iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** VI **Month of publication:** June 2019

DOI: http://doi.org/10.22214/ijraset.2019.6101

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
Volume 7 Issue VI, June 2019- Available at www.ijraset.com

Smart Iron Box to Prevent Fabric Damage

Alvin Subash[1], Anjali Jose[2], Archana Joy[3], Sona MS[4]
[1, 2, 3, 4]*Sahrdaya College Of Engineering And Technology*

Abstact: ***It is a frequent problem that our clothes get burnt while ironing. This mainly happens when the iron box is left idle when attending any phone calls or engaging in any other activities. Ironing works by loosening the bond between long chain polymer molecules in the fibers of the material. SMART IRON BOX PREVENTING FABRIC DAMAGE is a design that uses an innovative framework and motorized mechanisms to effectively iron various clothes by minimizing the difficulties in the task of ironing. This is a safety device which is very useful in every household. It will be a cheap, fold-able machine which is able to iron any cloth within a time frame. It uses ultrasonic sensor that senses the distance of the iron box from the cloth. As the iron box is left idle, the distance from the cloth becomes constant. Using this ideology, sensor senses the distance, for a particular time. As the distance continues to be constant further led blinks and buzzer sets on. Beyond this as the iron box still becomes idle, the power gets cut off. Thus, we can prevent our cloths from getting burned off.***
Keywords: Arduino Nano, Smart iron box Ultrasonic sensor, Relay Module, Fabric damage

I. INTRODUCTION

Iron box is an electronic device used to remove wrinkles on the clothes. It is a roughly triangular surfaced device, heated electrically and pressed against the cloth to remove creases. It is named for the metal of which the device was historically made commonly, and the use of it is generally called ironing. This process of Ironing happens due to the loosening the ties between the long chains of molecules that exist in polymer fiber materials. Due to the heat and the weight of the ironing plate, the fibers get stretched and when it cools, the fabric maintains its new shape. Some materials require the use of water to loosen the intermolecular bonds, like cotton.

Current from the power supply is drawn by the iron box. This current heat up the coil inside it. Further, this heat is transferred to the base plate of this device, which is pressed against the cloth to remove creases. Sole plates are the bottom piece of the box. To regulate the temperature, thermostat is present. A knob is also provided which can be rotated to indicate the material type.

In this busy world, people find no time to concentrate on their daily activities. As a result, many accidents occur. Accidents also happens while ironing. While placing the iron box on the cloth for a prolonged time, the cloth often gets damaged. The temperature sensitivity is different for various cloth material types. The main reason carelessness leads to the burning or melting of the fabric. Additionally, waste of energy, money, time also accompanies it.

The solution to the problem is designed by modifying the existing iron box by adding the features of automatic cut off and alarming system to warn the user. We modify the already existing iron box by incorporating ultrasonic sensors, Arduino Nano, relays, buzzer and led. Arduino Nano is placed inside the plastic handle over the iron cover which is connected to the ultrasonic sensor that protrudes from the plastic handle. Ultrasonic sensor is placed such that the sensing part is facing the cloth to be ironed. A buzzer and led are placed on either side of the knob. A relay is connected to the main supply. By this way, we can protect our clothes from damage to a great extent.



©IJRASET: All Rights are Reserved

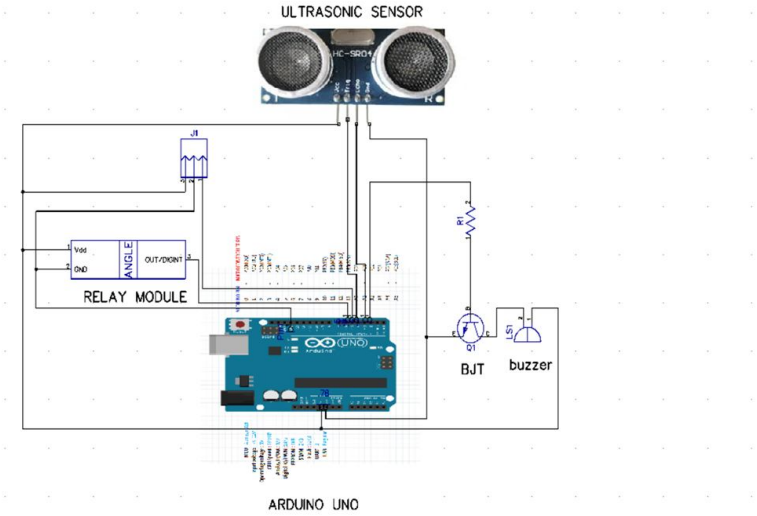
International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
Volume 7 Issue VI, June 2019- Available at www.ijraset.com

II. SYSTEM DESIGN

A. Working Of The Solution

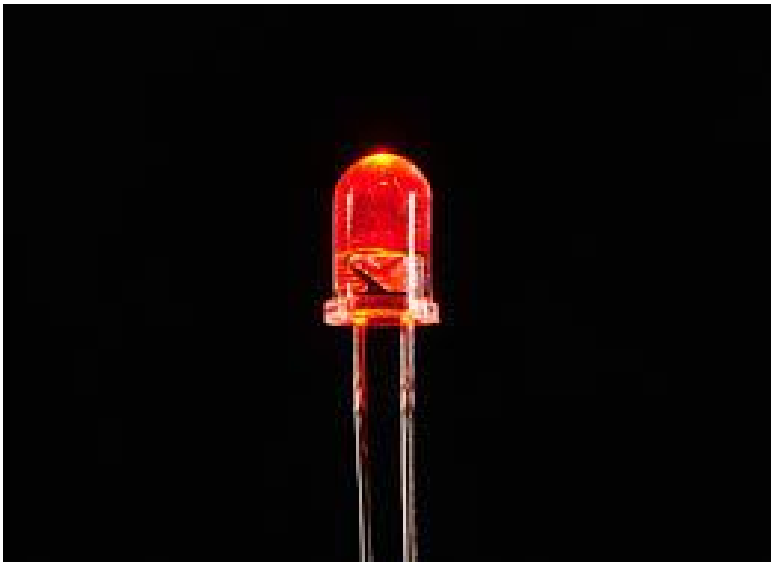
Arduino Uno is placed inside the plastic handle over the iron cover. This acts as the control center for all operations of the system. Arduino is connected to the ultrasound sensor which act as the input to the Arduino. It protrudes from the plastic handle and the height is measured constantly in each second. Ultrasonic sensor is placed such that the sensing part is facing the cloth to be ironed. When the distance or height remains constant for a period of time which is calculated by finding the lowest ignition temperature of the lightest material to be ironed at the highest temperature. If the distance remains constant for this period of time, the buzzer and led is made on and the relay cuts off the power supply making the iron box off and the temperature on the cloth is reduced leading to no fabric damage. A buzzer and led are placed on either side of the knob.

B. Circuit Diagram



C. Hardware Used

1) Led



It is used to signal the customers to change the position of the iron box to prevent fabric damage.
It has two terminals negative and positive.

2) *Buzzer:* A buzzer is an audio signaling device. It can be of different types, mechanical, electromechanical, or piezoelectric. They are used in alarm clocks, timers, indicators etc.

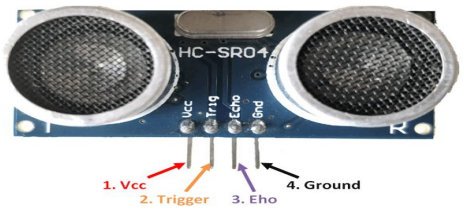
©IJRASET: All Rights are Reserved

3) Arduino Uno



Arduino Uno is a small, flexible, compactible and microcontroller board. It was developed by arduino.cc in Italy. This is based on ATmega328p (Arduino Nano V3.x)/Atmega168 (Arduino Nano V3.x). The digital pins present on the Uno can be used as an input or output, pin Mode(), digital Write() and digital Read() functions. This operates at 5 volts. Each pin provides or receives a maximum current of 40mA and has an internal pull-up resistor of 20-50kOhms, which is disconnected by default.

4) HC-SR04 Ultrasonic Sensor



HC-SR04 ultrasonic sensor is a module having 4 pins, they are Vcc, Trigger, Echo and Ground. This sensor is widely used for many applications. Commonly used for distance measuring and sensing the object. This module has 2 projections in the front known as ultrasonic transmitter and receiver. The transmitter transmits an ultrasonic wave which is then reflected by the object that is present in the direction of wave propagation. The distance is calculated by the formulae, distance=speed * time. The universal speed of ultrasonic wave is 330m/s, the time taken by the ultrasonic wave to come back is calculated. During this time the echo pin turns high. Now this distance is calculated using microcontroller or microprocessor.

5) Digital Relay



Digital relays are used for detection of electrical faults in industrial power transmission and power distribution system. They are protective computer-based systems that use software algorithms. It provides metering, communication and self-test function.

III. RESULT

The study conducted about the problem revealed the necessity of a modification of the iron box that we use today. The modification proposed serves for solving the problems while ironing. By using simple electronic components and integrating them caters the changes needed in the iron box. This smart iron box the prevent fabric damages are designed using Arduino UNO, ultra sensor, relay, buzzer, led. It is low cost and sustainable. The idle condition of the iron box is detected by using ultra sensor. Future improvements include iron box that detecting different cloth material and their heating temperature. It will avoid damaging of clothes due to carelessness. In today's world, the need of electricity is increasing at an alarming rate, which makes the idea of energy conservation. Thus, wasting of energy should be minimized to a possible extend. Obviously, iron box is one among the major power consuming equipment in our home. Our prototype can be improved by several ideas by reducing the size of the product by using Arduino Nano which is smaller than Arduino Uno. Here we had done based on the excessive heat and particular time was set. Instead, we can have additional function like detecting ignition temperatures based on materials of different clothes.

©IJRASET: All Rights are Reserved

IV. CONCLUSION

The study focused on the usage of iron box and the damages and difficulties that we face while using the current methods of ironing. The study revealed that the fabric damage caused due to less scientific methods and care leads to damage of fabric. Due to the careless usage of iron box by human there are situations where the fabric is damaged due to the excessive heating. While ironing, people carelessly keep the hot iron box over the cloth and leave it which will lead to damaging of the cloths. The solution to the problem is designed by modifying the existing iron box which is added with features of automatic cut off and alarming system to warn the user. We modify the already existing iron box by incorporating ultrasonic sensors, Arduino Nano, relays, buzzer and led. In today's world, the need of electricity is increasing at an alarming rate, which makes the idea of energy conservation. Thus, wasting of energy should be minimized to a possible extend. Obviously, iron box is one among the major power consuming equipment in our home. Our prototype can be improved by several ideas by reducing the size of the product by using Arduino Nano which is smaller than Arduino Uno. Here we had done based on the excessive heat and particular time was set. Instead, we can have additional function like detecting ignition temperatures based on materials of different clothes.

V. LITERATURE REVIEW

This chapter reviews are the various attempts made by researchers and various agencies and finally narrate the conclusions reveals from the literature review.

Automatic standby electric clothes iron [1]: An improved electric clothes iron comprises a water tank, chassis, handle, electrically heated soleplate, and steam chamber. The improvement includes heel and toe lifting pistons which are embedded in the soleplate and driven by an electric motor. A grip sensor in the handle triggers the lift piston motor to operate when the user is no longer gripping the handle. The lifting pistons are quickly retracted if the user grabs the handle again. The heated soleplate can be automatically turned off if the iron is left idle too long.

Automatic Ironing Machine [2]: Here two irons are used to increase the effectiveness and speed of ironing as well as reduce the overall time taken for one cloth (by ironing it from both sides i.e. up & down simultaneously). The cloth will be mounted on a stationary frame between the two irons. The movement of these irons is based upon chain & sprocket mechanism governed by ONLY two motors (X & Y direction each). For designer clothes and all other different varieties of clothes (thousands) that will not be ironed by AIM, a special feature has been given i.e. the upper iron can be completely detached off from the setup and can be used as our usual house-hold iron.

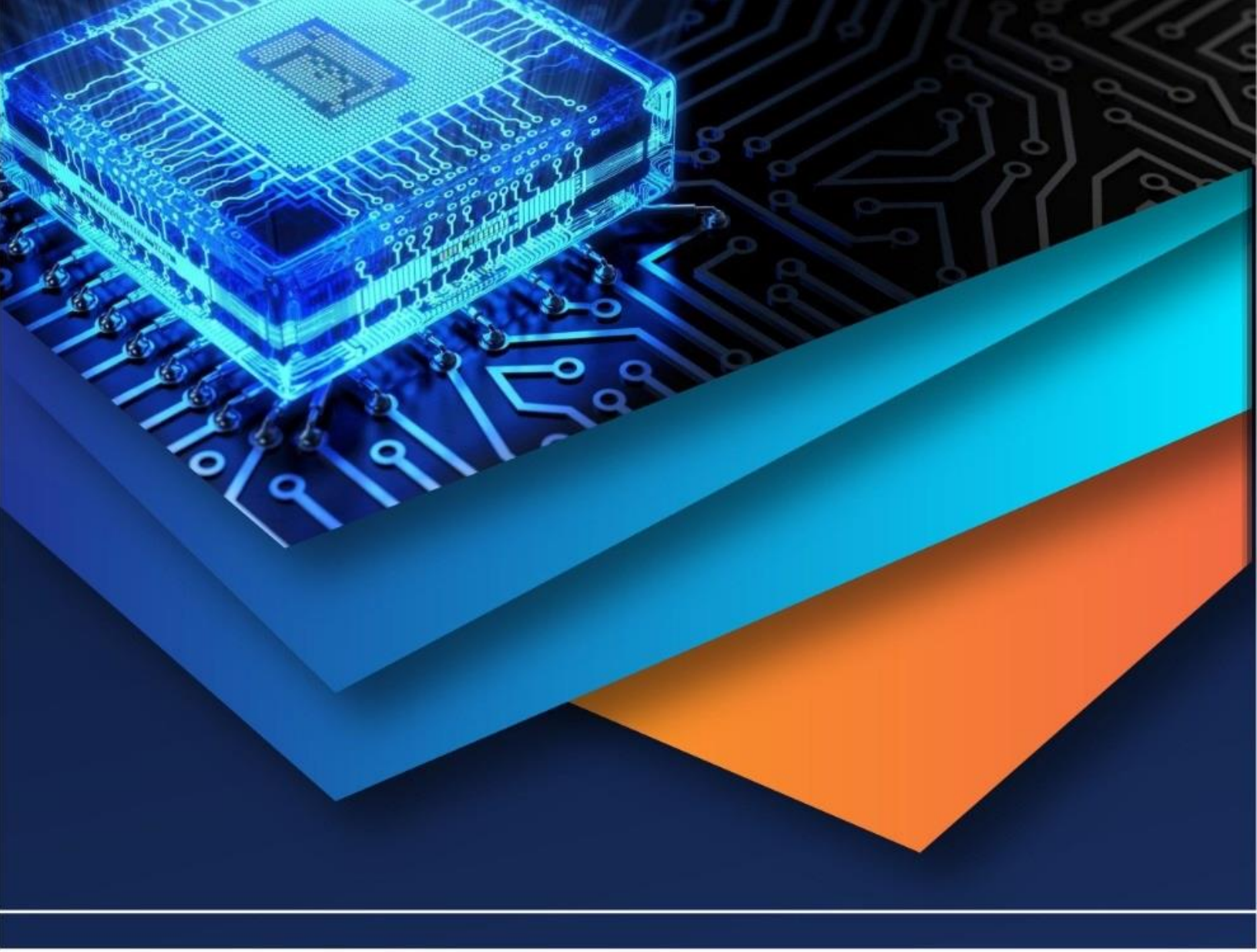
VI. ACKNOWLEDGMENT

We take immense pleasure in expressing our humble note of gratitude to our project guide Miss Chinchu Jose Assistant Professor Department of Electronics and Communication Engineering for her remarkable guidance in doing our project.

REFERENCE

[1] Biacs, G.A. ; Polytech. Eng. Coll., Subotica ; Adzic, M.S.: PLC control for a rotating ironing press Intelligent Systems and Informatics, 2008. SISY 2008.
[2] Ningu Lu ; Div. of Energy Sci. & Technol., Pacific Northern Lab., Richland, WA, USA ; Katipamula, s.: Control strategies of thermostatically controlled appliances in a competitive electricity market: Power Engineering Society General Meeting, 2005. IEEE
[3] Aranjo, B. ; Electron. & Electr. Eng., Heriot Watt Univ., Dubai, United Arab Emirates ; Soori, P.K. ; Talukder, P.: Stepper motor drives for robotic applications Power Engineering and Optimization Conference (PEDCO) Melaka, Malaysia, 2012 IEEE International
[4] Zhang Benhua ; Coll. Of Eng., Shenyang Agric. Univ., Shenyang, China ; Li Chenghua ; Sun Shiming ; Gan Lu: Design on a unipolar and unidirectional stepper motor circuit Electronic and Mechanical Engineering and Information Technology (EMEIT)

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)