Sugarcane Harvester Management System

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Abstract

The article presented the complete design framework of Using virtual prototype technology, the sugarcane harvester demonstrated the fundamental idea for creating an integrated ecosystem of product creation. It highlighted how to develop approximately integrated design framework, model for managing procedures, and product sugarcane model and product structure configuration harvester, and it elaborated on the model of class hierarchy of In the product data management (PDM) system, record data. The. For product development, dynamic control and adjustment could be fulfilled in a distributing situation, and the present Data would be sent to necessitate someone utilising current momentary mode. The reliable basis could be offered for cooperation and a sugarcane harvester with a serialised design.

Introduction

A sophisticated and cutting-edge technology created to optimise the sugarcane harvesting process is the Sugarcane Harvester Management System (SHMS). This solution combines automation, data analytics, and state-of-the-art technology to improve production, decrease manual labour, and boost efficiency in the sugarcane sector. Harvesting sugarcane is a labor-intensive, time-sensitive process that requires accuracy and quickness. Manual labourers using machetes are frequently used in traditional methods, which can be physically taxing and inefficient. The harvesting of sugarcane is being revolutionised by the SHMS, which introduces automation and smart management strategies to meet these difficulties. The SHMS includes robotic arms and sophisticated sensors in its automated sugarcane harvesting devices. These automated vehicles are able to find mature sugarcane plants and precisely pick them from the fields. The apparatus gathers an.

LITERATURE SURVEY

1. **Paper Name:** Inventory Management in Mass Customization Operations: A Review
   Author: Shu Guo, Tsan-Ming Choi
   Abstract : Mass customization (MC), as an operations program
   to satisfy target consumers by offering personalized products or services, has attracted substantial attention from both the industry and academia. Under this program, one of the most important issues is an efficient management of the related inventories, including the work-in-process inventories, standard items, and the customized items, which can ultimately contribute to a profitable business for the companies who have launched MC. This paper, therefore, focuses on reviewing the mass customization based literature and identifying various methods to effectively manage inventory for MC schemes. In addition to regular inventory management, with the increasing emphasis on corporate social responsibility, MC companies are required to devote more effort to the proper management of leftover and returned inventories under MC. This paper, hence, examines MC inventory management in both forward and reverse logistics. Findings from this review provide a guideline to operations managers on inventory management improvement in their MC operations. Future research opportunities related to MC inventory management, such as supply chain coordination and risk management, are discussed.

2. **Paper Name:** Factor Analysis of Inventory Management in Thai Construction Industry
   Author: Kanyanat Jakkraphobyothin.
   Abstract :- The possession of well-organized inventory management is a key factor for a construction company to maintain its competence among competitors. Efficient inventory management leads to a higher-quality financial performance of construction projects as inventory-related cost can account for 60-65examine key factors affecting inventory management in Thai construction industry. A questionnaire survey was developed to gather data for an exploratory factor analysis (EFA). The results extract four key factors affecting inventory management, including ‘performance’, ‘cost’, ‘strategy’ and ‘inventory policy’, with a total of 15 associated items. The four key factors provide better understanding of inventory management in Thai construction industry .

3. **Paper Name:** Excess Inventories Redeployment Strategy for Spare Parts Service Logistics Management.

Author: D. Mo1, D. C. K. Ho2 N. Chan
Description : Many leading companies are now offering global customers better spare parts services for system maintenance through a more complex service logistics network, extending beyond the traditional on-site stocking management, to boost profit margin. One challenge these spare parts service providers face is how to achieve desired service levels at a low cost through minimization of excess inventories in the global spare parts supply chain. To address this issue, we demonstrate an inventory redeployment strategy to transform a conventional spare parts supply chain (with forward stocking facilities only) into a closed-loop, multi-echelon service network with the capability of redeploying inventories from overstocking to understocking facilities, reducing purchase of high-value spare parts. To assess the quality of our novel solution approach, we used a network flow optimization model to analyze the proposed excess inventories redeployment strategy of an international company's service parts operations, and found significant inventory cost savings.

4. **Paper Name:** Spark-Based Large-Scale Matrix Inversion for Big Data Processing
Author: JUN LIU1 , (Member, IEEE), YANG LIANG
Description : Matrix inversion is a fundamental operation for solving linear equations for many computational applications, especially for various emerging big data applications. However, it is a challenging task to invert large-scale matrices of extremely high order (several thousands or millions), which are common in most Web-scale systems, such as social networks and recommendation systems. In this paper, we present an lower upper decomposition-based block-recursive algorithm for large-scale matrix inversion. We present its well-designed implementation with optimized data structure, reduction of space complexity, and effective matrix multiplication on the Spark parallel computing platform. The experimental evaluation results show that the proposed algorithm is efficient to invert large-scale matrices on a cluster composed of commodity servers and is scalable for inverting even larger matrices. The proposed algorithm and implementation will become a solid foundation for building a high-performance linear algebra library on Spark for big data processing and applications.

5. **Paper Name:** Research on Integrated Design Environment of Sugarcane Harvester
Author: Yanmei MENG, Funing LU, Li Bei, Xu Kai.
Abstract: The paper introduced the whole design frame of sugarcane harvester based on virtual prototype technology and presented the basic thought to build integrated environment of product development. It emphasized the building method about integrated design frame, procedure management model, product model and product structure configuration of the sugarcane harvester, and it also expatiated to class hierarchal model of document data in product data management (PDM) system. The dynamic adjustment and control for product development could be realized in distributing circumstance, and the current information would be passed to require somebody using current mode in time. The credible foundation could be provided for collaboration and serialized design of sugarcane harvester.

6. **Paper Name:** Sugarcane harvest and transport management A proven whole-of-systems approach that delivers least cost and maximum productivity
Author: 1NSW Sugar Milling Cooperative Ltd, NSW.
Abstract: NSW Sugar Milling, a cooperative sugarcane processing group in Northern NSW, Australia, harvests and transports up to 2.5 Mt of sugarcane each year to its three factories (Harwood, Broadwater and Condong) using only 21 harvesters and 28 trucks in total. Cane is delivered to each factory every six minutes to maintain maximum processing capacity. There is little or no queuing of trucks at the mill, and few interruptions from the field side operations.

7. **Paper Name:** Sugarcane Harvesting System: a Critical Overview
Author: Shaochun Ma, Manoj Karkee, Qin Zhang .
Abstract: In this paper, a critical literature review of sugarcane harvesting systems in the context of sugar and biofuel production is conducted. For sugar production, sugarcane field burning is carried out worldwide before harvesting to get rid of leaves and tops which would impede the harvest operation. However, field burning has environmental consequences. Hence, the improvement in harvester performance will have an effect on cost-effectiveness and sustainability of sugarcane production and also on the success of biofuel production. Sugarcane is one of the most efficient biofuel feedstocks in commercial use. Harvest cost comprises a major component of overall sugarcane production cost. We surveyed the merits and limitations of chopped billet and whole stalk harvesting systems. Whole stalk harvesting can reduce juice loss and sugar deterioration while chopped billet harvesting has higher efficiencies in handling high-tonnage and bent stalks. Moreover, new technologies and innovations applied

on cane harvesters for improving harvesting efficiencies and qualities are investigated. Finally, major issues requiring further research are identified and corresponding recommendations are made for future studies. Analyzing the current issues and challenges, the main outcome of this review is the identification of potential solutions that can be investigated to improve sugarcane harvesting efficiency. Effective and efficient harvesting can make sugarcane production more viable, profitable and sustainable, especially for biofuel use since it requires collecting both of stalks and trash.

8. **Paper Name**: A Study of Inventory Management System Case Study
Author: Nazar Sohai
Abstract: Inventory management is a challenging problem area in supply chain management. Companies need to have inventories in warehouses in order to fulfil customer demand, meanwhile these inventories have holding costs and this is frozen fund that can be lost. Therefore, the task of inventory management is to find the quantity of inventories that will fulfil the demand, avoiding overstocks. This paper presents a case study for the steel manufacturing industry (Small Scale Industry) on inventory management. The relationship between the inventory management and company performance was determined based on inventory days and return on asset (ROA) analysis. The research found that company X had a few inventory problems such as unorganized inventory arrangement, large amount of inventory days / no cycle counting and no accurate records balance due to unskilled workers. The study also proved that there was a significant relationship between return on asset (ROA) and inventory days. This paper also provides recommendation to the company and for further research.

PROPOSED SYSTEM

PROBLEM STATEMENT :-Inefficient and unorganized sugarcane harvesting practices lead to high operational costs, low yields, and labor management challenges. There is a need for a comprehensive management system that can optimize harvesting processes, track labor, and improve overall efficiency in sugarcane farming to enhance profitability and sustainability.

OBJECTIVE :- To automate sugarcane harvesting processes, reducing the reliance on manual labor. To helps in optimal allocation of resources such as labor, fuel, and machinery. To Automation reduces the need for manual labor in hazardous conditions. To standards and regulations, farmers avoid legal complications and maintain a positive reputation. To collects and analyzes vast amounts of data related to sugarcane farming.

METHODOLOGY Requirements Analysis: Understand the needs of sugarcane farmers and laborers for the app. Design: Create user-friendly app wireframes and UI/UX designs. Development: Build the Android app using appropriate programming languages and tools.

IMPLEMENTATION

Android is a mobile operating system based on a modified version of the Linux kernel and other open source software, designed primarily for touchscreen mobile devices such as smartphones and tablets. Android is developed by a consortium of developers known as the Open Handset Alliance and commercially sponsored by Google. It was unveiled in November 2007, with the first commercial Android device launched in September 2008. It is free and open source software; its source code is known as Android Open Source Project (AOSP), which is primarily licensed under the Apache License. However most Android devices ship with additional proprietary software preinstalled, most notably Google Mobile Services (GMS) which includes core apps such as Google Chrome, the digital distribution platform Google Play and associated Google Play Services development platform. About 70 percent of Android smartphones run Google's ecosystem; competing Android ecosystems and forks include Fire OS (developed by Amazon) or LineageOS. However the "Android" name and logo are trademarks of Google which impose standards to restrict "uncertified" devices outside their ecosystem to use Android branding. The source code has been used to develop variants of Android on a range of other electronics, such as game consoles, digital cameras, portable media players, PCs and others, each with a specialized user interface. Some well known derivatives include Android TV for televisions and Wear OS for wearables, both developed by Google. Software packages on Android, which use the APK format, are generally distributed through proprietary application stores like Google Play Store, Samsung Galaxy Store, and Huawei AppGallery, or open source platforms like Aptoide or F-Droid. Android has been the best-selling OS worldwide on smartphones since 2011 and on tablets since 2013. As of May 2017, it has over two billion monthly active

users, the largest installed base of any operating system, and as of August 2020, the Google Play Store features over 3 million apps.[15] The current stable version is Android 11, released on September 8, 2020.

CONCLUSION :-

Through integrated modeling analysis to sugarcane harvester design based on virtual prototype technology, the function model has been constructed, and its data information flow has been analyzed. According to above, it is the flow management model which could come true, the product model, and the product configuration model which is realized by serialized variable configuration that has been established, and on the basis of documents management request for product design, hierarchy view of documents has been showed.

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