World Journal of Engineering Research and Technology
WJERT
www.wjert.org
SJIF Impact Factor: 5.218

A SURVEY ON OPTIMIZED MILK DISTRIBUTION PROCESS USING HYBRID RULE GENERATION TECHNIQUES IN MILK BIG DATA SERVERS

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Article Received on 03/03/2019 **Article Revised on 24/03/2019** **Article Accepted on 14/04/2019**

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ABSTRACT

Milk consumption is one of the most basic needs for the human; so as to transport milk in order to fulfil the basic human need is quite a challenging task. Milk distribution and safety is of high concern as it involves the health of 90% of our society. A brand new mathematical model required for cold chain and maintenance and milk spoilage avoidance. Traditionally milk is supplied in cans with minimum monitoring which may result in milk getting spoiled before its use especially during transportation delay and time management milk has been spoiled completely. To overcome these problems first fetched the data of drivers from big data servers to generate the analytic algorithm to improve the time delay. The aim of the research work is to improve end to end distribution process of smart milk cooperation by applying our algorithm that will help to improve the factors of time delay, spoiled milk and predict production demand in future using existing big data available.

KEYTERMS: Big Data, Intelligent Transportation System, Milk Agent, Optimization, Time delay, Hybrid rule.

INTRODUCTION

India is the world's largest producer and consumer of dairy. The dairy industry in India was worth INR 5,000 billion in 2016. India is also globally the largest milk producing country since 1997. In India, the co-operatives and private dairies have access to only 20% of the milk produced. Approximately, 34% of the milk is sold in the unorganized market while 46% is consumed locally. This is in comparison to most of the developed nations where almost 90% of the surplus milk is passes through the organized sector. However, the sector is characterized by several challenges, namely high market competition; demand remaining below requirements recommended by nutritional standards, the specific characteristics of the raw material and diversification of ranges of products. Due to of these factors, the enterprises investigate the possibility to turn these challenges to a competitive advantage while continuously improving their operation. One of the key activities to achieve this goal is by an efficient integrating of production and distribution planning.

The competitions in the auto industry in around theworld have become so fierce nowadays that automanufacturers have to find better ways to manage andminimize its production cost. Supply chain and logisticsmanagement plays an important role as logistics costs aremajor cost components in the total production cost. TheJust-in-Time system (also lean production system) implemented by many other auto manufacturers withdifferent degrees of success as a means to reduce productioncosts. Most of the large manufacturers pursuing lean production adopt the combination of MRL material collection process and cross-docking which provides dedicated JIT (Just-in-Time) material distribution services for a single manufacturer.[1]

Considerable number of studies has examined the importance of the production-distribution problem in supply chain management. A comprehensive review on integrating production-distribution problems has been presented by,[2- 4] and various papers addresses the supply chain coordination issues at different decision levels.[5–8]

LITERATURE REVIEW

The concept of milk run logistics originates from the dairy industry. The notion covers a transportation network where all input and output (I/O) material requirements of several stations are covered by one vehicle that visits all these stations, and circulates according to a pre-defined schedule. This transportation concept is economical when the I/O volume of each single station is essentially smaller than a truckload. The milk run concept is frequently applied in internal plant logistics to transport raw materials, finished goods, and waste between manufacturing and assembly Stations and the warehouses of the plant.[9]

One of the most important and well-known pure logistic research tools is Milk run System. The name of this system comes from the traditional system for selling milk in the West, in which the milkman used to walk to the doors of the customers' houses with his dray in a specified route and deliver the milk containing bottles to his customers and finally take back the empty bottles. This system has been performed in miscellaneous industries and the auto manufacturing companies of the world have been (and are) the most important clients of this system.[10]

Lin and Cha (2010) optimized the integration of theinventory and transportation in the distribution system. It isimportant research in logistics integration strategy. Theyanalyzed the relationship between inventory andtransportation, builds the ITIO issue optimization based onmilk-run mode, and combining the character of Model. They also designed Genetic Algorithm of natural numbercoding to solve vehicle scheduling model of milk-run, thenuses stepwise iterated algorithm to balance inventory costand transportation cost, in order to make the total cost ofmilk-run logistics network system minimum.[11] Ricoh Express introduced the “milk run” method, by which onetruck travels around to multiple suppliers to pick up cargo.To operate the milk run system effectively, the companydeveloped a system to optimize vehicle routing, by checkingshipment volumes with suppliers prior to collection, bytelephone or dedicated network. This new initiative morethan doubled loading efficiency, from 30% to 65%, andshortened total travel distances for transportation. Inaddition, for large cargo with a sufficiently high loadingrate, these efforts led to an annual reduction of 310 tons, or35%, in CO2 emissions.[12]

In[13] a literature survey on quantitative approaches based on fuzzy and possibility theory is proposed to cope with the uncertainty in the supply chain planning problem. Regarding the production-distribution problem, there are a few studies that attempt to cope with the uncertainty characteristics.[14-16] The model must determine the exact time that asupplier would ship the milk. In other word, everysupplier needs to know the exact time to ship aparticular part and this could help the system topre-schedule the production plan. The explained model is capable of changing a truck towork in different routes in various time schedules. In thefollowing section we first introduce the decisionvariables and the parameters used in our problemformulation.[17]

Soon after the technological growth in the field of IoT and cloud computing a dynamic vehicle routing approach was adopted where the alerts triggered on the generation of new routes.[18] Real time alerts are created using real-time location and sensor data using cloud tracking system. The limitation of this system was that it could not collect the information of the past routes and analyzes the data for more effective routing.

Data mining technique is employed to discover the routing plans so as to generate case-based routing plans for the drivers. Then the existing sensor based system will measure the pH value of milk and determine its quality. The system will direct to nearest milk booth with the highest proximity by using routing technique where data centre serves as a cloud server to calculate the costs of a finding the nearest milk booth request, and these costs will be frequently updated by considering the location of van and the total number of milk booth in each areas whose data is accessible any time in the network.[19]

Association rules

Association rules are if/then statements that help uncover relationships between seemingly unrelated data in a relational database or other information repository.[20]

Association rules are created by analyzing data for frequent if/then patterns and using the criteria support and confidence to identify the most importantrelationships.[21-24] support is an indication of 8how frequently the items appear in the database. Confidence indicates the number of times the if/then statements have been found to be true.

In data mining, association rules are useful for analyzing and predicting customer behavior. They play an important part in shopping basket data analysis, product clustering, and catalog design and store layout.Programmers use association rules to build programs capable of machine learning.

Features of milk run logistics

In foreign countries where the density of parts suppliers is low, Milk-Run logistics has expanded, spreading all over the world. The automobile industry has been leading globalization efforts for a long time now. Moreover, Milk- Run logistics has spread not only in the automobile industry. Finally, Milk-Run logistics is performed through close coordination and linkages between the automobile manufacturer, parts supplier, and logistics service provider, and its influence on regional transport becomes more significant if the scale of the Milk-Run logistics becomes larger. In other words, Milk-Run logistics is purely private efforts with financial motivation, but it has positive external effects for society as well. In this case, public involvement may be required for planning Milk-Run logistics which include the cooperation of related local governments and affected residents.

Implementing of smart sensor based technology to monitor milk condition and dispatch through vehicle is made by creating new secure algorithm for large wireless mode of dispatching milk through milk run system.

To get drivers data to contiguous dispatching without any interaction or lack of transporter can avoid and to made milk dispatch in efficient way and is specified time delivery. Arranging of vehicle in sudden accident or delay time to show efficient shortest path to reach the destination of consumers and provide milk at good condition.

CONCLUSION

This system has the capability to diminish milk spoilage extensively and if used worldwide then would produce in tons of data that will help to improve not only milk transportation but also customer satisfaction. The ultimate goal of the project is to benefit the milk production industry and the end consumer of the dairy products.

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