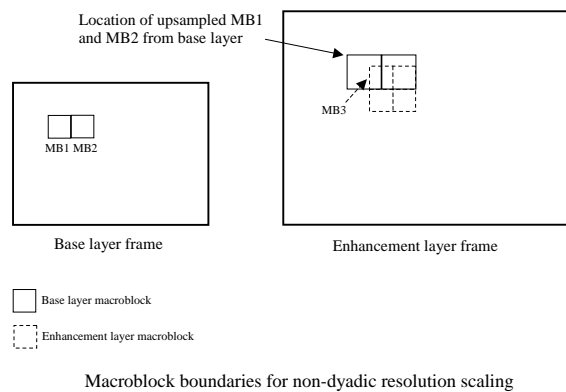


JVT-T088: Improved Inter-layer Prediction for ESS

Xianglin Wang, Justin Ridge

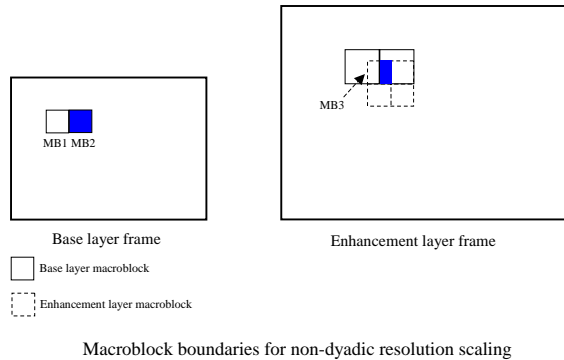
Nokia Research Center, Irving, Texas

Current ESS Inter-layer Prediction



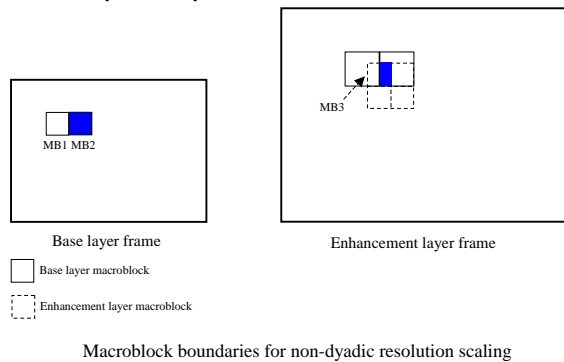
Problem—Intra-coded Area

- If an MB covered by both inter and intra MB from base layer, it is set to be an inter-MB for inter-layer prediction
- Intra coded MB from base layer often unused for inter-layer prediction



Proposed Solution

- For areas covered by inter-coded MB from base layer, use residual prediction
- For areas covered by intra-coded MB from base layer, use base layer reconstructed samples as prediction

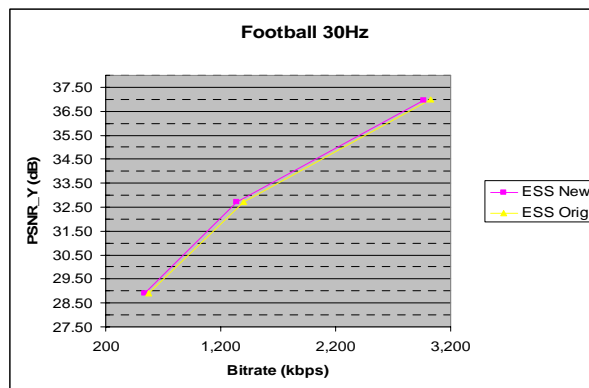


Results

- IPPP... configuration
- Same QP for both base and enhancement layers
- ESS: QVGA → CIF
- Error resilience (LARDO) applied to base layer

Football

ESS Orig					ESS New				
qp	Bitrate(kbps)	PSNR_Y(dB)	PSNR_U(dB)	PSNR_V(dB)	qp	Bitrate(kbps)	PSNR_Y(dB)	PSNR_U(dB)	PSNR_V(dB)
28	1594.0	36.96	41.10	42.46	28	1,594.0	36.96	41.10	42.46
28	3026.9	36.98	41.33	42.65	28	2,965.5	36.96	41.32	42.63
34	774.7	32.74	38.60	40.29	34	774.7	32.74	38.60	40.29
34	1398.8	32.72	38.99	40.56	34	1,342.1	32.71	38.93	40.46
40	327.2	29.09	36.18	38.23	40	327.2	29.09	36.18	38.23
40	572.9	28.92	36.47	38.50	40	536.7	28.91	36.39	38.28



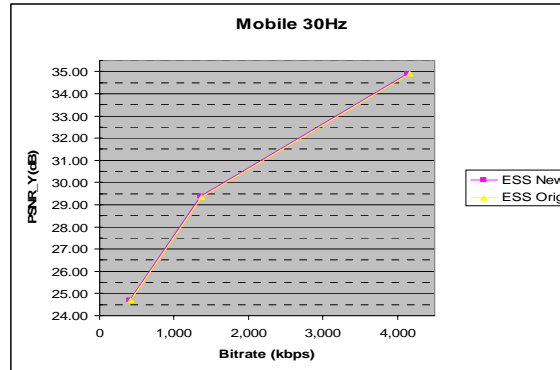
Mobile

ESS Orig

qp	Bitrate(kbps)	PSNR_Y(dB)	PSNR_U(dB)	PSNR_V(dB)
28	2250.8	35.21	36.99	36.83
28	4160.7	34.90	36.68	36.61
34	703.3	29.98	33.71	33.54
34	1365.1	29.35	33.52	33.30
40	208.2	25.37	30.58	30.27
40	415.6	24.69	30.78	30.31

ESS New

qp	Bitrate(kbps)	PSNR_Y(dB)	PSNR_U(dB)	PSNR_V(dB)
28	2250.8	35.21	36.99	36.83
28	4143.3	34.89	36.68	36.62
34	703.3	29.98	33.71	33.54
34	1358.6	29.37	33.58	33.35
40	208.2	25.37	30.58	30.27
40	407.5	24.71	30.80	30.37



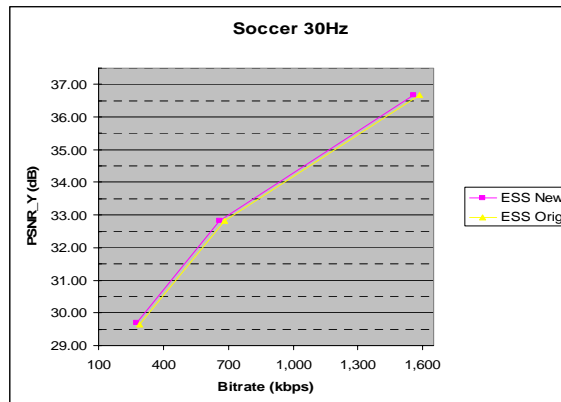
Soccer

ESS Orig

qp	Bitrate(kbps)	PSNR_Y(dB)	PSNR_U(dB)	PSNR_V(dB)
28	874.5	37.22	42.88	44.53
28	1585.8	36.68	43.09	44.93
34	381.4	33.38	40.44	42.47
34	680.8	32.82	40.99	43.10
40	166.4	30.18	38.28	39.95
40	288.7	29.66	38.92	40.69

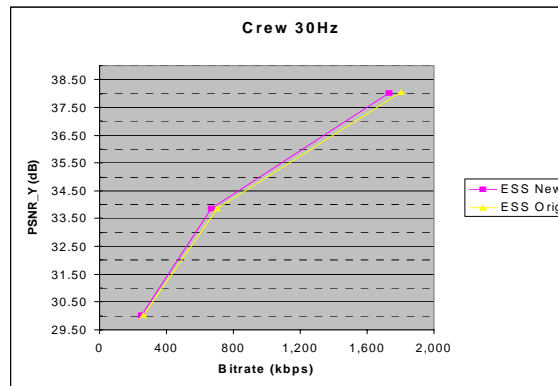
ESS New

qp	Bitrate(kbps)	PSNR_Y(dB)	PSNR_U(dB)	PSNR_V(dB)
28	874.5	37.22	42.88	44.53
28	1556.6	36.68	43.10	44.88
34	381.4	33.38	40.44	42.47
34	659.1	32.83	40.98	43.03
40	166.4	30.18	38.28	39.95
40	275.9	29.69	38.78	40.52



Crew

ESS Orig					ESS New				
qp	Bitrate(kbps)	PSNR_Y(dB)	PSNR_U(dB)	PSNR_V(dB)	qp	Bitrate(kbps)	PSNR_Y(dB)	PSNR_U(dB)	PSNR_V(dB)
28	990.5	38.24	41.07	40.27	28	990.5	38.24	41.07	40.27
28	1802.0	38.05	41.37	40.68	28	1733.1	38.01	41.34	40.66
34	391.0	33.98	38.71	37.45	34	391.0	33.98	38.71	37.45
34	702.6	33.87	39.23	38.06	34	671.6	33.86	39.19	38.02
40	139.9	29.96	36.40	34.51	40	139.9	29.96	36.40	34.51
40	262.5	30.01	37.00	35.33	40	252.9	30.03	37.01	35.35



Conclusion

- Proposed solution improves inter-layer prediction, especially for sequences not very motion compensation friendly
- No extra computer complexity