شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

شبكة المعلومات الجامعية

بعض الوثائق الأصلية تالفة

بالرسالة صفحات لم ترد بالأصل

FPGA REALIZATION FOR IMAGE PROCESSING TECHNIQUES USING HAAR TRANSFORM AND CHAOTIC SYSTEMS

By

Ahmed Ayman Abdel-Monem Ahmed Rezk

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY
in
Electronics and Communications Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Approved by the
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Title of Thesis:

FPGA Realization for Image Processing Techniques using Haar Transform and Chaotic Systems

Key Words:
Blur detection; Compression; Encryption; FPGA; Haar

Summary:
This thesis proposes a 3-in-1 standalone Field Programmable Gate Array (FPGA) system that can perform color image blur detection in parallel with compression and encryption. The proposed system can be integrated with digital cameras to process the captured images on-the-fly prior to transmission or storage. Based on the application, the blurred images can be either marked for future enhancement or simply filtered out. The compression scheme utilized by the proposed system is based on the following techniques: 3-level Haar Discrete Wavelet Transform (DWT), hard thresholding, and Run Length Encoding (RLE). The Haar DWT is also used in the blur detection to estimate the sharpness of the image edges. Accordingly, the Haar DWT is used as a common building block to save the resources. The encryption scheme utilized by the proposed system is based on the 128-bit Advanced Encryption Standard (AES), which is considered one of the most secure algorithms.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section

Name: Ahmed Ayman Abdel-Monem Ahmed Rezk Date: / /2021

Signature:

Dedication

I dedicate this thesis to my parents

Acknowledgments

I would like to express my deep appreciation to my supervisors: Prof. Ahmed Soliman, Prof. Ahmed Madian, and Prof. Ahmed Radwan. I was lucky to be mentored by such professors with high ethical values, and who are humble, supportive, energetic, open-minded, and creative. I am grateful for our discussions that significantly impacted the quality of the dissertation. Their helpful comments and discussions during our meetings are greatly appreciated.

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