

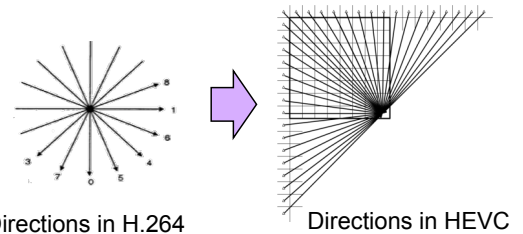
# Inter-Channel Correlation Based Low Complexity Intra Prediction and ALF in HEVC

陳 維靖 池永研究室修士課程修了

## Research background

HEVC (High Efficiency Video Coding):

- 1.Reducing bitrate 50% with comparable image quality compared to H.264 AVC High Profile.
- 2.Flexibility that depending on the application requirements, ability of trade off complexity, compression rate to processing delay time.



## Problem statement

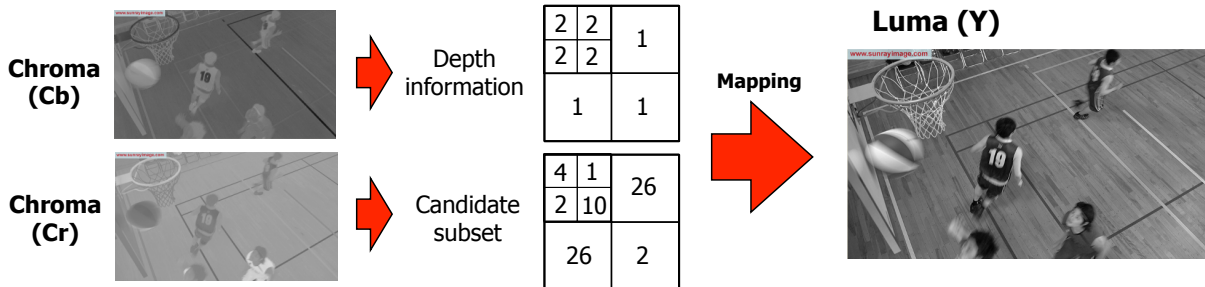
- 1.In H.264, there are only 9 prediction modes, but HEVC increased to 34 modes!
- 2.ALF can achieve efficient encoding, but costs a lot of memory bandwidth and calculation complexity!

**Low complexity intra mode decision algorithm and simplified ALF structure is necessary!**

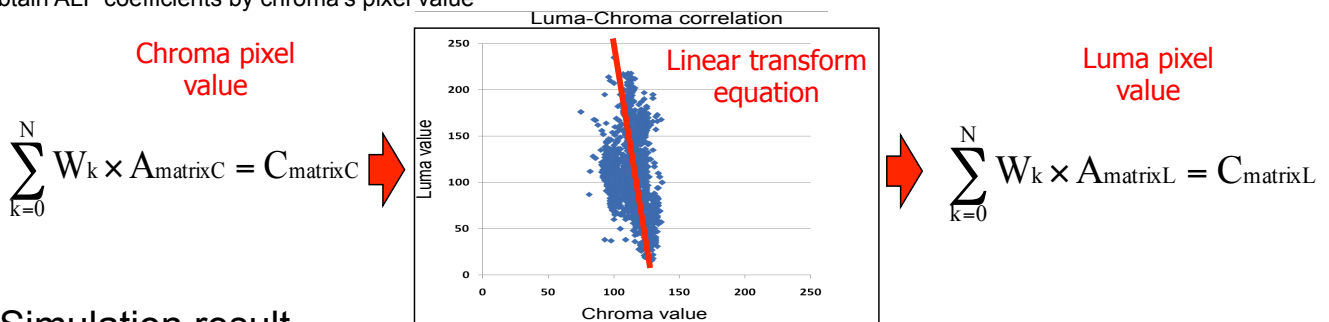
## Proposed method

Apply the inter-channel correlation of different components (YUV) to alleviate the computational cost

-Reversed prediction with candidate subset and depth information mapping



-Obtain ALF coefficients by chroma's pixel value



## Simulation result

-Proposal for intra prediction

	Vidyo1	Vidyo3	Vidyo4	Bballdrill	Party scene	BQMall	Average
Time(%)	-27.49%	-32.98%	-29.40%	-23.42%	-33.70%	-31.12%	-29.68%
Y	-0.049	-0.093	-0.012	0.054	0.339	0.084	0.053
U	-0.123	-0.181	-0.180	-0.020	0.303	0.044	-0.026
V	-0.166	-0.236	-0.199	-0.016	0.298	0.037	-0.047

-Proposal for ALF

	Kimono	Cactus	BQ Terrace	Bballdrill	Park scene	Average
Time(%)	-60.12%	-59.26%	-59.65%	-63.90%	-50.61%	-58.70%
Y	-0.053	-0.097	-0.104	-0.071	-0.043	-0.074
U	0.001	0.001	-0.044	-0.022	-0.008	-0.014
V	0.002	0.009	-0.013	-0.014	-0.007	-0.004

## Conclusion

In the proposed method, it can achieve 29% timesaving for intra prediction part. Also, after linear transformation, average 58.7% timesaving can be done for the ALF module.

