TABLE OF CONTENTS

1. INTRODUCTION

1.1 ABSTRACT

The project concerns an automatic door opening and closing system. An automatic door control system includes a sensor for sensing a person or object approaching the door. Systems and methods are very common in the art for opening and closing doors to enter and exit buildings, facilities etc. Automatic doors are commonly found in retail stores, supermarkets, and the like.

1.2 PRINCIPLE OF THE SYSTEM

The project generally relates to an automatic opening and closing of doors which will sense a person or object approaching the door and open automatically. This system is controlled by an Arduino microcontroller. The system includes DC motor which makes door to slides during opening or closing by rack and pinion gearing, a LCD to display information state of door, an audio buzzer to make sound through the duration of opened door and a controller for controlling the opening and closing of the door as a person or object detected by sensor.

1.3 FEATURES OF THE SYSTEM

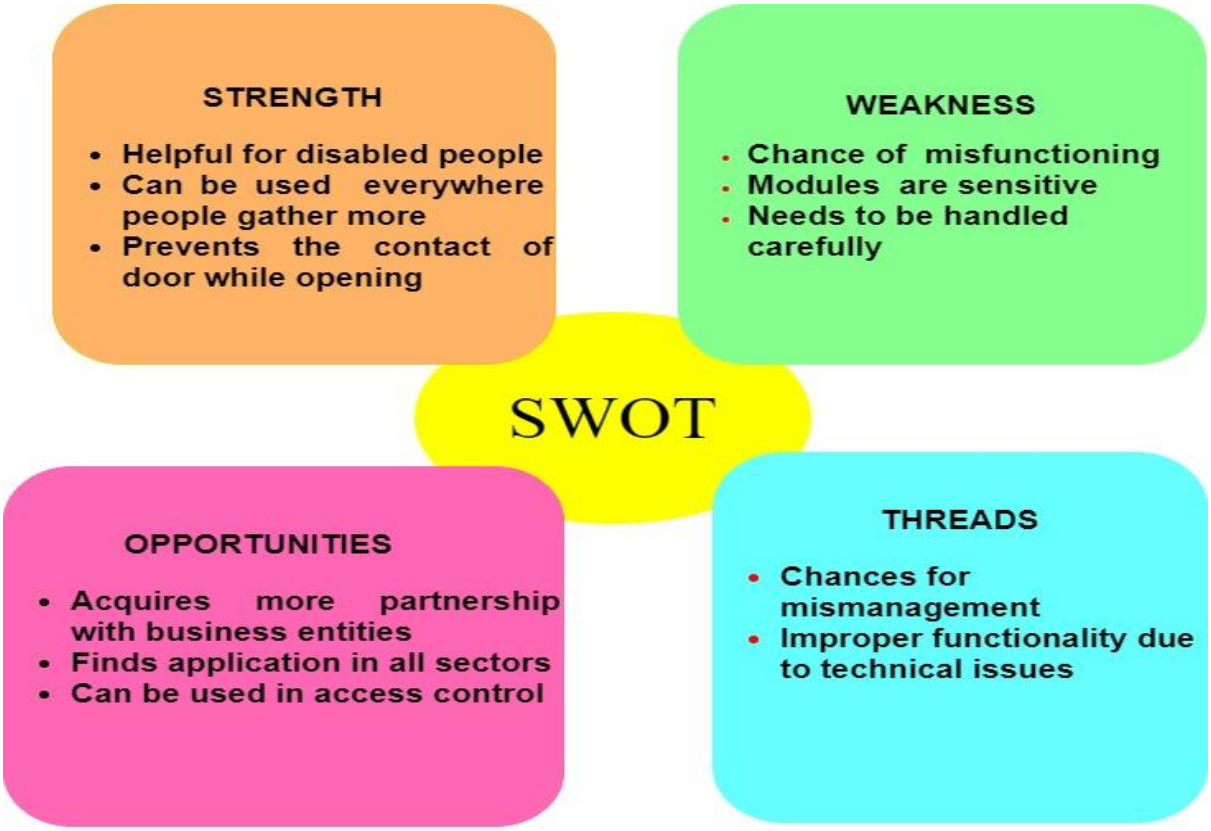
- Automatic opening of the door .
- Ability to detect the movement of people.

- Can be accessed everywhere.

1.4 ADVANTAGES OF THE SYSTEM

- Helpful for people in wheelchairs and disabled.
- Contactless operation of the door which prevents the spread of germs.
- Reduces manual power.

1.5 SWOT ANALYSIS



1.6 4W & 1H

WHAT - Automatic Door Opening System helps in contactless operation of the door.

WHERE - Can be implemented where entry of people is controlled.

WHEN - It can be used whenever required.

WHY - In order to control the entry of people.

HOW - By implementing the system wherever required.

2 REQUIREMENTS

2.1 HIGH LEVEL REQUIREMENTS

HLR ID	DESCRIPTION	CATEGORY	STATUS
HLR1	System shall detect the movement of people	Technical	Upheld
HLR2	System shall open the door automatically	Technical	Upheld
HLR3	System shall have user interface	Technical	Upheld
HLR4	System shall indicate the user about the entry	Technical	Upheld

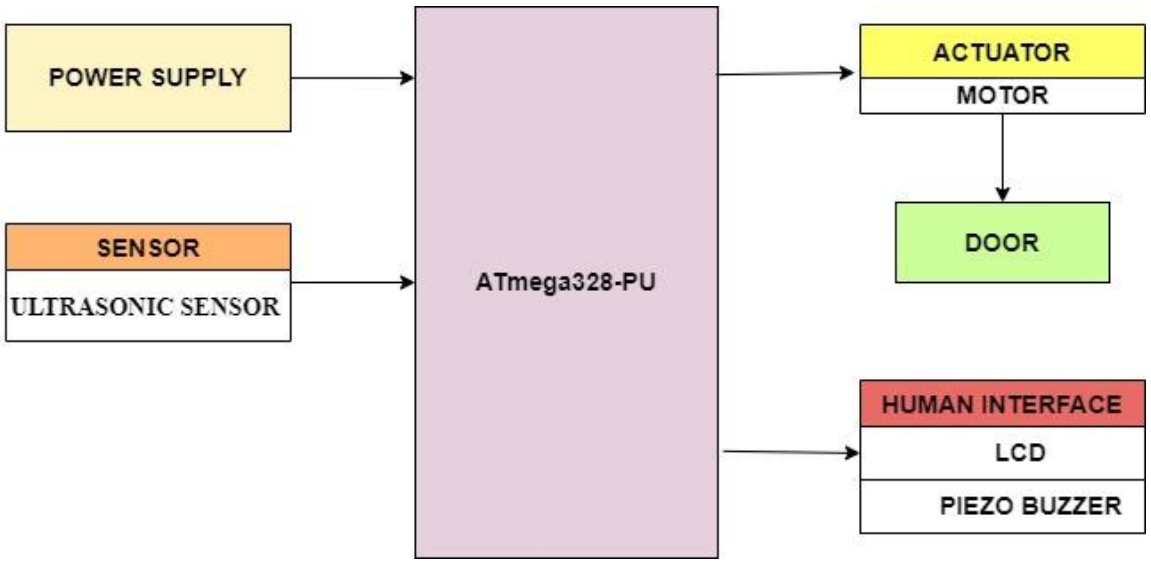
2.2 LOW LEVEL REQUIREMENTS

LLR ID	HLR ID	DESCRIPTION	CATEGORY	STATUS
LLR1	**HLR1**	**System shall have a sensor to detect the people**	**Technical**	**Upheld**
LLR2	**HLR2**	**System shall have a motor to open the door**	**Technical**	**Upheld**
LLR3	**HLR3**	**System shall have a**	**Technical**	**Upheld**

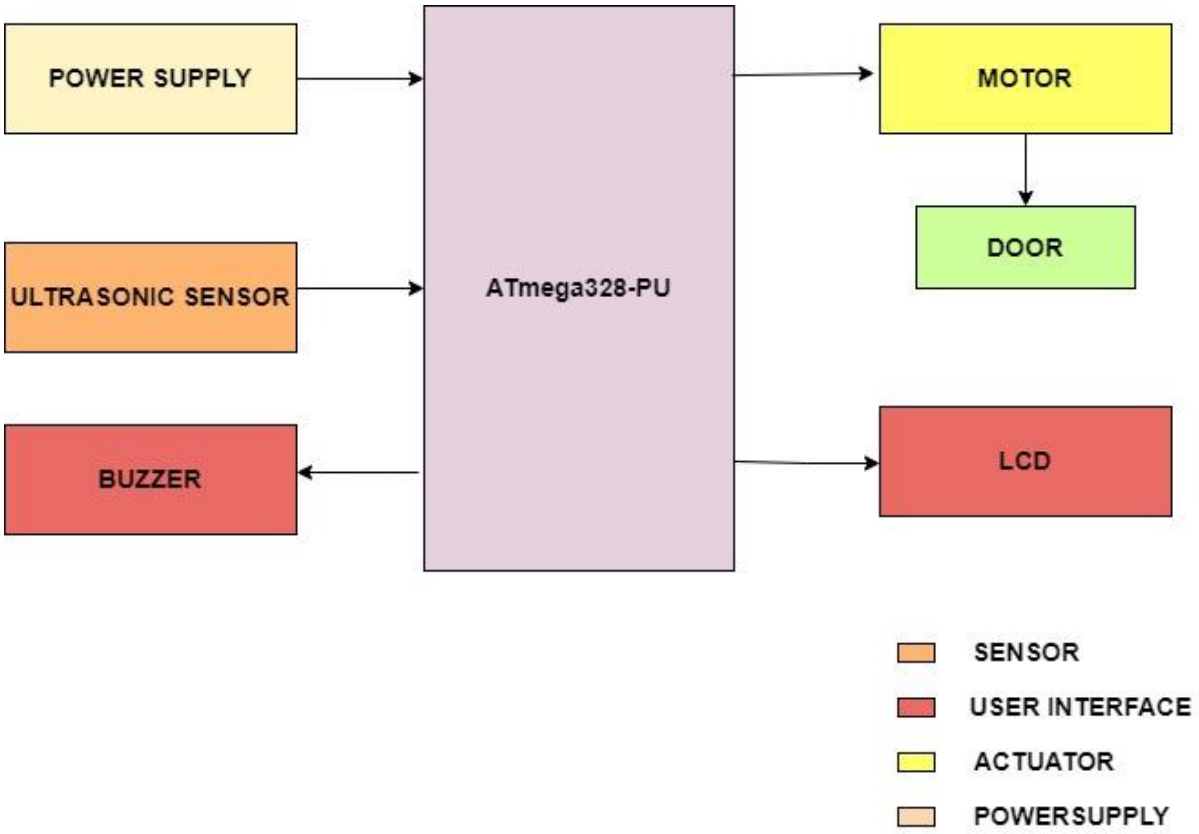
		LCD to communicate with user		
LLR4	**HLR4**	**System shall have a buzzer to indicate the users**	**Technical**	**Upheld**

3 ARCHITECTURE

3.1 SEQUENTIAL DIAGRAM



3.2 BLOCK DIAGRAM



3.3 COMPONENTS REQUIRED

- ATmega328-PU
- HRSC04 Ultrasonic sensor
- DC Motor
- LCD 16 X 2
- Piezo Buzzer
- Power Supply

1. ATmega328-PU

- The ATmega328 is a single-chip microcontroller created by Atmel in the megaAVR family It has a modified Harvard architecture 8-bit RISC processor core.

2.HRSC04 Ultrasonic sensor

- HRSC04 Ultrasonic sensor is used as a proximity sensor to detect a person or object arrived at door
- Ultrasonic ranging module HC - SR04 provides 2cm-400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules include ultrasonic transmitters, receiver and control circuit.

3.DC Motor

- The DC motor is the actuator used to open the door when the movement of people is detected.
- Here DC motor of specification

  Load current: 70mA (250mA MAX) (3V pm)

  Operating voltage: 3V ~ 12V DCTorque: 1.9 Kgf.cm

  Speed without load: 170 RMP (3V) is used.

4. LCD DISPLAY

- LCD display is the **Human Interface** of this system. Here a 16 x 2 LCD display is used. Liquid crystal display is used for displaying the messages.

5. Piezo Buzzer

- Piezo buzzer is a type of electronic device that's used to produce a tone, alarm or sound.
- Here piezo buzzer is a **human interface** used to alert the user.

3.4 APPLICATIONS

- Immense helpful for disabled people
- Can be implemented in hospitals to reduce the contamination since people do not need to handle doors manually.
- Can be implemented in warehouse to make people easier for people to go around.

3.5 FUTURESCOPE

- Upgrading the system using higher-bi microprocessor for speed operation
- Face-detection through cameras can be implemented for automatic attendance systems.