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Design Product Counting and Sorting Tools Using Esp8266-Based Volumenization

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ABSTRACT

Indonesia is a large country, so it does not rule out the possibility of natural resources owned by Indonesia such as natural resources coal, petroleum, gas, nickel and many others When we enter the industrial world, especially placed in the production process area, more precisely the process of sorting goods, it is very necessary to optimize the performance and results of the effectiveness of these working hours so as to get high performance efficiency and will get maximum yield. In the shipping section there are several occurrences of problems which include three main activities of the process of receiving, storing and sending when receiving or sending. We recommend reducing errors at the time of delivery of goods. As for the problem of empty packaging and calculating the number of inappropriate products, by providing solutions using loadcell sensors for weight, proximity sensors for automatic counters and using google sheets as data storage in real time using esp8266 as a controller module.causing performance effectiveness that is expected to be better automatically and using the sophistication of IoT systems connected to the web system.and supported by several Components include relays, pneumatics, googlesheets in order to get accurate results, product sorting tools using this loadcell will be compared with loadcell weighing devices that have been on the market in order to find out how accurately it has obtained the appropriate results using a volume of 103gr. The results of the entire test tool get accurate data ranging from googlesheet to reading through Lcd 20x4 testing is carried out five times so that this tool can be applied to other supporting tools.that the entire tool is able to answer the problems of the developing industrial world.

Keywords: ESP8266; Sorting tool; Googlesheets ; Uptime efficiency; Advanced industries;proximity sensor E18

1. INTRODUCTION

Indonesia is a large country, so it does not rule out the possibility of natural resources owned by Indonesia such as natural resources of coal, petroleum, gas, nickel and many others. So it is not surprising that industry in Indonesia is very calculated by other countries. And with the rapid development of technology accompanied by conducting research that will get the discovery of new things which are very supportive of daily activities both in the industrial and non-industrial fields(Silveira Cunha et al. 2020). When we enter the industrial world, especially placed in the area of the production process, more precisely the process of sorting goods, it is very necessary to optimize the performance and results of the effectiveness of these working hours so as to get high performance efficiency and will get maximum results(Wahyudi, Afroni, and Sugiono 2012). In the shipping department there are several occurrences of problems covering the three main activities of the process of receiving, storing and sending.(Akuntansi 2022). when receiving or sending.(Parningotan and Mulyanto 2020) We recommend reducing errors when shipping goods by using artificial intelligence such as sorting goods using color or weight of goods, Measurement of the type of weight can be done by knowing the weight of the product according to a predetermined weight(Lestari and Candra 2021).

Loadcell equipment as a measure of product feasibility and supported by peneumatic devices as a driver of products that pass heavy ferification. The LoadCell sensor itself is a force sensor used to measure weight.(Waluyo et al. 2019) Some goods counting in industry still uses manual counting using human labor when humans experience fatigue so that the speed and accuracy in calculating goods can be inappropriate from evaluation(Sulistiyowati and Hadidjaja 2016). Performance requires an item counting device that works automatically using the internet of things (IoT) can be interpreted as technology that can be controlled, communicated, and can cooperate with hardware through the internet network using NodeMCU Esp8266(Viviani and Eliza 2022).

With the creation of sorting tools based on the internet of things and reading through google sheets aims to reduce errors in the delivery of a product to be sold to consumers, thus this tool can be used as a form of application of advanced industries.(Kunicki et al. 2019).

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2. LITERATURE REVIEW

Syaprudin, Darwin (2018) with the title "Sorting Goods Based on Weight and Height Based on PLC with Vijeo Citect Monitoring" This study aims to make a tool for sorting goods based on weight and height, with a load cell sensor used as a sensor(Teknik Elektro, Negeri Jakarta, and A Syiwabessy 2018). Fadli Bima, Edidas (2022) with the title "Design and Build a Catfish Harvest Sorting Tool Based on Arduino UNO R3" This study aims to make a sorting tool according to the size of catfish using the CEEL HX711 load sensor for sorting control using a servo motor and combined with an infrared sensor as a counter for the number of catfish(Bima Prakarsa and Edidas 2022). Dio Putra Candra,Rendy munadi (2020) dengan judul "Perancangan dan Implementasi Sistem Perhitungan Barang Otomatis Berbasis Raspberry Pi dan Database Phpmysql" alat ini diciptakan untuk mempermudah suatu kegiatan sehari hari didalam toko penjualan bahan pokok maupun lainya(Elektro and Telkom 2020). Andrian Sunata, Rino (2020) with the title "Design and Build a Production Quantity Counting Tool Using a Web Service-Based Load Cell Microcontroller", the tool is expected to no longer manually calculate the number of results from production using the weight system of the load cell sensor as a detection tool and using the ESP8266 module integrated into the web as a data base so as to reduce the occurrence of errors when recapping calculations(Sunata and Rino 2020).

3. METHOD

In order to get relevant and accurate results, a case study is carried out through the problems faced and looking for references that support this research. As for the problem of empty packaging and calculating the number of products that are not suitable by providing solutions using loadcell sensors(Bima Prakarsa and Edidas 2022). For the weight of the proximity sensor for the counter(Teknik Elektro et al. 2018). Automatically(Elektro and Telkom 2020). As well as using Google Sheets as a data store in real time by using ESP8266 as a controller module(Sunata and Rino 2020).(Sahuri et al. 2021)

Tool Connection Design

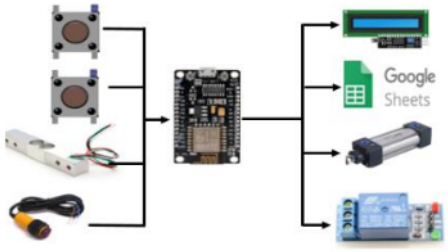

Figure 1. Tool Connection Design

Can be seen from picture 1.tool connection design the working system of a tool sorting goods using a loadcell as a product frification while calculating the number of products is read automatically and can be connected to Googlesheets As for the explanation of the purpose of the figure.

Tool Connection Design is:

1. Push button 1 as turning on power and push button 2 as a researcher when reading mismatch.
2. Loadcell sensor as a load control device on the product.
3. E18-D80NK proximity sensor as a counter for products that have been differentiated by the loadcell.
4. Lcd 20x4 as the reading of the corresponding product result.
5. Google sheets as an online recipient of data.
6. Peneumatic as a product booster that matches the device setting.
7. Relay as a contact to help turn on the electric valve and other supporting devices.

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Connection Wering Design

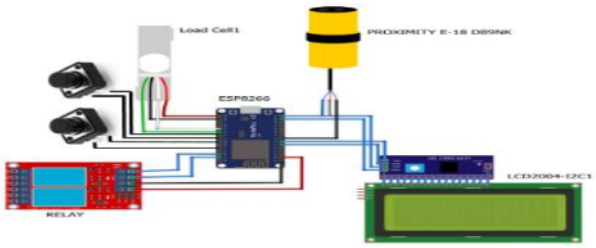

Figure 2. Connection Wering Design

Can be seen from picture 2. Connection wering design the overall series of tools above shows several components used to make a sorting device based on product weight, including the components used are microcontrollers ESP8266 as the next data processing module using relays as connecting components of electric valves and supporters, Push buttons are used for researchers when the tool is incompatible, Lcd i2c 20x4 as a monitor when the product has been read by the loadcell sensor, As well as a very fit component, namely the loadcell is used to calculate the amount of weight of a product, Proximity as a counter for the number of products.

Finished Tool Design

In making this tool design aims to minimize the occurrence of errors with good planing and planning will produce reliable tool quality for tool sizes 30cm x 15cm x 75cm. in size according to the proportional demand. Pictures can be seen 3. Finished tool design

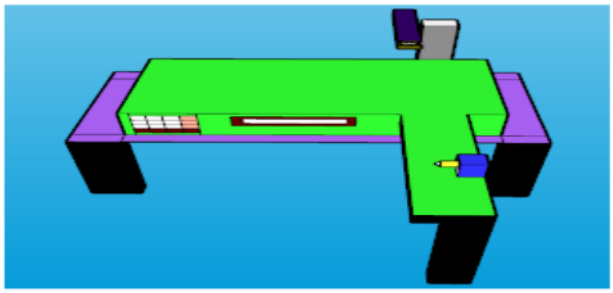

Figure 3. Finished Tool Design

Block Diagram

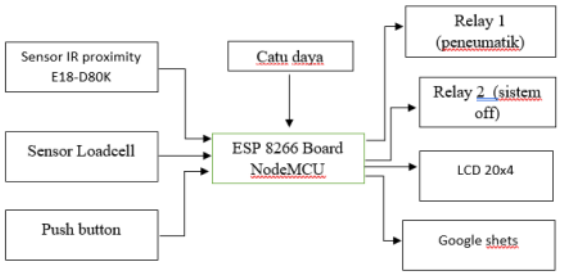

Figure 4. Block Diagram

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Can be seen from picture 4. Blok diagram in the current research, we will make a tool that is useful for sorting and counting entitled sorting tools using a volumenization system of packaging products based on esp8266, the working system of this tool is to use microcontrollers ESP8266 as modules will control loadcells as weight ferification and proximity for counters and relays as connectors and breakers valave electric The current series of tools is updated using esp8266,goole

System Flowchart

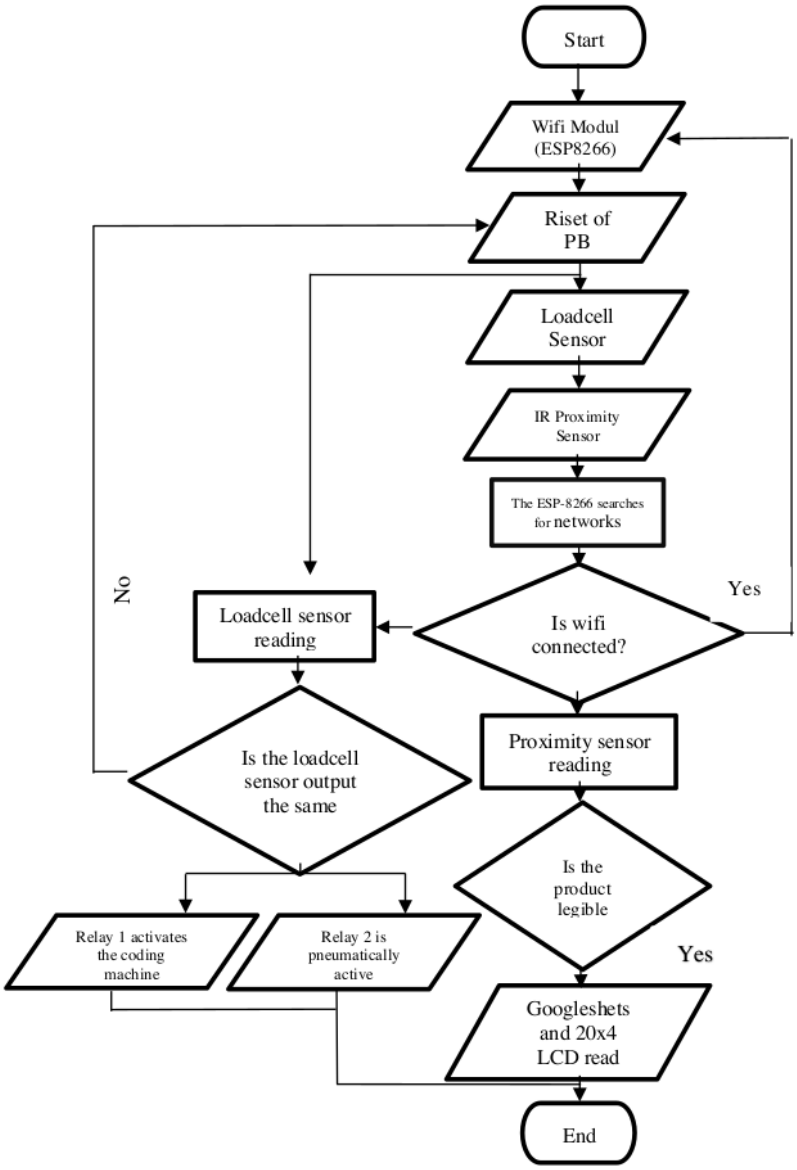

Figure 5. System Flowchart

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Figure 5. explain for a more detailed and clearer tool workflow, it will be explained as follows:

1. At the start session, the support system will run, for example conveyors or other machines.
2. In the next stage, the researcher button functions as research when there is an incompatibility in the tool system.
3. At the next stage, the product has arrived at the weighing area using a loadcell, reading the specific gravity of the product will communicate with the ESP8266 module if it matches the weight of the two relays on and vice versa if it does not match the two relays off
4. The next stage of the infrared proximity sensor is a sensor for calculating products that have been differentiated by the specific gravity system of the product.
5. By using esp8266 as a module for communication between infrared sensors to 20x4 lcd and provide communication between google sheets, If the wifi or internet signal is cut off, esp8266 cannot communicate with googlesheets, the monitoring will be done with a 20x4 lcd only

4. RESULT

Testing the sorting tool using loadcells and proximity sensors and supported by several components including relays, pneumatics, googlesheets in order to get accurate results, product sorting tools using loadcells will be compared with loadcell scales that have been on the market in order to find out how accurate the tool is, there are several stages of testing.

1. Installing the power cable against a 1pas power source.
2. Turn on Pb 1 to turn on the whole system.
3. Tare the tool in order to get the appropriate results.
4. Put the product in a sorting tool using a weight system (loadcell).
5. View results from Lcd and Google sheets, write and document.

After doing these steps, you can compare the product sorting tool with the loadcell sensor with other comparison tools.

Figure 6. Tool Comparator

From figure 6. Showing that the tools made with the comparison tool are appropriate, namely both 103gr data can be seen in the following table.

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Table 1. Testing of Sorting Tools Using Products Volume Contents >103 gr

Push Button	Product Volume Readings	Loadcell Sensor readings against the system		Information
		Relay 1 Peneumatic System	Relay 2 Conveyor Support Equipment	
on	103	on	off	tool runs well
on	103	on	off	tool runs well
on	103	on	off	tool runs well
on	103	on	off	tool runs well
on	103	on	off	tool runs well

Table 1. Above testing of sorting tools using products volume >103gr explained the performance of the tool starting from the push button as a switch and reset the button itself has two functions: work on and off when the button is pressed, it will be on when the button is pressed again off(Muhammad 2019). Loadcell that serves as a wheatstone bridge to read product weight(Sasmoko and Wicaksono 2017). Relays are used as control system switch media that have spring coils No and Nc(Gps et al. 2022). By testing five times without any errors, it can proceed to the next stage.

Table 2. Data Retrieval via Googlesheets

Date	Time	number of products	Product weight
30/08/2023	23.08.14	1	103
30/08/2023	23.08.59	2	103
30/08/2023	23.09.30	3	103
30/08/2023	23.09.59	4	103
30/08/2023	23.10.38	5	103
30/08/2023	23.11.24	6	103
30/08/2023	23.11.58	7	103

Table 2. Above data Retrieval via Googlesheets shows the results of the connection between the ESP8266 module and Gooleshet which is good enough to send and receive data ESP8266 itself has wireless fidelity so it is often used because the minimalist size of the power used is quite economical (Mulya, Rizkiqa Akbar, and Widasari 2017). With the existence of Google, the world of work is made easier because the platform can store data and make it easier to retrieve data even though it does not carry other devices (Kunicki et al. 2019).

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Table 3. Overall Testing of The Tool

20x4 lcd readings	Reading Googlesheet		Relay Performance		Information
	Total products	Product weight	Pneumatic R1	R2 conveyor support tool	
	1 pcs	103gr	On	On	tool runs well
	2 pcs	103gr	On	On	tool runs well
	3 pcs	103gr	On	On	tool runs well
	4 pcs	103gr	On	On	tool runs well
	5 pcs	103gr	On	On	tool runs well

Table 3. Above showing the performance of all tools, here it can be concluded that each tool has worked normally such as an lcd whose reading is appropriate, when the segment is said to be dark, the shaped character pattern is displayed (Anwar et al., 2019). Proximity can also upload from readings because this sensor is used to detect a certain object, the reading distance is 3cm-80cm (Rianti and Wildian, 2022).from five tests, the entire sorting and counting tool shows that the loadcell sensor and proximity sensor have worked in accordance with what was designed before, namely calculating the number of products that have been differentiated by the amount of weight weighed by the loadcell.

DISCUSSIONS

The sorting tool for goods using a volumenization system using a loadcell sensor and is guided to input the number of incoming goods by automatically calculating the product after being differentiated by the loadcell sensor, if the weight of the product is not appropriate, the pneumatic will not encourage the product because this tool has been systemized for further researchers, researchers currently recommend using a different ESP and the weight capacity of the product is added.

CONCLUSION

After going through various stages of testing sorting tools using volumenization, it can be concluded that all of these tools are able to answer the problems of the growing industrial world and the conclusion of this tool ,Laoadcell hx711 can be used as a product sorting tool combined with a relay with an average weighing result of 103gr, Proxim is capable of being a product counting tool and functions as a publish to googlesheet when the product weight is in

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accordance with the ferification. Googlesheet can help improve the performance of company employees where Googlesheet itself can store and process data in real time with online access. For the application of this tool, the weight used is >100-103gr which is often purchased by customers.

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