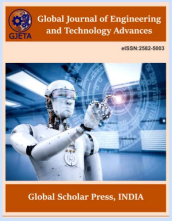
Global Journal of Engineering and Technology Advances

eISSN: 2582-5003

Cross Ref DOI: 10.30574/gjeta

Journal homepage: https://gjeta.com/



(RESEARCH ARTICLE)

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Dashboard Model Design for Tuna Fish Processing (PT. XYZ)

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Global Journal of Engineering and Technology Advances, 2023, 14(01), 039–049

Publication history: Received on 01 December 2022; revised on 12 January 2023; accepted on 15 January 2023

Article DOI: https://doi.org/10.30574/gjeta.2023.14.1.0012

Abstract

The dashboard systems provide visualization model help the management to make decision which shows the data summary in each processing stage and comparison of total result of main product and side product in specific periods of time at fish processors. This research proposes dashboard model to designed in fish processors which huge of complex processing data available and have difficulties to analyze and require some times to process data analytical to display the production result in each processing stage. We design analytical dashboard to show the quantity fish processed and seafood product summary analysis in each processing stage i.e. total weight of receiving, cutting, retouching, packing and shipment. The dashboard system helps the management to make quick decision based on analytical information related to how many fish processed, product result per each processing stage, and also help to compare yield in cutting and retouching process based on type of raw materials (dirty loin and clean loin). This dashboard also displayed details total production and total side product (by-product) i.e. black meat, belly, red meat, and residue. The scope of this research is to display summary analytical data from the periods September until November of 2022. Based on the calculation, the yield of cutting process during the period September to November was 63.7%, while the yield for retouching process was 57.65%. In this research it explained that by-product percentage for dirty loin cutting shows a higher percentage compared to clean loin because the dirty loin has more parts to remove.

Keywords: Dashboard; Yield; Review; Visualization

1. Introduction

Dashboard is the graphical and visualization model help the management to make decision which shows the data summary in each processing stage and comparison of total result of main product and side product in specific periods of time at fish processors. The dashboard is used to show the quantity fish processed and seafood product summary analysis in each processing stage i.e., total weight of receiving, cutting, retouching, packing and shipment. The dashboard system helps the management to make quick decision based on analytical information related to how many fish processed, product result per each processing stage, and also help to compare yield in cutting and retouching process based on type of raw materials (dirty loin and clean loin) in PT XYZ. Cutting process means to cut each fish into 4 pieces called loins to get best part of fish meat while the unused parts called as by-product. While retouching process means to trim each loin to make better shape and remove unused parts of loin. The dashboard system visualizes the data in pie charts, and developed based on JavaScript language web application system using Canvas.js. This dashboard visualizes processing data in each stage in the periods of September to November 2022. Fish / loin receipt from supplier is in the form of clean loin and dirty loin. The dashboard displays the total weight and total pcs receiving of clean loin, and the total weight and total pcs of receiving dirty loin. The dashboard also displays the total weight and total pcs of cutting, total weight and total pcs of retouching. Total weight packing and total box, total weight shipment and total box shipped. The dashboard displayed based on date selection, so it displays the data processing from selection date. This dashboard has menu to compare total weight of main process i.e. cutting dan retouching with the total weight of by-products for

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each process. The dashboard analysis result can be used as a reference to determine the total production of each production stage and compare percentage of the total weight main process with total weight of by-products.

2. Related Work

Some related researches are implementation of an electronic dashboard with a remote management system to improve glycemic management among hospitalized adults, 2020 by Y. Sheen. This study aims to get better glycemic control for hospitalized diabetic patients significantly reduces health expenditures and improves disease outcomes. It developed a dynamic dashboard with a remote management system and evaluated its impact on inpatient glycemic control. This study to observe participants were enrolled from a 1,500-bed public medical center from 2016 to 2018 and evaluated the impact of a dynamic dashboard system, which analyzed and monitored all glucose data with virtual glycemic management recommendation by a team of endocrinologists. It successfully implements electronic medical records-based dashboard monitoring system to improve inpatient glycemic control. The system, supported by a team of endocrinologists via remote recommendations, could efficiently fill an important need for improved glycemic management among hospitalized adults[1]. Another study from Nashrulloh, M (2019), about designing smart dashboard system towards digital leadership in franchise organizations. This study implements an innovation assimilation strategy framework, how franchise organization used its implementation of a Smart Dashboard System to improve performance, allows franchisors to keep a handle on their franchise accounts and put it on a path towards digital leadership. The franchise business is getting its place as a proven business format and successfully delivering thousands of business brands across various continents and times[2]. Another study from W. Lin and M. Low (2021), about design and development of a digital twin dashboards system under cyber-physical digital twin environment. This paper researched the design and development of a digital twin dashboards system for manufacturing systems. The digital twin dashboards system serves critical functionalities such as visibility and visualization of the various component modules under a cyber-physical digital twin system architecture. The digital twin dashboards system is required within the cyber-physical digital twin architecture environment based on the industry requirements. The key feature of the digital twin dashboards system is switching between a physical production database and a cyberspace simulation database connected seamlessly[3]. Another study from A.Andiani (2020) about dashboard information system of peminjaman uang (pinang) application. This study develops a digital application-based BRI Agro product that runs on the Android operating system, wherewith this application customers can apply for loans without collateral digitally, anywhere, and anytime. It requires a system that can help the process of managing data from Pinang customers, starting from adding company cooperation with the Pinang application to maintaining and monitoring the system. Pinang dashboard information system is needed that can assist in the operation of the Pinang application that is capable of managing data, monitoring, and maintenance if there are problems in the Pinang application borrowing process, including customer status, whitelist, repayment, disbursement, outstanding, ID card approval, and report withdrawal. By using Pinang Dashboard, it can facilitate the operational team in maintaining the Pinang application and building a system that can manage, monitor, and provide information related to the Pinang application[4]. Another study from J.Han and K.Kim (2021) about learning analytics dashboards for adaptive support in face-to-face collaborative argumentation. This study uses learning analytics to develop a dashboard system that provides adaptive support for F2F collaborative argumentation (FCA). This study developed two dashboards for students and instructors, which enabled students to monitor their FCA process through adaptive feedback and helped the instructor provide adaptive support at the right time. The effectiveness of the dashboards was examined in a university class with 88 students (56 females, 32 males) for 4 weeks. The dashboards significantly improved the FCA process and outcomes, encouraging students to actively participate in FCA and create high-quality arguments. Students had a positive attitude toward the dashboard and perceived it as useful and easy to use. These findings indicate the usefulness of learning analytics dashboards in improving collaborative learning through adaptive feedback and support. Suggestions are provided on how to design dashboards for adaptive support in F2F learning contexts using learning analytics[5]. Another study from Al-Aidaros (2017), about requirements modeling for university e-Ranking Dashboard System (e-RDS). The main aim of this study is to construct a requirement model for the e-Ranking Dashboard System (e-RDS) by using Unified Modeling Language (UML). World university rankings have positively influenced the development of organizations and widely attracted the attention of policy makers, especially in educational institutions. Universities have since developed systems to help decision makers in strategic planning for the ranking agenda. However, to date there has been no standard or generic model established for the university ranking information system. Requirement development phases have been adopted to achieve the objectives of this study and a set of questionnaires has been used to validate the prototype. As result, users gave positive feedback on the e-RDS's effectiveness and ease of use. Developers and system analysts can simplify the system design phase and improve the reliability of system deliverables[6]. Another study from R. Akbar (2020) about Implementation of Business Intelligence for Sales Data Management Using Interactive Dashboard Visualization in XYZ Stores. This study implements the Business Intelligence (BI) application at the XYZ Store by using Interactive Dashboard Visualization. In carrying out its operational activities, XYZ Store uses the Smile Invent application to manage data on products sales transactions. This research can produce reports in the form of Interactive

Dashboard Visualization that can be used by store managers to make better decisions[7]. Another study from J.Jamil (2016) about an innovative Data mining and dashboard system for monitoring of Malaysian dengue trends. This study is to implement one monitoring system required an innovative system that capable to extract many data and information from several databases and capable to summarize these data into meaningful information. Monitoring dengue fever become an important task in reducing dengue outbreaks crisis. These monitoring tasks offered the stakeholder such as the Ministry of Health Malaysia (MOH) well informed status of the dengue fever. There are abundant dengue cases reported in Malaysia including mortality recorded over the past year. Data from Malaysian Open Data portal reveals, 21,900 cases of dengue fever were reported in 2012 with 35 deaths. Knowing the dangerous effect of dengue fever, thus one of the solutions is to implement an innovative forecasting and dashboard system of dengue spread in Malaysia, with emphasize on an early prediction of dengue outbreak. The dashboard will deliver the message to health policy makers such as The Ministry of Health Malaysia (MOH), practitioners, and researchers of the importance to integrate their collaboration in exploring the potential strategies in order to reduce the future burden of the increase in dengue transmission cases in Malaysia[8]. Another study from D.Mould (2015) about Dashboard systems: Pharmacokinetic/pharmacodynamic mediated dose optimization for monoclonal antibodies. This study to implements dashboard systems, which are decision-support tools, offer an improved, convenient means of tailoring treatment for individual patients and reviews the clinical need for this approach, particularly with monoclonal antibodies, the design, development, and testing of such systems, and the likely benefits of dashboard systems in clinical practice. Many marketed drugs exhibit high variability in exposure and response. While these drugs are efficacious in their approved indications, finding appropriate dose regimens for individual patients is not straightforward. Similar dose adjustment problems are also seen with drugs that have a complex relationship between exposure and response and/or a narrow therapeutic window. This is particularly true for monoclonal antibodies, where prolonged dosing at a sub-therapeutic dose can also elicit anti-drug antibodies which will further compromise safety and efficacy. Thus, finding appropriate doses quickly would represent a substantial improvement in healthcare by using dashboard systems[9]. Another study from Van Ginkel (2018) about Urban Water Security Dashboard: Systems Approach to Characterizing the Water Security of Cities. This study is to implement the dashboard to ten cities to capture different characteristics of their water security and ranked the cities based on their overall water security index score. Urban water security is a major concern in the context of urbanization and climate change. Water security goes beyond having good infrastructure or good governance. This study developed a dashboard of 56 indicators based on the pressure-state-impact-response (PSIR) framework and applied the dashboard to ten cities to capture different characteristics of their water security and ranked the cities based on their overall water security index score. We found the highest levels of water security in wealthy cities in water-abundant environments (Amsterdam and Toronto), in which security is determined by the ability of the city to mitigate flood risks and the sustainability of hinterland dependencies for water supply. The lowest security was found in developing cities (Nairobi, Lima, and Jakarta). The combination of large socioeconomic pressures (e.g., rapid population growth, slums, low GDP, polluting industries) and an inadequate response (weak institutions, and poor planning and operational management) leads to inappropriate fulfilment of all functions of the urban water system[10]. Another study from Eka Putra (2020) Design Dashboard Model for Fish Processing System (Case Study PT Blue Ocean Grace International). The background of this research is a huge of complex processing data which is difficult and require sometimes to process and to present data analytical to management to monitor and review processing result and making decision based on data analytical. This research to design graphical analytical dashboard which make easy to present the quantity fish processed and seafood product summary analysis in each processing stage start from receiving, cutting, retouching, packing and shipment. By using this dashboard, management enable make quick decision based on analytical information related to how many fish processed, quantity of seafood product resulted per processing periods to decide and determining future plan strategy related to fish supply, market demand. The scope of this research is to present summary analytical data from the periods July until December of 2019 at PT Blue Ocean Grace International[11].

3. Methodology

3.1. General System Overview

There are several stages that must be carried out to design the dashboard model of a fish processing information system. The stages of the research procedure start from identifying the system requirements, collecting data at each stage of processing starting from receiving, cutting, retouching, packing and shipping. Furthermore, we calculate total cutting of clean loin and total by-product cutting and then both of them are compared. We calculate also total retouching from clean loin compare to total by-product retouching. Total cutting from dirty loin is calculated and compared to total by-product cutting, total retouching from dirty loin compare to total by-product retouching. The next stage of planning, in the form of meta-analysis of the total quantity of fish received, the total quantity of seafood products in the process of cutting, retouching, packing and shipping. The next stage are planning dashboard functionality or the type of dashboard type to be used, in this research we use the dashboard using pie chart, for easy to read and understand. The next stage

is designing prototype dashboard for fish processing information systems, designing designs and layouts, and designing navigation menus. The last step is to review the dashboard system that was designed and make improvements to the revision of the results of the review in Figure 1.

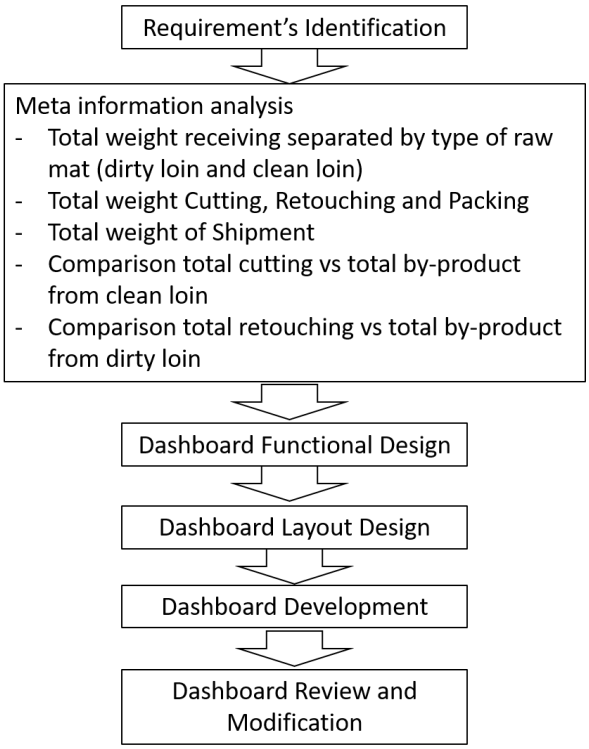

Figure 1 Research Flow

After design dashboard system has completed, then continue to design user interface of dashboard system as shown in Figure 2.

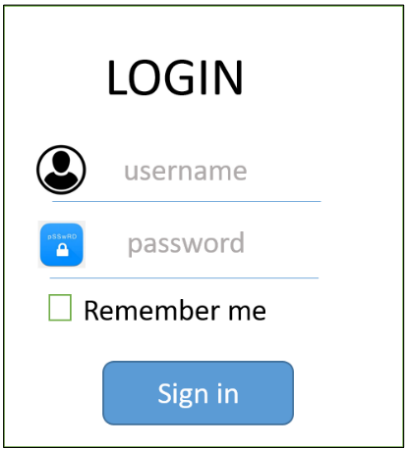

Figure 2 Login Transaction

The function of user interface login, is to make authorization which user enable to login once they have account registered. To register new user account, it manages by company user administrator, which the user interface design to create new user could be seen as Figure 3.

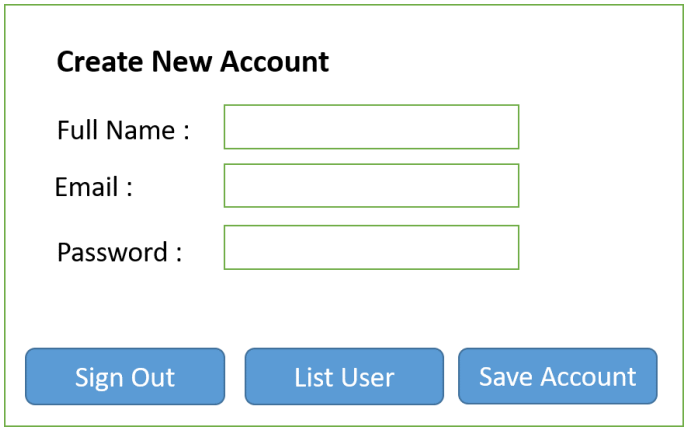

Figure 3 User Interface New User Account

Once user has been registered, system provide user interface list of user account as seen in Figure 4

Figure 4 User Interface List of User Account

The dashboard shows the total weight and total pieces for each stage of fish processing, and total box of seafood product on each stage based on date periods generated. User interface design could be seen in Figure 5.

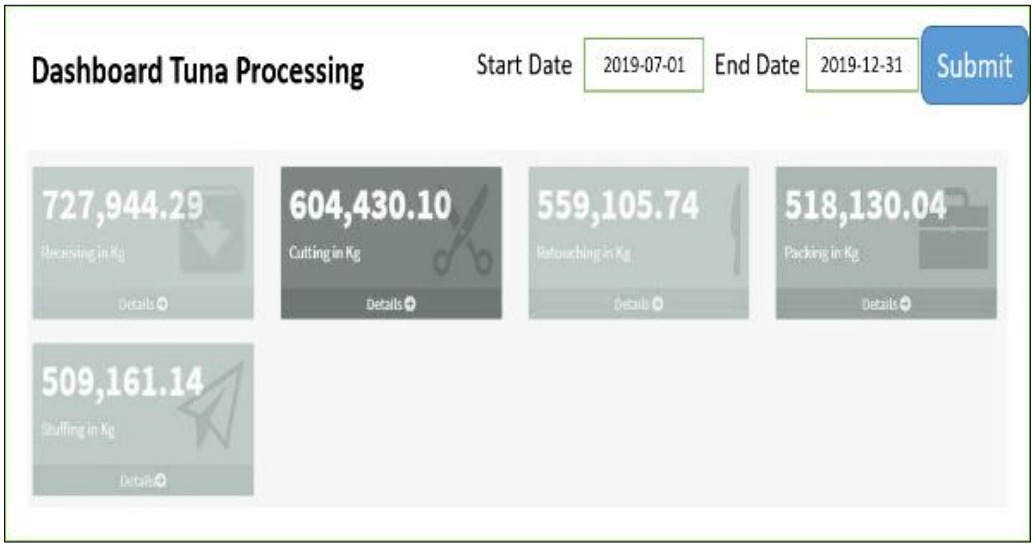

Figure 5 User Interface Design of Dashboard Each Stage of Tuna Processing

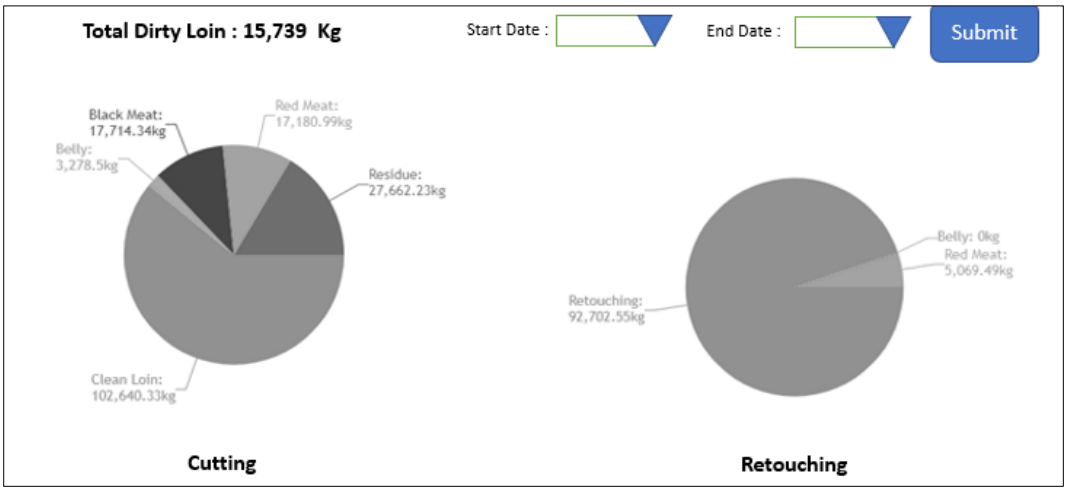

Figure 6 Comparison Total Weight Cutting and Retouching vs Total By-Product from Dirty Loin

Figure 6 shows a comparison of the total weight of Cutting and Retouching compared to the total weight of by-product dirty loin.

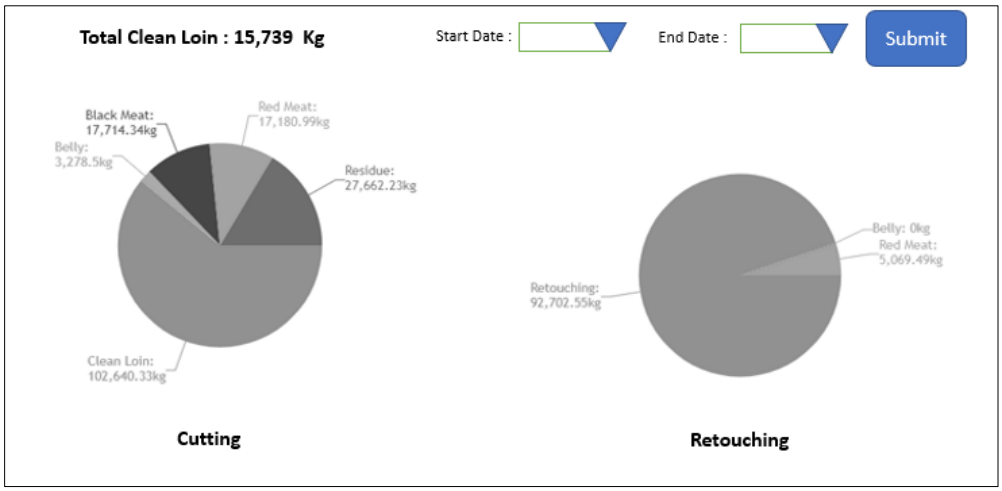

Figure 7 Comparison Total Weight Cutting and Retouching vs Total By-Product from Clean Loin

Figure 7 shows a comparison of the total weight of Cutting and Retouching compared to the total weight by-product clean loin.

4. Results

4.1. User Interface Screen Display

Login interface is used to make authorization only registered user enable to login. Login consist of user name by inputting email of users and password to login. User credentials managed by user administrator. User interface login could be seen in Figure 8.

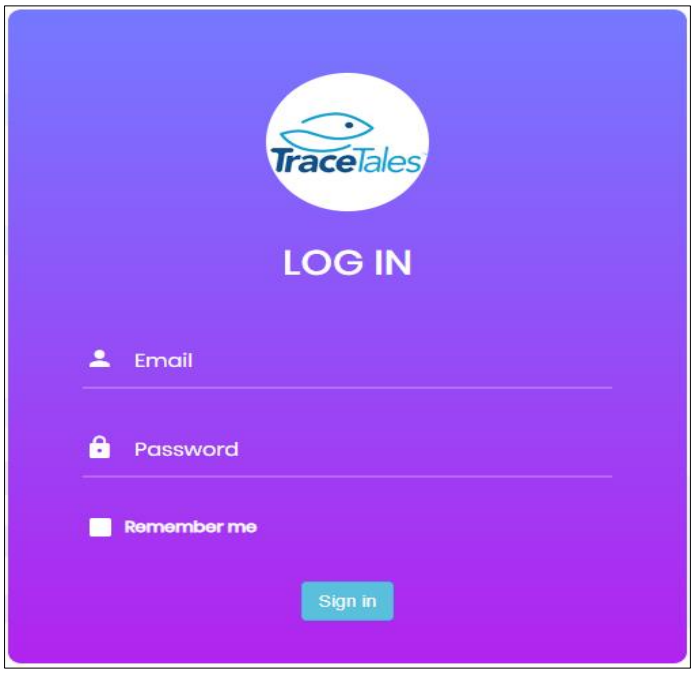

Figure 8 User Interface for Login System Dashboard

User interface create new user function is to register new user, managed by user administrator, could be seen in Figure 9.

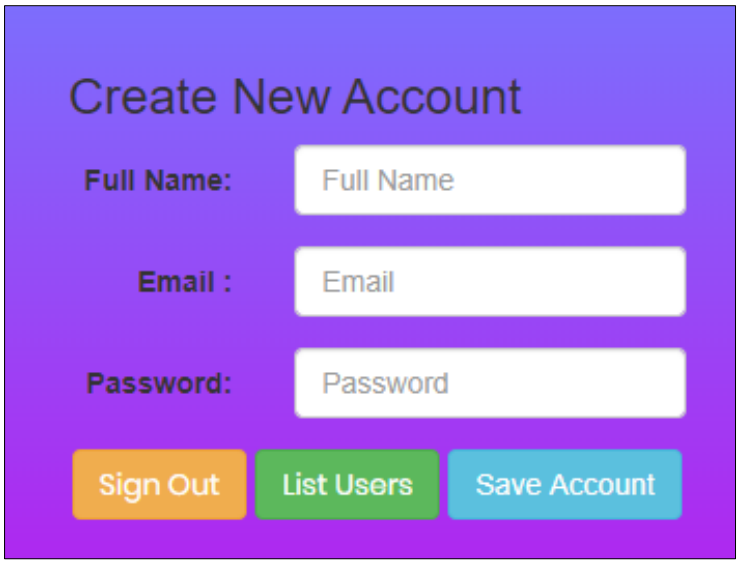

Figure 9 User Interface Create New User

User has been registered could be present in list of users. Administrator could edit user or remove user from the list. User interface could be seen in Figure 10.

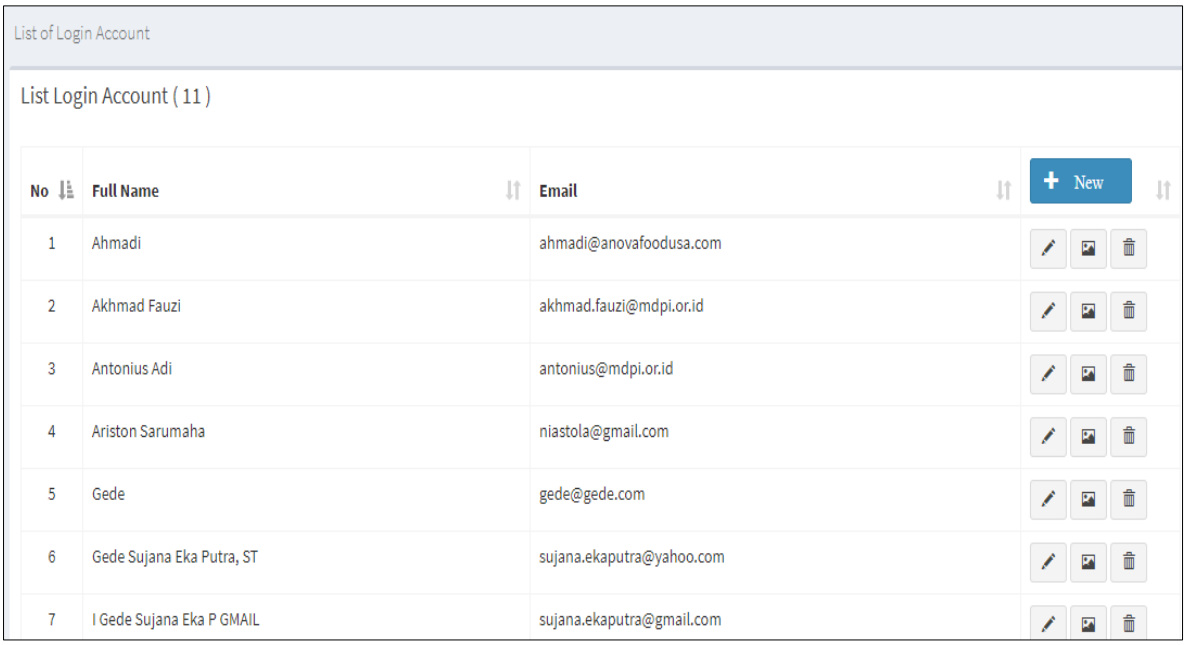

Figure 10 List of User

Once user successfully login into dashboard system, then system present total weight kg per receiving stage, cutting stage, retouching stage, packing stage until shipment. Total weight calculated per specific periods present in each stage processing as seen in Figure 11.

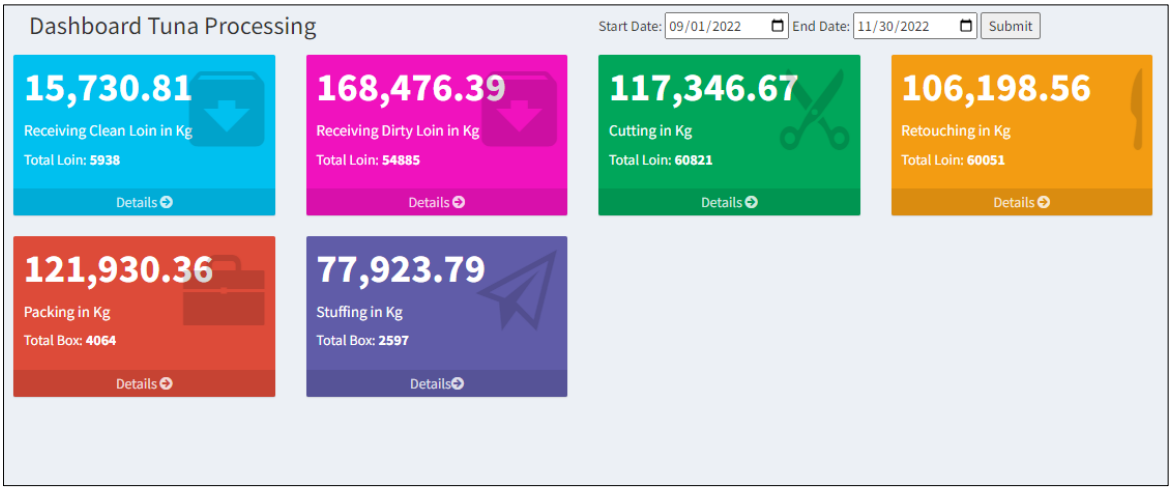

Figure 11 Dashboard Tuna Process Total Weight and Pieces per Stage Process

Figure 11 shows the total receipt of clean loin fish, total receipt of dirty loin fish, total weight cutting, total weight retouching, total packing and total shipment.

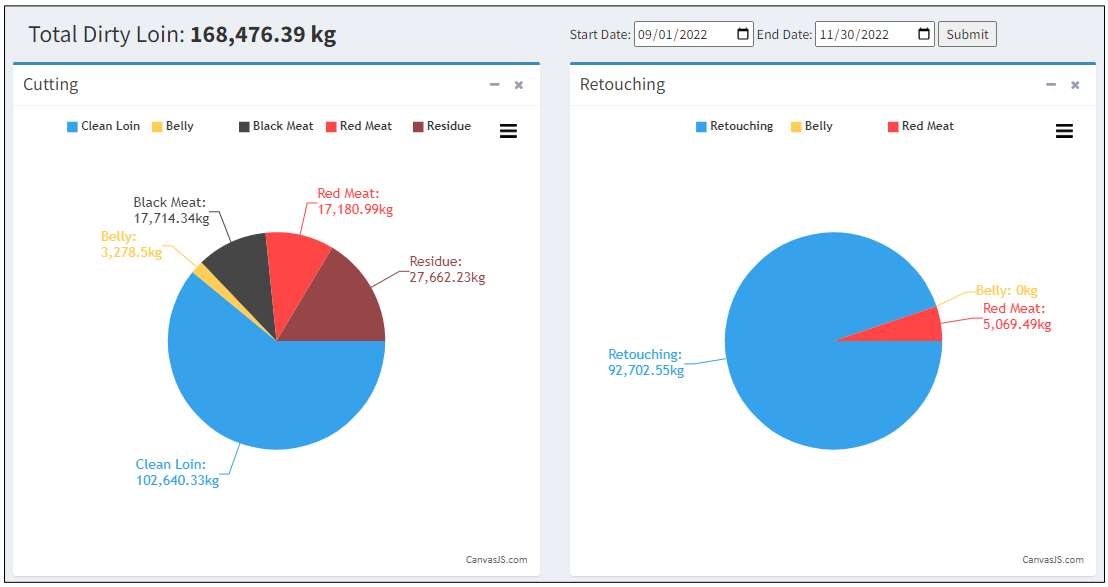

Figure 12 Comparison Total Weight Cutting and Retouching vs By-Product in Dirty Loin

Figure 12 shows a comparison of the total weight of cutting and retouching compared to the total weight by-product. The total weight cutting for clean loin is compared to the total weight of by-product includes red meat, total weight of black meat, total weight of belly and total residue. The total weight of retouching clean loin was compared with the total weight of red meat and total weight of belly.

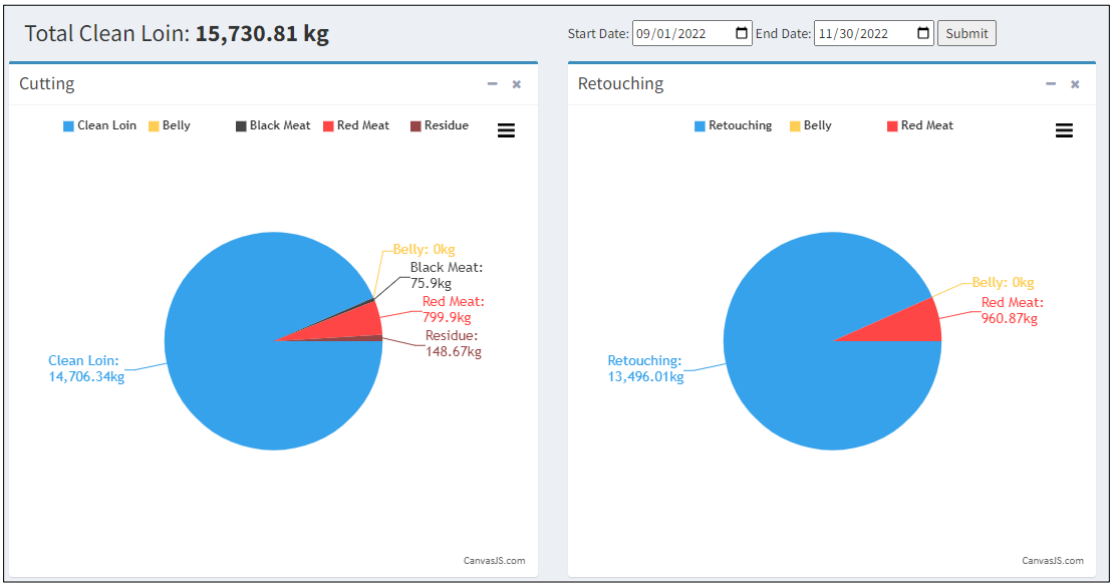

Figure 13 Comparison Total Weight Cutting and Retouching vs By-Product in Clean Loin

Figure 13 shows a comparison of the total weight of cutting and retouching compared to the total weight by-product. The total weight cutting for the dirty loin is compared to the total weight of by-product includes red meat, black meat, belly and total residue. The total weight of retouching clean loin was compared with the total weight of by-product includes red meat and belly.

5. Discussion

During the period from September to November 2022, according to the dashboard showed in Figure 11, the total receipt of tuna loin (dirty loin and clean loin) was 184.20 tons, and the total weight cutting was 117.35 tons. Furthermore, the

total weight for retouching was 106.19 tons. The total weight of the packing is 121.93 tons and the total weight of the shipment is 77.92 tons.

Table 1 Total Weight Each Stage Process

Processing Stage	Total Weight Kg
Receiving	184,207.2
Cutting	117,346.67
Retouching	106,198.56
Packing	121,930.36
Stuffing	77,923.79

Based on the data in Table 1, it shows calculation of yield cutting process and the yield of the retouching process. Yield is the percentage of total production weight compared to total fish/loin receipts. The yield of the cutting process is obtained by dividing the total weight of the cutting with the total weight receiving, then we obtain yield of cutting is 63.7%. The yield of the retouching process is obtained by dividing the total weight of the retouching by the total weight of the receiving so that a yield of retouching is 57.65%. Based on Figure 12 and Figure 13, it can be calculated the percentage of total by-product to the total weight receiving from dirty loin and clean loin. The total receipt of fish/loin from the dirty loin was 168,476.39 Kg with the total by-product for the dirty loin in the cutting process amounting to 65,836.06 Kg. The percentage of by-product cutting for dirty loin is calculated from the ratio of total by-product to total receiving, so that the percentage of by-product dirty loin is 39.07%. While the total by-product for dirty loin in the retouching process was 5069.49 kg, so the percentage of by-product retouching for dirty loin was 3%. The total receipt of fish/loin from clean loin is 15,730.81 Kg with a total by-product for clean loin in the cutting process of 1,024.47 Kg. The percentage of by-product cutting for clean loin is calculated from the ratio of total by-product to total receiving, the percentage of by-product clean loin is 6%. While the total by-product for clean loin in the retouching process was 960.87 kg so that the percentage of by-product retouching for clean loin was 6%. Based on the results of the analysis above, the cutting yield during the period September to November was 63.7%, while the yield for retouching was 57.65%. The percentage of by-product for dirty loin in the cutting process shows a higher percentage compared to clean loin, this is because the dirty loin has more parts that are removed compared to clean loin.

6. Conclusion

The dashboard system design stages consist of requirement identification, meta-information analysis, dashboard functional design, dashboard layout design, dashboard development and dashboard review and modification. Based on dashboard developed, it could be used by management of processing company to analyze production result of each stage production from stage receiving, cutting, retouching, packing and shipping and to get information of production yield per periods of production. This information help management to make decision to make production planning.

Compliance with ethical standards

Acknowledgments

The authors would like to thank the Indonesia's Tuna Fisheries Processors especially located in East of Indonesia which has supported and guided this research.

Disclosure of conflict of interest

There is no conflict of interest.

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Author's short Biography

I Gede Sujana Eka Putra has been studying a doctoral program at Udayana University, Bali Indonesia. He graduated a bachelor's degree in multimedia telecommunications at the Sepuluh Nopember Institute of Technology, Surabaya and a master's degree in Management of Computer Information Systems at Udayana University. He has more than 18 years of experiences working in the field of information technology and he had been developed traceability information system for fish processing industry and the application called "TraceTales". Sujana is committed to continuing to play an active role in developing and implementing technology to support sustainable fisheries. Currently he is active to conduct research about developing information system of fisheries traceability system from upstream (catch), processing into downstream (end customer). His research interest includes internet of things (IoT), biometrics, machine learning, artificial neural network. He has attended 3 national conferences, presented 3 papers, published 4 papers in International Journals and 9 papers in National Journal indexed. Please contact me at

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