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学术探讨

基于DSP的图像压缩系统设计与算法研究

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摘要 提出一种基于DSP和FPGA协同设计实现视频图像压缩的控制逻辑方案。由FPGA模块来实现图像采集，DSP模块进行编码压缩，同时针对块匹配算法中搜索精度与计算复杂度相关性问题，介绍了一种基于块匹配的量子行为的微粒群优化算法（Block Match Quantum-behaved Particle Swarm Optimization，BMQPSO）。在图像的实时压缩算法处理中，先对原始图像序列每一帧的宏块用微粒子进行搜索，再根据收敛性要求对压缩编码进行优化。实验结果表明该算法压缩效果优于经典搜索算法。

关键词 图像压缩 图像采集 DSP FPGA BMQPSO算法

分类号

Design and algorithm research of image compression system based on DSP Techniques

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Abstract

The need for effective data compression is evident in almost all applications where storage and transmission of digital images are involved.For the simple hardware complexity it is so easy to implement in SILI.A logic scheme image processing system based on coordinated DSP and FPGA techniques is presented，in this system，FPGA is used as image acquisition unit and DSP is designated to image compression.In order to dispose computational complexity and search precision aiming at the black match algorithm，in this paper，a method of Block Match Quantum-behaved Particle Swarm Optimization （BMQPSO） is introduced in order to realize the image compression problem.During the process of image compression，an ordered representation frame of image is first searched by particles，and then the compressed code was optimized according to the particles astringency.Experimental results show that the compression efficiency of BMQPSO algorithm is much better than classical algorithms.

Key words image compression image acquisition DSP FPGA BMQPSO algorithm

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