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PROJECT-SERI

Sericulture-Based Multipurpose Automatic Machine

Shreehari H S, Sumanth V N, Abhishek R, Afzal Pasha M

Department of ECE, SJC Institute of Technology, Chickballapur, India

Abstract--Sericulture is playing a very important role in farming for several years. It is one of the important factors in our country that which increases revenue. So, the major problem in this field is more manpower is required. we thought of reducing manpower & time consumption to cut and extract the mulberry plants from the field, just by automating the operations through a machine. By using advanced technologies such as machine learning, image processing, etc.., the machine is built and the buttons are provided to choose which operation is going to perform that is purely based on users' choice. This project is mainly focused on to build Automatic & multipurpose machine in the sericulture field. The main purpose of this idea is to make manual operations into autonomous and effective, which leads to reduced manpower & time consumption.

Keywords—Relay module, NodeMCU, IOT, Arduino Nano, Sericulture.

I. INTRODUCTION

Sericulture is the process of farming silkworms to cultivate silk from them. In sericulture, the silkworms are fed by mulberry leaves. Sericulture provides gainful employment, economic development, and improvement in the quality of life to the people in a rural area and therefore it plays an important role in the anti-poverty program and prevents migration of rural people to an urban area in search of employment. 'Mulberry' is widely recognized for its economic importance in producing Mori silk through feeding of leaf to silkworm (Bombyx mori) larvae. Mulberry foliage is the only food for the silkworm (Bombyx mori) and is grown under varied climatic conditions ranging from temperate to tropical. Silkworms have a diet that is completely made up of mulberry leaves. Packed full of vitamins, minerals, and amino acids, these leaves provide all the nutrients silkworms need. There's no need for silkworms to drink water because these fresh leaves contain enough hydration too. Mulberry leaf is a major economic component in sericulture since the quality and quantity of leaf produced per unit area directly affects cocoon harvest [1].

II. PROBLEM STATEMENT

In sericulture there was the manual cutting of Mulberry plants which requires more effort and time. Later machinery was evolved which decreases human effort as well as time consumption but causes fuel consumption and human monitoring to be required. Another major problem in Sericulture is the weeding process and spraying (pesticides and insecticides) again there is a requirement for more effort and time [2].

III. LITERATURE REVIEW

R. Ranjith Kumar, et-al [3], published a paper on 'Smart Mulberry Plant Cutter' designed with a movable holder or arm and a rotating cutter. Initially, the arm will hold the mulberry plant and the cutter starts to cut the plant. The plant cutter comprises a storage area to store the plants. The arm holding the plant will drop the plant in the storage area. The entire plant cutter should be moved manually to locate the plant properly. The holding and cutting processes are automated. Initially, the plant cutting unitwhich is attached to the chopper has to be taken to the mulberry field.
Sawpnil.V.Ghinmine, et-al [4], published a paper on 'Design And Fabrication of a Weeder & Cutter Machine'. It is a mechanical weeding actuation system was designed, and a prototype was constructed. This actuator was developed to mechanically control intra-row weed plants. The mechanical weeding actuator consisted of a belt drive system powered by an integrated engine and a rotating tine weeding mechanism powered by engine power.

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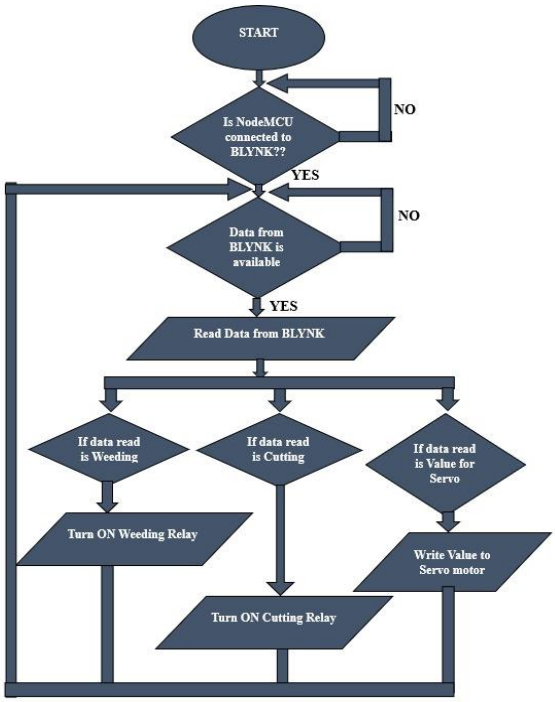
Basavarajeshwari, S. P. Madhavanavar [5], published a paper on 'A Survey on Weed Detection using Image Processing' In past days weed detection was done by employing some men, particularly for that intention. Later there came a few methods to discover the weeds without human intervention but due to lack of their accuracy, they were incapable to reach the public. Image processing was used for this purpose.



IV. METHOLODGY

V. In this proposed model the objective is to cut weeds and mulberry plants. The Mulberry plants are usually cultivated in a proper row-based manner which is suitable for weeding the unwanted plants and cutting and collecting the plants. Let's see the process of automation in the below diagram [6].

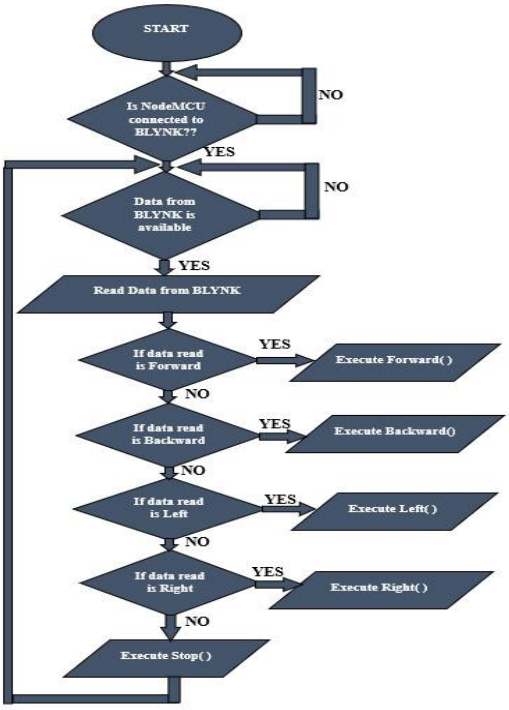


Figure 1: Flow chart for model movement

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Figure 1 shows the flow chart of model movement. The operation that should be performed must be specified by the user through remote control buttons, according to the input from the user further operations will be carried out.
Figure 2: Flow chart for model operation. Figure 2 shows the flow chart of model operation. If the input received as weeding, the model turns on weeding relay. Hence weeding operation is performed. If the input received as cutting, the model turns on cutting relay. Hence cutting operation is performed. If the data read as positive integer numbers from the range between (0-180). The data is written to the servo by using servo.data function. In this case all the operations are independent to each other, means more than one operation can be performed at a time [7].

VI. BLOCK DIAGRAM

Figure 3 shows the block diagram for ESP32-CAM. It is the vision for the project; this acts as an eye and performs streaming and object detection operations. The real-time data can be fetched by the ESP camera module such as objects (mulberry and weed plants). Detection operation on the real-time objects is performed by using the machine learning algorithm [8].
(YOLO v5) to get the position and existence of weeds and plants. The algorithm makes use of a dataset that is pre-trained to the model and by extracting the features of the input image the classification is made. For the user interface remote-control buttons are placed so that the user can choose the operations according to the requirement, and the logic behind the input button is made to perform both operation at a time. The operations that are selected are weeding and cutting mulberry pants (Harvesting).

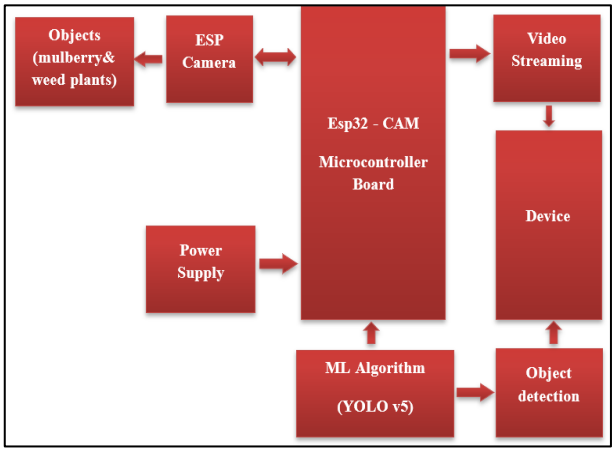

Figure 3: Block Diagram for ESP-32 cam

VII. ADVANTAGES

- They can operate with closer tolerances, they offer fewer errors and higher speeds, and the higher quality products can be sensed by the machines accurately [9].
- Reduce the environmental impact, increase precision and efficiency, and manage individual plants.
- Reduces human effort
- Autonomous and easy to use
- Multipurpose machine
- Alternate to machines that use fuels
- Cost-effective produce

VIII. APPLICATIONS

Slight changes in this project can lead to severall applications in the sericulture field:

- weed control [10].
- cloud seeding
- planting seeds
- harvesting
- Environmental monitoring and soil analysis [11].

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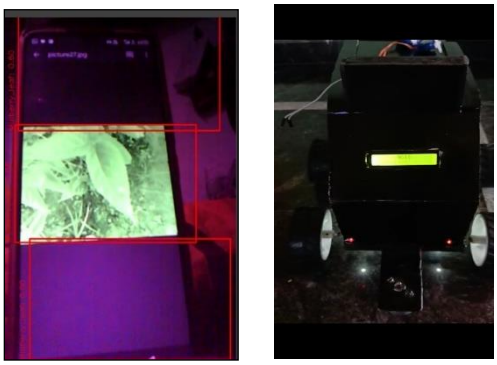
IX. RESULTS AND CONCLUSION

Figure 4: Blynk remote control buttons for controlling the bot.

Figure 5: Final output model



After the implementation of this project, we can expect advancement in the process of sericulture by using advanced technologies and by reducing human effort and time. This makes it easy for the farmer to choose which process must be executed just by pressing the respective remote-control remote control buttons dashboard.

This project helps the farmer to reduce the efforts to cut the plant & saves more time in the mulberry plant-cutting process. Thus, manufacturing these kinds of machines can increase the revenue in sericulture farming in India and increases the involvement of more people in agricultural activities.

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