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

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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

- Proposal for ALF

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.