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14 November 2022
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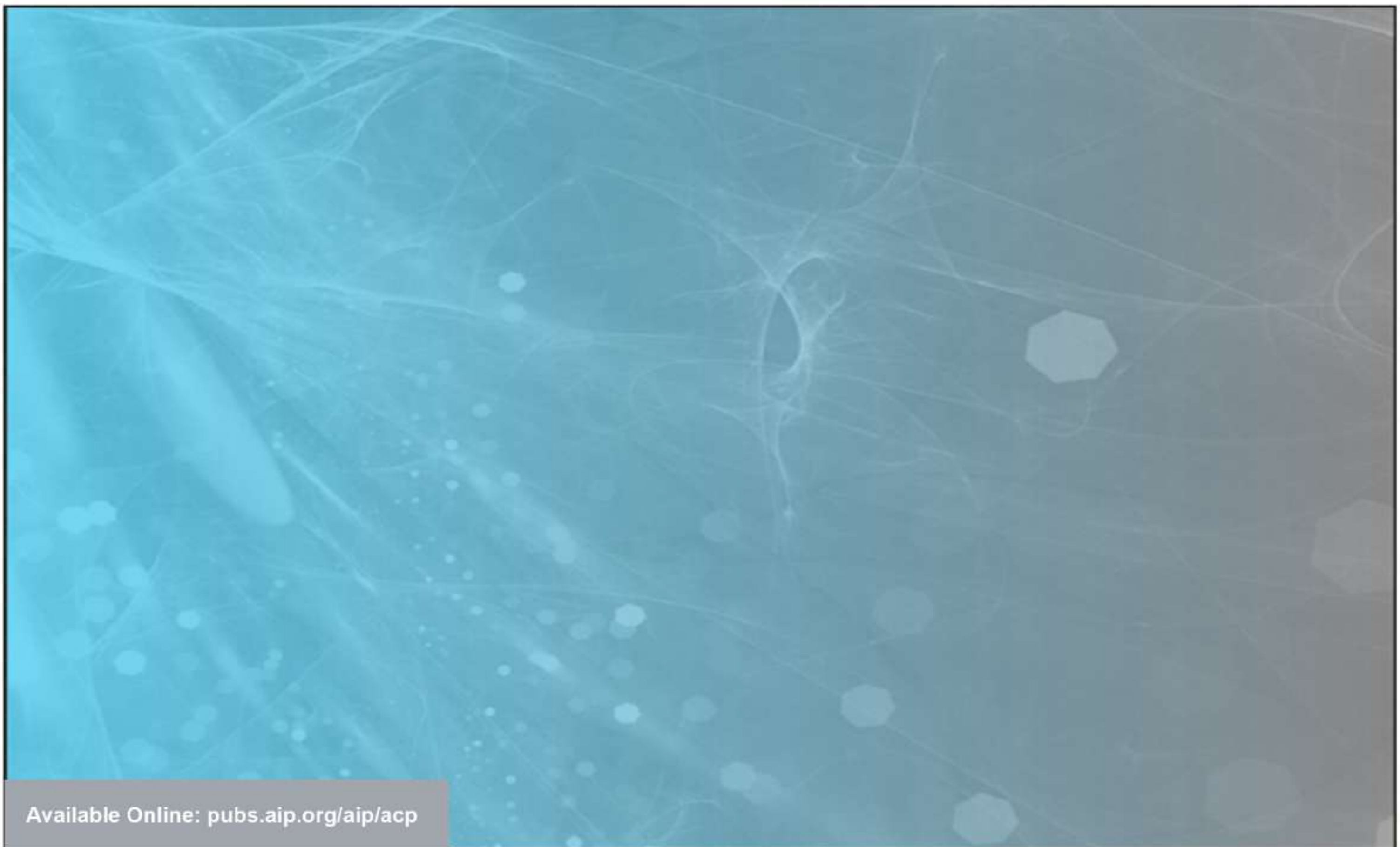

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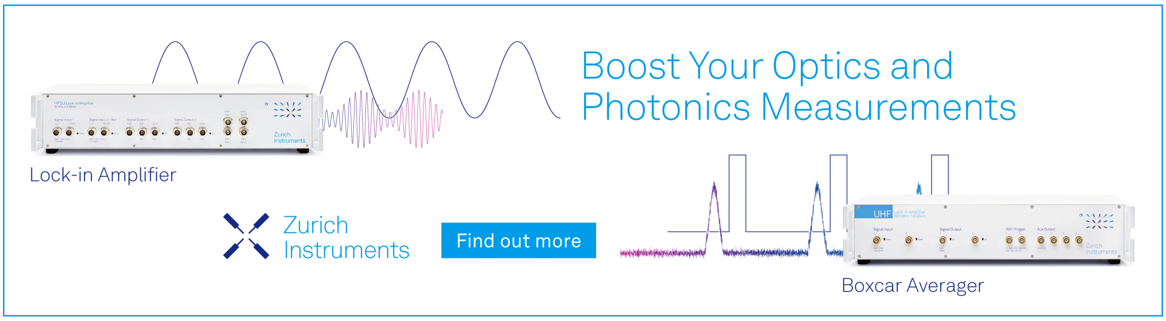

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Applying mobility business intelligence concept in analyzing oil palm plantation productivity

Andreas Wahyu Krisdiarto; Irya Wisnubhadra; Anzaludin Samsinga Perbangsa; Teddy Suparyanto; Bens Pardamean

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Applying Mobility Business Intelligence Concept in Analyzing Oil Palm Plantation Productivity

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Abstract. The palm oil business employs almost 20 million people, generates USD 21 billion in revenue, and plays a vital role in Indonesia's social economy. The Fresh Fruit Bunches (FFB) to Palm Oil Mills (POM) distribution system is one important aspect of fruit quality. Three steps are involved in getting Oil Palm FFB from the plantation to the POM. The first part of the procedure involves cutting FFB from the tree, the second stage involves gathering the fruit at a fruit collection point (FCP), and the third stage involves transporting the fruit to the palm oil mill (POM). As of now, the cost of the FFB transportation is still considerable, accounting for roughly 15% to 20% of the FFB pricing. The use of the Business Intelligence (BI) idea in the oil palm harvesting system is presented in this study as a foundation for creating web-based applications.

INTRODUCTION

Palm oil is a strategic and valuable agricultural commodity for Indonesia. In 2018, Indonesia accounted contributes 57% of the world's oil palm production, i.e. as much as 41 million tons [1]. This number increase to 46,89 million tons in 2021 and is predicted to achieve 49 million tons in 2022 [2]. Besides familiarly used cooking oil, palm oil, and palm kernel oil derivatives, such as olein and stearin, are also used as many materials in daily man use such as cleaning products and personal care products. To be processed into those derivative quality products, the oil palm fresh fruit bunch (FFB) as raw materials must also be of high quality. One of the important parameters of FFB quality is FFA, and one of the important parameters of FFB quality is FFA, which is influenced by the harvesting and transportation process [3-4].

Although oil palm has a comparative advantage over other vegetable oils, namely in terms of oil productivity and cost per ha, efficiency must always be improved. Harvesting is the initial stage of FFB quality control which management must pay attention to. Many parameters influence harvest management and control, such as the number and distribution of harvesters, allocating the harvesting area, and providing vehicles. The better this management, the

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higher the competitiveness of the company. In the competition between palm oil mills and the increasingly high demand for quality from consumers, companies are required to monitor and coordinate harvesting activities intensively and in real-time have developed a monitoring application as a tool to manage transportation systems to support that goal [5].

As production sustainability and palm oil quality must be guaranteed, management must always pursue strategic policies based on data analysis and the use of current technology. Research on the implementation of technology in oil palm has been carried out for example Agricultural Information Systems [6] and the implementation of Artificial Intelligence (AI). Our previous research on information systems has covered water management systems [7–9] and palm oil processing [10]. Other research about the implementation of AI for fertilization recommendation supports precision agriculture [11-12] and Weed Identification [13]. Furthermore, modern management and technology can be applied to achieve this target, one of them is business intelligence (BI). Applying Business Intelligence in oil palm FFB harvesting will integrate data and information, as well as analyze them in the strategic perspective system so that can increase harvesting system performance, both in quantity and quality. This paper presents the application of BI concept in the oil palm harvesting system, as a basis for developing a web-based application.

RELATED WORKS

Fruit Fresh Bunch (FFB) Logistic System

The production of palm oil uses a supply chain structure. The palm plantation block is the starting point for the process, which continues with the FFB mills in the Palm Oil Mill (POM), the storage tank for the palm oil, processing in the refinery, and distribution to the client [14–15]. It is possible to categorize the distribution of palm oil to customers as outgoing logistics and the FFB supplies for processing at POM as inbound logistics.

Reverse logistics was used by Alfonso-Lizarazo et al. to create a mathematical model for the Crude Palm Oil supply chain [16]. Similar to this, Ibrahim et al. suggested a linear programming-based transportation optimization model for Malaysia [17]. Widodo et al. also suggested a supply chain for palm oil that takes economic, social, and environmental factors into account. A logistics network optimization by Jun and Ling comprises technologies for transporting people between sea and distant ports. In a dynamic hinterland port group, optimization is done using linear programming to reduce transportation costs [16].

The quality control in the incoming logistics system of oil palm farms, namely the quality of FFB, is one of the crucial elements to maximizing the quality of the output products. The quality of the oil palm fruit decreases with increasing FFB ALB content. The shortest possible transportation time between the factory and the mills is essential, thus some optimization approaches will make this indicator their aim function. Using ArcGIS, Harahap et al. presented a network analysis of Sumatra's palm oil transportation from plantation to mill. They found about 272,241 routes, which were cut down to 26,590 by limiting trip times to four hours. They define the transportation expenses as variable expenses (0.2 USD/tFFB/km) and fixed expenses (0.5 USD/tFFB) [17]. This study also establishes equation 1's objective function, which is the maximization of overall profit through the minimization of total cost and product(s) supply chain:

$$TotProfit = TotIncome - TotCost - TotEnvCost \tag{1}$$

Mobility Analytics

MOs are objects (e.g., moving clouds, bird migrations, cars, pedestrians) that change continuously in time [18]. MOs create a massive amount of data captured by ubiquitous sensors, GPS, smartphones, and IoT technologies and stored in a Moving Object Database (MOD).

MOD is a transactional database that stores the positions of MOs at any point in time. Although these databases are appropriate for querying, they do not support complex analytical queries such as "Display the total number of trucks with a load more than 10 tons passing Alfa Block at speed higher than 40 km per hour." MOs data could be collected, integrated, stored, and analyzed in many ways, such as discovering mobility patterns [19] in many related fields like traffic management, transportation, telecommunication, tourism, and smart cities called mobility data analysis [20].

To support efficient collection, integration, storage, and analysis of the mobility pattern, data warehousing technologies are needed, yielding the notion of Mobility Data Warehouse (DW) [21]. Mobility DW is the heart of mobility analytics as an extension of Business Intelligence that includes the strategies, processes, applications, data, products, technologies, and technical architectures used to support the collection, analysis, presentation, and dissemination of business information [22] over mobility data.

Mobility Analytics utilizes the online analytical processing (OLAP) technique, which collects operations that manipulate the data cube. The most popular OLAP operations are roll-up, which aggregates measure data along a dimension up to a certain aggregation level; drill-down, which is the inverse of the former; slice, which drops a dimension from the cube; and dice, which selects a sub-cube that satisfies a boolean condition [23].

The subtypes of the temporal type include geometric, boolean, integer, float, and text. The subtype determines whether a temporal type is discrete or continuous. While discrete temporal types like boolean, integer, and text evolve gradually, continuous temporal types like float and geometric evolve continuously. Human body temperature is an illustration of a temporal float, while the GPS location of a vehicle is an illustration of a temporal geometric (point). The MO databases can use MobilityDB to implement temporal types like MOs. New abstract data types (ADTs) are created by the MobilityDB constructs on PostGIS and PostgreSQL to represent MO data. These ADTs are based on the idea of temporal types and the operations that go along with them. Figure 1 shows the building's layout of mobility analytics used in this implementation. The data source for the system comes from the transactional system.

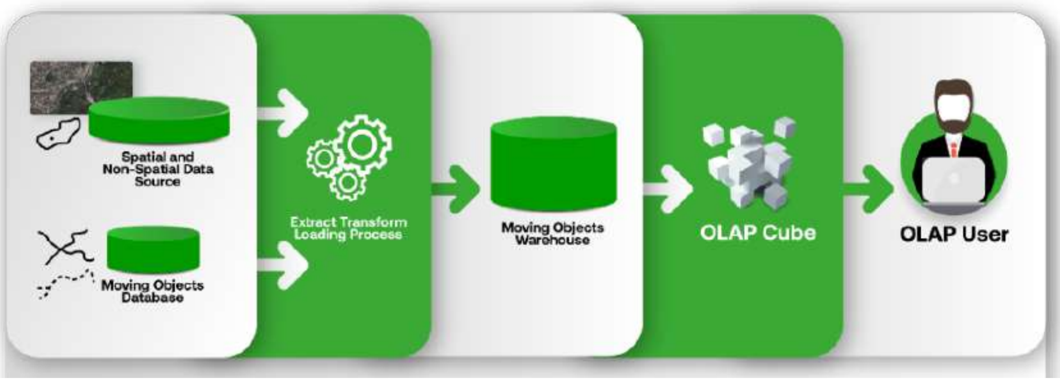

FIGURE 1. The architecture of mobility analytics

Vaisman et al. defined the notion of spatiotemporal queries with aggregation extended with spatial and moving types [24]. Based on this, they determined spatiotemporal DWs with spatiotemporal query support. Plenty of works and prototypes have been published using the trajectory data warehouses approach [25–28]. In this study, a spatio-temporal data warehouse (SDW) with base types in fact tables, the dimension with base, spatial kinds, and trajectories was presented for storing aggregate measures. For their DW, several approaches incorporate semantic information [29]. Table 1 contrasts Mobility DW with the various analysis subjects.

TABLE 1. Mobility Analytics Comparison

Authors	Measures	Subject of Analysis	Types
Braz et al. [26]	Number of observations, trajectories, Distance	Road Traffic	Base types
Wang et al. [27]	The best location for billboard placement	Advertisement	Base types, Spatial types
Cho et al. [28]	Visitor Locations	People Movement	Spatial types
Arfaoui et al.[29]	Number of Paths, Max Speed, Covered Distance, During	Movement of Animal	Base types
Alsahfi et al. [30]	Turn Locations, Road Status, Transportation Mode	Road Traffic	N/A
Nardini et al. [31]	Sample Representation of Points, Duration, Distance	Tourist recommendation	Base types, Spatial types, Semantic Info
This paper	max load, Trajectory, Speed, Duration	Plantation Transportation and Productivity	Base types, Spatial Types, Temporal types, Spatio-temporal Types

The extended version of the trajectory DW technique is used in this research to propose a design for mobility analytics. The DW measures implement the notion of spatiotemporal queries using MO data types. With certain queries and amazing execution sample results, this Mobility Analytics was used for descriptive and diagnostic analysis.

MATERIAL AND METHODS

Data Collection

The data was collected from an oil palm plantation pilot plan of Instiper in Bawen, Central Java, Indonesia in July 2022 and the oil palm plantation of PT Kerry Sawit, Wilmar at Central Kalimantan in 2021.

Business Process of Oil Palm Mobility

There are four main subsystems in oil palm plantations to produce fruit fresh bunch (FFB), i.e.: nursery, plant keep up, engineering and transport, and harvesting. The seed is prepared in about one year and planted by the nursery division. Due to the large area (sometimes the distance reaches 25 km), the seed distribution needs mobilization of the truck. From the time planted, oil palm starts to bear fruit after 3,5 years. This period is named the 'immature tree period'. During this period, the plant should be fertilized, and the distribution also needs a truck. Besides transporting the material, the mobilization of plantation vehicles is also used to support worker movement.

After the trees bear fruit, the transportation division gets an additional task, namely the transportation of fruit. While the transportation of fertilizers is only once per semester, the transportation of fruit is carried out every day because the oil palm harvest is always there. Therefore, the movement of vehicles occurs every day on a relatively massive scale (see Figure 2).

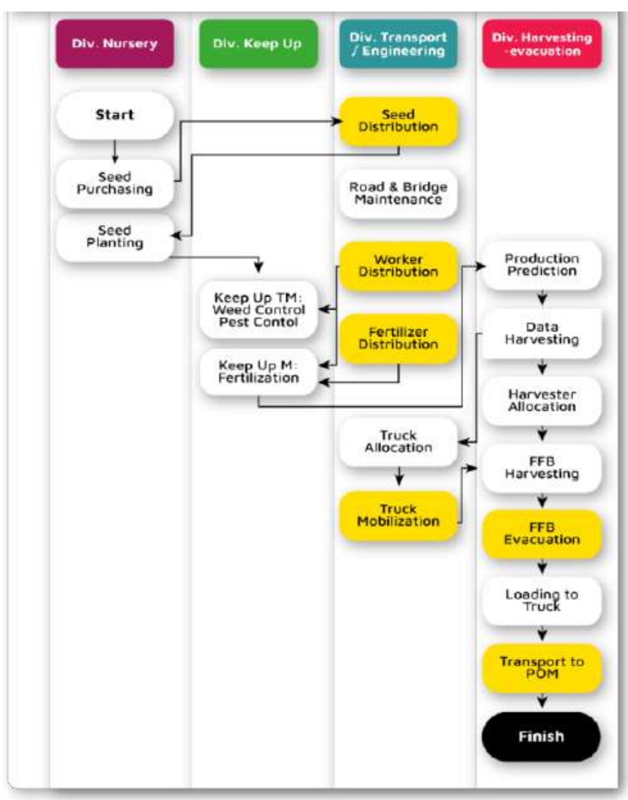

FIGURE 2. Oil Palm business process and mobilization activities on it (yellow box)

Agile Business Intelligence

A technique for implementing Business Intelligence (BI) products and projects that makes use of the agile software development approach is known as Agile Business Intelligence. The business intelligence team, when adopting agile business intelligence methods, frequently consists of software developers who are familiar with the agile methodology. The agile business intelligence method is very easy to implement. Run a series of quick iterative projects.

The team starts to formulate a general vision for the BI effort in the Concept phase as the first stage. The goal is to avoid being excessively specific by merely defining high-level project maps. This is typically done on a whiteboard, however, occasionally it is done on paper. The developer reached a significant milestone in the second step, Inception, with the implementation of the stakeholders' active engagement. The developer creates a working prototype that satisfies the changing requirements of stakeholders during the Construction iteration. The steps in this circular process will be repeated one after the other but in slight increments. In the Transition (Release) stage, products that have undergone the previous building iteration stage are becoming ready for manufacturing movement. The product eventually reaches stage 5 after going through stages 3 and 4, which happen in stages (production). Users begin using the system at the Production stage, which follows construction iterations and transitional phases. The agile BI methodology's five-step iterative process are [32]:

- Concept
- Inception
- Construction Iterations
- Transition
- Production

DISCUSSIONS AND RESULTS

The model's implementation discussions and findings will be given in this section in the same chronological order as in the section before it. After this segment, a discussion of the performance will be provided.

Concept

In Indonesia's palm industry, the transportation of oil palm FFB is the purpose of the Mobility Analytics deployment. There are two main sources of fresh fruit on this palm plantation. The factory plantation itself is the initial source of supply, and the independent farmer who lives outside the industrial plantation is the second. In order to improve competitiveness, the factory and farmer partnership wishes to reduce transportation costs, time, and loading/unloading time. The first critical stage of the FFB transportation process is fruit picking. The fruit is then manually picked or brought into the FCP using a technology like a net system or a grabber device.

Fresh Fruit Bunch (FFB) will be gathered, loaded onto a truck, brought to the POM, entered and waited in line at the factory gate, weighed, and then unloaded onto a loading ramp before being processed in the POM. The quality of palm oil was considerably impacted by this lengthy cycle, particularly when the fruit was bruised. All of the business process data is recorded by the logtransawit application. These data comprise spatiotemporal information about the POM's FFB delivery trajectory, non-spatial information about farmers and transportation options, and spatial information about the location of plantations.

Inception

To construct the requirement analysis of mobility analytics for the transportation of FFB, the user and their requirements were first identified, followed by the definition, improvement, and prioritization of goals. A mobile application by the name of Logtransawit that stores temporal forms of data (information that changes over time) serves as the data source for mobility DW. A web-based application is linked to a location-based mobile application called Logtransawit. At the STIPER Institute of Agriculture's education plantation in Central Java, Indonesia, the transaction data for transporting FFB has been recorded.

Construction

To construct a prototype of a business intelligence system with a star schema as a performance evaluation tool, the database design was created following an analysis of the existing data on Oil Palm Plantations. The design was created because business intelligence with a star schema is intended to be able to characterize data obtained from system transactions and offer analytical help for users' decision-making. Entity relationship diagrams are first created and then transformed into logical record structures as part of database architecture (LRS) as shown in Figure 3.

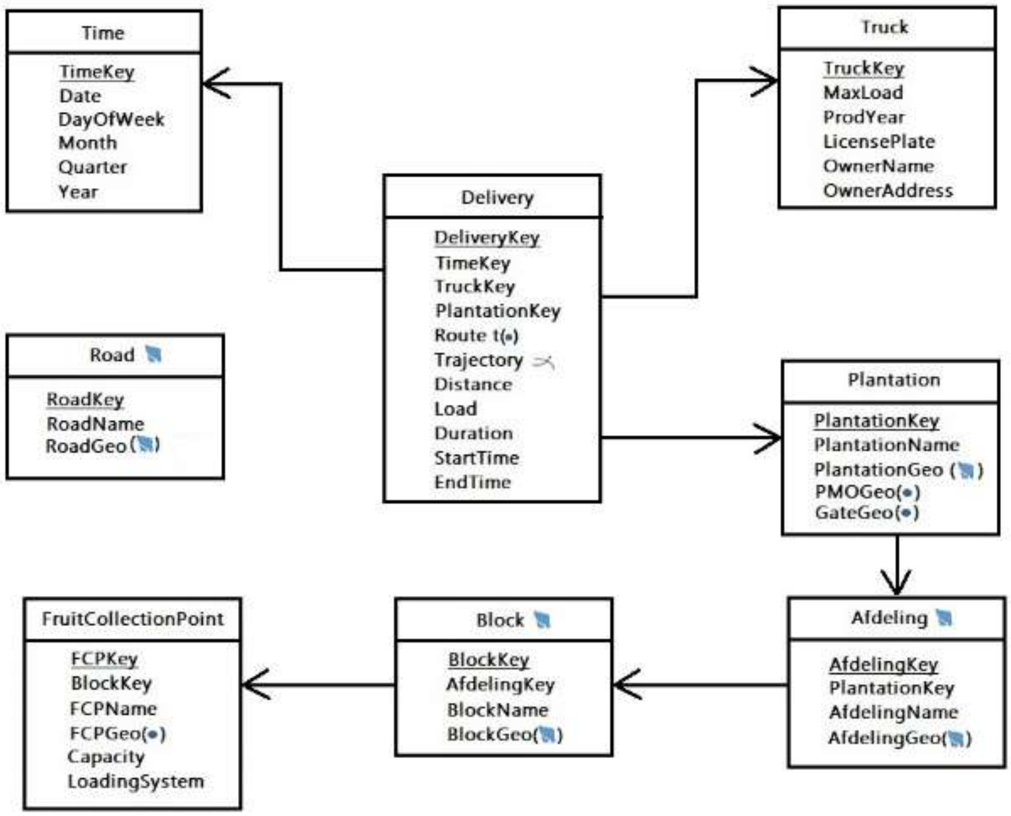

FIGURE 3. Multidimensional Schema

The source of mobility data DW originates from the mobile program Logtransawit, which stores temporal forms of data (information that changes over time). A web-based application is linked to a location-based mobile application called Logtransawit. At the STIPER Institute of Agriculture's education plantation in Central Java, Indonesia, the transaction data for transporting FFB has been recorded. The sample of the raw trajectory data contained information on delivery identification (delivery and Id), longitude, latitude, time, and truckload [33]. The transportation data, such as distance and types of truck data, could later be utilized to analyze the energy consumption of fossil fuels [34]. Also, it can be further studied in the mitigation of greenhouse gas emissions in oil palm cultivation [35] to support net-zero emissions.

CONCLUSION

Based on selected key performance indicators, the business intelligence system with the star schema approach as a tool for assessing enterprise performance can be used to measure and assess enterprise performance. The system developed in this study can be utilized in its implementation as a tool for management to measure and evaluate the level of performance under the shape and demands of the organization. It can also be used as a tool to conduct performance reviews independently and objectively. It is possible to use the business intelligence system model developed for this study's star scheme methodology as a prototype for creating information systems that incorporate the ideas of business intelligence, star schema, and data mining. This methodology was used as a tool for measuring enterprise performance.

REFERENCES

1. H. Ritchie and M. Roser, Our World Data (2021).
2. Indonesian Palm Oil Association (IPOA), (2022).
3. A.W. Krisdiarto and L. Sutiarso, Agritech **36**, 219 (2016).
4. A. Wahyu Krisdiarto and L. Sutiarso, Makara J. Technol. **20**, 67 (2016).
5. A.W. Krisdiarto and I. Wisnubhadra, IOP Conf. Ser. Earth Environ. Sci. **355**, 012071 (2019).
6. H. Soeparno, A.S. Perbangsa, and B. Pardamean, in *2018 Int. Conf. Inf. Manag. Technol.* (IEEE, 2018), pp. 489–494.
7. A.W. Krisdiarto, E. Julianto, I. Wisnubhadra, T. Suparyanto, D. Sudigyo, and B. Pardamean, in *2021 1st Int. Conf. Comput. Sci. Artif. Intell.* (IEEE, 2021), pp. 395–399.
8. S. Purboseno, T. Suparyanto, A.A. Hidayat, and B. Pardamean, in *2021 1st Int. Conf. Comput. Sci. Artif. Intell.* (IEEE, 2021), pp. 400–406.
9. Hermantoro, Suparman, D.S. Ariyanto, R. Rahutomo, T. Suparyanto, and B. Pardamean, in *2021 1st Int. Conf. Comput. Sci. Artif. Intell.* (IEEE, 2021), pp. 361–366.
10. R. Arnalis Renjani, Hermantoro, P. Okta Adi Nugraha, K. Purwandari, T. Suparyanto, and B. Pardamean, IOP Conf. Ser. Earth Environ. Sci. **998**, 012045 (2022).
11. E. Firmansyah, B. Pardamean, C. Ginting, H.G. Mawandha, D. Pratama Putra, and T. Suparyanto, in *2021 Int. Conf. Inf. Manag. Technol.* (IEEE, 2021), pp. 6–11.
12. D.P. Putra, M. Bimantio, T. Suparyanto, and B. Pardamean, in *Proc. 2021 Int. Conf. Inf. Manag. Technol.* (Proceedings of 2021 International Conference on Information Management and Technology, ICIMTech 2021, 2021).
13. E. Firmansyah, T. Suparyanto, A. Ahmad Hidayat, and B. Pardamean, IOP Conf. Ser. Earth Environ. Sci. **998**, 012046 (2022).
14. S. Aghazadeh, Int. J. Contemp. Hosp. Manag. **16**, 263 (2004).
15. P. Engelseth, Oper. Supply Chain Manag. An Int. J. **8**, 111 (2015).
16. E.H. Alfonso-Lizarazo, J.R. Montoya-Torres, and E. Gutiérrez-Franco, Appl. Math. Model. **37**, 9652 (2013).
17. S. Bin Ibrahim, Transportation Optimization Model of Palm Oil Products for Northern Peninsular Malaysia, Universiti Sains Malaysia, 2008.
18. F. Harahap, S. Leduc, S. Mesfun, D. Khatiwada, F. Kraxner, and S. Silveira, Energies **12**, 420 (2019).
19. R.H. Güting and M. Schneider, *Moving Objects Databases (The Morgan Kaufmann Series in Data Management Systems) (The Morgan Kaufmann Series in Data Management Systems)* (Morgan Kaufmann Publishers Inc., San Francisco, CA, USA, 2005).
20. A. Vaisman and E. Zimányi, ISPRS Int. J. Geo-Information **8**, 170 (2019).
21. C. Renso, S. Spaccapietra, and E. Zimányi, *Mobility Data* (Cambridge University Press, 2013).
22. N. Dedić and C. Stanier, J. Manag. Anal. **4**, (2017).
23. A. Vaisman and E. Zimányi, *Data Warehouse Systems* (Springer Berlin Heidelberg, Berlin, Heidelberg, 2014).
24. A. Vaisman and E. Zimányi, in *Lect. Notes Comput. Sci. (Including Subser. Lect. Notes Artif. Intell. Lect. Notes Bioinformatics)* (2009).
25. F. Braz, S. Orlando, R. Orsini, A. Raffaetà, A. Roncato, and C. Silvestri, in *Proc. - Int. Conf. Data Eng.* (2007).
26. L. Leonardi, S. Orlando, A. Raffaetà, A. Roncato, and C. Silvestri, in *Proc. ACM Symp. Appl. Comput.* (2009).
27. L. Wang, Z. Yu, D. Yang, H. Ma, and H. Sheng, IEEE Trans. Ind. Informatics **16**, (2020).
28. N. Cho and Y. Kang, Spat. Inf. Res. **25**, (2017).
29. N. Arfaoui and J. Akaichi, Int. J. Eng. Trends Technol. **6**, 1 (2011).
30. T. Alsahfi, M. Almotairi, and R. Elmasri, Spat. Inf. Res. **28**, (2020).
31. F.M. Nardini, S. Orlando, R. Perego, A. Raffaetà, C. Renso, and C. Silvestri, Stud. Big Data **31**, (2018).
32. G. Garani and G.K. Adam, Heal. Inf. Sci. Syst. **8**, (2020).
33. I. Wisnubhadra, A.W. Krisdiarto, S.S.K. Baharin, and N.A. Emran, ICIC Express Lett. Part B Appl. **13**,

(2022).
34. Y. Wijayanti, M. Anda, L. Safitri, S. Tarmadja, Juliastuti, and O. Setyandito, IOP Conf. Ser. Earth Environ. Sci. **426**, 012058 (2020).
35. U. Jaroenkietkajorn and S.H. Gheewala, Sustain. Prod. Consum. **22**, 205 (2020).

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