

**HIGH QUALITY CODING AND RECONSTRUCTION
FOR TRANSMISSION
OF SINGLE VIDEO IMAGES**

by

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ABSTRACT

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Hoë kwaliteit rekonstruksie en kodering

vir transmissie

van enkel videobeelde

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Title: High quality coding and reconstruction for transmission of single video images.

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High quality coding of images for transmission requires complete exploitation of all the redundancies present in most images. Redundancy is present in both the statistical and psychovisual properties of images. A detailed analysis was made of the origins of perceivable distortion in images. In the section addressing coefficient quantisation, it has been found that the use of uniform quantisation followed by source coding gives better results than can be achieved with the Lloyd-Max type quantisers. An algorithm has been presented that minimises this distortion for a given coding rate with the introduction of minimal artifacts. A major contribution towards the reduction of the visible distortion was achieved by using the lapped orthogonal transform together with adaptive quantisation. This reduced the visual perception of the so called "block effect". Other aspects investigated included the use of the human visual system to determine the importance of the coefficients during quantisation, and the effect that channel errors have on some of the algorithms.

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SAMEVATTING

Titel: Hoë kwaliteit rekonstruksie en kodering vir transmissie van enkel videobeelde.

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Wanneer beelde gekodeer word om so hoog as moontlike kwaliteit te verkry moet die statistiese en psigovisuele oortolligheid in so 'n beeld ten volle benut word. 'n Detail studie van die oorsake van waarneembare vervorming in 'n beeld is gemaak. Uit die studie is die nodige resultate verkry om 'n algoritme voor te stel wat die waarneembare vervorming minimiseer. Daar is gevind dat die gebruik van 'n transformasie wat oor die grense van 'n blokkie strek die steurende blok-effek drasties verminder het, veral wanneer dit gekombineer is met aanpasbare kwantisering. Verder is die oordragsfunksie van die mens se oog gebruik om tydens kwantisering te bepaal watter koëffisiente die meeste inligting dra. In die ondersoek na optimale kwantisering is daar gevind dat uniforme kwantisering gevolg deur bron-kodering beter resultate lewer as die Lloyd-Max tipe kwantiseerders. Daar is ook gekyk na die invloed wat kanaalfoute op die verkillende algoritmes het, en daar is vasgestel dat die gebruik van 'n oorvleuelende transformasie die effek van kanaalfoute verminder.

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¹ For a more general discussion of image coding the reader is referred to "Image Processing" John Wiley & Sons 1978.