Image Processing Based Sugarcane Node Cutting Machine: A Review

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Abstract- *Agriculture is the main occupation found in India. Sugarcane is one of the major crops in India that is cultivated with combined purposes of consumption as well as trade. India falls second in the list of production of sugarcane where as Brazil stands first. Sugarcane planting with traditional method is time consuming, costly and even maximum yield is not obtained hence to overcome these problems we suggest image processing methods and machine system to plant sugarcane as a seed by detecting its nodes*

Keywords- Image processing, Sugarcane harvesting, Automation, Cutting methods, Cutting machines.

I. INTRODUCTION

Agriculture is the backbone of India. It also contributes a major share in the Gross Domestic Product (GDP) of the country. In addition, the sector recruits about 50% of the entire manpower. Agriculture is currently the biggest industry in India. On the whole, it plays a key role in the socio economic growth of the country. Total arable land in India is 15,73,50,000 km^2 i.e. about 52.92% of the overall land zone of our country.

Sugarcane is the major crop grown in India. Tropical climate is most suitable for sugarcane, with lots of moisture and rainfall. Sugarcane cannot be grown in the areas where the climate is frosty as it does not tolerate frost. Sugarcane is classified as tall grass plant as it belongs to the family of simple grass. Total production of sugarcane in India is about 70 tons for every hectare and sugar production 10% of this. Sugarcane crop is grown by planting its existing stem, by stem cutting method. But the stems with buds can only be replanted to new sugarcane plant. The hand harvesting or the traditional method is the most commonly practiced harvesting methods used in India, which is time consuming, costly, unsafe and also the optimum amount of yield is affected. So a mechanized machine with image processing will help to overcome these problems and will lead to maximum profit in harvesting sugarcane.

II. LITERATURE SURVEY

We have referred number of papers on Sugarcane Node Cutting. Following section will discuss literature reviews.

Sanjay Patil et.al [1] discussed the demand for reducing the wastage of sugarcane by automatic system to reduce the mass and improve the quality of sugarcane. To plant the excised auxiliary buds of the sugarcane stalk which are known as bud chips. These bud chips are economical and easily transportable. This technology helps in rapid multiplication of new cane varities.

S. D. Shelke et.al [2] Introduced machine that works with less efforts and in less time, to reduce cost of labour required for seed sowing and fertilizer placement. Advanced techniques increase the production in minimum cost and time. The problem of labour shortage is also sorted by introducing this machine.

Rohit. J. Masute et.al [3] Contributed towards analyzing sugarcane harvester machine aspects for economical harvesting which helps to minimize the working fatigue, reduce labour cost and overcome the labour crices problem. Adarsh J.Jain et.al [4] the idea of petrol engine in the machine mounted on strong chassis is implemented, which helps to provide power to cutter. This machine is designed and fabricated to overcome the problem on small scale harvesting areas. This also helps farmers to proceed faster and easily with low labour cost.

III. SUGARCANE NODE CUTTING METHODS

There are many methods for cutting the sugarcane node. Some of the major methods are discussed below.

A. Manual Method

Fig. 1. Manual method

In manual method, the sugarcane stalk with number of nodes is cutted by a skilled labour at a certain node.Each node is placed at a distance of 4-6cm on sugarcane stalk.Manual method is practiced in the small area cultivation farm. But this method is unsafe, time consuming and sometimes may lead to damage of sugarcane node.

B. Chipping Method

Fig. 2. Chipping method

In chipping method, the sugarcane node is cutted with the help of chipping machine. Here though the machine is used, the skilled worker is required to pull the cam shaft up and down. The sugarcane stalk needs to be adjusted manually and after placing it properly, the node is cutted by the cutting blade by pulling the cam shaft down.

In this method, the node is cutted properly. Hence the proper node with buds can be replanted and it will not lead to damage. This method is time consuming, needs more accuracy and skilled worker.

IV. PROBLEM STATEMENT

Sugarcane node cutting with manual method that is traditional method is time consuming and requires skilled human. Also sugarcane node cutting is done by chipping machine which is known as chipping method. This exiting machine used for node cutting is unsafe, needs the skilled and trained worker and it is also quiet messy. The node with bud

can only be replanted, in the traditional and chipping method; the bud on the node may get damaged. So, to overcome these problems, the advanced cutting machine with image detection and proper cutting is needed.

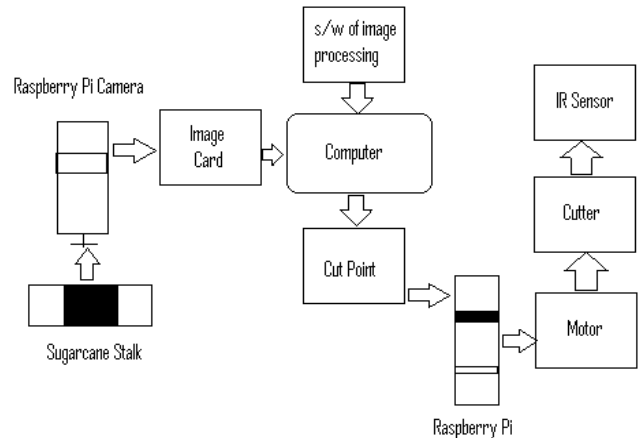## V. PROPOSED SYSTEM OF IMAGE PROCESSING BASED SUGARCANE NODE CUTTING MACHINE

Fig. 3. Proposed system of image processing based sugarcane node cutting machine.

In this process of system, firstly the raspberry pi camera will capture the image of sugarcane stalk with the node placed under cutter. The captured image will be passed to the raspberry pi which will compare the captured image with the image stored in the database. The signal will be passed next to the motor only if the node of the sugarcane stalk is detected. Here when the proper signal of detected node will be passed to the motor then only the node on sugarcane stalk will get cutted with the help of cutter. The number of cutted nodes will be sensed by the IR sensor and counted respectively.

VI. CONCLUSION

After the completion of this project, following conclusions will be made i.e. the automated sugarcane bud cutting machine will be fabricated and assembled as per the proposed design. Efforts which farmers put in terms of money, labour, time, physical efforts for optimum performance will be reduced. So the farmers with small and big farms both will be more profited and will overcome the problem of labor crises. This machine will cut the node automatically so the newly developed machine will be more effective for sugarcane cutting.

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