



Presage And Monitoring System for Patients Health Analysis

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Abstract - Critical worsening of the patients is gradually led up to by the small variations in the physiological criterion like blood pressure and heart rate. The Developed Early Alarm Warning Scoring system is a system had been made to help the healthcare staff in the hospital examine these physiological variations and determine the patient's needed urgent healthcare to keep away from fatal worsening. And this effort set out the design and execution of the same alert system which identifies the patient's condition with the help of fuzzy logic algorithms. We illustrated the execution system gives the authenticated results consistent with the present Developed Early Alarm Warning Scoring system which gives a higher insight into all the patient's health condition. Critical Worsening in the patient's health order is gradually led up to by the small variations in the physiological criterion like blood pressure and heart rate. The Developed Early Alarm Warning Scoring system is designed to help the healthcare staff examine physiological changes and determine the patients who require urgent medical help in an emergency to avoid fatal worsening. We can say that this work describes the design and execution of the alike alarm system which will classify the patient's status using fuzzy logic algorithms. We demonstrated that the executed system gives reliable outcomes with consistent results with the currently Developed Early Alarm Warning Scoring system, with the added benefit of the scoring scheme which provides higher insights into each patient's health conditions.

Key Words: Medical services, Heart rate, Physiology, Biomedical monitoring, Fuzzy logic, Medical diagnostic imaging, Sea measurements.

1. INTRODUCTION:-

In recent years, a great deal of effort has been devoted to the development of sensor systems for continuous monitoring of a patient's health status. Timely and acute monitoring is important, and proper data analysis enables rapid action and rescue in emergency situations and creates deep-rooted medical data to hold up the medical patient's recovery. For example, the medical data classifying technique gives a principal outlook in medical data systems. [4] A few small, lightweight smart sensors attached to a patient's anatomy can consistently check a patient's health condition and

activity, detecting peculiarity and alerting the health care staff in extremity situations. This system allows patients to carry out their daily activities while monitoring consistently [3]. In the current work, we propose a simultaneous outlying essential signs technique based on the intelligent classification approach. The Fuzzy resolution envoy uses a fuzzy speculation technique advanced for the special case to categorize the patient's health condition which is based on the physiological estimation of the patient's body condition to provide the alert alarm to the healthcare staff of the patient's body condition [5].

Commonly used sorting method, sorting, and fast curing. This method is developed during natural disasters and war in California and then applied worldwide. It is characterized by simplicity and speed of decision-making. Depending on the complication of the medical case, the patients are categorized as yellow, green, red, and black [3].

2. SCORING METHOD

Several techniques have been developed depending on the nature of the method (with or without consideration of various essential activity indicators). Such as Jump Start, MEWS, etc. In this, we proposed a sorting technique based on fuzzy logic and implemented modifications [2]. Fuzzy logic has proven to be highly effective in accurately assessing the level of risk associated with a patient's health status, enabling rapid and precise diagnosis of potential health problems. The scoring method is a classification technique used by healthcare staff to simultaneously determine a patient's health status which is based on the estimation of different physiological specifications (heart rate, pulse, sugar level, blood pressure, temperature, breathing) and through observing the mental condition. [1] The scoring method consists of various dimensional specifications.

3. FUZZY LOGIC STRUCTURE

Patient health analysis is an ever-growing field. Even excellent utilization in developed countries requires medical informational data and verification from the doctors whether the person is suitable for the particular job or not. Which is again very much distinct in high perilous definition, firearms occupation security guards, firefighters, etc. So for these [1] professionals, it's very important For these professionals, it is important to be

up to assess a patient's actual health situation before making any advice. Developed only for these parameters and can figure out the quick applications in situations where you did not have the time for the measurement of the multiple parameters. For example, we can say that it can be used in natural disasters and testing conditions. [3] Observing his work during military exercises and comparing the results with the doctors, I found that the results were the same as the doctors, although he had only three parameters measured.

The process of calculating risk levels is based on physiological parameters, and doctors' knowledge can be affected by various inaccuracies and uncertainties. [1] As a result, a fuzzy logic technique has been proposed that utilizes fuzzy sets and rules to incorporate uncertainties into the analysis and provide a more probabilistic assessment, thus enabling the inclusion of the doctor's knowledge and experience in the assessment.

We know that fuzzy logic, which is inexplicit, offers a very good way of representing materiality. And [2] the fuzzy logic levels compose of that truth to diversifying degrees, from completely verifies to completely unverified the basic proposal of multi-fuzzy logic was enlightened by many mathematicians around the world, but, in reality, it is made by Professor Zadeh at the University of California in the USA.

The 1965 publication discussed the theory of fuzzy logic, detailing its time frames and outlining the mathematical principles involved. This new approach to mathematics presented by fuzzy logic offers a fresh perspective on its application in various fields.

Numerous research papers have documented the widespread use of fuzzy logic and controllers in various medical applications. These [5] techniques have been applied in diverse areas of medical science, ranging from diagnosis to treatment and monitoring. By incorporating uncertainty and imprecise data into the analysis, fuzzy logic and controllers have proven to be effective in situations where traditional methods may be insufficient. Overall, these techniques have opened up new possibilities for medical research and are likely to continue to be valuable tools in the future.

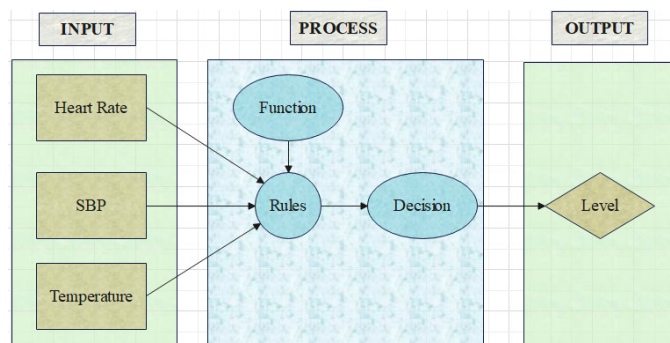


Fig-1:- Structure of the fuzzy logic system

4. PHYSIOLOGICAL PARAMETERS

Heart Rate:-

The heart rate function is irregular quadrilateral and its range is within the below-given limits:- low2 is less than 50, and low1 is 45 to 60, high2 is 105 to 130 and high1 is greater than 125.

Systolic Blood Pressure:-

Systolic blood pressure is defined as the pressure in your arteries when your heart is beating. We have four levels of systolic blood pressure low3 is less than 83 low2, 86 to 91, low1 is 92 to 93 and normal is greater than 30. The membership function for this is always trapezoidal

Body Temperature:-

So we have the three levels of body temperature low is less than 36.5, normal is 36 to 38.5, and high is greater than 38

Rule Base:-

The fuzzy logic controller contains a total of 72 rules, which are determined based on the calculation of each physiological parameter. The number of rules is obtained by multiplying the highest score of each physiological specification.

Output Function:-

We have the output function which represents the scale from the range of one to eight. [3] The scales are created by adding up the highest scores of each physiological parameter. Therefore we can say that the fuzzy logic controller contains the highest scores of the physiological specifications and the membership function of 8 can be obtained by summing these highest scores of the physiological parameters.

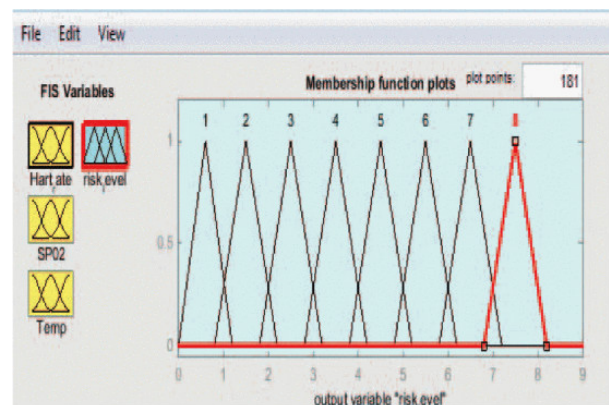


Fig-2 :- Output Functions

From [4] one to eight, the scales are numbered and consisted of the following trigonometric functions in descending order HRG8, HRG7, HRG6, HRG5, LRG4, LRG3, LRG2, LRG1, NRM. So these 8 membership functions are therefore used to identify the level of disease of the patients with high L and low L for each of the membership functions.

OUTPUT FUNCTION	
RANGE	COLOR
$0 < RG < 1$	LRG2
$1 < RG < 2$	LRG2
$2 < RG < 3$	LRG3
$3 < RG < 4$	LRG4
$4 < RG < 5$	HRG5
$5 < RG < 6$	HRG6
$6 < RG < 7$	HRG7
$7 < RG < 8$	HRG8

Fig-3:- Risk Level

Risk levels are determined by the below color tagging:-

- **Green describes the minor injury.**
- **Yellow describes that can wait.**
- **Orange describes the rapid treatment.**
- **Red describes the immediate transported.**

5. CONCLUSION AND FUTURE WORK

Accurately monitoring the patient's medical condition is the domain of extremity therapy. This is proof of the work which had been structured in high danger, especially for the people who require weapons, security guards and firefighters, etc. In the past few years, many requests of the technical and non-technical variety had used fuzzy logic. In our case study, we had been coming to the result that the developed fuzzy logic controller gives the exceeding correct and fast way to get information about the patient's health. Another [4] advancement of the color marks output from the developed extremity medical triage technique. Additional research has been done to find out the connection of the physiological parameters in the 8 man-made developed schemes with the help of the principal component study.

Therefore we had culminated that the result of the physiological specification based on the result of the fuzzy logic controller is not consistent. As previously noted, the key application of this intelligent technique lies in situations where time is of the

essence, and a rapid assessment is required without the luxury of measuring numerous parameters. In such scenarios, the technique can prove invaluable in providing swift and accurate judgments [2]. We can say that a Fuzzy Decision Delegate uses the Fuzzy Reasoning Arrangement and the Early warning Classification assemble to group the health level by the examined vital signs, then combine all these rules to discover the patient's health level and determine what action to be taken

Now the developed system automatically conveys the real-time circumspection to the doctors or the extremity assistance when the retrogression in the patient's body condition is detected, on the condition that various advantages for the both healthcare contributor and the patient. [5] The Fuzzy Inference System has been executed and examined using matrix Laboratory R2012b software, with the fuzzy rule output outcome which was examined based on the knowledge of his two experts. And only two of the twenty total instances had resulted in the administration drift from the report. It obtains about 93% performance.

We can say that this is alike to most of the organizations in the literature. And as the future study path, we can adjoin the learning features for the fuzzy resolution agents which are based on the adaptive neuro-fuzzy reasoning administration to create them more adjustable neuro-fuzzy conclusion system to develop them more absolute and thus much adjustable and therefore more personalized to improve the technical performance [1]. We also plan to make classification with better accuracy. Indispensable sign evaluation takes into account the patient's physical activity [3]. And this system should verify the different physical activities like resting, running, and not bring out false alarms when the physiological readings increase while the patient is busy with all these tasks.

6. REFERENCES

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BIOGRAPHIES



Mr. Yashpal Kharpuriya is a driven and passionate third-year student pursuing a Bachelor of Technology degree in Computer Technology at Yeshwantrao Chavan College of Engineering. With an insatiable curiosity for research, he has explored various domains of computer science, but has developed a particular interest in fuzzy logic and neural networks. His research in these areas has led him to develop presage and monitoring systems for patient health analysis using these advanced technologies.



Dr. Shreyash Dubewar is a renowned author and medical professional with extensive experience in the field of Nephrology. He has worked at various reputed medical institutions including The Queen Elizabeth Hospital King's Lynn NHS Foundation Trust, Apollo Hospitals, All India Institute of Medical Science Nagpur, and Wockhardt Hospitals. Dr. Dubewar holds a medical degree from JMF's ACPM Medical College and has also studied at the Maharashtra University of Health Sciences. He has authored several research papers in reputed medical journals and is recognized for his contributions to the field of Nephrology.



Dr. Shubhangi Rathkanthiwar is a renowned author, researcher, and educator, with over 33 years of experience in teaching and research. She is an expert in several areas, including Artificial Neural Networks, IoT Modules in Telemedicine, Signal Processing in Wireless Communications, and Embedded Systems, among others. Dr. Shubhangi Rathkanthiwar has authored 6 books and 5 book chapters, with more than 107 papers published in international journals and conferences. She has also received multiple awards, including the Global Excellence award-2021, Best research paper award (2011), and Shikshak-Ratna Award (2011-12). Dr. Rathkanthiwar is a reviewer for multiple IEEE journals and conferences, and an editorial board member of 7 international journals. She has received 3 patent grants from the Government of India, with 8 filed patent applications and 2 copyrights to her credit. Dr. Shubhangi Rathkanthiwar has significant contributions to Marathi literature, with regular column writing in several newspapers. She is a visiting scholar of 11 countries and currently serves as a professor in the Department of Electronics Engineering at YCCE, Nagpur.