A NOVEL DESIGN OF FLOWER TYING MACHINE

Sincy Elezebeth Kuruvilla[1], Vasanth Kumar B N[2], Lakshmishree C[3], Molkire Vaishnavi Dhanraj[4], Kavya G M[5]

[1,2,3,4,5]Department of Electrical & Electronics Engineering,

RajaRajeswari College of Engineering, Bengaluru
sincyekrrce@gmail.com, vasanthkiran4255@gmail.com

ABSTRACT: A prototype model of automated flower string machine is proposed to knot the flowers. In India's rich culture flower garlands play a vital role. They are used for decorations and adorations of Gods, men and women. Garlanding of flower is a monotonous and time- consuming job. The flower string machine is conceptualized based on the working principle of sewing machine and added multiple kinematic mechanisms to drive the flower feeding and stringing. The flowers will be placed on the conveyor belt and based on process control technique; an innovative knotting mechanism will be used to string the flowers. It is also a customized machine for armless and loss of fingers community. Flower tying machine ensures perfect garlanding in an affordable cost. By this technique, the manual work can be reduced and flower vendors can utilize their time effectively.

Keywords: DC Motor, Microcontroller, Sensor

1. Introduction

As we all know, India is well known for its spiritual rituals, tradition and cultures. Flowers being a symbolic way to express a token of love, devotion etc., Garland is one such way in the form of band or loop of blossoms used for decorations, worship god, expression of love, as a gift, new birth, ceremonies etc., Garland is a decorative wreath of flowers. Flower Garland has been a function of religious culture, traditional rituals from ancient times. Garlanding of the flower has also been a business and provides a way of earning money. The labour requires for this being massive and cost-effective. Also consumes time to tie a few mm of garland by labours. So, we developed this concept. Flower tying machine is developed to make the garland easily with an efficient task [1]. This device provides a smart work of tying a flower which maximises efficient work which reduces labour strife. Making such a way of automation of flower garlanding has

been a new concept that we are formulating. By implementing this concept, we can reduce labour hand to handwork, the time, labour cost, minimizing maintenance work.

2. Objective of the Project

Flower garlands have been a part of India's culture and traditions since ancient times. The stringing of flower garlands is also a mean of earning money. The labour required for this is arduous, expensive and time consuming. We have developed the concept of a flower tying machine to make garlands easily and efficiently.

3. Block Diagram

The figure 1 shows the block diagram of proposed project. In which first the power supply is switched and it will supply power to Microcontroller, both DC motor and even to the object sensor also. Then the buck converter is mainly used to step-down the voltage and then gives it to the Microcontroller. The two DC motor is used to drive both conveyor belt and stitching unit. The microcontroller is heart of this project which controls both DC motor by Using (PWM) Pulse Width Modulation technique. The object sensor is used to detect the whether the flower is coming or Using (PWM) Pulse Width Modulation technique. The object sensor is used to Using (PWM) Pulse Width Modulation technique. The object sensor is used to detect the whether the flower is coming or not. When the flowers are coming continuously in series format the object sensor detects the flowers and then give the signal to the microcontroller. By using this signal the microcontroller controls both DC motor speed in which by this way we are able to tie the flowers easily and complete the work in very small time. The red arrows indicate power supply connections and black arrow indicates normal connections and blue arrow indicates controlling action and purple arrow indicate signal travelling.
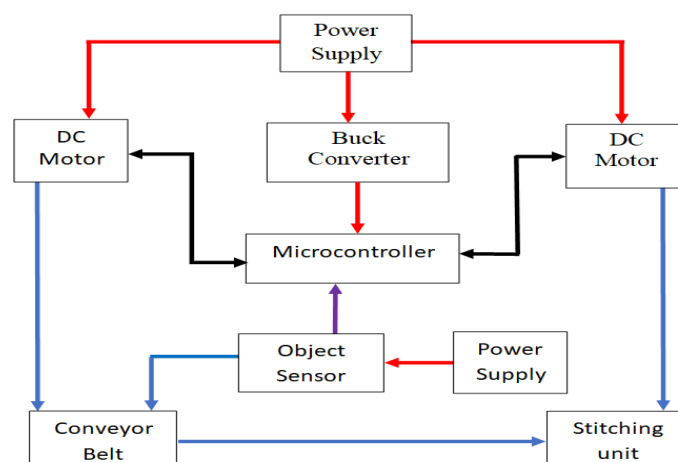

Figure 1 Block diagram of proposed flower tying Machine

4. Methodology

In our work, a prototype flower string/knot machine is proposed to knot the flower. The flower string machine is based on the working principle of the sewing machine [2] and added some mechanism to string/knot the flower. (Mechanism like the position of the needle, thread position, speed control of motor etc.) The flowers will be placed on the conveyor belt and stringing action will takes place by the modified sewing machine. The conveyor belt is driven/run by DC motor [3]. Object sensor will be placed on a conveyor belt which detects the object is coming or not and we are using an innovative knotting mechanism to string the flower which makes the perfect and beautiful garlands of the flower. By, using this technique the manual work is reduced and flower vendors utilize their time in other useful work.

5. Hardware Implementation and Description

Hopper: A hopper is a funnel shaped device used to move material from one receptacle to another. Functions: Collect item (flower) into its space above inventory; Pull a single item into its inventory; Push a single item to the container it's facing.

Conveyor belt: Conveyor belt mechanism prevails the technology of continuous conveyance of materials horizontally or at an incline up or down [4], [5],[6]. The parts of the belt conveyor are shown in figure 2. The belt moving over pulleys at a fixed position are driven by dc motor. For speed control of a belt, it is convenient to use AC speed control motors or brushless DC motors and gear motors that offer a wide speed control range and constant torque regardless of load [7], [8], [9].
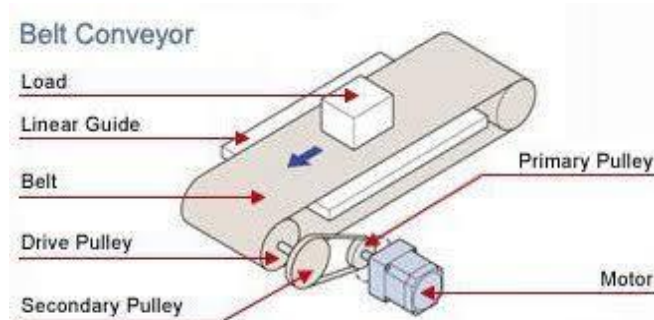

Figure 2 Belt conveyor

DC Motor: Operating voltage is 4.5 to 18V, current 5to10A, Speed is 200 RPM and power up to 300MW-used to drive the conveyor belt [10] pulleys for loop and for the stitching mechanism unit for stringing the flowers.

Working Table: The worktable is a table or a supporting desk for interlacing. This table possesses a large space and a full set of sewing

equipment. Sewing machine for sewing needs to be mounted at the same level as the worktable by considering the specific configurations while designing. Special care is taken in designing the worktable height of placement, a length, a breadth, a type of material work table.

Sewing Machine Unit: It employs the lock stitching method in which two threads and a single needle used for knotting flower. This technique uses two strings i.e., upper thread and downward thread. The upper thread is run by a spindle which is held on the top of the machine. The downward thread is wound around a bobbin which runs by the spin of the bobbin. The top view and front view of the proposed arrangement of flower tying machine is shown in figure 3 and figure 4 respectively.
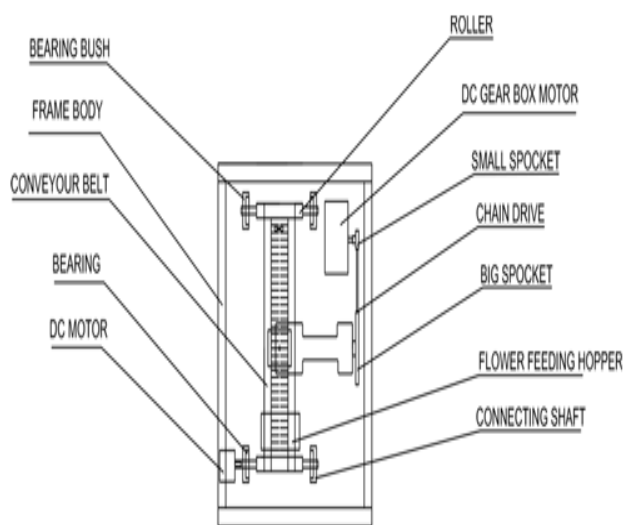

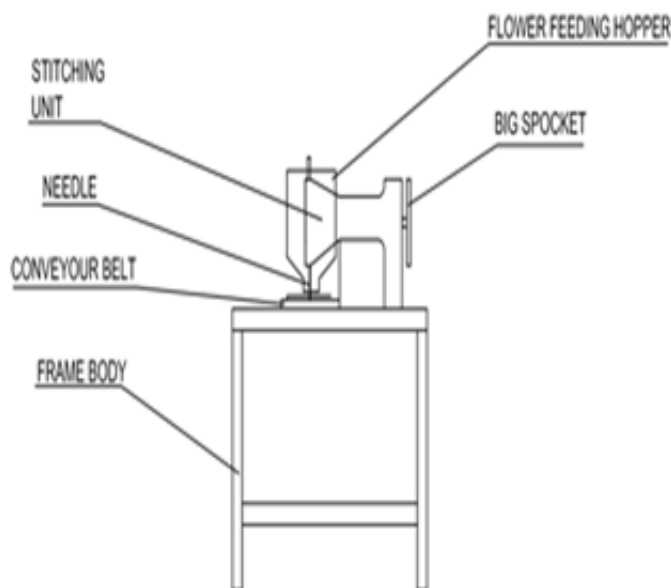
Figure 3 Top View of Flower Tying Machine

Figure 4 Front View of Flower Tying Machine

Microcontroller: The Uno Arduino has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a USB connection, a power jack, a reset button and more. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

Buck Converter: Buck converter (step-down converter) is a DC-DC power converter which steps down voltage from its input (supply) to its output (load). It is a class of switched mode power supply (SMPS) typically containing at least two semiconductors energy storage element, a capacitor, inductor, or the two in combination. Switching converters (such as buck converters) provide much greater power efficiency as DC-to- DC converters than linear regulator, which are simpler circuits.

Object Sensor: IR sensor is a simple electronic device which emits and detects IR radiation in order to find out certain objects/obstacles in its range [11], [12]. Some of its features are heat and motion sensing.IR sensors are infrared radiation of wavelength between 0.75 to 1000 micrometer which falls between visible and microwave regions of electromagnetic spectrum [13],[14],[15]. IR region is not visible to human eyes. Infrared spectrum is categorized into the three regions based on its wavelength ie., Near Infrared, Mid Infrared, far Infrared.

6. Conclusion

Flower tying machine ensures a smart way of stringing a garland which maximizes efficient work and reduces labour. The automation of stringing garlands is a new concept that we have formulated. By implementing this concept, we can minimize labour, time, money and maintenance work.

References

[1]   R. Anandhi, D. Kowsalya and N. Jerusha Chintu. "Flower Knitting Machine", Asian Journal of Applied Science and Technology, Vol1, Issue 3, pp 17-19, 2017.

[2]   Zuber Ahmed, "Design and Development of Semi- Automated Flower Stringing Machines". AMD (PT-2015).

[3]   Muhammad Ali, "Cost Effective Way to Control the Speed and Direction of Dc Motor for Driving the Conveyor", American scientific research Journal for Engineering, Technology and Sciences, 2017.

[4] Deepak Gupta, Dheeraj Dave, "Study and Performance of Belt Conveyor System with Different Type Parameter", International Journal for Innovative Research in Science and Technology, Vol 2 ,Issue 6, NoV -2015

[5] Shasha Wang, Weina Guo, Wu Wen, Ruihan Chen, Ting Li, and Fang Fang, "Research on Belt Conveyor Monitoring and Control System", International Conference on Information Computing and Applications, pp 334-339, 2010

[6] Vijay M Patil, Niteshkumar A Vidya, Roshan L Katkar, Piyush S pande, "Type of Conveyor System: A Review", IJSRD – International Journal for Scientific Research & Development, Vol.2, issue 12, 2015.

[7] Avinash L Nandivale, Omkar D Kumbhar, Aniket R Kherade, Amar V Kolekar, Shubham D Hankare, "A review of automatic conveyor system", International Journal of Advance Research in Science and Engineering, Vol.07, Sp. Issue.1, 2018

[8] Kriti Shrivastava, Prof. M D Pawar, " A review on types of DC Motors and the necessity of starter for its speed regulation", International Journal of Advanced Research in Computer and Communication Engineering, Vol 5, Issue 4, 2016.

[9] Pranay S Chaudhari, V A Kolhe, S B Ambekar, " A review paper on flexible spring conveyor system for material handling system", International Research Journal of Engineering and Technology, Vol. 3, Issue 4, 2016.

[10] Andromache G. Katsioula, Yannis Karnavas, "An Enhanced Simulation Model for DC Motor Belt Drive Conveyor System Control", 7th International Conference on Modern Circuits and Systems Technologies, 2018.

[11] Mrs. Poonam Khari, "Literature survey on the various methods of object detection in video surveillance systems", International Research Journal of Engineering and Technology, Dec 2016

[12] Shubham Gupta, Abhishek Ratee, Abhishek Kathariya, Ashish, Harpeet Kaur Channi, "Modelling and designing of color detector using Arduino", International Journal of Scientific Research in Computer Science, Engineering and Information Technology, vol 2, Issue 6, 2017

[13] Mihai Negru, Segiu Nedevschi, "Improving image quality by camera signal adaptation to lighting conditions" in Proceedings of Intelligent Computer and Communication Processing, 2011 IEEE International Conference.

[14] Zhong-Qiu Zhao, Peng Zheng, Xindong Wu.," An Object Detection and Tracking Algorithms", In Applications of Computer Vision. WACV'98. Proceedings, Fourth IEEE Workshop on, pages 8–14. IEEE, 2016.

[15] Tushar G Gaikar, Soham N Zadokar, Rajendra S Bhandari, Sagar S Patil, " Object sorting using color sensor and Arduino", International Journal of Recent Innovation in Computing and Communication, Vol. 4, Issue 4, 2016