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SIREUBOH: LOCATION DATA CLASSIFICATION OF GOODS USING REGION OF INTEREST (ROI) AND RANSAC ALGORITHM

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Abstract

Warehouse Management System (WMS) in companies engaged in logistics, in the operation system management section is still complicated in the process of placing goods. The RANSAC algorithm method uses Region Of Interest (ROI) to reduce the scope of item location data and the RANSAC algorithm to measure the accuracy of item location data for the process of placing goods according to company requirements. The results of the analysis with matching Dloc WMS data and Logistics Execution System (LES) with a percentage value of 87% for the accuracy of the data location of goods by processing 100 samples of location data of item owned by the company. The results of this study are very useful because it can do data matching based on the location of the goods.

Keywords: *WMS, LES, RANSAC Algorithm, ROI.*

1. Introduction

Logistics is a planning orientation and a framework that seeks to create a plan for the flow of products and information through business [1]. Logistics performance is also significant for a country's economic growth and competitiveness, so logistics workers have a global measurement called the Logistics Performance Index (LPI). The value of LPI is determined by the results of surveys of logistics professionals in a country [2]. The LPI results in 2018 designate Germany as the best-performing country, with a score of LPI 4.20 and Afghanistan as the lowest, with a score of 1.95 [3]. While the Indonesian LPI score in 2018 rose 0.17 points (5.7%) to 3.15 from 2.98 (in 2016). The increase in scores was mainly supported by an increase in the International Shipments dimension (increased by 0.33 points or 11.4%), Infrastructure (0.25 points; 9.4%), and Timeliness (0.21 points; 6.1%). Furthermore, other dimensions that contributed positively were Tracking & Tracing (0.11 points; 3.4%) and Logistics Competence (0.10 points; 3.3%). Meanwhile, the Customs dimension decreased by 0.02 points or 0.7% [4].

Problems in logistics are always faced with uncertainty and risk because of their uncertain nature [5]. Logistics sector players need an innovation that can improve competitiveness in services [6]. In Indonesia, the development of an efficient logistics system is a challenge faced by several companies [7]. In warehousing in logistics companies, there is a problem which does not have a modern warehouse to manage all the processes that occur within the warehouse, making it difficult for the team member/warehouse staff to perform their work processes. In warehouses, errors or difficulties often occur in the process of placing goods, because location data is different from the system that runs on the logistics company.

This research was conducted to analyze the location data of goods in WMS and LES using the RANSAC Algorithm. The first step is to find the edge pixel, then connect the edge to small segments using the RANSAC method. After that, combine sections into lines and see

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all intersection points of all lines perpendicular to each other. The last step, understanding the two pairs of intersection points with the farthest distance, will get four outermost markers which are essential steps in detecting markers [8]. This study uses the RANSAC algorithm, to see the feasibility of the method used by processing 100 item location data to measure the accuracy of the data from the location of the goods currently running, which is to help the process of placing the item with accurate location data.

2. Related Works

Receiving is all the beginning of the flow of goods moving in the warehouse. The receipt of goods from suppliers or partners does look easy, but if this does not have a regulating system, it can certainly interfere with productivity [9].

The RANSAC algorithm in the image correction algorithm is a more classic algorithm, which is characterized by high stability, good accuracy, and good screening ability for error matching points [10]. The RANSAC algorithm is also used to estimate a model from a data set, where the estimated model is fulfilled by most of the matching points [11].

In this study utilizing the Region Of Interest (ROI) to reduce the scope of goods location data and the RANSAC algorithm to measure the accuracy of item location data for the process of placing goods corresponding company needs.

3. Research Method

In this study using the RANSAC algorithm in the process of calculating the accuracy of the accuracy of data items in a logistics company. To solve the problem, it is necessary to apply the research methodology, which is shown in Figure 1.

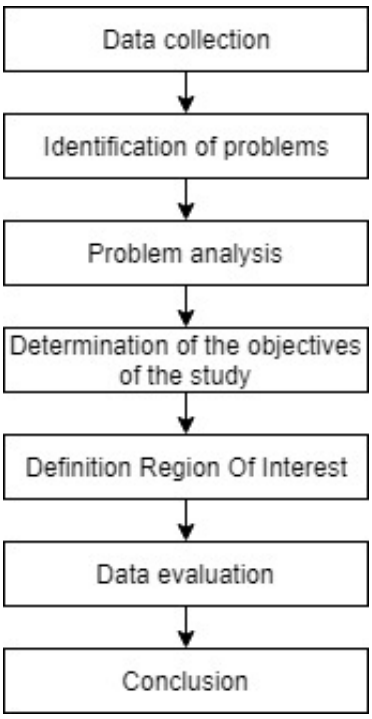

Figure 1. Flowchart of research methodology

3.1. Data collection

At this stage, the author collects data from primary data, secondary data, interviews, observations and literature as data needed to support the author's research.

3.2. Identfication of problems

At this stage, the author will find problems that occur in the warehouse, see issues in the placement of goods, and those who need accurate location data.

3.3. Problem analysis

At this writing stage, the author will analyze what happened to the warehousing management system. The author will formulate steps for the problem that has been done by carrying out an analysis such as identifying, understanding and analyzing.

3.4. Determination of the objectives of the study

The purpose and benefits for processing information using the RANSAC algorithm, with that can streamline the tasks of the warehouse staff in the process of placing goods with accurate data. With the existence of this research, it is also expected to be able to dispose of disturbances in the warehouse.

3.5. Definition Region Of Interest

The benefits of Region of Interest (ROI) are areas that are used as the most significant area in a data to be identified for a particular purpose. At this time, the researcher chooses location data and data for location data of goods to be processed. The purpose of using the ROI feature is to minimize the scope of data to be treated, thereby increasing process data.

3.6. Data evaluation

At this stage, the results of the accuracy of the location data for the placement of goods will be carried out on the data determined from the Region of Interest (ROI). To calculate accuracy data use the RANSAC algorithm argument as follows:

$$k = \frac{log(1-p)}{log(1-w^n)} \tag{1}$$

3.7. Conclusion

The results of the study were obtained from the effects of data analysis using the RANSAC algorithm, where the results of the data collected at the level of 87%, can help the process of placing goods with accurate location data. Then the author will provide advice that can be used by logistics companies.

4. Result and Analysis

In this process, we will review the data generated from the results of the data that have been carried out to support the analysis of this study using the RANSAC algorithm, so that it can provide benefits for operating system management.

4.1. Business Process Receiving Goods

The business process of receiving goods to be analyzed based on the process, using a new method in carrying out goods placement activities, makes it easier for researchers to process the RANSAC algorithm to determine the accuracy of the accuracy of the data on placement of goods.

4.2. Primary Data

Primary data is obtained and collected directly from the source. The main data source comes from fieldwork. Primary data includes information on goods that occur in logistics compa-

nies, which are several categories, namely Part Used, Dloc, and LES.

4.3. Region Of Interest

At this stage, the area of interest processes 100 item location data from primary data, which in the primary data there are many categories, and researchers will process data based on the location data of the item as a sample data, to determine the accuracy of data accuracy in wms and use RANSAC algorithm, from the results of the analysis and data that have made 87 suitable data and 13 data do not match.

4.4. Data Evaluation

At this stage the continuation of the region of interest, which utilizes the data that has been made, to process the calculation of the accuracy value of item. which in this calculation uses the formula of the RANSAC algorithm.

The calculation of the value to determine the accuracy of the data from the RANSAC algorithm formula is as follows:

Table 1. Perhitungan Akurasi

Aktual	Akurasi Data	
	DLOC	LES
DLOC	TD (TRUE DLOC)	FD (FALSE DLOC)
LES	FL (FALSE LES)	TL (TRUE LES)

Actual is the ownership of the location of goods sourced from primary data. If the results of dloc matching and location of les are the same, the results are correct. The number of true and false can be seen in Table 2. The following are the results of calculating the accuracy of the item placement data:

Table 2. Hasil Perhitungan

Aktual	Akurasi Data	
	DLOC	LES
DLOC	87	13
LES	13	87

$$Akurasi = \frac{87 + 87}{87 + 87 + 13 + 13} = \frac{147}{200} = 0.87 = 87\% \quad (2)$$

Based on the results of the calculation of Table 2, the accuracy of the item location data is obtained by 87%, in the location data of the goods that are currently running. Which is where the accuracy of the location of the item at WMS with tutoring using the RANSAC algorithm can be used to match location data on WMS and tutoring where errors often occur in the process of placing the goods, because the location data is inaccurate.

5. Discussion

The results of the analysis are to match the Dloc WMS data and the Logistics Execution System (LES) with a percentage value of 87% for the accuracy of the location of the item data by processing 100 samples of the location data of goods owned by the company. In this study very beneficial for logistic companies because they can match the location data of items.

6. Conclusion

The results of the study used the RANSAC algorithm to determine the accuracy of item location data from 100 sample data, obtained from the evaluation of goods location data at WMS and tutoring, with an accuracy rate of item location data accuracy of 87%. Accurate location of goods.

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