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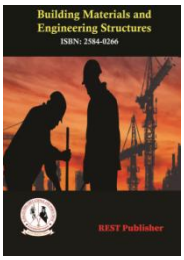

A survey on Transportation System Using the WPM method

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Abstract. *Transportation System, Introduction: Every movement has a goal, a starting point, possibly a number of intermediate places, and a final location. Transport systems, which are made up of infrastructure, modes, and terminals, support and propel mobility. They allow for interaction and the pursuit of economic, social, social, or political endeavors by individuals, organizations, corporations, regions, and nations. The main goal of this textbook is to help readers understand how geography of transportation and mobility are related. With a wide-ranging overview of the field's concepts, procedures, and areas of application, The Geographic location of Transport Systems provides a thorough and approachable introduction. Research significance: There are twelve chapters in the textbook. A particular conceptual aspect of transport topography, such as routes, modes, destinations, and urban transportation, is covered in each of the first ten chapters. Emerging issues like globalization, management of supply chains, computing infrastructure, energy, and also the environment are thoroughly covered in advisement to these traditional subjects. Methodology: Popular Multiple Dimension Analysis (MCDA) and Inter Decision Making (MCDM) techniques include the Weighted Product Model (WPM). The primary distinction is that multiplication has replaced addition as the fundamental mathematical operation. The objective of this research is to suggest a CS evaluation method from the perspective of the customer for the development of personalized products. Alternative: Roadside Assistance, Routing/location Assistance, Convenience services, and Remote Vehicle Diagnosis. Evaluation Option: Extremely satisfied, satisfied, somewhat satisfied, Not Very satisfied, not at all satisfied Result: "from the result it is seen that not at all satisfied and is got the first rank whereas is the Not Very satisfied got is having the lowest rank". Conclusion: "The value of the dataset for Nutritional Facts in Weighted product method shows that it results in not at all satisfied and top ranking".*
Keywords: *Convenience services, Remote Vehicle Diagnosis, Roadside Assistance.*

1. INTRODUCTION

Land transportation methods range from 12 m frozen container for long haul road or rail movement of bulk frozen or chilled products to small un - insulated vehicles serving food to nearby retail establishments or perhaps even directly towards the customer. Some of the first road and rail refrigerated vehicles for chilled goods used air that was pushed or freely circulated over sizable ice containers as a cooling agent. Transport vehicle cooling has also utilized similar systems that employ solid dioxide as the refrigerant. [1] Transportation systems based on agents allow distributed subsystems to work together to conduct traffic management and control tasks based on current traffic circumstances. An early illustration of the distributed dilemma network is the distributed transportation management testbed shown in. Operative traffic and transportation applications have been noted more frequently in recent times. In many areas of traffic and transportation processes, including modeling and simulation, smart transportation control and management, dynamic routing and congested roads strategic planning, motorist collaboration, and decision support, the methods and approaches resulting from the fields of agent systems and MAS have been used. [2] The vehicle's coordinates are displayed on the map screen using a locator provided by a VICS terminal, which also enables communication with ground stations to gather traffic data for route planning. ASVs (Advanced Safety Vehicles), designed to support the advancement of the development and research of vehicle safety technology, are examples of other created initiatives. ARTS (Advanced Road Network Systems), by the Department of Construction, are one example. The VERTIS conference was put on by academic and business representatives. [3] For instance, Location information can be used to assess and forecast traffic user behavior, a feature that is underutilized in traditional ITS. The conventional ITS will eventually change into an information intelligent transportation system (D2ITS), where data gathered from many sources will be crucial to ITS. The advantages and disadvantages of D2ITS need to be looked at in more detail. A solid theoretical foundation must be

established in order to create a data-driven strategy for enhancing D2ITS performance. [4] It is crucial to many intelligent transportation systems, such as vehicle-to-infrastructure integration, vehicle-to-vehicle communication, adaptive timing of traffic signals, electronic toll collection, congested charging, electronic road pricing, and information distribution. Radio frequency identity (RFID) technology includes DSRC as a subset. The United States band, the band in Japan, and the band in Europe are all supported by the technologies for ITS applications. The current DSRC networks in Europe, Japan, and the US are typically incompatible. [5] The design/analysis process as it relates to air-breathing space transportation systems is illustrated in this example. It is vital to model the individual steps after a certain organization's procedures in order to show the process in depth. The procedure in this scenario will be demonstrated using the hypersonic vehicle development process at NASA Langley. The design and analysis process for air-breathing vehicles at NASA Langley is schematized in. The reader should remember that each business customizes the process and applies it in a unique way depending on the situation, so they shouldn't be alarmed if their organization doesn't follow the exact same standards and procedures for designing hypersonic or air breather vehicles. [6] This essay's goal is to outline the traits of two game theory-based behavioral models that are used in decision-making processes for the design and management of transportation systems. Many of these issues, specifically, fit inside the Stackelberg frameworks. This study highlights the distinctions between the two games and provides illustrations of issues plaguing either framework. It helps to highlight the variations between certain problem types, and by explicitly demonstrating how they relate to game theory, the variety of viable resolution methods is increased. Since individual acts jointly decide the result, game theory provides a structure for modelling interaction between groups of decision-makers. [7] Which policies are being employed to encourage or stimulate the development of sustainable transportation systems? Professionals who are interested in putting policies, planning processes, and systems for decision-support into practice to advance towards the sustainability of transportation systems as defined by their missions will find the responses to these inquiries useful. These will also be helpful to academics looking to improve analytical methods and political tools, as well as teachers looking to broaden their current curricula to include sustainability in the design of civil infrastructure systems. [8] Information and communication technology (ICT) advancements in the fields of hardware, software, and communication have opened up new possibilities for the creation of a smart, sustainable transportation system. The adoption of Intelligent Transportation Systems (ITS), which place a strong emphasis on four core rules: sustainable development, integration, safety, and responsiveness, will be made possible by the integration of information and communication technologies with the transportation infrastructure. ITS will improve and make travelling safer. These guiding principles will be crucial to attaining the access and mobility, environmental protection, and economic development goals of something like the Intelligent Transportation Systems. [9] It can be used to anticipate traffic accidents and optimize the road congestion. Fernandez and Ito suggest using ontologies to organize sensor data in intelligent modes of transportation and transform it into semantic information. The system that automatically adjusts traffic lights may utilize the data to foresee and prevent accidents. provide a methodical approach for developing ontologies in the ITS area. This taxonomy will be the foundation of semantics to a semantically service that permits the connecting of new machinery to that of an urban network. [10] Those agents are produced to traffic-control centers, roadside remotes, sensing devices, and data management via communications systems to arrive at the correct choices and collect this same right data when it's needed. We have created and built unique junction light controller and sensing systems that seem to be capable of hosting and analyzing traffic-control agents for varied functions. Generally, an advisor can independent move in networking, define its tasks, and vigorously improve its performance. administration methods to traffic-control and administration agents was a natural step ahead in this time of networks and connectivity. [11] In conclusion, there is no reason to doubt that transport networks were becoming smarter and smarter as a result of computer vision, big data analysis, and more potent computing resources. was innovative in that it gathered the actual customer need from millions of Singaporeans in order to optimize the bus schedule in an info manner. As the gathering, storage, and analysis of multisensory dataset obtained become cheaper and easier, new and fascinating applications develop. In other words, the average wait time at bus stops must be decreased without affecting the user experience. Bus stop allocation and bus network design are two examples of other large-scale optimization issues that can be addressed using similar data-driven methodologies. [12] History has shown that humanity's ability to just have rapid communication routes is the fundamental basis of all wonderful societies. The Romans were arguably the biggest users of the technology. The rapid public transport of legions and details facilitated a far carelessly tossed empire to also be governed from Rome, and most importantly prosper. The fundamental components of commerce goods and food could be distributed from key hubs, laying the groundwork for trade and commerce much as we know it today. The rudimentary road network that was in place in all of Europe up to the late 1700s could be traced back to the early Romans road builders. [13] Despite the fact that DF techniques have been applied to modelling complex systems before, there is application to transportation systems. Road traffic might be considered as \sa ground where benefits anticipated from the implementation of DF methods are fruitful. The challenges in determining the viability, efficacy, approaches, however, outweigh the advantages. The interest in DF is relatively new in the literature on traffic engineering and it happens to coincide with the introduction of ITS. The earliest publication which discusses the Fad was by Peirce in the early. [14]

2. MATERIALS AND METHODS

Popular Multi Scale Analysis (MCDA) and Multi-Scale Decision - making process (MCDM) techniques include the Weighted Product Model (WPM). The primary distinction is that multiplication has replaced addition as the fundamental mathematical operation. The objective of this research is to suggest a CS evaluation method from the perspective of the customer for the development of personalized products. The major steps of the suggested methodology are (a) Client Voice (VoC), (b) modeling, and (c) model solution, which are connected to integration with each level size technique and consumer in terms of weights. includes identifying and classifying needs. Entropy Weight and Hierarchical Analysis Method (AHP). The subsections that follow provide more information on each phase. Professional weight determination has long been a significant concern in GDM issues. As a result, the correctness and validity of the decision-making process in the GDM process depend on how fair the weight of both the experts is given to their cognitive structure and levels, social context, and personal experience. Several people make decisions in the MCDA. Indicator weight there is numerous ways to assign. This relative evaluation method is a straightforward one. Results criteria are arranged in comparison estimation mode based on the estimated value. Because there are numerous decision-makers in reality in order to determine criteria It is not possible to assign weight in numbers. Thus, everyone in this way how much the scale weighs regarding the scale's assessment Because of the ranking order, basically calculated, basically several criteria The person who made the decision to arrange is really at ease. When evaluating each criterion, there are differences. Final standards utilizing this approach of comparison. Here, the first assessment criterions for overweight individuals and vice versa are offered. This approach of weight estimate, then, combines a variety of relationships. Weighted production technique, for example. The primary distinction is that this approach uses multiplication rather than addition. Every substitution multiplied by a number of ratios in contrast to others. WP and Twisty algorithms Enables decision making utilising an online application has been developed to test accuracy. 30 Students' Data based on their calculated rankings. exact ratings of two prediction techniques Calculated data to determine % using one of two techniques Low error rates and accuracy were attained. E-learning or online learning The importance of the Internet in establishing has influenced. All industries and business activities have been impacted by internet technology, e-commerce, and e-learning. The sector's expansion has quickened. Information The transaction's size and increasing speed In addition, duties involving knowledge transfer and simplification internet and education In terms of technology, collaboration It was motivating. E-learning is used by numerous businesses. Workplace training for results, cost savings, staff time, and other costs smuggling is the alternate method. In order to convey the procedure and data, this will gather the sensor nodes and send them to the base station. These sensor nodes primarily collect environmental data, which is then stored in those other intermediate Packets of data that are retrieved from the source and transferred to the base station via nodes are going to reach the target via nodes. Information The transaction's size and increasing speed In addition, duties involving knowledge transfer and simplification internet and education In terms of technology, collaboration It was motivating. E-learning is used by numerous businesses. Workplace training for results, cost savings, staff time, and other costs smuggling is the alternate method. In order to convey the procedure and data, this will gather the sensor nodes and send them to the base station. These sensor nodes primarily collect environmental data, which is then stored in those other intermediate Packets of data that are retrieved from the source and transferred to the base station via nodes are going to reach the target via nodes.

Design of decision matrix and weight matrix

$$D = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & \ddots & \cdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{bmatrix}$$

The weight vector may be expressed as,

$$w_j = [w_1 \quad \cdots \quad w_n], \qquad where \sum_{j=1}^{n} (w_1 \quad \cdots \quad w_n) = 1$$

Step 1. Normalisation of DM

$$n_{ij} = \begin{cases} \dfrac{x_{ij}}{max.x_{ij}} & | \ j \in B \\ \dfrac{min.x_{ij}}{x_{ij}} & | \ j \in C \end{cases}$$

Where n_{ij} is the normalized value of the i^{th} alternative for the j^{th} criterion, $max.x_{ij}$ and $min.x_{ij}$ are maximum and minimum value of x_{ij} in the j^{th} column for the benefit (B) and cost criteria (C) respectively.

Step 2. Weighted normalized Decision Matrix

$$W_{n_{ij}} = w_j n_{ij}$$

Step 3. Ranking of alternatives

$S_i^{WPM} = \prod_{j=1}^{n} (n_{ij})^{w_j}$

Where, S_i^{WPM} is the ranking score of the i^{th} alternative, w_j is weight of the j^{th} criterion. Then the alternatives are ranked in descending order with highest S_i^{WPM} being ranked highest

To measure accuracy Decision making using WP and Tops Algorithms an application system that supports Has been created. Thirty student data Calculated according to their ranking. Two in predicting accurate rankings The data were calculated to determine the percentage of methods, from it were obtained two methods of accuracy and low error ratios. Perfect for each method to find the scale, in a specific section of the company Created a ranking of trainees who received an internship program. From these barriers, in Bali Digital library services at computer colleges in It was necessary to evaluate, thus Developed recommendations for service improvements. In principle, the evaluator is a specific product / project / service / Absolute about the policy under review and collecting accurate information from an appraiser, Is the process of analysis. So, in decision making Can be used as a recommendation. Evaluation is a Information about the specific object Collecting, analyzing and distributing. Of computer learning control Provides appropriate functionality. The path of learning objects.

3. ANALYSIS AND DISSECTION

TABLE 1. Transportation System in Weighted product method Data Set

DATA SET				
	Roadside Assistance	**Routing/location Assistance**	**Convenience services**	**Remote vehicle Diagnosis**
Extremely satisfied	25.84	32.62	52.08	29.15
satisfied	143	33.69	29.12	139.53
Somewhat satisfied	33.33	27.96	122.58	24.08
Not Very satisfied	29.12	186.41	13.86	50.04
Not at all satisfied	25.15	16.08	28.25	108.42

This table 1 shows that the value of dataset for Transportation System in Weighted product method Alternative: Roadside Assistance, Routing/location Assistance, Convenience services and Remote Vehicle Diagnosis. Evaluation Option: Extremely satisfied, satisfied, somewhat satisfied, Not Very satisfied, not at all satisfied.

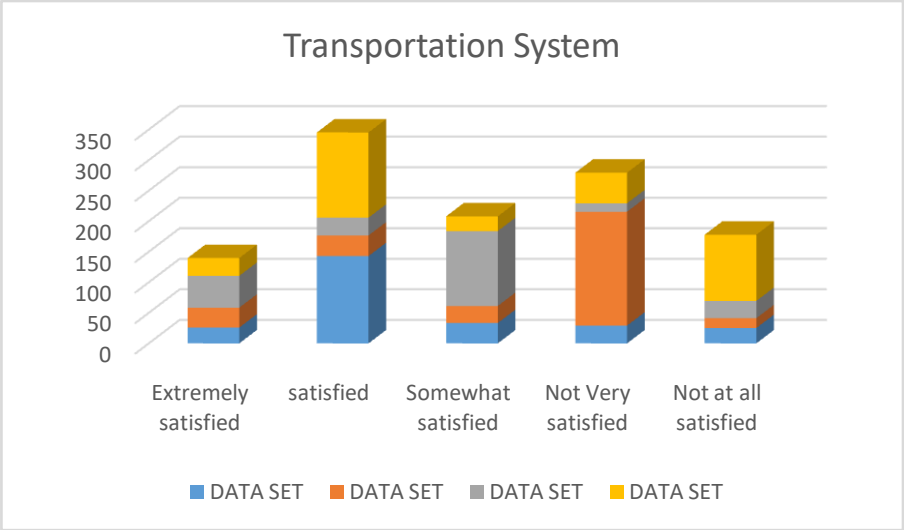

FIGURE 1. Transportation System

This figure 1 shows that the value of dataset for Transportation System in Weighted product method Alternative: Roadside Assistance, Routing/location Assistance, Convenience services and Remote Vehicle Diagnosis. Evaluation Option: Extremely satisfied, satisfied, somewhat satisfied, Not Very satisfied, not at all satisfied

TABLE 2. Transportation System in Weighted product method Performance value

Performance value			
0.181	0.17499	0.2661	0.826072
1	0.18073	0.476	0.172579
0.233	0.14999	0.1131	1
0.204	1	1	0.481215
0.176	0.08626	0.4906	0.222099

This table 2 shows that the values of Transportation System in Weighted product method for Performance value using Weighted product method Find the pair wise comparison value for Extremely satisfied, satisfied, somewhat satisfied, Not Very satisfied, not at all satisfied.

TABLE 3. Transportation System in Weighted Product Weight age

Weight			
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25

This table 3 shows that the values of Transportation System in Weighted product method for Weight age using Weighted product method Find the pair wise comparison value for Extremely satisfied, satisfied, somewhat satisfied, Not Very satisfied, not at all satisfied.

TABLE 4. Transportation System in Weighted Product Weighted normalized decision matrix

Weighted normalized decision matrix			
0.652	0.646776	0.7182	0.9534
1	0.652016	0.8306	0.6445
0.6949	0.622325	0.5799	1
0.6718	1	1	0.8329
0.6476	0.541944	0.8369	0.6865

This table 4 shows that the values of Transportation System in Weighted product method for Weighted normalized decision matrix using Weighted product method Find the pair wise comparison value Roadside Assistance, Routing/location Assistance, Convenience services and Remote Vehicle Diagnosis. Evaluation Option: Extremely satisfied, satisfied, somewhat satisfied, Not Very satisfied, not at all satisfied.

TABLE 5. Transportation System in Weighted Product Preference Score

	Preference Score
Extremely satisfied	0.2887641
satisfied	0.3490584
Somewhat satisfied	0.2507555
Not Very satisfied	0.5595275
Not at all satisfied	0.201651

This table 5 shows that from the result it is seen that Extremely satisfied = 0.2887641, satisfied = 0.3490584, Somewhat satisfied = 0.2507555, Not Very satisfied = 0.5595275, Not at all satisfied = 0.201651.

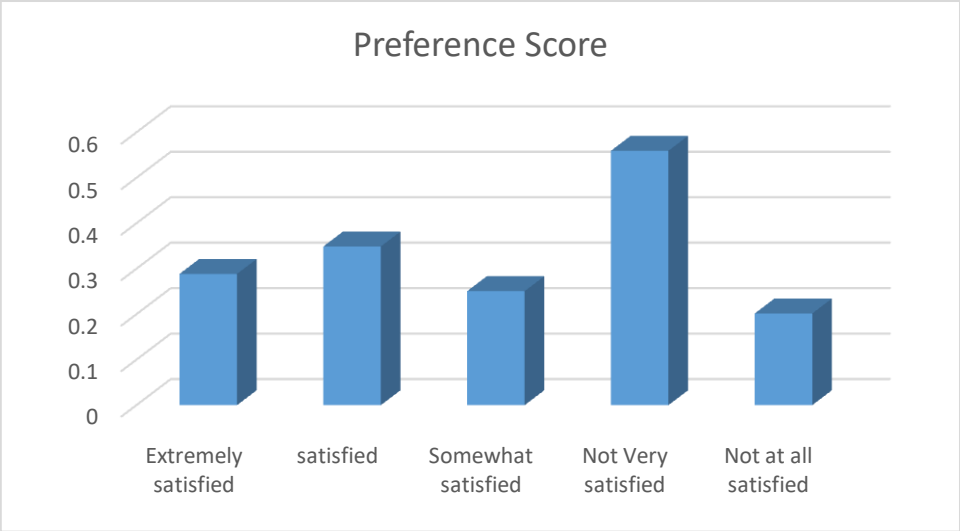

FIGURE 2. Transportation System in Weighted Product Preference Score

This figure 2 shows that from the result it is seen that Extremely satisfied = 0.2887641, satisfied = 0.3490584, Somewhat satisfied = 0.2507555, Not Very satisfied = 0.5595275, Not at all satisfied = 0.201651.

TABLE 6. Transportation System in Weighted product Rank

	Rank
Extremely satisfied	3
satisfied	2
Somewhat satisfied	4
Not Very satisfied	1
Not at all satisfied	5

This table 6 shows that from the result it is seen that Not Very satisfied and is got the first rank whereas is the Not at all satisfied got is having the lowest rank.

FIGURE 3. Rank

This figure 3 shows that from the result it is seen that Not Very satisfied and is got the first rank whereas is the Not at all satisfied got is having the lowest rank.

4. CONCLUSION

The subsections that follow provide more information on each phase. Professional weight determination has long been a significant concern in GDM issues. As a result, the correctness and validity of the decision-making process

in the GDM process depend on how far the weight of both the experts is given to their cognitive structure and levels, social context, and personal experience. Several people make decisions in the MCDA. Indicator weight There are numerous ways to assign. This relative evaluation method is a straightforward one. Results criteria are arranged in comparison estimation mode based on the estimated value. Because there are numerous decision-makers in reality in order to determine criteria It is not possible to assign weight in numbers. Thus, everyone in this way How much the scale weighs Regarding the scale's assessment Because of the ranking order, basically calculated, basically several criteria The person who made the decision to arrange is really at ease. When evaluating each criterion, there are differences. Final standards Utilizing this approach of comparison. Here, the first assessment criterion for overweight individuals and vice versa is offered. This approach of weight estimate, then, combines a variety of relationships. Transportation systems based on agents allow distributed subsystems to work together to conduct traffic management and control tasks based on current traffic circumstances. An early illustration of the distributed dilemma network is the distributed transportation management testbed shown in. Operative traffic and transportation applications have been noted more frequently in recent times. In many areas of traffic and transportation processes, including modelling and simulation, smart transportation control and management, dynamic routing and congested roads strategic planning, motorist collaboration, and decision support, the methods and approaches resulting from the fields of agent systems and MAS have been used. The vehicle's coordinates are displayed on the map screen using a locator provided by a VIC's terminal, which also enables communication with ground stations to gather traffic data for route planning. ASVs (Advanced Safety Vehicles), designed to support the advancement of the development and research of vehicle safety technology, are examples of other created initiatives. ARTS (Advanced Road Network Systems), by the Department of Construction, are one example. The VERTIS conference was put on by academic and business representatives. From the result it is seen that not at all satisfied and is got the first rank whereas is the Not Very satisfied got is having the lowest rank.

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