Algorithm and Architecture Design for Intra Prediction in H.264/AVC High Profile

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Abstract:  
In this paper, we propose a novel two-stage intra prediction algorithm and hardware architecture that can support H.264/AVC high profile for 1080p HD size. The proposed DCT-based open-loop intra prediction algorithm can parallel predict each sub block with quality loss. With reconfigurable 8-pixel parallelism processing elements, the proposed architecture can process intra prediction and reconstruction with almost 100% hardware utilization. The proposed architecture was implemented by UMC 90 nm technology with 100k gate counts at 223MHz. It is the first hardware architecture that can real-time encode 1080p HD sequence with H.264/AVC high profile.