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Title: **An Adaptive Quantizer Scheme Using Non-Zero Level Codebooks**

Purpose: Proposal

I Introduction

To obtain gains over the quantizer part of the current standards, it is necessary to use *vector quantizers* (VQ) instead of scalar quantizer, i.e., VQ can achieve a gain which cannot be achievable through the scalar quantizer. However, the major disadvantage of VQ is the encoding complexity which increases dramatically as the vector dimension or bit rate increases. The current video coding standard systems are based on high bit-rate quantizers, even when the coding systems are designed for a low bit rate transmission environment. Hence, applying VQ to the current video coding structure is very difficult.

In this proposal, we propose an *adaptive quantizer scheme* (AQS) by employing a feed-forward adaptive quantizer, called *sample-adaptive product quantizer* (SAPQ) (that has recently proposed in [13] and [14]), for the INTER block quantization part of the ITU-T H.263 version 2 (H.263+). Since the structure of this quantizer is based on scalar quantizers, we can readily apply SAPQ to the current quantizer schemes of the video standards. What is remarkable about SAPQ is that it can be used to obtain VQ-level performance with scalar quantization level complexity.

This proposal is organized as follows. In Section II, we concisely describe the uniform SAPQ in preparation for the SAPQ. We introduce the proposed AQS for H.263+, the low bit-rate video coding, in Section III. In Section IV, the design of SAPQ to the INTER block quantization in H.263+ is shown, and simulation results with discussions are given. We then summarize and conclude the proposal in the last section.