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AUTOMATIC PRODUCTION PLANNING AND SCHEDULING OF SIZE

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Abstract—**Depending upon the quantity of products booked by distributers, marketing agents, other companies, etc are taken into account and based upon which production of that particular product will be done. In background the production mangers will be making a plan according to the booking which was done a week a head or a month . It will be categorized depending upon the sizes, because depending upon the sizes the production machines will be allocated and human resources too. In this paper, we had proposed anautomatic production planning and scheduling system which will be helpful in making this process much smoother and easier too. A graphical view of the completed and pending orders will be populated with the help of company data and displayed to the end users. Schedulers with the help of cron job will pick up the orders and segregated depend upon the sizes and execute the production plan.**

Keywords -Production ,human resource ,error ,demand forecasting, automated scheduling, automated production planning, graphical representation, finished and pending orders.

I. INTRODUCTION

Efficient production planning and scheduling arecritical components that impact the timely delivery of products in the dynamic world of modern manufacturing.Managing orders from distributors, marketing agencies,and other organizations requires careful planning in orderto maximize resources and satisfy demand. Thecomplexities of varying product sizes are sometimes toocomplex for traditional manual planning techniques, whichcan result in bottlenecks and the misallocation ofresources. In order to completely transform the productionplanning and scheduling process, a novel solution ispresented in this study. The suggested automatic orderclassification and scheduling [1] system offers a moreresponsive and efficient way to handle the difficultiespresented by different order numbers and product sizesbecause it is made to smoothly interact with currentoperations. Our technology enables production managers tomake dynamic plan modifications and ensure optimalutilization of both machinery and human resources by utilizing real-time data and powerful algorithms. Oursystem's primary role is to examine incoming orders,classify them according to their size, and then provide adetailed productionschedule. Production managers meticulously created this plan, taking into consideration the particular needs of every order to reduce downtime andincrease overall efficiency. Our system's graphical userinterface [2], which gives stakeholders a visual depiction of completed and pending orders, is one of its primary features. Powered by corporate data, this user-friendly display speeds up decision-making and promotes a more thorough comprehension of the production environment. Production managers benefit from this transparency since itfacilitates cooperative decision-making with other supply chain participants. Schedulers are essential to the smooth operation of the production plan. Our system uses a scheduled task mechanism, often known as a cron job, to automatically distribute orders according to size categories.By doing this, schedulers' manual labor is lessened while also guaranteeing a timely and error-free execution of the production plan. In the subsequent sections, we delve into the technical architecture of our proposed system the algorithms that power the automated planning procedure and the expected advantages of our strategy for the manufacturing sector. We hope to usher in a new era of efficiency and adaptability for the manufacturing sector with this creative solution, setting the stage for long-term prosperity in a cutthroat market.

II. EXISTING SYSTEM

In the past, it was quite difficult to keep up the production process because we would only receive a few number of orders each month [3] and would have to start the machine regularly for those few orders. Production managers devised a strategy to create a production plan in response to these kinds of problems, however because to human error [4], some manufacturing items were also overlooked.During production, incorrect sizes were even manufactured,which caused significant problems for the business. We had suggested an autonomous production planning and scheduling system to address these kinds of problems, andit will also help to make the process go much more smoothly and easily.

III. PROPOSE SYSTEM

A production schedule was recently developed by production managers as a solution to these issues nonetheless, a number of manufacturing products were alsomissed due to human error. Even the wrong sizes were produced throughout production, which posed serious

challenges for the company. We propose an autonomous production planning and scheduling system in this study, which will make this process more easier and more seamless. The end customers will see a graphical representation of the completed and pending orders [5]created using company data. With the help of cron jobs,schedulers will pick up orders, sort them according to size,and execute the production plan.

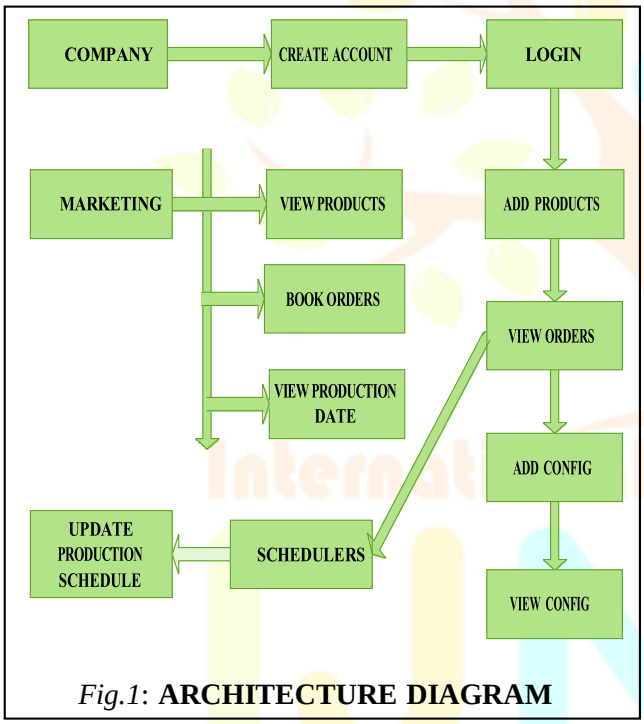

Fig.1: **ARCHITECTURE DIAGRAM**

A. Self-construction Production SchedulingSystem

The landscape of production scheduling systems is vast, but one recurring challenge lies in heavy customization needs for each unique production environment. This often translates to substantial development and maintenance costs. Recognizing this limitation, a shift in approach is necessary. This research aims to develop a system that adaptively learns scheduling techniques by observing real- world production scheduling data. This learning capability has the potential to significantly reduce investment compared to traditional, customized systems.

We present a prototype of a Gantt chart interface system that mimics manual scheduling practices on paper. By analysing operator behaviour within this system, we propose a method for extracting key scheduling information (master data) automatically. This extracted master data empowers scheduling professionals to work faster and more accurately by minimizing operational constraints. Implementing this extraction mechanism allows for seamless integration of scheduling systems without incurring high customization costs.This paper outlines the proposed master data extraction mechanism and operator support functionalities, both grounded in a model representing the underlying scheduling problem.

B. Automating a manual production schedulingprocess at a pharmaceutical company

We look at how a pharmaceutical company's manual production scheduling process was automated using mixedinteger optimization and a simple greedy algorithm. The pharmaceutical company produces things built to orderusing highly efficient resources and flexible production procedures. We present the algorithms, assess their performance on real data, and compare the results to the company's existing manual process [6]. The results demonstrate that automated scheduling methods can improve production scheduling while reducing the critical time that human schedulers must devote to producing production schedules.

C. Auto-MPS: an automated master production scheduling system for large volume manufacturing

The Automated Master Production Scheduler (Auto-MPS),a hybrid expert scheduling system, manages production scheduling for thousands of assemblies in a high-volume manufacturing context [7]. It generates schedules based on a set of rules and constraint satisfaction algorithms, simulating the scheduling schemes devised by managementto meet customer demand while controlling shipping and inventory expenses. Furthermore, the Auto-MPS recognizes the existence of significant events that require demand management study. Thanks to a graphical user interface that combines sophisticated graphical displaysand hypertext-based editors, the user may identify and analyze any problems as well as immediately understand the status of the current production schedules. The Auto- MPS has significantly improved the scheduling processes at AlliedSignal Safety Restraint Systems after nearly two years of operation

D. A production scheduling system modeling approach based on virtual manufacturing cells

In today's multi-species, small-lot production environment,cellular manufacturing is an effective way to increase production efficiency and flexibility. This research proposes a modeling approach for production scheduling systems based on virtual manufacturing cells. In system design, object-oriented architecture is used [8]. Virtual manufacturing cells are used to organize production tasks. The complexity of the production scheduling problem can be decreased by treating manufacturing cells as management units, evaluating job scheduling in cells, and applying existing scheduling techniques. Based on this, a dynamic production scheduling system is created.

E. A Scheduling Model of Intelligent Manufacturing System Based on GA Optimization

This research suggests a way of applying GA to the scheduling of intelligent manufacturing system in order to lower the production cost and create an effective scheduling method. First, a mathematical model and objective constraints are presented with an eye toward the multi-objective optimization problem that arises during thescheduling of garment production. Next, a technique for dynamically and selectively changing the weight is presented in order to improve GA, and the fitness function is created in accordance with this approach. Next, we detailthe various functional aspects of other processes' program code. The results of the simulation demonstrate that the new algorithm successfully overcomes stagnation, improvesglobal search capability, and significantly lowers machine waiting times. As a result, managers may effectively use this algorithm to help compile workpiece processing schedules.

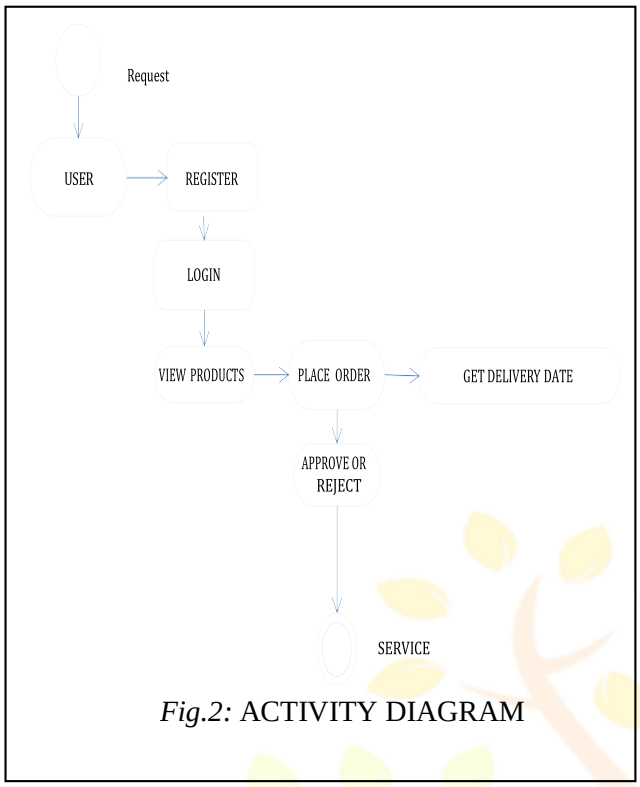

Fig.2: ACTIVITY DIAGRAM

A. Discussion

Integration and Adaptability

The ability of the Self-Construction Production SchedulingSystem to adjust to various production contexts was shown. The system exhibits exceptional flexibility by autonomously deriving scheduling strategies from day-to- day activities [9]. Scheduling operators may easily integrateand adapt to changing scheduling duties because to the intuitive Gantt chart interface.

The pharmaceutical company's automation of a labor- intensive manual production scheduling process demonstrated the value of mixed integer optimization [10] with a straightforward greedy algorithm. The solution demonstrated the flexibility needed in a make-to-order production environment while simultaneously lessening theworkload for human schedulers. When compared to manualmethods, computerized scheduling has the potential to increase productivity and enhance time management.

B. Scalability and Efficiency

The Automated Master Production Scheduling System, or Auto-MPS, has demonstrated its scalability in managing thousands of assemblies in a high-volume production environment. Including rules and constraint satisfaction algorithms ensures efficient scheduling while controlling inventory and delivery costs. By providing a live representation of the current production schedules, the graphical user interface significantly enhances user comprehension. The proposed modeling technique based on virtual manufacturing cells encourages scalability by grouping production operations. This decrease in scheduling complexity leads to increased production flexibility and efficiency. A robust system design that can handle the intricacies of modern production is ensured by the object-oriented architecture.

C. Optimization and Performance

The application of Genetic Algorithm (GA) optimization inthe scheduling model for intelligent manufacturing systems[11]presents a novel solution. The GA-based algorithmeffectively addresses the multi-objective optimization problem, reducing production costs, and enhancing scheduling efficiency. The simulation results indicate improved global search ability, overcoming stagnation, and reducing machine waiting times.

IV. CONCLUSION

To sum up, our investigation into automated production scheduling systems has shown the manufacturing sector some very bright future directions. The systems that are being showcased exhibit flexibility, expandability, and efficiency, effectively tackling the inherent difficulties associated with conventional scheduling methods [12]. Production planning has undergone a paradigm shift thanksto the Self-Construction Production Scheduling System [13], Auto-MPS, the automated pharmaceutical productionscheduler, and the modeling technique based on virtual manufacturing cells [14]. These systems are economically feasible options for a variety of manufacturing contexts because they simplify scheduling processes and minimize the need for significant modification. Automation, flexibility, and optimization concepts along with production scheduling advances will be crucial to creating a manufacturing ecosystem that is more responsive and efficient. The results in this paper add to the current conversation.

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