

Indian Gooseberry Deseeding Machine

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Abstract

An automatic aamla deseeding machine which consists of a hopper, fruit orientation assembly, a robo-arm and the punching machine has been designed for the automatic removal of seed from the fruit. Here we have used Raspberry Pi 3B+ module for overall control of hardware, DIP for detection of real-time motion of aamla. This system will help in decreasing the chances of fruit wastage during extraction. Also, this system can be used in food industries, pharmaceutical industries where the manual efforts will be reduced.

Keywords: Aamla deseeding machine, fruit orientation assembly, Image processing for fruit deseeding, automatic seed extractor using DIP

I. INTRODUCTION

Indian gooseberry (*Phyllanthus Emblica*), popularly known as Aamla. This bitter fruit has been used in Ayurvedic medicine for thousands of years. It is rich in vitamin C, iron and calcium. As people became more aware of their health, they started consuming Amla to maintain their health and well-being. Aamla is a fruit which is available for 3-4 months during the season. Since Ayurveda is popular for its uses to make medicine and beauty aid, the need for aamla increases for its different purposes. Aamla products can be used in various forms such as powder, dried, treated slices, crushed and also to make syrups, oils, pasty forms (in chutney and Chyawanprash). Companies like Dabur, Zandu, Charak Baidyanath and many more use Aamla for making Chawanprash and oils etc. They have a huge market and vying to capture a most of the share of the market.

Old methods of seed extraction provide poor quality of Aamla with low nutrient content. In the mechanization of Aamla processing for manufacturing various products, removing seeds from fruits is a challenging task. Traditional methods include blanching the fruit for easy separation but Blanching leads to loss of valuable nutrients. Another method is shredding the fruit in the shredder to remove the seed but shredder includes rollers, which crushes the fruit and because of which there is a heavy loss of juice and pulp.

A hand-operated seed remover for Aamla was developed by Ganachari(2005). Since it was hand operated limits, it was unsuitable for large scale industries. It is time and manpower consuming process. Therefore, we came up with the idea to design continuously operating machine for the removal of seed with minimum damage of fruit.

II. METHODOLOGY

We can clearly make out from the design below that, the project consists of four major components.

A. Hopper

The primary task is to make the fruit available to the fruit orientation assembly for further process. This task is achieved with the help of a hopper. The hopper is a conical container which will drop down a single fruit at a time.

B. Fruit Orientation Assembly

The fruit orientation assembly consists of three motorized wheels positioned at 120 degree angle to each other. The main purpose of this assembly is to re-orient the fruit for seed extraction by constantly monitoring the fruit's position at its own place with the help of motors. A camera is connected to a raspberry pi module, which is used to monitor fruit position. This is achieved by rotating the fruit with the help of motors till the fruit is perfectly in upright or upside-down position. It is important to extract the seed when the fruit is in this position to minimize the loss of pulp during the process.

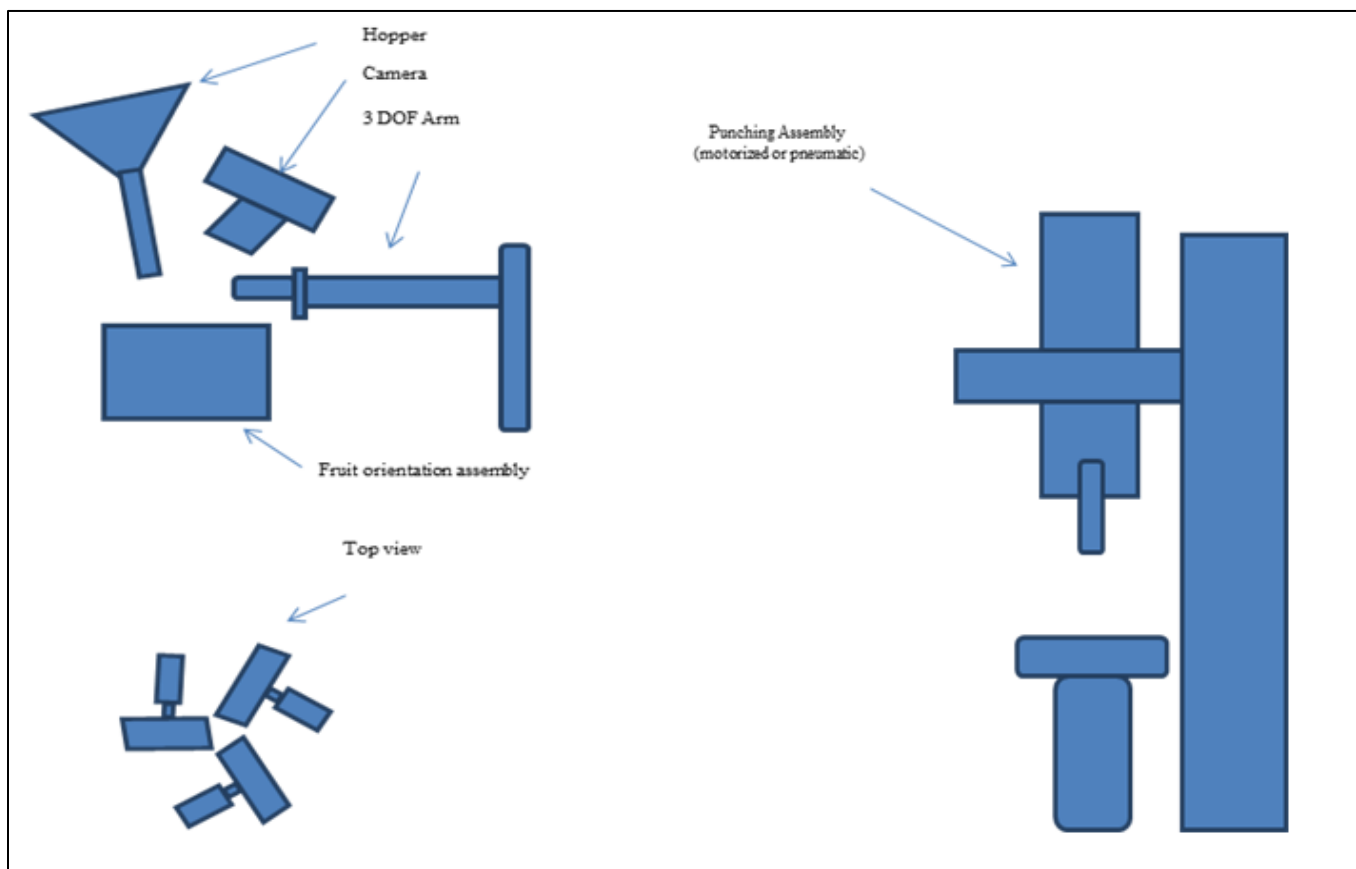
C. A Robo-arm

We are using a robo-arm with three degrees of freedom. This will be used for picking the fruit from the fruit orientation assembly and handing it to next step of our project that is, the punching machine.

D. The Punching Machine

This is final stage of the project where, the seed will finally be departed from the fruit. This will be achieved by making a hole in the fruit.

III. DESIGN



IV. FEATURES

This machine required only one person for operating the equipment. Using this machine it's easy to extract all the seed successfully and at fast pace. Its performance is easy and simple. Also it ensure corrosion resistance and thus able to withstand damage. It required less maintenance so it's easy to handle. This machine can be used in various industries such as agricultural, cosmetic, pharmaceutical and many more.

V. RESULTS

This machine is efficient to extract the seed from gooseberry in which the percentage of pulp wastage is also very less. Only one gooseberry is processed at a time. The time taken for processing single gooseberry is less than two second.

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