A NEW FORMULATION OF GEOMETRIC MOMENTS FROM LOWER OUTPUT VALUES OF DIGITAL FILTERS

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JOURNAL OF CIRCUITS SYSTEMS AND COMPUTERS

Volume: 23

Issue: 4

Article Number: 1450055

DOI: 10.1142/S0218126614500558

Published: APR 2014

View Journal Information

Abstract

An important aspect of the real-time image processing applications using orthogonal moments is the speed of their computation. They can be computed directly or via geometric moments (GMs). One of the fast methods to generate GMs is the usage of the cascaded digital filter outputs. However, a concern of this design is that the outputs of the digital filters, which operate as accumulators, increase exponentially as the orders of moment increase. It is shown in previous works, for an N Chi N image, the digital filter outputs are sampled at N or later instances. In this paper, we propose a new formulation to solve this problem by using a set of lower digital fi lter output values as the order of moments increases. This is achieved by sampling the digital fi lter outputs at earlier instances, N; N - 1; N - 2;...; N - p, where p is the maximum moment order. This method enables the usage of the lower digital filter output values for higher- order moments. As the moment order approaches N, the number of additions is approximately 45% less for the proposed method when compared with the existing methods, resulting in a corresponding reduction in computation time.

Keywords

Author Keywords:Image moments; digital filter output values; impulse response

KeyWords Plus:ZERNIKE MOMENTS; IMAGE-ANALYSIS; PATTERN-RECOGNITION; RECURSIVE COMPUTATION; KRAWTCHOUK MOMENTS; TCHEBICHEF MOMENT; INVERSE TRANSFORM; EDGE-DETECTION; INVARIANTS; ALGORITHM

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Funding

Funding Agency	Grant Number
University of Malaya	UM.C/HIR/MOHE/ENG/42

View funding text

Publisher

WORLD SCIENTIFIC PUBL CO PTE LTD, 5 TOH TUCK LINK, SINGAPORE 596224, SINGAPORE

Categories / Classification

Research Areas:Computer Science; Engineering

Web of Science Categories:Computer Science, Hardware & Architecture; Engineering, Electrical & Electronic

Document Information

Document Type:Article

Language:English

Accession Number: WOS:000334693200012

ISSN: 0218-1266

eISSN: 1793-6454

Journal Information

- Impact Factor: Journal Citation Reports®

Other Information

IDS Number: AF4ON

Cited References in Web of Science Core Collection: **30**

Times Cited in Web of Science Core Collection: **0**

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