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EFFECTIVE REVIEW AND SURVEY ON ENGINEERING DESIGN MODIFICATION APPROACHES

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ABSTRACT

In gathering system, generally association will separate work costs into direct expenses and variation costs. These terms simply recommend if the work went to direct making of material or if the expense was by proposal identified with the period of the material. More noteworthy affiliations ought to attempt to use duplicated suites to process these expenses as a consequence of the wide volume of masters. Precisely when creators set the cost of an OK they consider the expense of work. This is in light of the way that they have to charge more than that staggering's aggregate expense of period. In the event that eagerness for a superior than normal drops or the

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quality clients are willing to pay for the extensive falls, affiliations must change the expense of work to stay productive. They can reduce the measure of representatives, diminish creation, oblige more raised measures of benefit, decreasing wicked work costs or decrease unmistakable considers the expense of period. This work gives a composed survey of the forefront in thing cost estimation covering assorted systems and frameworks turned out to be as the years advanced. The general work is asked for into subjective and quantitative systems. The subjective techniques are further subdivided into typical and analogical methods, and the quantitative ones into parametric and illustrative structures. Each of the methodologies may be depicted and examined, in reason for energy, with further subdivisions. The work comparably recommends the centrality of expense estimation in the right on time times of the configuration cycle and, in like way, quickly talks about the present cases and future headings in the region. Examination work to be done in the field with reference to particular applications is in like way evaluated. The work gives an exhaustive work in the field and ought to be valuable to specialists and specialists enthused about this field. The proposed algorithmic method is encouraged with the hereditary estimation, a prestigious metaheuristic system for the progress of results.

Keywords – Manpower Optimization, Labor Cost Optimization, Genetic Algorithm

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INTRODUCTION

The cost-of-production theory of value is the theory that the price of an object or condition is determined by the sum of the cost of the resources that went into making it. The cost can comprise any of the factors of production (including labor, capital, or land) and taxation. The theory makes the most sense under assumptions of constant returns to scale and the existence of just one non-produced factor of production. These are the assumptions of the so-called non-

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substitution theorem. Under these assumptions, the long-run price of a commodity is equal to the sum of the cost of the inputs into that commodity, including interest charges.

Too many small business owners consider employees as a burden and a massive expense. Although labor and employee salaries are a significant portion to any small business budget, they are still necessary to the success of the company. There are ways to reduce labor costs and keep your company growing and successful.

Overtime can be a heavy labor burden. Paying 1-1/2 to 2 times the regular hourly rate can add up quickly, especially in times of heavy production. Cutting labor costs by reducing overtime for non-exempt employees is a good strategy. Read below to find ways to prevent overtime.

It is common in many small businesses to have peak periods of business production. A retail specialty store may have extended hours and need more employees during the year-end holidays. A clothing designer business may need extra help to produce summer styles. Whatever your need, you can look to temporary agencies to help cut labor costs.

Why hire a full-time or even part-time employee when you only need extra help at certain times of the year? Temp help is a great way to reduce labor costs and keep your production or sales going strong.

One problem that many small businesses face is inefficiency. This stems from the lack of established and written procedures that your employees can use to make their jobs easier and faster.

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Don't reinvent the proverbial wheel every time you need a project done. Reduce labor costs by using tools like a conveyor belt for assembly, hierarchy of approval for purchase orders, written recipes for your chocolate confections, etc.

Technology can help you in cutting labor costs as well. Computers can automate many tasks that might need an unnecessary manual hand. Equipment can greatly reduce production time and costs, especially for certain heavy labor jobs. Even simply computer software can enhance and improve project management and workflows so that more gets done with less labor.

Know what each job entails and what necessary skills are required to perform them. Then hire employees that best match those skill sets. Your bookkeeper should have college-level accounting training. A plumber should have passed an apprenticeship. Hiring the best candidate for each job will both reduce labor costs and increase your production and efficiency.

We can help your staff and employees become more efficient and more proficient in their jobs by training and educating them. Offer an education bonus for those who wish to take a college course, attend a seminar, or even attend a conference. The benefits you'll see are greater production and ultimately a reduction in labor costs.

The employees don't have to be a burden. Give them the tools they need, and create efficient processes to help reduce labor costs and improve your bottom line.

In any plant, when production increases above planned-for levels – whether due to sudden increased demand or unexpected constraints in the system – contract labor may be brought in as a quick fix. While this provides some flexibility in operations, increased labor costs is a problem.

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Six Sigma can be used to optimize these changing labor costs and the accompanying productivity concerns. Cost accounting principles are also applied to these productivity improvements. Last year a flavors and food additives company in Asia, Amgis, had a surge in production in one of its product lines (liquids) due to the transfer of production from an affiliate and, simultaneously, an increase in sales. Because of the strict labor laws and strong union power in the Asian country, the company was reluctant to hire additional permanent employees as that could lead to over-employment within its workforce. Asking employees to work overtime also held little appeal, due to severe penalties related to overtime imposed by the government.

Amgis chose to go with a third option – hiring casual (i.e., temporary) labor to handle additional production loads when needed. The casual labor market in this locale is predominantly provided by one third-party service provider that has long had a good relationship with Amgis. This arrangement was supposed to help maintain the cost-effective use of casual labor by Amgis. Instead, Amgis was seeing an unreasonably high increase in casual labor cost.

LITERATURE REVIEW

To propose and defend the research work, a number of research papers are analyzed. Following are the excerpts from the different research work performed by number of academicians and researchers.

Lu, H. C., & Huang, Y. H. (2015). [1] - In this study, we investigate a two-dimensional cutting stock problem in the thin film transistor liquid crystal display industry. Given the lack of an efficient and effective mixed production method that can produce various sizes of liquid crystal display panels from a glass substrate sheet, thin film transistor liquid crystal display

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manufacturers have relied on the batch production method, which only produces one size of liquid crystal display panel from a single substrate. However, batch production is not an effective or flexible strategy because it increases production costs by using an excessive number of glass substrate sheets and causes wastage costs from unused liquid crystal display panels. A number of mixed production approaches or algorithms have been proposed. However, these approaches cannot solve industrial-scale two-dimensional cutting stock problem efficiently because of its computational complexity. We propose an efficient and effective genetic algorithm that incorporates a novel placement procedure, called a corner space algorithm, and a mixed integer programming model to resolve the problem. The key objectives are to reduce the total production costs and to satisfy the requirements of customers. Our computational results show that, in terms of solution quality and computation time, the proposed method significantly outperforms the existing approaches.

Jun, S., & Park, J. (2015) [2] - This paper addresses a hybrid flow shop scheduling problem with real-world constraints, and proposes a novel algorithm for its solution. We first discuss the distinguishing characteristics of nighttime and simultaneous work in the transformer manufacturing process. To solve the problem within a reasonable time, we propose a hybrid genetic algorithm. This algorithm combines the Nawaz–Enscore–Ham (NEH) heuristic, a local search algorithm, and a machine allocation rule with the aim of minimizing the total tardiness. Our experimental results show that the proposed algorithm outperforms the NEH algorithm, a simple genetic algorithm, and five existing dispatching rules in terms of average total tardiness performance and relative deviation index. The proposed algorithm is also shown to be competitive with respect to its efficiency and robustness.

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Bhunia, A., Biswas, A., & Sen, N. (2014) [3] - In this paper, we have modeled a decision making problem of a tea industry as a multi-objective optimization problem in interval environment. The goal of this problem is to maximize the overall profit as well as to minimize the total production cost subject to the given resource constraints depending on budget, storage space and allotted processing times in different machines. For this purpose, the problem has been formulated as a multi-objective integer linear programming problem with interval objectives. To solve the problem, we have proposed extended elitist non-dominated sorting genetic algorithm (ENSGA-II) for integer variables with interval fitness, crowded tournament selection, intermediate crossover, one neighborhood mutation and elitism. To develop this algorithm, we have proposed modified non-dominated sorting and crowding distance based on interval mathematics and interval order relations. Finally, to test the performance of the proposed algorithm, a numerical example has been solved.

Razavi, H., Ramezanifar, E., & Bagherzadeh, J. (2014) [4] - Noise control in industrial workplaces is enforced by health and safety regulations in order to prevent or reduce risks to personnel. Apart from compliance with rules, the adverse effects of noise on productivity have always been a challenge for industry. As a consequence, practical solutions, ranging from protection aids to acoustic damping and isolation, have occasionally been employed. These unplanned remedies do not necessarily aim at higher risk locations and hence may impose significant and unjustified expense on the company. In this paper, the optimum combination of treatments is investigated using binary integer programming with objective cost function. The model constraints include recommended noise doses for highly exposed operators as well as budget limits. In addition, sound specification of the sources, treatment effects and relevant production information are incorporated into the model through structured databases. Then a

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genetic algorithm is utilized in a Matlab environment and final results are obtained. The procedure is applied to an example of a press shop and the validity of the results is approved.

PROPOSED WORK AND OBJECTIVES

- The classical work on manpower / labor cost is optimized using genetic algorithmic approach.
- The reduction in manpower of labor cost is optimized using GA techniques
- Genetic Algorithm with association of monte carlo simulation is integrated for the industrial manufacturing related to labor cost.

METHODOLOGY

The proposed research work is based on the genetic algorithm. In GA based implementation, there is the concept of fitness function and values using which the results can be accepted or rejected based on the threshold parameters.

GENETIC ALGORITHM

Countless variants and hybrids of these techniques have been proposed, and many more applications of Metaheuristics to specific problems have been reported. This is one of the active fields of research, with a considerable literature, a large community of researchers and users, and a wide range of applications.

Traditional methods of search and optimization are too slow in finding a solution in a very complex search space, even implemented in supercomputers. Metaheuristics consist of number of methods and theories having robust search method requiring little information to search effectively in a large or poorly-understood search space. There exists an extensive range of

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problems which can be formulated as obtaining the values for a vector of variables subject to some restrictions. The elements of this vector are denominated decision-variables, and their nature determines a classification of this kind of problems. Specifically, if decision-variables are required to be discrete, the problem is said to be combinatorial. The process of finding optimal solutions (maximizing or minimizing an objective function) for such a problem is called combinatorial optimization.

Combinatorial optimization problems have been traditionally approached using exact techniques such as Branch and Bound (Lawler and Wood, 1966). Finding the optimal solution is ensured with these techniques but, unfortunately, they are seriously limited in their application due to the so-called combinatorial explosion. As an example, consider the Traveling Salesman Problem (TSP). This problem (obtaining a minimal Hamiltonian tour through a complete graph of n nodes) is a classical example of NP-complexity: the work-area to be explored grows exponentially according with the number of nodes in the graph, and so does the complexity of every know algorithm to solve this problem. It is not only a good example of a combinatorial optimization problem, but also an approach to real problems like VLSI-design or X-ray Crystallography.

Genetic algorithms are collections of modeling, search, and optimization methods inspired by evolutionary biology. In evolutionary biology, species evolve via inherited variation, either through mutation, recombination, or some other process. By natural selection, the fittest survive and reproduce, thereby transmitting their genetic material to future populations. A genetic algorithm simulates the evolutionary process. Possible solutions are encoded as genomes (usually bit-vectors), and during each generation, the genomes are assigned a “fitness” based on a pre-determined fitness function. The genomes that score higher fitness survive to the next

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generation. In addition, these fitter genomes can be mutated, and can produce offspring (through recombination of bit segments) for the next generation. In the end, genomes with superior "fitness" evolve as the optimal solution to the problem.

CONCLUSION

A number of methods and strategies are devised so far for the manpower cost reduction, still a huge scope is there as the paradigm is dynamic in nature. If physical labor is the biggest expense in manufacturing your product, controlling labor costs will give you the quickest path to increased profits. Labor cost reductions can be generated by lowering the dollars paid to factory workers or by making workers more efficient. Although low-cost labor can be obtained by employing unskilled labor, another way to decrease labor costs is to improve the efficiency of experienced labor. Study all production practices to eliminate wasted steps in the process. Reduce the time required to produce an average unit by providing specialized training that allows employees to work at a faster pace. Offer incentives to employees who can introduce labor-saving techniques into your production facility.

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