

بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



جامعة عين شمس

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Cairo University

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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Under the Supervision of

Prof. Dr. Ahmed Mohamed Soliman

Prof. Dr. Ahmed Gomaa Radwan

.....
Professor
Engineering Electronics and Communications
Department
Faculty of Engineering, Cairo University

.....
Professor
Engineering Mathematics and Physics
Department
Faculty of Engineering, Cairo University
on leave (Nile University)

Prof. Dr. Ahmed Hassan Madian

.....
Professor
Engineering Electronics and Communications
Egyptian Atomic Energy Authority

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Approved by the
Examining Committee

Prof. Dr. Ahmed Mohamed Soliman **Thesis Main Advisor**

Prof. Dr. Ahmed Gomaa Radwan **Advisor**

Prof. Dr. Ahmed Hassan Madian **Advisor**
- Professor, Egyptian Atomic Energy Authority.

Prof. Dr. Mohamed Fathy Abu-Elyazeed **Internal Examiner**

Prof. Dr. Hassan Ibrahim Saleh **External Examiner**
- Professor, Egyptian Atomic Energy Authority.

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2021

Engineer's Name: Ahmed Ayman Abdel-Monem
Date of Birth: 04/09/1990
Nationality: Egyptian
E-mail: ahmed.rezk1990@gmail.com
Phone: 01001594115
Address: 52 Gezeiret el Arab Street
Registration Date: 1/10/2016
Awarding Date: / /2021
Degree: Doctor of Philosophy
Department: Electronics and Communications Engineering



Supervisors:

Prof. Ahmed Mohamed Soliman
Prof. Ahmed Gomaa Radwan
Prof. Ahmed Hassan Madian

Examiners:

Prof. Ahmed Mohamed Soliman (Thesis main advisor)
Prof. Ahmed Gomaa Radwan (Advisor)
Prof. Ahmed Hassan Madian (Advisor)
- **Professor, Egyptian Atomic Energy Authority.**
Prof. Mohamed Fathy Abu-Elyazeed (Internal examiner)
Prof. Hassan Ibrahim Saleh (External examiner)
- **Professor, Egyptian Atomic Energy Authority.**

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

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