36.6	0.98	3359.94	36.7942	0.979
	42	1952.4	34.25	0.96	1953.12	34.4875	0.964
FoodMarket4	22	6096.06	46.28	1	6095.52	46.285	0.996
	27	2776.62	45.49	0.99	2775	45.4962	0.994
	32	1736.94	44.67	0.99	1735.8	44.724	0.993
	37	1128.72	43.34	0.99	1133.1	43.4373	0.99
	42	743.52	41.42	0.98	746.04	41.579	0.985

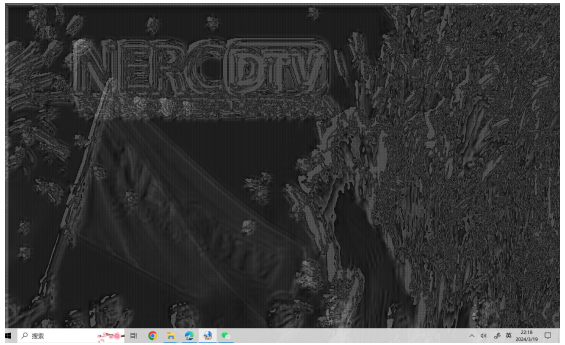
Visual Display



LR



HR



SR