e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

FARMER FRIENDLY MATLAB BASED AUTOMATIC SILKWORM EGGS COUNTING SYSTEM

Ms. Nehal Gautam Patil*1, Prof. Mrs. Nagama Sheikh*2, Prof. Mrs. Rohini Pochhi*3

*1PG Student, Department Of Electronics And Communication, Tulsiramji Gaikwad-Patil College Of Engineering & Technology, Nagpur, India.

*2,3Professor, Department Of Electronics And Communication, Tulsiramji Gaikwad-Patil College Of Engineering & Technology, Nagpur, India.

ABSTRACT

The silkworm seed production is an important activity of sericulture. This involves the rearing of parent seed crops for the production of seed of silkworms known as Disease Free Lyings (DFLs). To find out the laying capability of the month and hatching percentage, counting silkworm eggs is essential during silkworm rearing. Similarly, it is important to count silkworm eggs accurately so that farmers can pay accordingly and they will not suffer any loss while buying. The manual counting of silkworm eggs is very tedious work and involves chances of errors and damage to the eggs. Also as it's in large number, it takes a lot of time to count it manually. So there is a need to develop some fast and automatic methods to count the number of silkworm eggs. This paper presents an image processing technique that calculates the number of eggs and displays it on LCD for ease. For displaying count on LCD we are using Arduino UNO as controller.

I. INTRODUCTION

Sericulture is a town-based industry that gives and works to a significant segment of the populace. It is a craft of silkworm raising for the creation of covers. The silkworm seed creation is one of the significant actions of sericulture. The DFLs are set up in their garages and provided to ranchers for raising. The interest of eggs for raising silkworms isn't uniform consistently. In Silk's creation, the number of silkworms needed for the estate of mulberry trees ought to be surmised for an acceptable yield of silk. It won't squander mulberry leaves. For this ranchers need to buy an estimated number of silkworm eggs. The DFLs arranged in grainages have fluctuation in egg amounts laid on sheets. This can cause financial misfortunes and the control measures to screen the eggs numbers are dreary and arduous. Tallying of silkworm eggs is essential during the selling of eggs to ranchers for raising So that they can pay appropriately and ought not to endure any financial misfortune. Sericulture is a based industry giving work to a sizable part of the populace. It is a specialty of silkworm raising for casing creation. To support sericulture as a business crop in a contest with other money yields, the creation and convenient stockpile of predominant quality silkworm seed is essential.

In India, sericulture is drilled in mild just as a tropical region. Because of various seasons and shifting raising conditions silkworm breeds vary in different zones[1].

The silkworm seed creation is one of the significant movements of sericulture. The silkworm seed known as Disease Free Laying (DFLs) is set up in their focuses and provided to the ranchers for raising. Both Government and private area grainages are associated with this action. In sericulture, the interest of eggs for raising silkworms isn't uniform consistently. At the point when seed casings are free in a lot of good seasons, a surplus amount of eggs should be ready and put away in chilly stockpiling to be delivered at the hour of interest.

The egg identification and tallying are finished utilizing MATLAB. With a common advanced camera gadget and a PC, we can make the discovery and tallying gadget. The framework will be made as programming which comprises of information and yield parts. The info part is acknowledging the picture document from the camera and the yield part is answerable for revealing the outcome as far as egg check to the client utilizing GUI. Scarcely any picture handling key procedures have been applied to execute.

Presently, days the strategies utilized for the checking of silkworm eggs are the manual tallying technique with sketch pen or marker and checking of eggs by number cruncher. The ordinary strategy for silkworm egg checking is by utilizing ink or a sketch pen. The straightforward paper is put on the egg sheet and eggs from one DFL are checked by stamping it utilizing a sketch pen. Each DFL roughly contains 400-500 eggs. Then, at that point Eggs from all DFLs on the sheet are determined by duplicating several eggs from one DFL by complete no. of DFLs on the sheet. This is typically acted in a manual, visual and non-programmed structure which is

mistaken and tedious. Along these lines, it isn't an acceptable strategy for checking eggs since it doesn't give the right outcome.

Picture handling methods are being utilized oftentimes to check objects, arrange pieces, or segregate between objects with various visual qualities. Most computerized picture frameworks perform tallying by dividing the item to be tallied from the foundation by applying a limit dependent on the pixel force or potentially power slope(or pace of progress of powers).

II. MATERIAL AND METHODS

A computerized camera with 12 megapixels goal and 4.5 occasions optical zoom is used. The camera is associated with a PC. An advanced picture caught from the camera of size 1600 versus 1,200 pixels is prepared. The measure of eggs is checked from each DFL by visual investigation to contrast and tally got from picture preparing calculations tested. Picture preparing calculations and GUI carried out to show the outcomes to the client in MATLAB.

The investigated calculation assessed depends on shading division and numerical morphology. Figure 1 shows the example picture of one DFL which comprises 585 eggs. A shading advanced picture of size 1,600 x 1,200 is changed over to a dark picture as RGB shading models are not appropriate for portraying the tones in terms that are not appropriate for human interpretation [10].

This transformation of the RGB picture to grayscale is completed by killing the tone and immersion data while holding the luminance. (Fig. 2)

Figure 3 is binarized utilizing Otsu's technique which utilizes a worldwide limit to change over the power picture to paired image[10]. Otsu's technique is utilized to discover the worldwide edge level to limit the intraclass fluctuation of thresholded high contrast pixels. The applied change is according to condition (2)

S(x,y) = 1 if r(x,y) > Threshold

= 0 if r(x,y) < Threshold

where r(x, y) addresses the pixels of the unique picture and S(x, y) addresses the pixels of the thresholded picture. Figure 4 shows the consequence of thresholding. It performs morphological opening on the grayscale or double picture with organizing component. Morphological opening activity is disintegration trailed by widening utilizing the same organizing component for both activities.

A morphological opening activity is utilized to appraise the foundation brightening.

TopHat sifting ¼ Image _ Opening of picture

The initial activity eliminates objects that can't contain the organizing component. After applying formal hat separating, we improve results for thresholding as demonstrated in Fig. 4. Little regions can be erased as they couldn't contain an egg. Figure 5 shows the aftereffect of disintegration because of which some of the associated eggs are eliminated. With the double picture, and associated parts calculation is applied to name the associated locales of the picture. This calculation puts an alternate name at each associated white space of the picture. With this marking, it is feasible to assess each associated region. This gives the number of associated objects found in a picture which addresses the quantity of eggs in picture.

Once Count of Eggs has been calculated , that number is sent to the Arduino Controller by serial communication. As soon as arduino UNO receives this data it takes it and displays the same on LCD which is interfaced with it. By displaying count on LCD it becomes easy for user to observe and proceed for the next procedure. Output of the system is shown in image.

Image processing steps :-

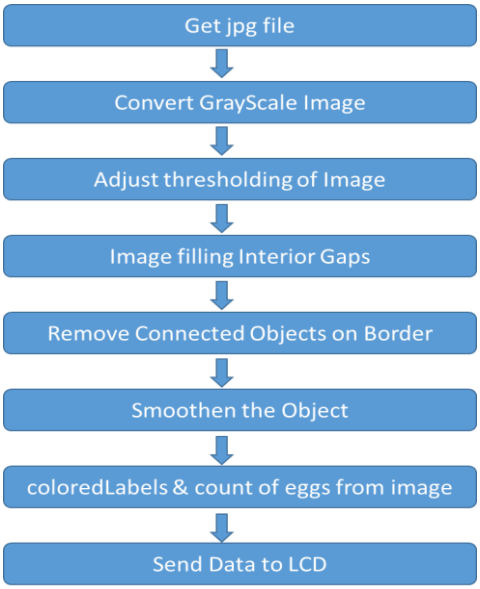


Fig 1: Original Image

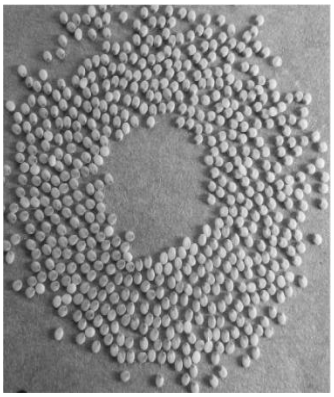


Fig 2: Gray Image

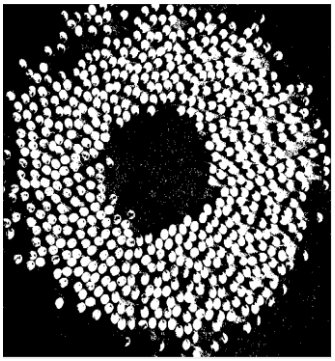


Fig 3: Threshold Image

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

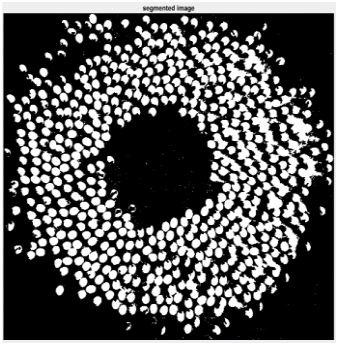


Fig 4: Segmented Image

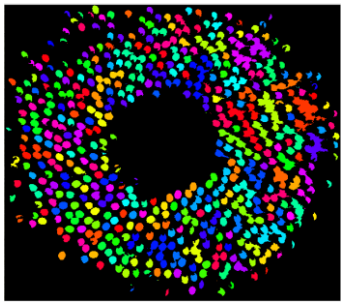
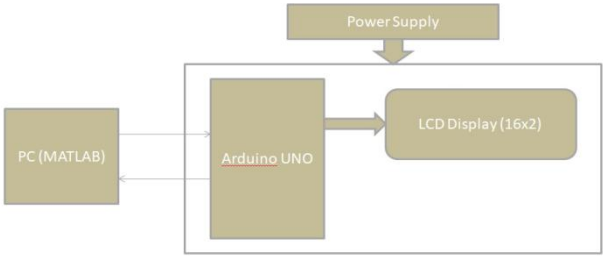
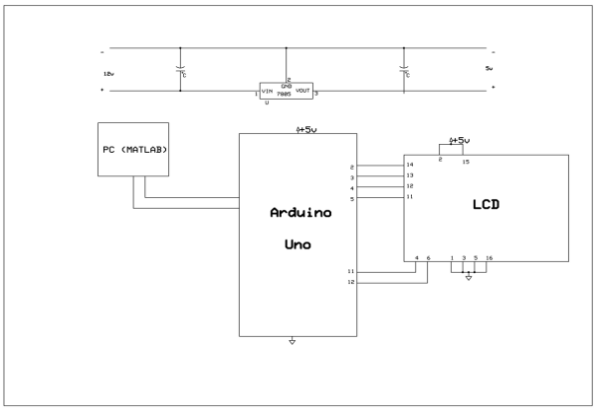


Fig 5: Color Lobes and count

III. BLOCK DIAGRAM



IV. CIRCUIT DIAGRAM



V. SOFTWARE & HARDWARE USED

1. Arduino IDE
2. Arduino UNO
3. LCD 16x2
4. USB A-B Cable
5. MATLAB

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

VI. OUTPUT

VII. CONCLUSION

This paper investigates an Image Processing strategy for checking silkworm eggs. The primary strategy dependent on morphology is basic, proficient and it requires less memory yet delicate to the non-uniform enlightenment. The subsequent strategy dependent on hough change is commotion open-minded, so it gives better outcomes with more prominent precision yet requires huge memory for the calculation of boundaries. The change-based strategy identifies just roundabout items.

Because of light this strategy likewise identifies some undesirable circles notwithstanding genuine eggs. So sometimes we get the check more than the genuine count. The present work can be additionally stretched out to carry out many imaging applications for recognition of roundabout articles like eye identification, mosquito egg tallying, and location of vehicle haggles cells discovery. Devoted equipment can be executed utilizing programmable rationale gadgets which can bring about a higher speed of activity. An electronic tallying framework can be executed utilizing the proposed technique.

VIII. REFERENCES

[1] Dr. M. N. Narasimhanna, "Manual on Silkworm Egg Production," Central Silk Board, 1st ed. Jan 1988. [Online]. Available: http://www.tnsericulture.gov.in [Aug 8, 2016]

[2] Radhakrishna PG, Sekharappa BM, Muniraju E, 1997. [Online]. Available : http://kssrdi.org/technology/technology_view.asp?id=303 [Sept 18, 2013]]

[3] G. Gusmao, Saulo C. S. Machado, and Marco A. B. Rodrigues,"A New Algorithm for segmenting and Counting Aedesaegypti Eggs in Ovitraps", 31st Annual International Conference of the IEEE EMBS Minneapolis, Minnesota, USA, September 2009 ppp.6714-6717

[4] Chomtip Pornpanomchai, Fuangchat Stheitsthienchai, Sorawat Rattanachuen," Object Detection and Counting System", 2008 Congress on Image and Signal Processing

[5] Y. H. Toh T.M. Ng, B.K. Liew," Automated fish counting using image processing", 978-1- 4244-4507-3/09/$25.00 ©2009 IEEE.

[6] T.C. Pearson, R.H. Edwards, A.P.Mossman, D.F. Wood, P.C. Yu, E.L.Miller, "Insect Egg Counting on Mass Rearing Oviposition pads by Image Analysis", Applied Engineering in Agriculture 2002 American Society of Agricultural Engineers ISSN 0883 -8542, Vol 18(1):129-135.

[7] W. M. K Wan Mohd Khairos faizal and A. J. Nor'aini, "Eyes Detection in Facial Images using Circular Hough Transform", 2009.

[8] 5th International Colloquium on Signal Processing & Its Applications (CSPA) 978-1-4244-4152-5/09/$25.00 ©2009 IEEE

[9] Rupali Kawade, "Automatic Silkworm Egg Counting Mechanism for Sericulture",

[10] Proceedings of International Conference on Internet Computing and Information Communications Advances in Intelligent Systems and Computing, vol. 216, pp 121-128, 2014.