

Automatic T-Shirt Folding Machine

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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 switch. This folding machine is fully automatic where one have 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.

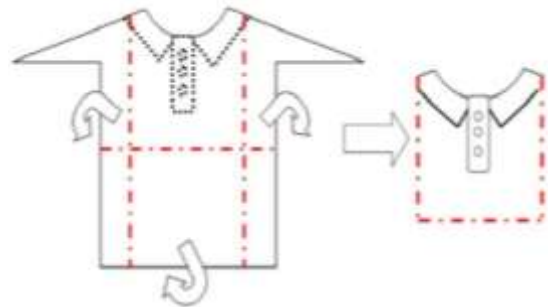


Fig 1: T-shirt folding process

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 things. 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.

Key Words: T-shirt, Automatic, Folding, Laundry

1. 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 [1].

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 are, 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 picture on the shows in figure 1. 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.

The operation of the machine requires little human involvement, which is significantly useful for people who are not willing to organize their clothes [2].

2. 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 [3].

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 [3].

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 2: T-shirt folding method



Fig 4: Foldimate Machine

b) Current Method:

Automatic Folding Machine FX23: Fx23 is an automatic folding platform that can easily fold lots of clothes in a short time. It is really easy to operate with just two buttons. One of its strong merits is that it can stack those folded clothes after. However, it is an industrial product not suited for a household environment.

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. 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.



Fig 3: T-Shirt Folding Board

FoldiMate: 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.

3. PROPOSED SYSTEM

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 [1].

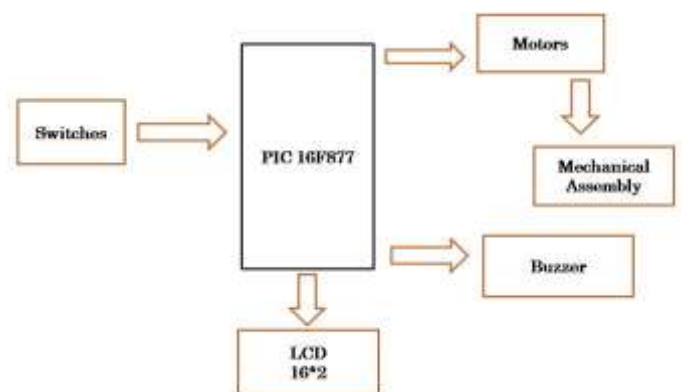


Fig 5: Block diagram of t-shirt folding machine

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 anticlock 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.

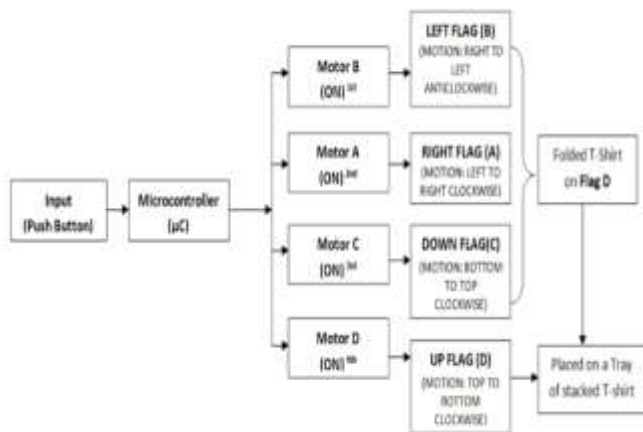


Fig 6: Mechanical assembly

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 Figure 9. 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 [1].

Parameters to Analysis:

[1] Time

When human manually fold a shirt, it will take roughly 8 second to complete one t-shirt but with using this easy t-shirt folding machine that time is reduced to just 2 seconds.

[2] Size

When a human folds a t-shirt size of every fold varies with the t-shirt size. But when a machine folds a t-shirt every fold will be of same size and every folded t-shirt will be of same size and pattern.

SCOPE OF WORK:

The system should be programmed to fold clothes. It will operate in a semi-automated process; the users ‘only need to lay the clothes flat on the platform and the machine takes them in for folding. It should be connected to a power source. It should have folding pattern, for short-sleeve shirts.

4. EXPECTED OUTCOME

Table 1 below shows time to complete 1000 shirts. From the table it shows that by using the easy t-shirt folding machine, the time to fold 1000 pieces of shirt will only take 33 min compare to manually folding the t-shirt which takes up to an hour and 7 min. This clearly shows that the time saved by

using the machine is approximately half an hour compare to manually folding 1000 t-shirts [1].

	Human	Machine
Folding time(sec)	Nearby 30 to 33 sec	8sec + 1sec(t-shirt sensing delay) = 9 sec
1000 t-shirt (min)	500mins / approx. 8 hrs.	150mins /approx. 2.5 hrs.

Table 1: outcome

5. CONCLUSIONS

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 [1].

After several attempts on completing this T-Shirt folding project, a novel yet simple project is successfully created.

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REFERENCES

- 1) TerraGreen, “RENEWABLE ENERGY AND CLEAN ENVIRONMENT” 13 International Conference 2013.
- 2) Suraj Shah, Utkarsha Mahajan, “Automatic cloth folding and colour based sorting mechanism” IJTRE, Volume 2, Issue 7. (March-2015.)
- 3) N.Gomes, Y.M.Irwan, “Photovoltaic powered T-shirt folding machine” Conference Paper in Energy Procedia, February 2013.
- 4) T-shirt folding board (available on Amazon) <https://goo.gl/images/dFC9iY>
- 5) <https://nearsay.com/c/135141/125232/3-convenient-benefits-of-using-a-laundry-service>
- 6) Y-Shirt folding method: <https://goo.gl/images/84JcpE>

- 7) Benefits of t-shirt folding machine:
<http://bigglaundry.com/benefits-folding-laundry/>
- 8) Foldimate machine: <https://goo.gl/images/2826E9>
<https://goo.gl/images/EhUoeh>