Abstract

Increasing Processing capabilities of graphic devices and recent improvements in CCD technology have made hexagonal sampling attractive for practical applications. Also, hexagonal representation has special computational features that are pertinent to the vision process. This paper describes Edge detection operation on hexagonally sampled images and its hardware implementation based on Cellular Logic Array Processing (CLAP) algorithm. This architecture
builds up a virtual hexagonal grid system on the memory space of computer and processing
algorithms can be implemented on such virtual spiral space, thereby decreasing the
computational complexity. These operations were done on hexagonal sampled grid using
MATLAB version 7 and the results were compared with rectangular sampled grid. MODELSIM
and Quartus II software were used for analysis and synthesis. The performance was tested
using Altera Cyclone II FPGA. It was observed from the results that there is a marginal
improvement while processing with hexagonal sampled grid. Hardware utilization is found to be
less for the image sampled on hexagonal grid compared with rectangular grid.

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Hardware Implementation of Edge detection on Hexagonal Sampled Image Grids


Index Terms

Computer Science

Computer Vision

Key words

Hexagonal image processing

FPGA implementation of CLAP algorithm

CLAP algorithm