

IMPLEMENTATION OF CREATIVE TECHNOLOGY IN AGRICULTURE AND FISHERIES BASED ON ARTIFICIAL INTELLIGENCE TO INCREASE THE QUALITY AND SELLING VALUE OF A PRODUCT

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Abstract

Improving the quality of a product is a must so that the value of the product has a high selling value, for example in the fields of agriculture and fisheries which are part of the support for the Indonesian economy, it becomes an important part so that the

independence and economy of farmers and fishermen can be increased, because a result In agriculture and fisheries, a monitoring process needs to be carried out so that the resulting products are ready to be marketed and have a high value, at this time farmers and fishermen will carry out a sorting process on each agricultural product so that the value and conditions are in accordance with export standards and are at least suitable for export. sold and have high competitiveness with agricultural products from outside, in agriculture for example the sorting system will be done manually by sorting strawberries but this becomes a problem if the fruit is stored in large quantities so that the sorting process is missed, this is if it is the same in the field of fisheries and lobster breeding, for example, lobsters that have the same size and in accordance with export standards will have a high selling value, the process of applying sorting and monitoring of agricultural products at this time can use an image processing technique where the sorting process and monitoring can be done for 24 hours and the monitoring data can be used as an evaluation reference to analyze the next harvest.

Keywords: *Creative technology, Agriculture, Fisheries, Image processing and IoT (Internet Of things)*

Introduction

The application of an appropriate technology in an agricultural sector is used to improve the quality of an item or product, the improvement process can be fulfilled if the item has good shape and quality, for example, Indonesia has a high potential value for agriculture and fisheries, in the fisheries sector in Indonesia has aquaculture of sea and land water as well as shrimp and lobster ponds, lobster itself is a commodity that has a very high value and has an export selling value that can compete with foreign countries, and vice versa in the farming sector and have several commodities that have high value.

High selling prices such as oranges, mangoes, chocolates and coffee, in this study a sorting system for and monitoring of strawberries will be made, this fruit is also widely in Indonesia and has become an agricultural commodity that is not inferior to foreign countries, currently strawberry and nut farmers of lobster cultivation already has awareness about quality and quantity in increasing the two types of commodities, for example a strawberry farmer at harvest will not immediately sell strawberries but selects and sorts out strawberry fruit size, size, color and pests, from these three components. which have the same color and size will have a higher selling value and have a high export value so that defective fruit will not be sold and even strawberries that do not yet have a small size and are ready to harvest will not be sold, this condition will reduce crop failure conditions and vice versa because the picking process is too fast. While in the field of lobster cultivation, they experience a condition similar to that of lobster itself, which is an animal that is easily stressed if the breeding site is disturbed, causing the lobster to die and cause crop failure or breeding, even farmers sometimes sell lobster that is still small and not ready to harvest, some farmers themselves are able to measure lobsters and their cultivation independently but it will be difficult if the lobster sorting system is done manually, to overcome this a lobster monitoring technology has begun to be developed using computer assistance that can monitor lobsters stored in reservoirs, This is based on image processing technology with the help of AI(Artificial intelligence) techniques, so the type of lobster can be recorded and the computer will provide information on whether the lobster is ready to be harvested or not.

Literature study

The system must recognize objects based on their properties. Objects have different shapes and colors. This process is made easier by using automation. Automation provides mechanical support through control systems. It reduces human manual effort, time expenditure and also increases time to market. The aim of the proposed project is to develop a system that can identify various objects moving through a conveyor belt and sort them according to their nature by designing a mechanical structure to automate the product separation process[1].

Object recognition is the most important task in computer vision. The increasing demand for real-time image processing has led to much research into object recognition algorithms. Object recognition is widely used in various applications such as automation, surveillance, medical field, etc. The aim of object recognition is to automatically recognize objects on the screen and to classify them according to their properties. This process must be repeated for all frames of the recorded image. The area of interest is determined by training the model from a sample of objects.[2, 3].

a digital farming concept. Agricultural information systems are also known as intelligent agriculture or information agriculture. which develops from agricultural land management, agricultural land information, agricultural equipment and agricultural chemical control. In the 21st century, there is a need to develop intelligent agriculture in order to save water and produce pollution-free, high-yield and high-quality agricultural products. The term modernization includes digitization in all areas of agriculture. Agriculture modernization is accepted in developed countries like the United States. Smart farming helps you choose which seeds will thrive in which fields and thus achieve the maximum benefit. In our country there is a need to develop such a system since most of the population depends on agriculture for their livelihood[4].

The system we need to develop must first collect data, analyze data and transmit information over the network to remote locations and intensify it by combining it with new technologies. We currently have IP based cameras and we need to connect them to the internet to continuously monitor our remote farms. We need to integrate it with computing skills such as detecting plant diseases, rodents, monitoring plant growth in the field and informing information by activating electronic devices and Raspberry Pi and sending information to servers which in turn provides information to farmers who are sent[5, 6].

Strawberry fruit image segmentation is widely used in strawberry harvest and fruit Classification. In the strawberry harvest, the strawberry fruit is a normal ripe strawberry, that is it is easy to group fruit images as the color of the fruit area is almost the same. By doing Strawberry sorting, the strawberries have been picked and not yet it is difficult to segment the image because the background is relatively consistent. The strawberry image segmentation algorithm discussed in this article aims to Objections to real-time online identification of three common strawberry diseases. Therefore, this algorithm is suitable for the complete image segmentation of strawberry fruits[7, 8].

According to the Food and Agriculture Organization (FAO) on the future of food and agriculture: The "Alternative Pathways to 2050" report is nearly 10 billion people worldwide. Reach 2050. which governs the continuous increase in crop production. While agriculture In the context of climate change, there is an increase in resource scarcity, with a decrease Water and land resources. Precision farming is a critical approach to assisting compliance the aim of continuously increasing crop production. Precision farming is an operation and information technology-assisted management systems, target Measurement of plant growth, plant health, soil conditions and other factors[9, 10].

Research Method

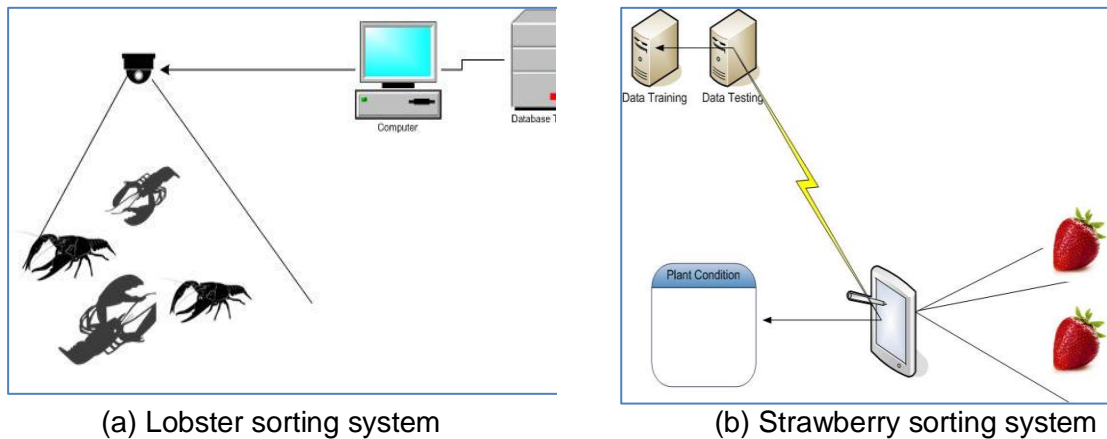


Fig.1, Research method of image processing based sorting system

In the picture above, a sorting method using image processing techniques is implemented and used for the quality sorting process of an agricultural product with the help of image processing techniques, in a computerized system we need the help of a camera and server, the camera is used to take the object of the image either itself, the image fishery products with pictures of lobsters or agricultural products with examples of strawberries, an application or system is expected to be used as a tool to improve the quality of a product. The first thing we have to formulate is to make a tool or identify the required software and hardware that functions as a data processor, while the function of a server is to store an application in the form of web based or mobile if a sorting tool will be made mobile. Another important part is the need for training data and data testing which will later be used to compare the objects we are examining in the form of size, color, type and shape of a strawberry or lobster, with this data we can determine the quality of the product under study and determine a product parameter. , these parameters can also be used to determine the value of the product into a high or low grade.

Implementation System

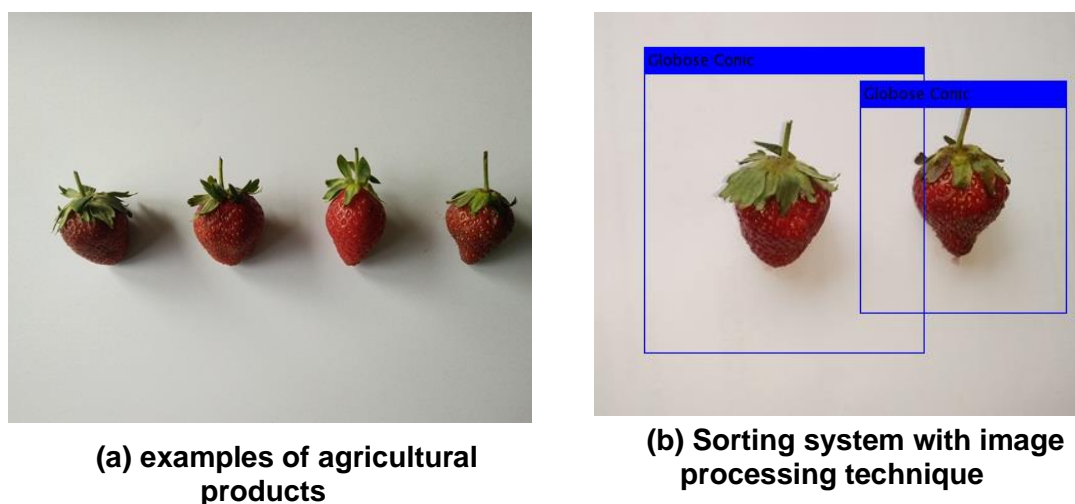


Fig. 2, sorting system process with image processing and artificial intelligence techniques

At this time agriculture is an inseparable part of our lives because it is a source of support for the source of life and has a high economic value, at this time in Indonesia

the conventional-based agricultural system starts from the planting process of care to the post-harvest production process. post-harvest production to see quality still depends and relies on ability during the sorting process which is done manually, causing the sorting process to be missed or defective so that it can reduce sales value, the sorting process itself is not only in the agricultural sector but also in the fisheries sector, such as it is known that Indonesia has very high land and sea fishery potential and can meet export and import quotas, the problem faced is how farmers can meet export quality, one of which is by using a sorting system, for example in the fish sorting system. or on lobsters. at this time farmers and fishermen are required or implement a more modern sorting system that is not done automatically with the help of a computerized system, for example lobster farmers can use IOT (Internet of things) tools to deliver automatically to ponds or breeding ponds so that quality food will be maintained and there will be no accumulation of uneaten feed so that it can contaminate pond water, then the implementation of the second technology is to use an image processing technique system, this method can be used to sort fish or lobster in large quantities so that we can monitor these animals without disturbing the ecosystem the animal is alive. In the picture above is an image processing-based sorting implementation system in reading and determining the quality of strawberries, the accuracy of the image processing system depends on the number of datasets used, the method of collecting datasets is taken by collecting as many types of strawberry or fish species as possible and extracting them into binary form, where the number has a color code or commonly called the degree of gray, the data is then divided into two, namely training and testing data. the process works if a system has new data, the computer will read and compare the object with the training data and display the type of object, accuracy and defects in the object, detection of defects in an object is very important, in addition to improving quality it will also increase the selling value For example, 1 kg of strawberries with various sizes will have a cheap selling value compared to making strawberries of the same size and without defects or defects.

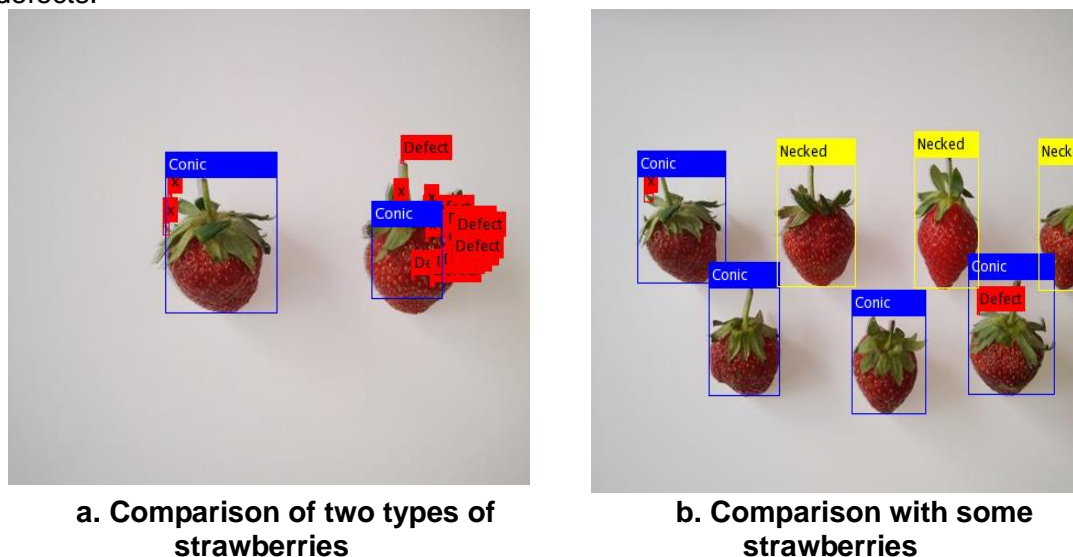
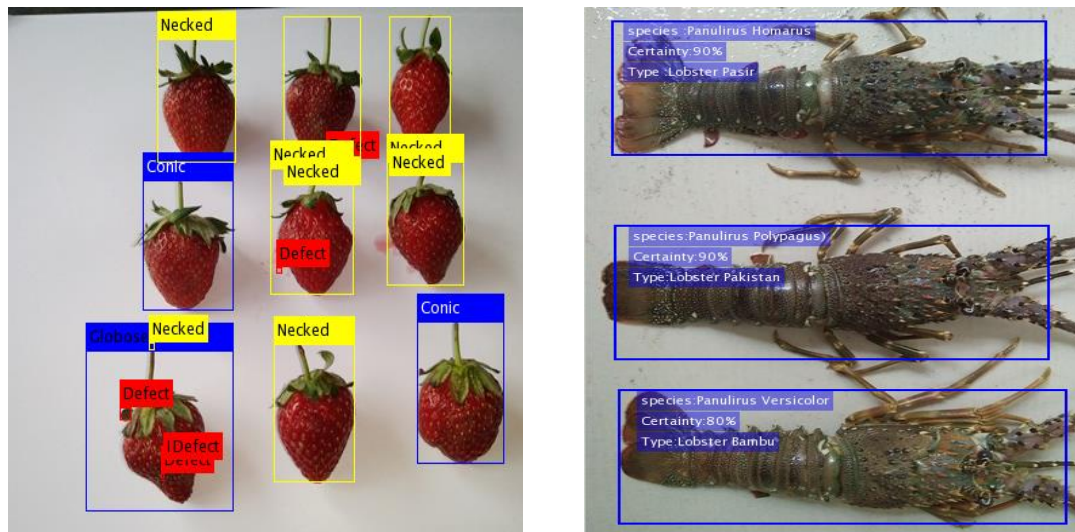


Fig. 3, sorting system process to detect types and objects

In the picture above is a system testing process on agricultural crops, in this case strawberry fruit, in a manual sorting system it will be difficult to distinguish the size from making strawberries because farmers have their own standards, by using image processing technology a sorting size system can be made according to export needs, in a more sophisticated system such as in computerized technical drawings, it

can be set using AI (artificial intelligence) techniques, so the system can distinguish the type of strawberry that is good and has no defects.



(a) pest detection on strawberry fruit.

(b) Lobster identification and size

Fig.4, testing using image processing and AI (artificial intelligence)

In Figure 4 above is an experiment using several strawberry samples in Figure (a) to detect defects or not and the type of strawberry, from the data automatically image processing using AI algorithms can distinguish types of fruit and group them with the economic value of the fruit, from earlier it can be calculated and is able to increase selling value because defects or damaged fruit can be separated and grouped, in Figure (b) is an image processing technique used to detect the type of lobster and its size where the type of lobster that has a large size has a high economic value.

Conclusion

From the experimental results, it can be concluded that the use of appropriate technology can increase the selling value of a product, the product can be in the form of agricultural or livestock products, a sorting concept and the selection of a superior product can increase a selling value, the sorting process with computational able to sort a product. in large quantities which is impossible to do manually. this system in subsequent developments can be improved again for sorting different types of agricultural products, computerized techniques have the advantage of sorting data that can be used to analyze subsequent harvests and become reference material about the condition of the products produced, so that there is something that hinders agriculture, steps can be taken immediately prevention so that the control of agricultural and fishery production can be controlled and prevent crop failure

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