

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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صَدَقَ اللَّهُ الْعَظِيمُ

DEDICATION

Keep your dreams alive

Understand to achieve

anything requires faith and belief ,

vision, hard work, determination, and dedication.

Remember all things are possible for those who believe.

To Our dear parents

To those who deserve respect

Who taught us the secrets of life and taught us to the straight path

To Our teachers

Who're always been a devoted guides in our educational journey

To our great supervisor

Who helped in the preparation of this project

To our wonderful friends

To those who take our hands To those who accompanied us a path

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ABSTRACT

Recently agricultural development techniques have been increasing rapidly with the help of modern available controlled devices like computer, microcontrollers, sensor, and integrated circuits.

In the present work a Microcontroller based controlled irrigation system is developed for the agricultural plantation. Required water provides for plantation whenever the level of water in the canals and the humidity of the soil go below the set-point value.

Humidity and level sensors provide proportional amount of output with change in humidity, which is compared, to the set-point and the data is taken through the channel. If the set-point data indicate that planet needs water then the gate is opened to provide water. If the set-point data indicate that planet don't need water any more then the gate is closed. This provides right amount of water at right time. The required software program is developed in micro C language.

المستخلص

مؤخرا تقنيات التنمية الزراعية تتزايد بسرعة مع مساعدة من الأجهزة التحكم المتوفرة الحديثة مثل الكمبيوتر و ميكروكنترولر، وأجهزة الاستشعار، والدوائر المتكاملة .

في العمل الحالي يتم تطوير نظام الري باستخدام المتحكمات الدقيقة للري الاتوماتيكي للاراضي الزراعية.يتم توفير المياه اللازمة للاراضي الزراعية كلما كان مستوى ونسبة الرطوبة في التربة اقل منالقيمة المحددة المطلوبة .

توفر أجهزة استشعار الرطوبة و أجهزة استشعار المستوى كمية متناسبة من الخرج مع التغيير في الرطوبة، والتي تتم بمقارنة مجموعة من نقاط ويتم أخذ البيانات من خلال القناة. إذا كانت البيانات المأخوذة منالمجموعة من النقاط تشير إلى حاجة الارض الزراعية للماء يتمفتح البوابة ليوفر المياه إلىالارض الزراعية .و عندماتشيرالبيانات المأخوذة منالمجموعة من النقاطإلى عدمحاجةالارض الزراعية للماء يتمقفل البوابة. وهذا يوفر كمية مناسبة من الماء في الوقت المناسب. تم تطوير البرنامج باستخدام لغة micro C.

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LIST OF ABBREVIATIONS

AC	Alternating Current
ADC	Analog-to-Digital Converter
ADcon1	Analog-to-Digital Converter Pin
CPU	Central Processing Unit
DC	Direct Current
EEPROM	Electricity Erasable Programmable Read Only Memory
EPROM	Erasable Programmable Read Only Memory
I/O	Input/Output Components
LCD	Liquid Crystal Display
LED	Light-Emitting Diode
PC	Personal Computer
PCB	Piezotronic Sensor
PLC	Programmable Logic Control
RAM	Random Access Memory
RISC	Reduced instruction set computing
SRAM	Static Random Access Memory
USART	Universal Synchronous/Asynchronous Receiver Transmitter
VREF	Voltage Reference

List of Abbreviations

CHAPTER ONE

INTRODUCTION

1.1 Preface

Sonduos is one of the huge agricultural projects that aim to develop agriculture in Sudan. The main irrigation system utilized in the project depends on Canals. where water is lifted from the river by using pumps to a main canal and then distribute it to smaller sub canals through gates and then directed to the farms, this gates are controlled by traditional ways ,there's a worker who opens the gates at the irrigation time and close them manually which is ineffective way in such big project.

1.2 Problem Statement

The gates are controlled manually which lead to a lot of problems and lost affect the whole project, sometimes it even destroy the planted area when the canals are overfilled. The manual operator who opens the gates of irrigation is ineffective in such big project.

1.3 Proposed Solution

Altering the ineffective manual controlling system with a fully automatic system to control the irrigation gates.This proposed system includes electronic circuit based on microcontroller.

1.4 Research Aims and Objectives

The main object of this project is to overcome the problems caused by the manual controlling, so that it guarantee:

- vProposed of control system
- System simulation.
- Performance evaluation

1.5 Methodology

This research is an attempt to implement the proposed system, using microcontroller to provide the proper output control signal according to the signals of the sensors, to control opening and closing gates by motors.

The software program used to simulate this circuit is developed in microC for indicating the signals of the sensors so the controller provides the required output signal.

1.6 Research outlines

- **Chapter one** includes introduction, problem statement, proposed solution, research aims and objectives, methodology and research outlines.
- **Chapter two** includes background, automatic irrigation control, Automatic Gates Developments, Microcontrollers, water level sensors, Controlling Gates Movement, Field Study and related work.
- **Chapter three** includes system design.
- **Chapter four** simulation and circuit.
- **Chapter five** includes conclusion and recommendations.

