Sudan University of Science and Technology

College of Engineering

School of Electronics Engineering

An Intelligent Traffic Light System

A Research Submitted in Partial fulfillment for the Requirements of the Degree of B.Sc.(Honors) in Electronic Engineering

Prepared by:

1. Hadeel Ibrahim Siddiq Mohammed
2. Nada Mohammed Salih Abd-Elrhman
3. Tasabih Abd-Elgader Mohammed

Supervised by:

Alaa Aldeen Awouda

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الإستهلال

اقْرَأْ باسْمِ رَبِّكَ الَّذِي خَلَقَ (1) خَلَقَ الْإِنْسَانَ مِنْ عَلَقٍ (2)اقْرَأْ وَرَبُّكَ الْأَكْرَمُ (3) الَّذِي عَلَّمَ بِالْقَلَمِ (4) عَلَّمَ الْإِنْسَانَ مَا لَمْ يَعْلَمْ (5)

DEDICATION

We dedicated this thesis to our parents, to our sisters and brothers, to all who we love

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ABSTRACT

In this research the fuzzy logic concept is implemented in ATMEGA 16 microcontroller to control the traffic effectively and safely by including traffic congestions and emergency cases through applying load cell senor to sense the congestion of each road and RF (Radio Frequency) for emergency cases. The ATMEGA determine the priority of each road according to the values sensed by sensors and the output signals of RF. This project is simulated, and the simulation results show that an intelligent traffic light controller has better performance and more optimal.

المستخلص

في هذا البحث تم تطبيق مفهوم المنطق الغامض باستخدام المعالج الدقيق (ATMEGA16) للتحكم في حركة السير بشكل فعال و آمن, لحل مشاكل الازدحام من خلال استخدام حساس الضغط لتحديد كثافة كل اتجاه , و دائرة تردد الراديو RF في الحالات الطارئة . يقوم المعالج الدقيق (ATMEGA16) بتحديد الأولوية لكل اتجاه تبعا للاشارة المستقبلة من حساس الضغط و دائرة تردد الراديو.تم تنفيذ هذا المشروع من خلال برامج المحاكاة , و أثبتت النتائج كفاءة المشروع .

TABLE OF CONTENTS

TITLE	PAGE
الاستهلال	II
DEDICATION	III
ACKNOWLEDGMENTS	IV
ABSTRACT	V
المستخلص	VI
TABLE OF CONTENTS	VII
LIST OF FIGURES	IX
LIST OF TABLES	X
LIST OF ABBERVIATIONS	XI
CHAPTER ONE INTRODUCTION	
1.1 Introduction	2
1.2 Problem Statement	3
1.3 Proposed Solution	3
1.4 Aims and Objectives	4
1.5 Methodology	4
1.6 Research Outlines	5
CHAPTER TWO LITERATURE REVIEW	
2.1 Overview	7
2.2 Background	7
2.3 Related Works	7
2.4 System Components	11
2.4.1 Load Cell Sensor	11
2.4.2 ATMEGA16	13
2.4.3 RF Circuit	17
2.4.4 Fuzzy Logic	21
2.4.5 LCD	21
CHAPTER THREE SYSTEM DESIGN	
3.1 Overview	24
3.2 System Block Diagram	24
3.3 Pins Configuration	25
3.4 System Design	26
CHAPTER FOUR RESULTS AND ANALYSIS	
4.1 Overview	30
4.2 Simulation Results	30

4.2.1 First Scenario 31
4.2.2 Second Scenario 52

CHAPTER FIVE CONCLUSION AND RECOMMENDATIONS
5.1 Overview 54
5.2 Conclusion 54
5.3 Recommendations 54

LIST OF FIGURES

FIGURE NO	TITLE	PAGE
2.1	Load Cell Sensor	12
2.2	Wheatstone Bridge	12
2.3	ATMEGA16 Microcontroller	14
2.4	Structure of ATMEGA16 Microcontroller	15
2.5	Basic Superheterodyne Radio Receiver	18
2.6	Basic Superheterodyne Radio Transmitter	18
2.7	RF Transmitter and Receiver	19
2.8	Encoder	20
2.9	Decoder	20
2.10	LCD	22
3.1	System Block Diagram	24
3.2	System Flow Chart	28
4.1	System Simulation	31
4.2	Traffic Scenario 1 ,Case 1	32
4.3	Traffic Scenario 1 ,Case 1	33
4.4	Traffic Scenario 1 ,Case 2	34
4.5	Traffic Scenario 1 ,Case 2	35
4.6	Traffic Scenario 1 ,Case 3	36
4.7	Traffic Scenario 1 ,Case 3	37
4.8	Traffic Scenario 1 ,Case 4	38
4.9	Traffic Scenario 1 ,Case 4	39
4.10	Traffic Scenario 1 ,Case 5	40
4.11	Traffic Scenario 1 ,Case 5	41
4.12	Traffic Scenario 1 ,Case 6	42
4.13	Traffic Scenario 1 ,Case 6	43
4.14	Traffic Scenario 1 ,Case 7	44
4.15	Traffic Scenario 1 ,Case 7	45
4.16	Traffic Scenario 1 ,Case 8	46
4.17	Traffic Scenario 1 ,Case 9	47
4.18	Traffic Scenario 1 ,Case 10	48
4.19	Traffic Scenario 1 ,Case 11	49
4.20	Traffic Scenario 1 ,Case 12	50
4.21	Traffic Scenario 1 ,Case 13	51
4.22	Traffic Scenario 1 ,Case 14	52

LIST OF TABLES

TABLE NO	TITLE	PAGE
2.1	Pins Description	**16**
3.1	ATMEGA16 Pins System Function	**25**

LIST OF ABBREVIATIONS

PTC Pre-Timed Controller

FLC Fuzzy Logic Controller

FTJSC Fuzzy logic-based Traffic Junction signal Controller

RISC Reduced Instructions Set Computer

PSG Product-Sum-Gravity

TX-RX Transmitter and Receiver

LED Light Emitting Diodes

RF Radio Frequency

LO Local Oscillator

IF Intermediate Frequency

AM Amplitude Modulation

FM Frequency Modulation

QAM Quadrature Amplitude Modulation

AI Artificial Intelligent

FL Fuzzy Logic

DIP Digital Image Processing