Mega Multipurpose Shoe Dryer with Microcontroller

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Abstract — The "MEGA Microcontroller Multipurpose Shoe Dryer" is a study that employs UV light to eliminate microorganisms to make drying shoes easier after usage. For a range of shoe kinds, there is a temperature-setting system. The MEGA microcontroller-controlled multipurpose shoe dryer is therefore run using the Arduino programming language. With an average of 4.7 and a ranking of 2, the efficiency is at a very high level, and the software system's stability is excellent. With an average score of 4.8 and a third-place ranking, the hardware stability is acceptable. At a pace four times faster than displaying results, there is an average of 3.7. With a 4.2 average and fifth rank, the equipment is in good condition. The machinery is in fair shape. The Mega microcontroller-controlled multipurpose shoe incubator's effectiveness scored an average of 3.8 out of 5. Contrarily, the MEGA microcontroller-controlled multifunctional shoe incubator was able to dry the shoe in only 10-15 minutes while also eradicating bacteria by employing UV light to remove moisture from the shoe. It is quicker and produces more benefits when compared to traditional sun exposure techniques.

Keywords-MEGA Microcontroller, Multipurpose Shoe Dryer

I. BACKGROUND AND IMPORTANCE OF THE PROBLEM:

A technology known as the Internet of Things, or IoT, is used to connect gadgets on online networks like Wi-Fi, Bluetooth, or other networks. Anything that can connect to the Internet will be the connected device. If every piece of technology—whether it's an airplane, a car, a cell phone, electrical appliances, etc.—is connected by the Internet, it will improve human existence because all technologies can talk to one another. users' comfort and quickness. IoT technologies can be helpful in maximizing how much energy is conserved by buildings in terms of energy usage. Using mobile phones to turn on and off electrical appliances in a building is only one example of how IoT technology makes it possible to control and manage the operating systems of connected devices. It is predicted that if we leave the building without turning off the electrical appliances, the country's energy consumption will drop by up to 20%, improving the country's energy security [1]. Putting your shoes in the sun by using the heat from the sun It is a common method of drying shoes that can be disinfected to a certain extent. The average of solar radiation intensity during the experiment was at 707 W/m2 An ambient temperature, concrete floor, surface collector tubes was increase with solar radiation. The maximum temperature of surface collector tubes was at 200 °C. As a result, the drying chamber with the solar parabolic trough concentrator had an average temperature of 50 °C, which was higher than the average temperature of the drying chamber without the parabolic trough, which was 40 °C [2]. However, if there isn't any sunshine that day, shoes won't dry or might dry type of shoe can be made from a variety of materials, including rubber, cloth, leather, and others. Type Another aspect of keeping things clean is cleaning

to disinfect. since there are still numerous issues with shoe odor that need to be resolved. shoes caused by moisture after usage and the difficulty of washing some types of shoes, resulting in the shoes wearing out or wearing out more quickly than they should So, using the idea of determining the moisture level of shoes, a multi-functional shoe dryer controlled by a microcontroller MEGA was created. Using the use of heat and UV light in an oven to effectively eliminate shoe odor at the proper temperature. Additionally, baking does not harm the shoe's rubber, cloth, or leather.

II. RESEARCH OBJECTIVES

1) An all-purpose shoe dryer for any style of shoe can be made with a Mega microcontroller.
2)To evaluate the functionality of a very sophisticated microprocessor-powered multi-purpose shoe dryer.

III. RESEARCH METHODOLOGY

based on the theory that has been researched As a result, a variety of theories have been used to develop this project's hardware and software, which make up its two primary parts. This chapter will cover the functions, components, and specifics of the software.

For the purpose of creating a project, research and data gathering are required. This includes learning about Arduino MEGA, the programming language, and various software tools. Project information Arduino boards are capable of being connected to various motors, sensors, and other devices in order to analyze the operation of the Arduino MEGA. Programming can be used to create new applications that can drive mobile robots, construct interactive displays, and create other things. The Arduino board employs an easy-to-learn programming language. One may envision a lot of things. [3] Design and implement the control. The temperature inside the cabinet is used to assess the effectiveness of various components, weigh benefits and drawbacks, make changes for greater advantages, and come to decisions.

Design: The practical layout of a MEGA microcontroller-driven multipurpose shoe dryer system.

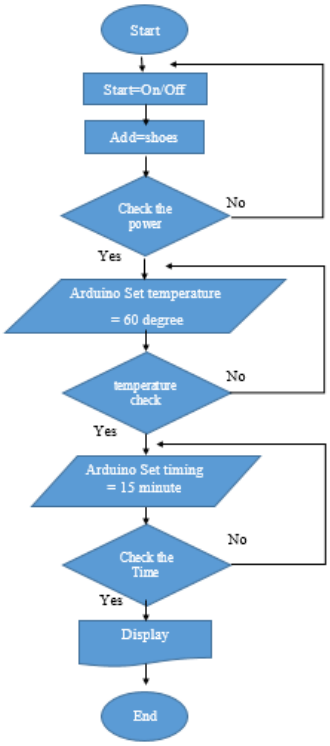


Figure 1: Schematic of the functional design of the system

Working in this capacity is Lighting up the room and placing the shoes inside the incubator are the first steps. to determine if the device is operational. Return and verify that the power is on if the machine is not operating. Set the thermostat to 6 2 degrees, though, if it's working. Setting the baking timer for 1 5 minutes is the next step, after which you should go check to see if the time was accurately set. Reset and go back if necessary. Display results as requested if set.

IV. RESEARCH RESULTS

The following are the outcomes of controlling, monitoring, and analyzing the performance of the shoe drying system under test conditions utilizing 220 volt electricity:

In a multipurpose shoe incubator run by a Mega microcontroller, shoe drying was tested. Semi-leather, sneakers, and leather shoes were the three types of shoes that were put to the test. having a variety of equipment As illustrated in Table 1, the temperature is set to profile with three different shoe kinds.

Table 1. Shoe classification table.

shoe type	temperature	time
canvas shoes	60°	15 minute
semi-leather shoes	55°	13 minute
leather shoes	50°	10 minute

The temperature can be configured such that it is shown in real time on the monitor. These two topics make up its division:

• Set Temp is the temperature that was predetermined.

• The incubator's internal temperature is represented by Ac Temp.

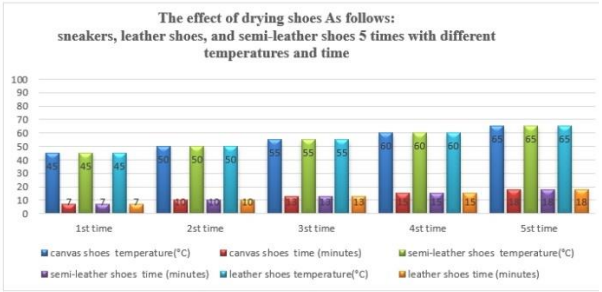
As shown in Table 2, three different types of shoe drying experiments were conducted on sneakers, leather shoes, and semi-leather shoes in five separate trials at various temperatures and times. The Test for Shoe Drying.

Table 2. The Shoe Drying Test (1-3)

Drying Test	1st time			2nd time			3rd time		
shoe type	temperature	time	result	temperature	time	result	temperature	time	result
canvas shoes	45•	7 minute	not dry	50•	10 minute	not dry	55•	13 minute	not dry
semi-leather shoes	45•	7 minute	not dry	50•	10 minute	not dry	55•	13 minute	dry
leather shoes	45•	7 minute	not dry	50•	10 minute	dry	55•	13 minute	dry

Table 3. The Shoe Drying Test (4-5)

Drying Test	4th time			5th time		
shoe type	temperature	time	result	temperature	time	result
canvas shoes	60•	15 minute	dry	65•	18 minute	dry
semi-leather shoes	60•	15 minute	dry	65•	18 minute	dry
leather shoes	60•	15 minute	dry	65•	18 minute	dry



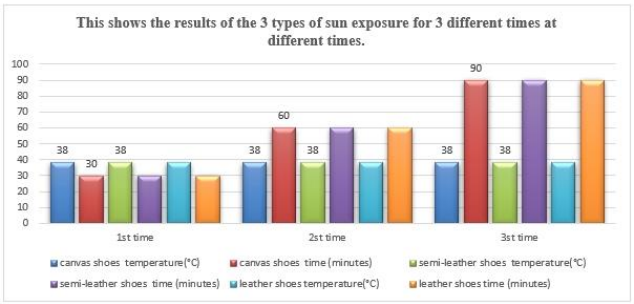
Then contrast every outcome of the experiment. I put all three of the different shoe styles outside to dry in the sun three different times.

Table 4: Timetable for 1-2 hours of sun exposure

sun exposure examination	1st time			2nd time		
shoe type	temperature	time	result	temperature	time	result
canvas shoes	37.5• - 39•	30 minute	not dry	37.5• - 39•	60 minute	not dry
semi-leather shoes	37.5• - 39•	30 minute	not dry	37.5• - 39•	60 minute	dry
leather shoes	37.5• - 39•	30 minute	dry	37.5• - 39•	60 minute	dry

Table 5: The third sun exposure table

sun exposure examination	3rd time		
shoe type	temperature	time	result
canvas shoes	37.5• - 39•	90 minute	dry
semi-leather shoes	37.5• - 39•	90 minute	dry
leather shoes	37.5• - 39•	90 minute	dry



The results of this research showed that using sunshine requires more time than using an incubator because of the unstable temperature swings that occur in sunlight. When drying any of the three types of shoes in the sun, the outcomes vary with time. Sneakers were discovered to dry more slowly than leather and semi-leather shoes. and the outcomes of testing the performance of the UV-light-powered shoe incubator over the course of 10 cycles with three different types of shoes. Sneakers average 80%, semi-leather shoes average 90%, and leather shoes average 100%, with 90% being the general average and confidence level.

Table 6. User test results table

The test	canvas shoes		semi-leather shoes		leather shoes		percentage
	dry	Not dry	dry	Not dry	dry	Not dry	
1	✓		✓		✓		100
2	✓		✓		✓		100
3	✓		✓		✓		100
4	✓		✓		✓		100
5		✓	✓		✓		66.66
6	✓		✓		✓		100
7	✓		✓		✓		100
8	✓			✓	✓		66.66
9		✓	✓		✓		66.66
10	✓		✓		✓		100
Total	8	2	10	0	9	1	-
average	80%		100%		90%		90

Based on a participant survey covering the following topics, the findings of the demonstration of the performance of the MEGA microcontroller-controlled multipurpose shoe incubator system were:

Table 7. Machine performance table.

No	device performance	$\bar{x}$	S.D.	result
1	ease of use	4.7	0.483	very good
2	software stability	4.8	0.422	very good
3	hardware stability	3.7	0.823	Fair
4	speed of displaying results	4.2	0.632	good
5	the shape of the device	3.8	0.789	Fair
average		4.2	0.630	good

V. SUMMARY OF EXPERIMENTAL RESULTS

The findings of an experiment utilizing a multipurpose shoe incubator controlled by a MEGA microcontroller to test the effectiveness of a time-controlled temperature-control circuit and to assess user satisfaction led the researcher to build the device, which consists of two parts. As a result of its full construction, it may be used to test theories and gather data from experiments to fill in any gaps in previous research. and repair hardware and software devices so that you can use them properly. The research's conclusions are summarized as follows:

1) A multipurpose shoe dryer that is operated by a Mega microcontroller has been created, and it is currently in use. The equipment's flaws as well as the functional control circuit have been tested and modified by the researcher. Due to this, the MEGA microcontroller-controlled multipurpose shoe dryer satisfies customer demands. This was written by Thanaphon Supattanakitkul in response to his article on the Arduino Freezer Temperature Controller. The FTC system can keep the temperature at the desired level, according to actual experimental results. As compared to a thermostat-controlled control device, the temperature had a standard variation of 0.54. Although the temperature had a standard deviation of 3.33, it did not meet the standards.[8]

2) The experiment's findings demonstrated that a microcontroller-driven, multipurpose shoe incubator The Mega can regulate three different temperature and time settings at 50°, 55°, and 60°, as well as time intervals of 10, 13, and 15 minutes and temperatures of up to 70° for 20 minutes (the temperature is not used to dry shoes). It was in line with the ideas put forth by Teerasart Kanasri Santi Narakulnan and colleagues regarding the prototype temperature-controlled chicken coop. It was discovered that the Arduino board could regulate the temperature [4] and that this was in accordance with Worawat Phaha et al. with relation to the temperature control mechanism inside the incubator for dried bananasby combining solar power with liquefied petroleum gas It was discovered that by combining solar heat energy with liquefied petroleum gas, the temperature beneath the incubator could be adjusted between 50 and 70 degrees Celsius. [5] Saowalak, too. On the development of an automatic controlled smoked dryer using solar energy, Yodwinyuwong, Atsadang Boonsri, Rattaphong Pleakhot, and Abhisit Napee discovered that coconut husk fuel provided maximum heat up to 78.7 degrees Celsius, humidity of 33.3%, baking time of 2 hours and 30 minutes, and used 3 kilograms of coconut husks. [6] and Design and development of smoke pots for rice baskets by Bancha Tai Sri Kot, Songkot, Sriprasarn, and Dr. Triphop Chinboon If using the smoke furnace, it will take between 35 and 60 minutes. designed to take 19–20 minutes for the same number of 10 balls, and it can aid in fumigation baking control. Kratib rice is delicious. [7]

3) The findings of the performance assessment of the versatile shoe incubation The experimenters discovered that the total evaluation, with mean values of 4.2 and S.D. $\bar{x}$ = 0.630, was at a very excellent level.

Limitation: Use restrictions When attempting to change the baking temperature, a selection error took place. or select an incorrect button. The default condition can be restored. The system can be reset to its default settings by pushing the buttons of these three colors simultaneously (you should press Reset no more than 1 minute after pressing the wrong button).

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