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Analysis and Evaluation of Medical Care Data using Analytic Fuzzy Process

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***Abstract*— In the last 2 decades, managers have increasingly used multi-criteria decision-making techniques like the analytic hierarchy process (AHP) owing to its many advantages. Additionally, the capabilities of multi-criteria decision-making techniques are enhanced with the use of Fuzzy logic. The purpose of this research was to assess the efficacy of the FAHP strategy in the hospital setting. In this research, we used the Fuzzy Analytic Hierarchy Process to conduct a comprehensive literature review, omitting consideration of temporal considerations in favor of a focus on input and output criteria, finding that the technique has the widest applicability to questions of quality of service and positional awareness but relatively little use elsewhere in the health service. Although FAHP approaches are increasingly being used in the healthcare sector, their prevalence is still modest when compared to other disciplines.**

Keywords — Medical Care Data, Analytical Fuzzy Process, and Internet of Medical Things

I. INTRODUCTION

By examining consumer satisfaction with the sector's services in light of the country's ageing market, this research seeks to assist the forest health industry in the three northeastern provinces (i.e., [1]). Premature births total around 1,000,000 per year [2]. The provision of top-notch medical services forms the basis of the medical center's administration's choices. Conventional assessment techniques, however, have been shown to be ineffective for determining service quality. The linguistic techniques of fuzzy set theory are ideally adapted to tackle this problem. To collect expert views in a more useful and understandable way, classic fuzzy sets are being extended with classifiers based on three dimensions, including Pythagorean fuzzy sets (PFS), intuitionistic fuzzy sets (IFS), and neutrosophic sets (NS) [3]. Environmental resources must be used to reduce energy use, and the construction industry uses both heavily. Buildings that require less energy and also have fewer negative impacts are made using the green building concept. Setting a standard for quality is crucial in light of the rising need for environmentally friendly building practises [4]. Avedis Donabedian proposed three key elements for evaluating the quality of medical treatment. the effectiveness of the design, the efficiency of the process, and the effectiveness of the outcome. As per Donabedian, the value of the architecture, the integrity of the procedure, and the level of the final result are all directly causally related. The framework causal model has been the subject of a number of papers, but only a small number of these studies have looked at how organisational changes affect the quality of treatment. The issue of vaginal delivery after caesarean section (VBAC) should be addressed quickly as the number of caesarean deliveries (CDs) increases. However, from 1989 to 1996, research aimed to show the advantages of trial labour after surgery, and this trend was largely reversed (TOLAC). However, the rise in VBACs has brought up the issue of scar ruptures, which has alarmed women and forced them to choose caesarean procedures once again. Cesarean sections (CS) continue to increase despite the World Health Organization's (WHO) recommendations that they decline [6]. By taking into account 20 variables from medical, academic, transport, economic, and ecological environments, this study uses a geographic information extraction of points of interest (POI) methodology with a kernel density estimation research method to provide a quick, affordable, and accurate reflection of residential livability. We developed a web-based method for evaluating the life quality in various neighborhoods using the ArcGIS Server. A Levenberg-Marquardt backpropagation algorithm (LMBP), that is used to assess the livability of residential areas, was also developed using the Gauss-Newton approach. Then, elements including house acceptance ratings, point-of-interest (POI) analysis, statistical analysis, and nuclear density analysis are put into use. Gray relational analysis and also the fuzzy analytical hierarchical approach were used to examine the effectiveness of the LMBP method for determining how livable a house is [7]. Introduction About 95% of Indians with mental health problems, such as depression, anxiety, or substance dependence, are unable to get the necessary care. The stigma associated with seeking help and the dearth of professionals in the area who are sufficiently trained are two main barriers to obtaining mental health therapy. The Systematic Medical Appraisal, Referral, and Treatment (SMART) Psychiatric initiative merges a society effective intervention campaign and task sharing with the aid of such a mobile-enabled electronic decision support system to reduce psychiatric comorbidities from stress, depression, and self-harm in high-risk individual people [8]. (EDSS). Being pregnant is a long and important period for the majority of women, making having a kid a significant affair. For many women, for a variety of factors, there is a significant risk of complications during pregnancy. Thankfully, pregnant women who get maternity care early

and often have infants with fewer issues and simpler delivery. However, according to recent research, most pregnant women may still not fully understand how the pregnancy works because of the volume of medical information and the lack of carer attention [9]. The effectiveness of activities within a specific environment must be monitored and controlled with the help of performance evaluation. To provide patients the greatest treatment possible, it has recently been include in hospital strategic plans [10].

- Heart rate, heart rate, temperatures, and breathing are just few of the vitals that may be continually monitored with the use of inventive gadgets that are wired and connected around the clock.
- Blood pressure, heart rate, temperature, as well as respiratory are all examples of vital signs that may be collected by smart devices that, once connected to the system, do so at regular intervals and are stored for further analysis.
- Different parameters connected with most common chronic diseases, such as blood glucose, venous fat, water in the body percent, psychological stress, and detainment risk, are continuously collected using productive tools, which include interconnection systems, that obtain relevant and store information around the clock, every day of the year.
- Fourth, the system regularly collects and stores information on particular parameters linked to common chronic conditions, such as blood sugar, blood fat, body water percentage, stress levels, and the danger of seizure.
- Objects (humans, medical devices, etc.) and their capacities to communicate with the wireless sensor network's devices are tracked and monitored in real time by linking bases that are strategically placed and have a high data transfer rate.
- 6. Virtual help: life-saving and health-care services such as emergencies, first aid, healthy homes, nutrition and conventional methods, telehealth and remote patient monitoring, health and social networks, etc. may be supplied remotely using internet-optimized equipment.
- 7. Data management: with the interconnection of global IoT, all facets of healthcare information (including assistance, diagnostic, treatments, recovery, medication, management, finances, and everyday activities) may be employed in the context of a comprehensive data collecting and management system. An organized report on the illness, city, region, time, patient, physicians, and physicians may be retrieved from the system and categorised.
- In the event of obvious symptoms, the system can modify a user's profile page and immediately send the articles or instructional films described that disease to the user's screen based on the given heat signatures and precise also the with common chronic diseases that are collected per individual and in light of their defined threshold levels.
- As a result of IoT's use in healthcare systems, consolidated data from several organizations may be collected in one place. With this function, physicians, nursing, therapists, and radiologists may see a participant's complete medical history from anywhere in the world.

The most significant benefits of this technology for medical systems are as follows: Having the option to meet and assess patients virtually helps cut down on the expense of in-person visits. However, many patients may now be hospitalised and examined in the comfort of their own homes because to technological advancements in home care devices.

- Successful completion of treatment: because surveillance is constant and automated, all data are kept in the cloud and provided to the doctor on a regular basis, ensuring that the treatment procedures proceeded appropriately. By using this technique, doctors will be able to gauge their patients' progress in a timely manner.
- Disease management: early detection and prevention by regular monitoring and reporting of vital signs.
- Reducing the number of medical malpractice and the consequential financial and life-threatening expenses they incur is one of the primary goals of error-free medical data collection and analysis.
- Patients ' satisfaction, which is achieved by factors such as a focus on patient needs, accurate data, prompt treatment, decreased expenditures, fewer repeat visits, and documentation of the patient's progress toward recovery.
- Medication governance: IoT aids both patients and healthcare facilities in ensuring that medications are used precisely as prescribed [7].

II. LITERATURE REVIEW

In order to collect information from a sample of older individuals in the three NE regions and a board of forestry health specialists, this study employed a questionnaire survey technique. The questionnaire is expected to get responses from 96.23 percentage of the older population, and thus far, 587 valid questionnaires have been collected. To address the index fulfillment of the senior population, we combine the evaluation weight of the index in this study. We then analyse the index values from 10 expert judgment questionnaires to create the FCE fuzzy full evaluation score of satisfaction. After that, a comparative study of the importance-satisfaction ranking of the index is used to analyse the demand- and supply-development state of the forest medical system key supply indices in the ageing market. The data indicate that each of the key indicators has the following relative weight: Architecture (0.4226) > Leisure and the Arts (0.4464) > Healthcare (0.4464) (0.1310). All 3-factor layers and all 15 index layers have scores between 74.6 and 79.95 on the a scale ranging from 0 to 100, which indicates that they are all in excellent shape. Current ratings for nine other metrics, including the accessibility of fundamental accomodation services, government service infrastructure, lodging, folk specially made activities, vacations, presentations on forest health, commercial shopping areas, and cultural centres devoted to the

advancement of forest ecosystems and rehabilitation, are lower than those for customer satisfaction, which is classified as "advantage maintenance." Its indicator, which are a component of the "constant reform" indicators, have some development lag and other issues. Based on the results, the paper ends with a discussion of the suitable service source for the overaged market in the 3 northeastern provinces' forest healthcare sector and offers recommendations for raising the geriatric population's satisfaction with regard to their usage of assessment indices [11]. The goal of this project is to develop a clinical risk evaluation model for preterm delivery using fuzzy multicriteria analysis. The technique employs a thorough approach to risk evaluation by taking into account six (6) risk criteria that correspond to the socio-economic medical profiles, and behavioural of expectant mothers and enabling experts to lend their experience and judgement to the choice process. We dissect every hazard dimension into its individual dangers and examine them independently to have a clearer understanding of the full breadth of threat. A number of 35 experts who had all worked in the area of obstetrics for more than 20 years were polled. The criteria for the model were selected to give a thorough technique of risk assessment after a thorough literature review. Both the model's structure and the criteria were finished, according to experts. The fuzzy analytical hierarchical technique was utilised to estimate the importance of each component in order to evaluate and rank pregnant women as according their risk of giving birth prematurely. In the recommended model, fuzzy based and multi-criteria assessment are used. It discusses the difficult choices made while estimating the danger of an early birth. It may be used to classify situations according to danger, and it does so while taking into consideration obstetricians' intuitive judgement. Additionally, a customized risk assessment of specific scenarios may be provided using it. The effectiveness of the suggested model as a predictor is assessed using expert judgements [12]. A spherical fuzzy analytic hierarchy process (SF-AHP) approach was proposed in the literature by Kutlu Gundogdu and Kahraman (2019a), who also constructed expanded three-dimensional spherical fuzzy sets. The approach to a interval-valued spherical fuzzy AHP (IVSF-AHP) technique is extended in this chapter and used to assess the level of care offered by different medical institutions. Utilizing the SERVQUAL framework, this approach was created to evaluate the quality of healthcare services. We provide a comparative study using univalent functions AHP to further illustrate the validity and dependability of the recommended method. The hospital management may utilise the assessment's results as a starting point for improving patient care [13]. This study proposes a Hierarchy Project Architecture, an Analytical Hierarchical Methodology, and a Fuzzy Analytical Hierarchy Method to identify and quantify risks for Philippine Green Building Projects (GBP). Data collection and analysis took place over the course of four phases of the risk management process (identification, evaluation, handling, and controlling). In total, 28 risk factors were found and divided into 11 different classifications that represented both internal and external dangers. Consistency ratios for all categories of identified risk it was between 0.00 and 0.70, which would be regarded as satisfactory. The Geometric Mean approach, the Extent Analysis method, and the Mathematical Mean method are the three separate Fuzzy AHP methodologies we use in this inquiry. The three FAHP techniques were compared using the Kolmogorov-Smirnov test in order to establish the ideal weights for the criterion. We compare the results of the AHP with FAHP by assessing the parameter weights in order to further enhance the rank of the risks expressed in GBPs based on the amount of impact. Eleven risk reduction strategies are suggested in this research that, if implemented effectively, might assist the Philippines in achieving its sustainability objectives [14]. These tactics were included in the creation of a framework for risk management. In this study, we give a paradigm for evaluating how changing the layout of a healthcare institution could impact the level of care it offers. The four steps of the recommended process for developing and assessing models are as follows: This procedure involves these four steps: Choosing a sample size and gathering pertinent data are the first steps. The second is using exploratory factor analysis to focus the data and identify identifiers for each of Donabedian Model's dimensions. The third is using fuzzy binary relations to look into the indirect effects of structural changes. The fourth step is determining how much the performance measures have changed as a result of the changes and modelling managerial and organizational responses. The study of fuzzy binary relations is integrated with fuzzy cognitive modelling techniques in the model. What-if analysis supports merging the two approaches, which makes it easier to choose the optimum management strategy. The approach is put into practise using data gleaned from a survey of those who need an ambulance [15]. In order to assess pregnant women's health and suggest the safest and most suitable delivery option, this research developed two fuzzy models: a Fuzzy vaginal birth after cesarean (VBAC) paradigm and the Fuzzy caesarian (CS) model. Methods: We have compiled a tentative list of factors affecting VBAC or CS after examining the literature. In order to learn more about the characteristics they had uncovered, researchers created a questionnaire and semi-structured interview with 29 experienced obstetricians using the final set of criteria. The Fuzzy Analytic Hierarchy Process (FAHP) method is used to generate the fuzzy VBAC and fuzzy CS multicriteria models. Results: There are total of 36 factors that should be considered while choosing the appropriate distribution strategy. A woman's decision to use CS was found to be influenced by a total of 27 factors, but the top 5 were the following: the fact that vaginal birth was medically impossible, a prior postpartum hemorrhage, an uterus perforation, significant transfundal uterine surgery, and the desire to be sterilised at the time of delivery. The decision to choose VBAC is positively impacted by a group of nine factors. The top 5 factors that positively influence decisions to select VBAC are: maternal desire for VBAC, mother's personal values/preferences, prior bladder injury, professional recommendations from healthcare providers, family obligations, and previous VBAC after CS. In conclusion, the recommended approach considers the difficulty of identifying the most efficient manner of distribution. Obstetrics and midwives may express their knowledge and instincts within a methodologically sound framework using fuzzy logic analysis, which enables them to assess patient circumstances more precisely and provide more reliable suggestions for care center [16]. The goal of this study was to evaluate the performance of Hormozgan's medical sciences college and healthcare systems using the Scorecard model and a fuzzy logic approach. This 2013 description (survey) research's objective was to evaluate the outcomes of 2012. All managers and senior staff department

specialists who are taking part in the Balanced Scorecard (BSC) method assessment of Required in order to obtain Medical Sciences University's effectiveness are included. For the research, a questionnaire comprising 15 aims and 25 criteria was employed. Both the validity and reliability of the research were examined across all participants using scientific methods. Data was analysed utilizing fuzzy logic with in Matlab platform after the surveys, data, and documents were gathered at the university. Finally, gap analysis was used to determine the distinction between the current situation and the ideal one. A Wilcoxon statistical test of P = 0.01 was obtained from the fuzzy method's analysis of college performance in relation to strategic goals; this value indicates a statistically meaningful discrepancy between both the actual and optimal levels of academic achievement. But according to the performance appraisal, there isn't a statistically significant difference between medical science colleges' actual and optimal performance (P = 0.06). Additionally, it performs well in terms of finances, growth, learning, internal processes, and client preferences. Outcomes will be more trustworthy if the scoreboard model is utilised to assess in a fuzzy environment. Given the shortcomings of the scorecard model, a fuzzy logic technique is an appropriate instrument for evaluating the company since it increases assessment accuracy and makes up for these shortcomings [17]. The results show that the recommended method may quickly and accurately evaluate home livability online, saving money and time while still giving customers necessary details about which communities could be most suited to their requirements. The results of this study might influence how houses, public spaces, and businesses are built [18]. This research presents and discusses the SMART Psychiatric process evaluation method. Methods and Assessments In order to analyse the effectiveness of the intervention and the variables that support and obstruct its spread, a mix of qualitative and quantitative methodologies will be utilised. Case studies will be conducted on six clusters getting therapy and two clusters acting as controls. The mHealth platforms' use statistics will be utilised as a quantifiable source of data for the research. The qualitative data will be assembled via focus groups and one-on-one interviews with project participants, primary care doctors, community members (Accredited Social Health Activits), and local leaders. The design and analysis of the research will be guided by the Regularization Process Models and the Reach, Adoption, Effectiveness, Implementation, and Maintenance (RE-AIM) methodology created by the Medical Research Council. Sharing information and morality The study has received permission from both the All India Institute of Medical Sciences (AIIMS), Delhi, and the George Institute for Global Health in India. The study's results will be disseminated via publications in scholarly journals, seminars visited by interested parties, internet publications, and social media. CTRI-2018-08-015355 is the Clinical Trials Registry ID. [19]. As a result, we researched the various prenatal care choices, gathered information on what women require, and investigated the connections among maternal complaints and newborn disease. With this knowledge in mind, we developed PregnancyLine, an innovative visualisation system that offers a pregnancy care plan and information on medical checks at each trimester via a series of eye-catching visual metaphors. This system's objectives are to improve two-way communication between expectant mothers and their doctors and to help identify abnormalities and odd events. Our technique is helpful in identifying and understanding abnormalities and also helping pregnant women recognise risk of pregnancy and the necessity for testing, according to the evaluation and case studies [20].

III. Proposed Model

Thomas L. Saaty initially presented AHP to the world in 1980. AHP has been utilized for quite some time in many different areas, including the social sciences, health planning, and management. Using AHP to evaluate a hospital's efficiency has several benefits:

- AHP has a good mathematical foundation, and its implementation is user-friendly; • medical care are multi-factorial, with variables that are both objective and subjective; • assessment of the effectiveness of such a system may be accomplished with relative ease using FAHP.
- AHP permits doing a sensitivity analysis that may aid hospital administrators in comprehending the impact of their actions, and prioritizing the areas needing improvement. AHP is designed to address ill-defined issues.

The usual theory of mathematics sets somehow doesn't accurately represent human thought, but by using fuzzy sets theory, it takes into account the fuzziness and uncertainties included in the weights ascribed to the criterion. This work is based on Chang's method, which employs the extension analysis technique to display synthetic extension values derived from a compare and offers the Triangular Fuzzy Numbers (TFN) for spare set comparison.

Although AHP is required to do several spare set comparison in order to choose the correct measures according to the perceptions of something like the relative significance, very few of these assessments really combine the significance and performances of the variables in question. The first step in using FAHP is to determine what influences the issue at hand. After that, he organizes the elements into classes based on their shared features. The many tiers of the hierarchy are defined by these categorizations. An essential part of FAHP is the user-created criterion, sub-criterion, and alternative hierarchy that results from this process. Each set of items was compared to every other element in a higher stratum in a pairwise approach to determine priority. For this evaluation, we used a numeric scale with nine possible outcomes. How strongly and precisely each pair is compared to establish priority.

By enhancing AHP with fuzzy logic, the FAHP approach enables researchers to take advantage of imprecise data. For this investigation, the authors used Hu et al[10] .'s proposal of triangular fuzzy numbers. Table I displays the data.

A. Modified Fuzzy Analytic Hierarchy Process (FAHP)

In 1996, a group of Chinese scholars headed by a man named Chang submitted a progress report on combining AHP with fuzzy logic. In this technique, we employ triangle fuzzy values. The "(1)" and "(2)" represent two sides of a triangle fuzzy number, whereas the "(3)" and "(4)" represent joint functions applied to those numbers.

TABLE I. QUALITATIVE TERM AND THEIR CORRESPONDING TRIANGULAR FUZZY NUMBERS

Linguistic variables	Positive triangular fuzz number	Positive reciprocal triangu fuzzy number
Extremely strong Intermediate Very strong Intermediate Strong Intermediate Moderately Stron Intermediate Equally Strong	(9,9,9)	(0.11,0.11,0.11)
	(7,8,9)	(0.11,0.13,0.14)
	(6,7,8)	(0.13,0.14,0.17)
	(5,6,7)	(0.14,0.17,0.20)
	(4,5,6)	(0.17,0.20,0.25)
	(3,4,5)	(0.20,0.25,0.33)
	(2,3,4)	(0.25,0.33,0.5)

$$\tilde{A} = (l, m, u)$$

$$\tilde{u}(x) = \begin{cases} 0 & x < m \leq u \\ (x-l)/(m-l) & l \leq x \leq m \\ (u-x)/(u-m) & m \leq x \leq u \\ 0 & x > u \end{cases} \quad (1)$$

Utilizing "(4)," the Sk value, which is likewise a trapezoidal fuzzy number, is computed for each matrix row in the paired comparison approach.

$$\mathrm{S_k} = \sum_{j=1}^{n} M_{kj} \times \left[\sum_{i=1}^{m} \sum_{j=1}^{n} M_{ij} \right]^{-1}$$

The k indicates the columns, I and j stand for the criterion and choices available, and denotes the total number of columns. In this approach, the big degree toward one another is estimated once Sk is determined. At a high level, if M_1 and M_2 are two triangular fuzzy numbers, the large degree of M_1 towards M_2 defined as “(5)."

$$\begin{Bmatrix} V(M_1 \geq M_2) = 1 & \text{ifm } m_1 \geq m_2 \\ V(M_1 \geq M_2) = \text{hgt}\,(M_1 \cap M_2) & \text{ifm } m_1 \leq m_2 \end{Bmatrix}$$

So that can have "(6)."

$$\text{hgt}\,(M_1 \cap M_2) = \frac{(l_2 - u_1)}{(m_1 - u_1) - (m_2 - l_2)}$$

Additionally, "(7)," is used to compute the strengths of the criterion in the matrix of paired comparisons:

$$W(X_i) = \mathrm{m}\ \{V(S_i \geq S_k)\} k = 1,2,\ldots,n; k \neq$$

$$W' = [W'(x_1), W'(x_2), \ldots, W'(x_n)]^T$$

Since "(8)" represents FAHP's unweighted coefficients vector, it may be used to determine the vector's weight. These balanced matrices are represented by "(9).."

$$W_i = \frac{W_i'}{\sum W_i'}$$

Combining the pairwise comparison matrix allows for a more comprehensive view in decision making, reflecting the whole expert consensus. The geometric mean approach is employed in group decision making to accomplish this goal. The "(10)," illustrates the connection between the experts' various compositions. The number of people involved in making a choice is shown by L here.

$$X_{ij} = \left(\prod_{L=1}^{k} \tilde{X}_{ijL} \right)^{\frac{1}{k}}$$

The FAHP and Chang's developmental evaluation are utilized in the vast majority of published materials. One of the key flaws of this approach is that it is sometimes used to determine the negative weights of criterion and sub-criteria. To avoid these issues, Chang suggested running the FAHP with Chang's developmental analysis, which would first transform the decision matrix to normal cellular. The vast majority of researchers ignored this obvious answer. This research modifies Chang's approach by first normalizing the cellular matrix before beginning the procedure, so that no negative weights are accidentally calculated.

There are distinctions between reliability evaluation in statistics and multi-criteria decision-making methods. The proportion of compatibility must be determined for each matrix obtained from the perspective of the expert. Thus, it reveals whether or not decision-makers are reasonably consistent when using paired comparison. A final matrix's percent of compatibility is used to evaluate the validity of fuzzy decision making. Phase 16 is a compatible matrix if and only if the definitive matrix of paired comparisons is consistent. As a result, the fuzzy inference matrix is replaced with a set of deterministic matrices. Specifically, the Center of Area (CA) approach is applied, which entails translating fuzzy values into their exact counterparts. The formula for determining fuzzy numbers using this method is "(11)".

$$CA = \frac{(u-l) + (m-l)}{3} + l$$

V. EXPERIMENTAL RESULTS

Decision tables depicted here represent the arithmetic average of responses from fifteenth specialists, doctors, administrators, and IoT specialists in Bahrain who participated in a questionnaire for this study for the brevity sake, presenting of each table and FAHP was prevented).

The following is an integrated matrix that was created using the feedback of experts. The proportion of inconsistent tables was calculated, and the results were all less than 1.0, indicating its consistency and trustworthiness. Criteria prioritization was then performed based on Chang's research findings. Before using FAHP with Chang's development analysis method, the regular choices matrices were transformed into cellular matrices to exclude the possibility of negative weight calculations. It should be noted that in order to keep the article's length down, the specifics of each calculation were omitted and only cellular-normalized decision tables were included.

A. Weighting and Prioritization Criteria and Sub-Criteria

The cellular structure of the incorporated irregular decision problem and the use of Chang's algorithm are both hallmarks of Chang's approach to development analysis.

Once that is done, we use AHP and Chang's method to determine how much emphasis should be placed on each factor. Table II shows that the criteria of economic growth came in first with a weight of 0.413, followed by the criteria of quality of life with a weight of 0.386, and finally the criteria of environmental conservation with a weight of 0.201.

TABLE II. THE FINAL WEIGHT AND RANK OF THE THREE TOP CRITERIA

Criteria's sign	Criteria's name	Criteria's Weight	Priority
C1	Economic prosperity	0.413	1
C2	Environmental protection	0.201	3
C3	Quality of Life	0.386	2

After calculating the weight of main criteria's, the weight of sub- criteria's has to be estimated and prioritized. The results of these calculations presented in Table III.

TABLE III. THE FINAL WEIGHT AND RANK OF ALL NINE SUB-CRITERIA

Sub-criteria	Final sub-criteria's weight	Priority
Dental Health Sleep Control Sportsmen Care	0.158	1
	0.132	2
	0.126	3
Fall Detection	0.112	4
Patient Surveillance Medical Fridges	0.109	5
Ultraviolet Radiation	0.105	6
Chronic Disease Management	0.101	7
Hygienic Hand Control	0.093	8
	0.064	9

The sleep-control inter - and intra (with such a final weight of 0.158) is the most important factor for the adoption of IoT health systems, while the chronic condition sub-criteria (with a final body weight of 0.064) is the least important one. Table III demonstrates the relative importance of the other factors.

VI. CONCLUSION

Without a doubt, this study may serve as the groundwork for developing a research application model to broaden IoT's appeal inside healthcare systems and facilitate comparisons of healthcare settings in future research. With the results of this research in hand, healthcare facilities and organizations may make informed decisions on how best to put the Internet of Things (IoT) into practice, taking into account a robust framework for incorporating IoT into all home health monitoring devices. However, this aids manufacturers in zeroing in on the internal elements of a firm that are most likely to determine whether or not this new technology is adopted. The collecting of such a large amount of sensitive data is a significant problem, but the internet of things has the potential to revolutionize the treatment area in healthcare systems. Incorrectly disseminating huge data may compromise treatment zones and the quality of the data obtained. However, there will be strain on the databases as more and more health information is retrieved, recorded, and digitized. The frequent use of health trackers and wearables to monitor bodily parameters requires specialized hardware and a data center to store and analyze the resulting mountain of information. In addition, the healthcare industry need a common terminology for communicating and sharing data. Smart healthcare systems have additional difficulties with regards to security. As more and more information is gathered, more and more security is required to prevent loss or theft through cyber means. The backbone of every effective Internet of Things design is a robust analytics engine, cloud platform, or virtualized infrastructure. Abnormalities in network traffic, user access, and system failures should trigger quick reporting and resolution using these tools, which should be controlled in some way. Every second counts when it concerns to health systems, and any downtime may literally mean the difference between life and death.

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