

T-Shirt Folding Machine By Using DC Motor

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ABSTRACT— T-shirt folding process is an easy and useful process in this world of tortoise and rabbit race. The purpose of this project is to fold t-shirt by just pressing a button. This folding machine is fully automatic where one has to just place the t-shirt on the board and press the start switch and within fraction of seconds the t-shirt will get folded.

Many problems are generally faced by the working women's who have to manage the household chores. This idea will definitely be a helpful hand to the working women's. This energy and time can be saved by this automatic t-shirt folding machine and can be used in some other work. Washing machine and clothes dryer is a common concept so people do not pay attention on this thing. Generally, people get bored for folding the clothes after washing so they dump them as it is in the cupboard. This leads to mess in cupboard and makes difficult in finding clothes in emergency case. To overcome above stated issue we have prepared a cost effective machine that will detect the t-shirt and fold. This machine will require less human involvement.

Keywords—T-shirt Folding, Automatic, Time Consume, Laundry, Hostel.

I. INTRODUCTION

Easy T-Shirt Folding Machine is an automatic motor controlled t-shirt folding machine powered by a photovoltaic system. The aim of this project is to fold t-shirts merely by pressing a button. The folding machine is fully automatic where one has to place the t-shirt on the folding tray and press the button. It will then fold the t-shirt by itself. Usually, a person uses conventional method to fold the clothes which by hand folding.

People nowadays have been living with tight schedule in their daily life. Household chorus despite gender discrepancy has been a burden for many. This work is a burden for many and sometimes tiring depending on the amount of clothing and number of people in a house.

Clothes such as shirts, pants and undergarments are the usual and if multiplied by the number of person in a family, will consume a lot of time and energy. This is a predicament for an average person that needs to be resolved. The process flow of a laundry usually is washing, drying and folding thus an idea of a machine that can fold clothes are presented in here, among many categories of clothing, the T-shirt is chosen as a test focus and the project is conducted based on the T-shirt folding. The t-shirt folding machine will fold the t-shirt; The shirt is placed front to back. The red dotted lines are the parts where the machine will fold the t-shirt and lastly becoming the one near the right.

II. LITERATURE REVIEW

The textile industry in INDIA currently doesn't use the automation in cloth folding and sorting mechanism based on color of the cloth. It is very necessary to bring automation according to the literature survey only 89% of manufacturers uses any kind of automation in INDIA. The Indian textile and clothing industry currently accounts for about 16 percent of industrial production and about 4 percent of GDP. It employs close to 82 million people, 35 million and 47 million in the textile and allied sectors respectively. The total employment by 2015 will be close to 99 million people, 42 million and 57 million in the textile and allied sectors respectively.

There is very high demand to bring in automation in the cloth folding as well as in the sorting mechanism in the manufacturing industry and also in high maintained mechanically operated laundries. Currently in laundries mechanism used is only limited to cleaning and ironing of cloths and not on the distribution or sorting of the cloth in INDIA. But cloth folding mechanism majorly found in U.S and CHINA. The distribution and sorting of the cloths is a very time consuming effort and prone to error manually, the automation in this field will save time and error free distribution or sorting of cloth can be achieved.

A. Traditional Method:

The traditional method of T-Shirt folding machine is very easy. It is an old method carried out by our ancestors.



Fig.1.Traditional Method

B. T-Shirt Folding Board:

The folding board is ideal ironing companion and allows you to get the neat finish on all your shirts, t-shirts.



Fig.2.T-Shirt Folding Board

Enable maximum control when presenting your laundry and is used to fold pre-ironed item. It neatly folds' cloths and is easy to us and store. This board require minimum maintenance.

C. Foldi Mate:

Foldimate was found by Gal Rozov, an Israel software engineer who decided that folding laundry was a tedious chore that could be done by a robot. In 2010 he quit the job and spend 2 years developing his laundry folding device. And finally in 2016 the Foldimate was found. FoldiMate Folding Machine is a robotic clothes folding machine which can easily handle most of types of

clothes including pants, shirts and towels with its easy clipping function. Moreover. [10]



Fig.3.Foldi Mate

III. OBJECTIVE AND PROBLEM DEFINATION

The aim of this project is to fold t-shirts merely by pressing a button. The folding machine is fully automatic where one has to place the t-shirt on the folding tray and press the button. Main purpose is to overcome the cost and other problems that are face from traditional method and current methods. To reduce the manual efforts of T-Shirt folding process on large scales like garment shops, hotels, hospitals and laundry it is proposed to develop a system which will assist the folding of T-shirt

Some Time it Can Be Time Consuming, When Lots of T-Shirt We Have.

IV. MECHANICAL ASSEMBLY

Process of this easy t-shirt folding machine will start once the push button is pressed.

When the push button is pressed, motor B will rotate anti clock wise. Once it reached the time set in the program, it will stop. Then motor B will return to the original position by rotating clockwise. The sequence of the motor will be same for motor A, C and motor D.

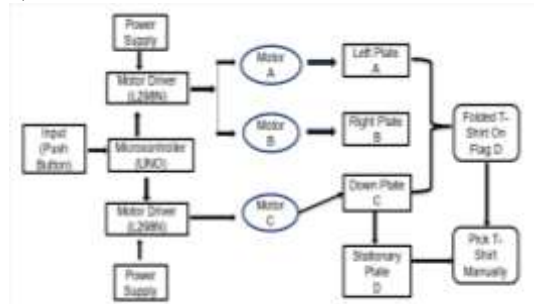


Fig.4.Block Diagram

The folding motion of this machine is controlled by the motor which is attached with the folding material listed as Motor A, B, C and D as shown in fig. Motor B is the first motor to rotate where it will make the B flag of the polystyrene to

rotate to the left. Then follows by motor A will lift up and make flag A to rotate from left to right. Then followed by motor C from bottom to top to finish up the folding mechanism and finally motor D will move from top to bottom to slide the folded t-shirt on a tray that will stacked the folded t-shirt. This motion continues until the shirts are completely ready with fold.

V. FLOW CHART

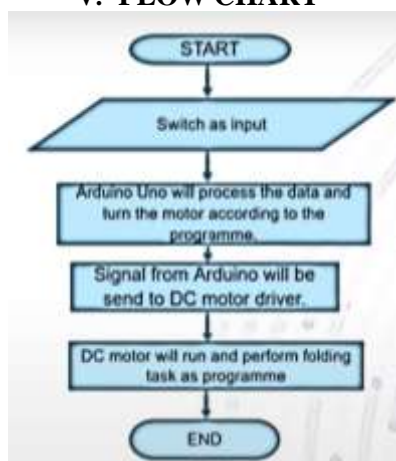


Fig.6.Flow chart

VI. TOOLS & COMPONENTS

Table No.1.

Battery (12V) / Adaptor	1 No(s)
Push Switch	1- Nos.
DC Geared Motors(30 rpm)	3- Nos.
Iron Rod	3- Nos
Arduino	1- Nos
Foam Sheet	72*58cm
Motor Driver (L298N)	2- Nos

VII. IMAGES OF PROJECTS



Fig.7

It is the base, on it we mark the position and place our components on it. Light in weight, easy to handle, easy to cut and use nut and bolt for fixing the components.



Fig.8

Fig.9

In the above image, clamp place on the wooden block and fix it to acrylic sheet with the screw. Then place foam sheet to remaining side of clamp and fixed it with bolt and nut.

Both side of corner we place the wooden block for the support of foam sheet. Fixed the rod to the motor with the help of flex quick. When motor rotate, rod also rotate in clock and anti-clockwise direction, as per the direction foam sheet move up & down.

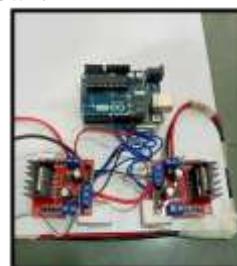


Fig.10

It's a circuit or wiring of Arduino with motor driver (L298N). We use 13 to 8 pins of Arduino, each two pins connected to input pins of the motor driver. Output end connect to DC motor.

30RPM Centre Shaft Economy Series DC Motor is high quality low cost DC geared motor. It has steel gears and pinions to ensure longer life and better wear and tear properties. The gears are fixed on hardened steel spindles polished to a mirror finish. The output shaft rotates in a plastic bushing. The whole assembly is covered with a plastic ring. Gearbox is sealed and lubricated with lithium grease and require no maintenance. The motor is screwed to the gear box from inside.



Fig.11.DC Motor & Clamp

Specification:

DC supply: 4 to 12V, RPM: 30 at 12V,
Motor Weight: 100gms, Total length: 46mm,
Motor diameter: 36mm, Motor length: 25mm,
Brush type: Precious metal, Gear head, diameter:
37mm, Gear head length: 21mm, Output, shaft:
Centered, Shaft diameter: 6mm, Shaft length:
22mm.

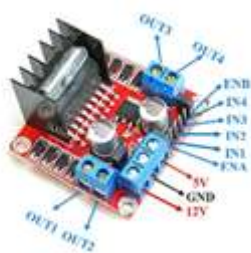


Fig.12.Motor Driver (L298N)

This L298N Motor Driver Module is a high power motor driver module for driving DC and Stepper Motors. This module consists of an L298 motor driver IC and a 78M05 5V regulator. L298N Module can control up to 4 DC motors, or 2 DC motors with directional and speed control [13].

L298 Module Features & Specifications:

Driver Model: L298N 2A, Driver Chip: Double H Bridge L298N, Motor Supply Voltage (Maximum): 46V, Motor, Supply Current (Maximum): 2A, Logic Voltage: 5V, Driver, Voltage: 5-35V, Driver Current:2A, Logical Current:0-36mA, Maximum Power (W): 25W, Current Sense for each motor, Heatsink for better performance, Power-On LED indicator.

VIII.SOFTWARE USE

We can use two software as follows: -Arduino – For Arduino Programming, Proteus 8 SPO – For Circuit Design.

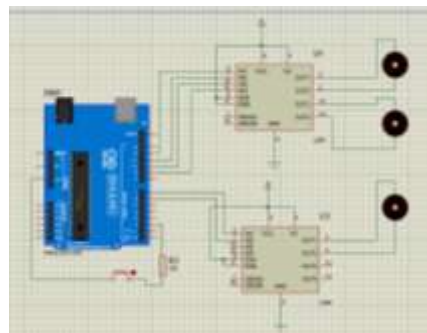


Fig.13.Circuit Diagram

IX. CONCLUSION

The conventional way of house hold chorus, in terms of folding T-shirts are now done faster and needs less attention or monitoring. This is because this machine is totally automatic and it is proved by a complete cycle of shirt folding by a push of a button. This machine can help users to lessen their burden and is highly handy for users with loads of shirts to fold. The time spent to fold the t-shirt also has been slash to half since the machine can do the folding in almost half of the time taken by the manual way. This project also comes handy to several industries such as the laundries services, hospitals, shirt manufacturers and so on that needs clothes to be folded in a much cheaper way compare to the CNC machine which is expensive and cost a lot.

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