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## PACKAGING MACHINE FOR FOOD INDUSTRIES: A REVIEW

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**Abstract:** This paper reviews aspects of systems, standards and interfaces for the modern food industry. It presents processing and packaging principles, methods, techniques, standards, interfaces, and state-of-the-art technology. The primary purpose of this paper is to update the information in this domain so that not only the novice practitioner will gain much out of this review but the system integrators, researchers, and the stakeholders as well. In addition that, in the packaging industry the speed of packaging machines and flexibility is a major factor in determining the quantity of packaged product being produced. This paper presents a machine vision approach to inspecting the integrity of food packing seals. A kind of new method for inspecting food packing seals was used, the method meets currently the industry's requirements for high-speed and accuracy quality inspection, with low associated production costs.

**Keyword:** Food industry, Food packaging, Automation in packaging industries, Fast inspection, Machine vision and its application.

### INTRODUCTION:

Today's industrial growth is depends upon the marketing of product, quality of product and the attractive packaging of product. Especially in case of food products, the packaging plays very important role which makes easy for the marketing department to advertise. And other important issue is the increasing population and the demand is also going to be increasing. To complete this demand the conventional or traditional operations of manufacturing have to be replaced by automated machines, so that manufacturing rate would be increase.

Packaging technology is essential to present life styles in developed societies. With the general use of packaging and the development of modern techniques for food safety and commercialization, the universalized consumption of all food has become possible with out distance or seasonal limitations, and at an adequate cost. Efficient packaging is necessary for the commercialization of every food type, from fresh produce to ready to eat meals.

A package is a manufactured product consisting of any material or material combination, used to present, contain, protect, handle, and distribute goods, from raw materials to finished products, in every phase of the distribution chain. Thus, the basic packaging functions follow:

- To contain the product.
- To present and identify the product.
- To protect the products physical integrity.
- To preserve the products properties and quality characteristics
- To prepare the product for handling during transportation and commercial distribution.

To inform the consumer [1]

The food industries are budgeting more funding at applied research for the development of more efficient processes and products to meet the demand for cheaper, healthier, safer, functional, and more convenient processed foods. The recent developments are on active packaging that suggests the development of materials which in some way interact with the product to improve its quality, safety, shelf-life and usability. [2]

### Principal Of Automatic Packaging Machine

The hardware of basic module is mainly composed of film paper pulling-down mechanism, sealing mechanism, former and control equipment etc. Its work principle is as follows. The pulling-down mechanism pulls the film paper down a bag length, which can be adjusted of course. When the packaging machine runs in a moment, the sealing mechanism can seal rectangle bag in three directions.

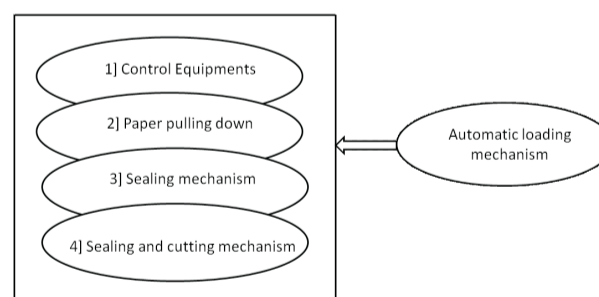


Fig. 1 Principal Automatic Packaging Machine [1]

### Flexibility In Packaging Machine

F. Lotti et. al [3] explained flexibility as, flexibility can be considered the main design goal for the new-generation packaging machines differently from the past, the enhancement of productivity, which means increasing the operating speed, is no longer the dominating issue. This demand for higher flexibility is due to the growing interest towards machines suitable to operate on a wide range of packaging formats, so that the same machine can quickly and efficiently fulfill the needs of different production mixes. In the ideal case, a machine should be able to change its production goal in a very short time, without any human intervention for substitution of parts or set-up and tuning operations. To reduce the process time is the dream of many product manufacturers and the exciting challenge for all the machine designers.

### Reconfigurable Theory

Current dedicated and flexible manufacturing systems are not able to meet the requirement arises from unpredictable market changes. Manufacturing companies in the 21st Century must possess new types of manufacturing systems that are cost-effective and very responsive to all these market changes. Reconfigurable manufacturing systems (RMS) are the cornerstones of this new manufacturing paradigm. Zihui Liu et al. [4] has given the definition of RMS. He points that RMS is designed for rapid adjustment of production capacity and functionality, in response to new circumstances, by rearrangement or change of its components. One of key characteristics of a RMS is modularity. Reconfigurable machines (RMs) are essential components to implement a RMS. RMs are classified into reconfigurable machine tools, reconfigurable fixture systems, reconfigurable assembly systems, reconfigurable inspection or calibration system, and reconfigurable material-handling systems.

### Work Improvement In Packaging Machine

X. F. Sun et. al [5] studies on the improvement of production efficiency and balance rate of the manual assembly line in a packaging machine manufacturing company. Modular Arrangement of Predetermined Time Standards (MODAPTS) method is used to obtain time values for elements and for entire operations of the manual assembly line. Also the ECRS four principles (Eliminate, Combine, Rearrange and Simple) are used to minimize the idle time at every station or the percentage of line balance loss. In order to verify the results that were obtained from the generated line-balancing pre- and post-, Witness

Simulation software is used to estimate the output. Simulation results showed that productivity increases about 41.72% higher than the current situation.

In order to automated the packaging machines for the improvement of packaging industries Yuming Lu et. al [6] investigate the major function units of an automatic packaging machine including bag forming, material filling, sealing temperature control, status display, fault detection and alarm etc. ATmega18 microcontroller is used as the central manager to coordinate the individual control function

modules. AC motor is used to fulfill the film drawing in both fixed length mode and color tag tracing mode. Under the same precision control, it costs much less than using servo or stepper motor. This controller has the advantage of easy installation and maintenance compare to the normal implementation with a complex interface circuit. Fig. 2 shows the general micro controller system for the packaging machine.

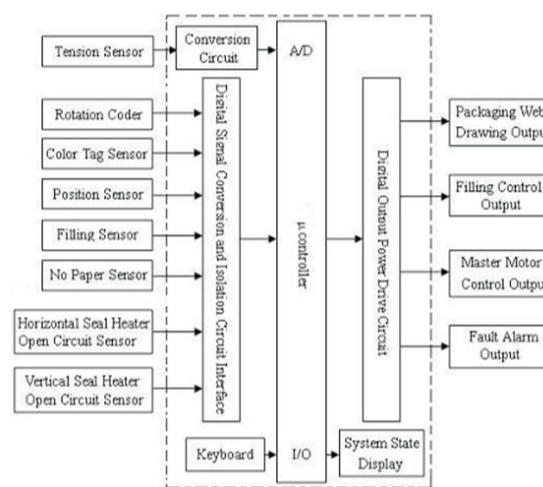


Fig. 2 System Block Diagram [6]

### Fast Inspection of Food Packing Seals Using Machine Vision.

Zheng Shuangyang [7] presents a machine vision approach to inspecting the integrity of food packing seals. A kind of new method for inspecting food packing seals was used, the method meets currently the industry's requirements for high-speed and accuracy quality inspection, with low associated production costs. Through analyzing examples of "eligible" and "faulty" food packing seals images, these seals uniformity have been examined and associated with numerical quality measures. For distinguishing between "eligible" and "faulty" seals conditions, template matching is used. Getting correlation parameter between template and image inspected, and then it was taken as standard distinguishing "eligible" and "faulty" seals. For realizing fast inspection, a set of inspecting and grading system based on machine vision was developed. The system is shown to have a high success rate provided that illumination conditions remain constant.

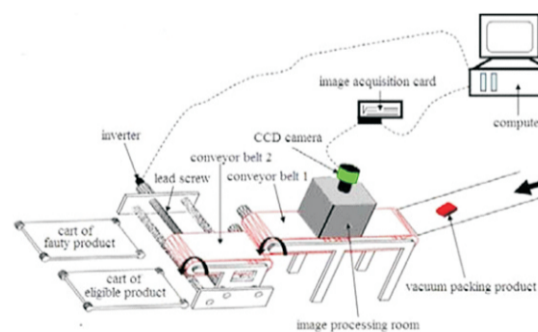


Fig 3 View of Fast Inspection [7]

**Concept for Automation in Packaging the Foods/Spices.**

To automate the packaging process of foods/spices in the food industries, we can use the same principle of packaging machine as stated above. Here we have decided to make complete packaging of food/spices automatically in four steps, as described shortly bellow,

- 1) Folding of paper – In this step, we have to transform the flat configuration of paper in the open 3D configuration, by means of cone system or gate system.
- 2) Pulling of Paper – to make the proper folding of paper, it has to pull beyond the folding arrangement by rolling means. For that we can use the motor, having torque capacity of at least 10 kg, and 30 rpm.
- 3) Sealing of paper – here we have to seal the three sides of paper, by the means of heating. To seal the upper side, we have to provide a heating surface and the rolling link which will apply the pressure on that heating surface. The paper will have to flow from between the heating surface and rolling link, so as the upper side of paper will heat and stick simultaneously.
- 4) Cutting and sealing of Paper – In this step, we have to seal and cut the front and back side of the paper. For completing this task we can provide the pneumatic system to cut and heating surface to heat.

The projected final output of the machine, will be as shown in the fig bellow.



**Fig.4 – Projected Output after Packaging**

**8. CONCLUSION**

This paper provides an overview of the research principles, methods, technology, systems, and standards which are being adopted in typical modern day food industries. Food processing, packaging and automation systems involve multidisciplinary activities for which there was a requirement to review its scope to a better extent. This paper reviewed some aspects of packaging materials in view of sustainability and active packaging

After studying this literature, we have conclude that, still there is a scope to do work on automation in packaging machine to reduce the process time and ultimately to increases the productivity of an Indian industry. We have also found that, there is a very few machines which are used as a multipurpose packaging machine. By using the same principle of packaging machine stated above it is possible to create a machine which can be used for two to three processes

simultaneously. Also there is a need to make such machine, which having as less as possible mechanical linkages for maintenance point of view.

**REFERENCES**

- [1] Nitaigour P. Mahalik , Processing and packaging automation systems: a review Published online: 18 February 2009 Springer Science+Business Media, LLC 2009.
- [2] Leming Fan, Yang Liu, Research on the Industrial Design Engineering of Packaging Machines, 2009 IEEE
- [3] F. Lotti, M. Salmon', G. Vassura, A. Zucchelli, Selection of linear motors for high-speed packaging machines, 2001 IEEE
- [4] Zhihui Liu, Mengqi Li, Zhigang Chen, Zhiwei Lin, Xuemin Liu ,The Automatic Packaging Machine Design Based on Reconfigurable Theory, 2011 IEEE
- [5] X. F. Sun, G. Cheng, W. Li, Study on Work Improvement in a Packaging Machine Manufacturing Company, 2009 IEEE
- [6] Yuming Lu, and Yingui Liu, Gengyu Li, Guozhi Song, Mingzhe Liu, Weixin Liu, Design and application of an automatic packaging machine controller based on ATmega 128, 2010 IEEE
- [7] Zheng Shuangyang, Fast inspection of food packing seals using machine vision, 2010 IEEE

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