Intelligent Health Profile Using Good Environment and IoMT Sensor Feedback for Personalized Health Monitoring and Predictive Diagnostics-Study

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***Abstract*—The integration of machine learning (ML) withGE learning and sensors from the Internet of Medical Things allows a perception on health indicators and determination of possible illnesses in advance, which is highly advantageous in creating customised healthcare interventions. This research was conducted by conducting a review of academic literature to design a health categorization which combines good environemnt mics data with IoMT data in order to anticipate prognosis, manage disease at early stages, as well as to maximize the satisfaction of the patient. Significant impediments include the non-uniform quality of data, the internet safety as well as some above-board issues. Next steps of research aims at integration of clinical measurement data along with other demographic data and more extensive populations. This paper represents an effort of an advancement in precision medicine that optimizes the management of health of the proactive users.**

***Index Terms*— Personalized healthcare, Machine learning (ML), GE, Internet of Medical Things (IoMT), Predictive diagnostics, Real-time health monitoring, Chronic disease management, Artificial intelligence (AI), Hierarchical Data Aggregation, Data integration, Ethical considerations.**

I. Introduction

The rise of machine learning (ML) integrated into thegood environment -GE study panels, along with sensor feedback from IoMT, is creating personalized healthcare. Here is this paper offering a very sophisticated intelligent health profiles using all possibilities for real-time health monitoring and predictive diagnosis. This study synthesizes data collected from a peer-reviewed articles on the growing possibility of combining different facets of literature to capture methodology, bioinformatics and sensor data to create dynamic, personalized health profiles. The approach thus highlights how early identification of diseases could be enhanced, strategies of treatment improved, and patient outcomes strengthened.

In the records of WHO, India registered population with 1,438,069,596 as on 2023, with a 17% rise would reach 1679589259 by 2050, top causes of death COVID-19 159.9/278.4, Heart disease 99.4/121/5, pulmonary disease 75/66.1, stroke 57.9/49.3, respiratory infections 32/23.8, etc, and road injury 21.9. *During 2021, various representations of reports - In India, the *right to health is not fundamentally mentioned, but a legal response with the Act 21 held by the Supreme Court. Thus, the Supreme Court enabled the right to health as a paramount in preserving life and public health access to healthcare services, has directed the government to ensure the facilities provided to the public regarding medicines, good medical care, and even to take care of the administration of hospitals for better improvement.

This IoMT is a daughter term under IoT, IoT were introduced by Kevin Austin in the year 1999, It was introduced as a stepping stone of IoT with the introduction of RFID to track the production material in warehouses at Procter & Gamble, as the work done during his job assignment he named it as IoT, the tracking of products made easy with RFID and network with internet connection to store the information, here the things were refered to RFID its data generated is accessible through internet server.

Technologies are at most available, Now adays every 100 person at a ratio there it exist more than 100 SIM subscribers, this is the same scenario for wide range of gadgets in use, being that the smart devices used for traditional purposes were in increasing too, in the part of health scenarios it is the same, for these things it is a limited in ratio with internet of things, the aspect of designing internet of medical things for health and diagnostics for better health is a focused area, at a ground level of lifestyles in our communities it is necessary for a person to take care of their health, in this way internet of things support microcontrollers and sensors in these focused area, with this it is possible to retrieve real-time data of a person health by health professionals for conducting diagnostics.

As a friend in need, these IoMT sensors with MCU act as a well-wisher too; the well-being of the person is identified by the telemetry generated and sent to cloud, in the same way, sends a telecommand to MCU with the actuator to perform the necessary action.

Introducing IoT in Healthcare is not a simple technology, its a wide opening with line of existing technologies to work under this, it become essential part of life, the machine learning, data mining, cloud computing, big data, AI & ML, Edge Computing, Cognitive Computing, Data Fabric, Privacy Preserving, Quantum Computing, Sustainable Tech, Autonomous Systems, Cyber Security

Related Works:

The frameworks leverages the superior technologies and methods such as artificial intelligence (AI), machine learning (ML), and big data analytics to interrogate and make sense of complex datasets, thereby offering a truly transformative opportunity for personalised medicine.[1][2]

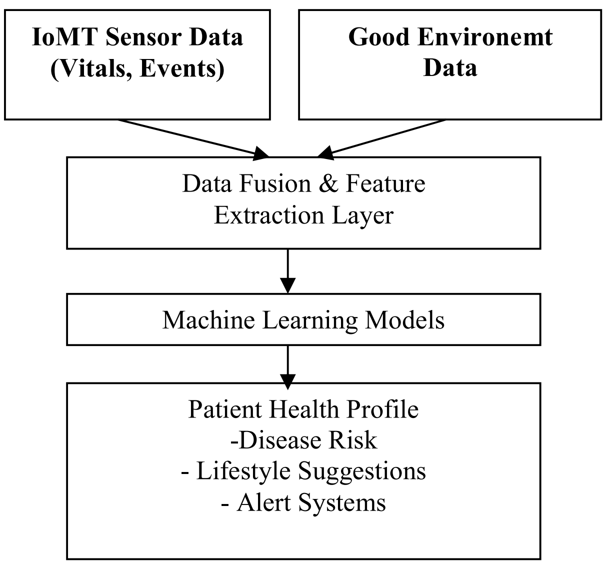

Fig ,1. Integration Model Architecture

The Proposed work is carried as in Fig.1, survey carried approach, From the perspective of fewframeworks, it would be crucial to integrate machine-learning algorithms that support real-time analysis of the volume of data generated by IoMT sensors. The said algorithms enhance the predictive abilities of health monitoring systems and allow the prescription of individualized treatment protocols sugar-coated to an individual's profile and health measurements. Through the employment of ensemble learning[17] techniques, healthcare providers will discern complex patterns that could be an indication of early signs of disease, thus allowing them to institute timely preventive interventions. Besides, the amalgamation of good environment and IoMT foster an well ahead perceptive of the induce of way of life factors on wellbeing outcome, in that way uphold the guarantee of transforming the management of chronic diseases [1]. This comprehensive viewpoint emphasizes the importance of establishing solid infrastructure where data can be seamlessly integrated and analyzed in order to better patient care and health outcomes.

The significance of telemedicine and remote patient monitoring technologies is increasingly recognised within the personalised health framework. Utilising modern electronic medical records (EMRs) and Internet of Medical Things [I o M T] procedure, physicians can continually monitor patient health and promptly intervene upon detecting problems via real-time data analytics [9]. The connection enhances access to treatment alternatives and enables the patient to engage in the management of their health through the transparency of their health data. Nevertheless, the issue of assuring data reliability remains, as any faulty or misleading information could lead to erroneous treatments. Consequently, the establishment of stringent data validation and preprocessing techniques is essential to enhance the innovative strategy for personalised health promotion and to prioritise preventative care. The integration of IoMT technologies with machine-learning algorithms enhances the efficiency and accuracy of patient health monitoring systems, resulting in improved health outcomes[18]. Facerecognition models also an extension for better healthcare[21]. with movements and expressions.[22][23]

Data Integration: Good Environment and IoMT Sensor Feedback

Good Environment Data(GED):

It draws an individual's health map, nurturing an awareness of Good Environment predispositions, susceptibility to disease states, and therapy., physicians could look into biomarkers attributed to particular illnesses and diagnose such cases early, then form treatment plans accordingly.[1][3]

IoMT Sensor Feedback: IoMT technologies, which comprise wearable sensors and smart medical instruments, always collect real-time physiological data including health indicators, activity, and environmental variables. When this data is integrated along with Good Environment Data, it offers a better understanding of the health dynamics of an individual so they can pro-actively manage their health. [4] [5]

Synergy Between Good Environemt Data and IoMT Data: Combining GED with

IoMT sensor feedback creates a strong synergy that is capable of identifying minute health changes and predicting upcoming diseases. Wearable technologies vigilantly monitor any physiological characteristics associated with aenvironment marker while providing an early alert system for the manifestation of diseases such as cardiovascular diseases or diabetes.[6][7]

AI and Machine Learning Techniques for prophetic Analysis,
HDA Algorithm thus combined with datasets analysed by machine learning algorithms, such as the Random Forest algorithm, Support Vector Machines, and Convolutional Neural Networks. This allows for study of the possible patterns and relationships between good environment features and real-time health measurement data for accurate predictions and personalised advice. [6] [8]

Deep Learning Architectures :In time-series analysis of IoMT data, deep learning models such as RNNs and LSTMs have been extolled as the best. These models predict future health outcomes based on past trends, allowing treatment to be administered without delay. [8][9]

Hybrid AI Frameworks: A hybrid framework is said to offer better prediction abilities since it straddles both data-driven and knowledge-driven methodologies. These hybrid frameworks leverage domain expertise, such as environment pathways and clinical guidelines, combined with the data-driven intelligence offered by the machine-learning methods, thus providing a sturdier outlet for predictive diagnoses[10] [11]

Applications in Personalized Health Monitoring and Predictive DiagnosticsChronic Disease Management :Particularly strong in managing chronic diseases, this framework provides an excellent response to the sort of patients with diabetes, hypertension, and cardiovascular diseases. By continuous monitoring of physiological data and environment susceptibility analysis, the system advises the appropriate lifestyle choices to be made and sets early warnings during illness progression. [7] [12]

Real-Time Health Monitoring :Immediate observation of vital signs including heart rate, blood pressure, oxygen saturation, etc., permits the swift identification of abnormalities. AI-based systems can instigate alerts to practitioners in the event of possible abnormalities, thus allowing timely intervention to improve patient status. [4] [5]

Predictive Diagnostics :By far, the GEDand sensor feedback could give rise to medical estimates of the disease development before symptoms begin to appear. This prescient power is especially potent for certain illnesses that show environment predisposition: some malignancies and neurological disorders.[6] [8]

Privacy and Security Concerns

Privacy and security issues are raised by ___managing sensitive health information. Therefore, strong encryption techniques should be adopted to protect patient information, including a secure channel for transmission against any unauthorized access. [13][14]

Model Generalizability and Bias :To ensure generalisability during training and to prevent bias, the data must be carefully selected from a heterogeneous balanced dataset. A trained model on datasets with representations of different populations may give erroneous interpretation and discriminatory treatment till execution. [3] [9]

Ethical Considerations :The use of information ironically raises ethical questions about ownership, consent, and discrimination. There need to be explicit ethical norms and legal frameworks to address these issues and to ensure that environment information will be used properly. [3] [11]

Future Directions :Standardization of Data and Protocols
Standardisation of data formats and communication protocols will provide seamless integration of environment and Internet of Medical Things data. Attempts at setting universal standards shall encourage interoperability and hence improve framework efficiency.[6][5]

Advanced AI Techniques :More advanced artificial intelligence methods, such as transfer learning methods or ensemble methods, need to be developed in further research to improve model accuracy and generality. These developments underpin more interesting applications of prediction and personalized interventions.[8][9]

Ethical and Regulatory Frameworks :In order to address the issues arising from the integration of environment data and IoMT data, there need to be extensive ethical and regulatory frameworks. These guidelines shall ensure the ethical use of data and protect the rights of patients.[3][11]

Patient-Centric Approaches: The approaches that put emphasis on the concern and aversions of the individual will be very important for the implementation of the framework. The participation of patients in decision-making and transparency in the use of data will create trust and assure compliance with the health plan.[7][12]

Integration of Data :Good Environment Analysis Uses environment data to distinguish illness predispositions for customisedtreatment[15]. Lifestyle and Environmental Factors: Incorporates real-time data on nutrition, physical activities, and environmental factors considered crucial in designing appropriate health interventions

Various Adapatable interventions a study: A subset of reviewed literature, though not directly focused on ECG, presents novel techniques that fewcan be adapted and not for ECG-based IoMT systems:, Federated Learning Security with Homomorphic Encryption and Adversarial Attack Surveys are highly relevant for enabling privacy-preserving ECG analytics, ensuring data confidentiality during transmission and training across decentralized nodes.Federated Learning (FL): Vital for decentralized health monitoring while preserving patient privacy, Enhances generalization against unseen domains,concentrated on domain generalization, adversarial robustness[27] Improving Unsupervised Domain Adaptation[29] and MADG tackle the challenge of domain generalization — a critical aspect in ECG modeling due to inter-patient and inter-device variability., Domain Adaptation & Generalization (UDA, MADG): Helps handle ECG variability across individuals and devices., Helps transfer learning from one domain to another with limited data , Domain adaptation, unsupervised learning[29], Lightweight Models (ULSAM): Crucial for running on battery-powered wearable ECG monitors., Introduces lightweight attention modules suitable for low-power devices , with Lightweight CNNs, self-attention, embedded systems, Ulsam introduces ultra-lightweight attention modules that are ideal for real-time ECG processing on resource-constrained devices, such as wearable sensors or microcontrollers like Raspberry Pi or Arduino. [30], These works collectively contribute valuable frameworks for addressing efficiency, generalization, privacy, and security, which are cornerstones of robust ECG monitoring in real-world IoMT deployments.On the other hand, several works were found to be domain-specific to fields such as computer vision, autonomous driving, and video processing, and thus not suitable for direct adaptation in ECG monitoring. For example: Sinh, D.et.al Fast-BoW, Facial Expression Recognition, and Multisentence Video Description focus on visual feature extraction or multimedia analytics, which are unrelated to 1D biomedical signal processing.[30], Others interventions security like EVAA (LiDAR attacks) and Multi-Agent Trajectory Prediction are tailored for autonomous vehicle systems, dealing with spatial sensor data unlike the temporal biosignal nature of ECG[26] tying to understand various procedures may caused in diversion. The adoption of unified defense with homomorphic data space causes no raw data leaves the device yet possible to train powerful models[27] multi domain hospitals in cities real-world smart healthsystem have domain variability without exception, new site with different environment sensors model less fail due to variability in domain.

Role of IoMT in Health Monitoring :Real-Time Data Collection: IoMT devices continually measure health parameters, providing feedback or interventions in time[28] Predictive Analytics: Machine learning algorithms use data from IoMT devices to anticipate health outcomes and recommend protective means(Manias et al., n.d.).

Economic and Social Implications :Cost-Effectiveness: The framework seeks to reduce the costs of healthcare through early diagnosis and individualized treatment plans, thus potentially altering the path of healthcare delivery (Dominiczak, 2023).

Global Market Growth: The precision medicine [2] market is expected to grow to £134 billion by 2025, emphasizing the economic application of such frameworks.

While the Intelligent Health Profile has considerable potential for personalized healthcare, the few issues left to be tackled are those relating to data privacy, the integration of various data types, and equitable access to these technologies. Great care must, therefore, go into ensuring that these issues affecting innovative health solutions are addressed in

Table.1 Key Aspects of the Intelligent Health Profile

Aspect	Description	Citation
Data Sources	GED (RNA-seq, microarrays) and IoMT sensor feedback (wearables)	[1][4]
AI Techniques	Machine learning (Random Forest, SVM) and deep learning (RNNs, LSTMs)	[6][8]
Applications	Chronic disease management, real-time monitoring, predictive diagnostics	[5][7][12]
Challenges	Data heterogeneity, privacy, model bias, ethical concerns	[6][11][13][3]
Future Directions	Standardization, advanced AI, ethical frameworks, patient-centric approaches	[6][3][8][11][9]

highlighting the power of integrating environment and clinical data for disease discovery .

Related Work:

Here, Gradual enthusiasm made a route map on delivering outcomes looking forward a design of a module prototype which can be accommodate in a open spaces, indoor spaces with these were implemented in a four-level architecture, that is

1)Device level: MCU + Sensor+Actuator level,
2)Fog Computiong Level: ML + Edge device + Fog Level ,
3)Model+Cloud Level,
4)Diagnotsics+AI during these levels it processes various phases in diagnosis analysis and prediction with intervention of Artificial intelligence.

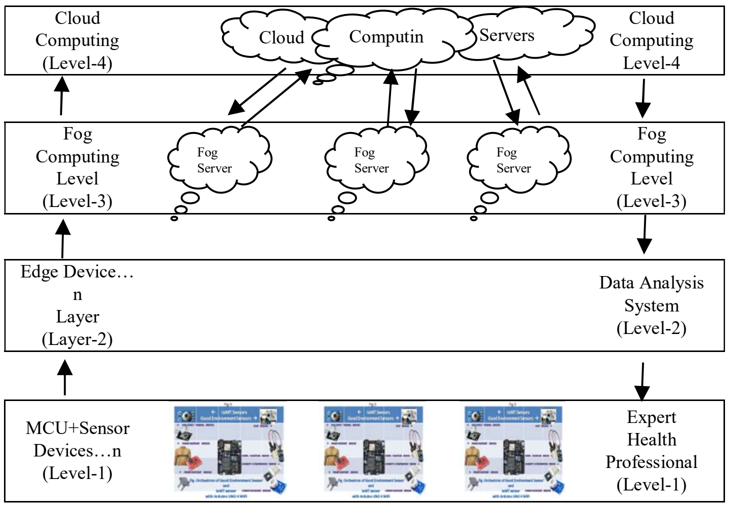

Fig.1. Good Environment Internet of Things with IoMT Framework

In this process, implementation of ML it is necessary to divide the data at first 30% for testing and 70% for training,

Here , we can understood that at Level-1 both the sensors with patient and experts were located ,these sensors with MCU's corresponds data were received by edge devices at Level-2 to process at level-3 using ML implementation with Hierarchical Data Aggregation Algorithm and stores the ML Model in cloud, now the analysis data which is receiving sensor devices at Level-1

Health profiles making of the environment based with IoMT is totally a IOT concept that is internet of things, here the integration of the machine learning is there, already we know about the environment how it is sophisticated around us, It consists of lot of different things called air, water and the heat and the dust and everything. So, in conjunction of all these things the matter of the health is totally changing , even though the doctors say that you are going to recover and so on ,so it takes particularly, but it does not matter it is a prolonging of the recovery rate, here we can able to estimate how far that is possible to recover a patient based on the environment which is being there - we have been seeing a lot of pollutants around us , in our rooms and everywhere, so that it causes a very drastic changes to the health, that it may be possible to recover the health or not also there. So, the estimates need to gathered, in our room there is a fresh air, we can feel it very happy as that it is good for us. So, in the same way if the patient is there in a fresh environment, the possibility of the recovery will be very fast. here we can able to think that such a scope of environment is there or not. So, we have to collaborate a lot of technologies for that. Here that internet of things, that is the prime thing that has been chosen here. Here in the internet of things we can able to gather the data and we can able to do lot of things. Here in the internet of things there are lot of sensors of all aspects.

For every person, good environment for their health is concern. At a basic level, it is possible to validate with a technology, such as IoMT, there is a diversity of users uses this technology, the necessasity for bring a innovative in real-time health profiling is vital. The Good Environment (GE) is wizilling on health profile, It lead to the development and conjunction of Good Environment monitoring technology in combination of environment sensing sensors with internet of medical things, it improves the life safety from a very dangerous situations, notably some chemical industries in industrial estates leaking of dangerous gases nearby people living areas during suspenseful time. These alarming things of life-threatening situations can be overcome with the intervention of Good Environment sensors. On the way IoMT sensors also play a crucial role at the moment, the development of this module is proposed in this study as a innovative approach to health safety of a person at a home or office while sedentary or sleeping on a bed, the method of proposed must be created or manufactured nano technolgies at VLSI for diverse group of users or to the diversity.

The study witness the hardware components with a user friendly design[16] to implement, particularly with basic knowledge of electronic circuit building shown in Fig.2,

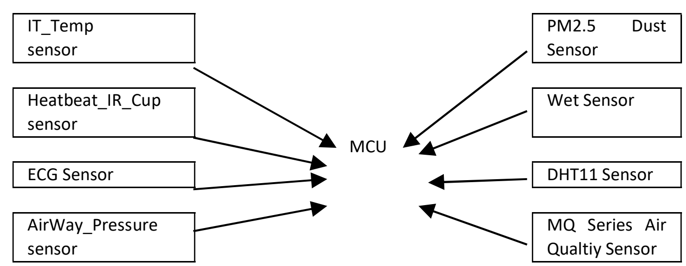

Fig.2. Microcontroller connected with sensors gathering environment data and health data

Sensors at this study:1) IR_Temperature sensor,2)Heartbeat Cup Sensor, 3) ECGSensor: 4)Airway Presure sensor: 5) Wet Sensor: 6)Digital Humidity

Temperature Sensor: 7) MQ Series Air quality sensor: 8) Dust sensor , This can be made as a device is carried as a prototype, The research proposes this implementation with the intervention of machine learning algorithm for quick identification of environmental issue as a execution model with a stream of data arriving from the sensors. The sensor data is the heart of the subject. In the aim of novelty the literature survey carried as a study of knowledge and interventions made during their proposed works in the field of IoT,IoMT, Machine Learning, CNN, Deeplearning, Image Processing, Environment Factors, Health Study,various fields. This work bridges with Intelligent health profile using Good Environment Sensor Data and IoMT Sensor Data for personalized health monitoring and predictive diagnostics.

Immediate care of patients were must informed about the diseases from the data gather during diagnostics with the explicit consent by implication of data. The fairness of technology amplify the health , by avoiding human error, the EHR can be used with a structure having made with coding methods. Health data stored in different sources were identified with coding methods enable the sequence of happening or going to happen in future with chronological data of recorded health profiles. Generally human beings were moving around from one place to another place for the requirements to fulfill in such circumstances the importance of health profiles must be documented with a sort of international coding methods ,is useful during medical needs, the recorded data even with some randomness can be verified as to obtain the trending profile- sometimes it goes to golden time too, critical care added the need of health profile inputs to succeed over golden time who even on breathing machine or anesthesia machine during surgery. The tandem combination of machine learning and IoMT technologies eases monitoring of patients far away from the hospitals to reduce their responsibilities. Integrating GE data with the sensor feedback from the Internet of Medical
Things represents a major step forward in personalised health monitoring and predictive diagnosis.The merging creates a hybrid approach to healthcare, balancing GE knowledge with real-time physiological data for personalised interventions and early diagnosis down the line.

Henceforth, advancements in fusion of GE & IoMT open new possibilities in personalised health monitoring and predictive diagnostics. The framework of intelligent health profile leads this advancement by the useof good environment data and real-time feedback from IoMT sensors to provide detailed health profiles customised for specific patients, use of customized algorthim to filter and using advanced ML techniques to analyse large datasets generated by GE& IoMT devices, thereby enhancing predictive capabilities of health monitoring systems. These algorithms, especially ensemble learning algorithms, enable healthcare providers to trace complex patterns, which could form very early stages of illness, hence facilitating early interventions and preventive actions. The interaction between good environment profiles and lifestyle factors provide a deeper understanding of health outcomes, which could change the paradigm for chronic disease management. ,

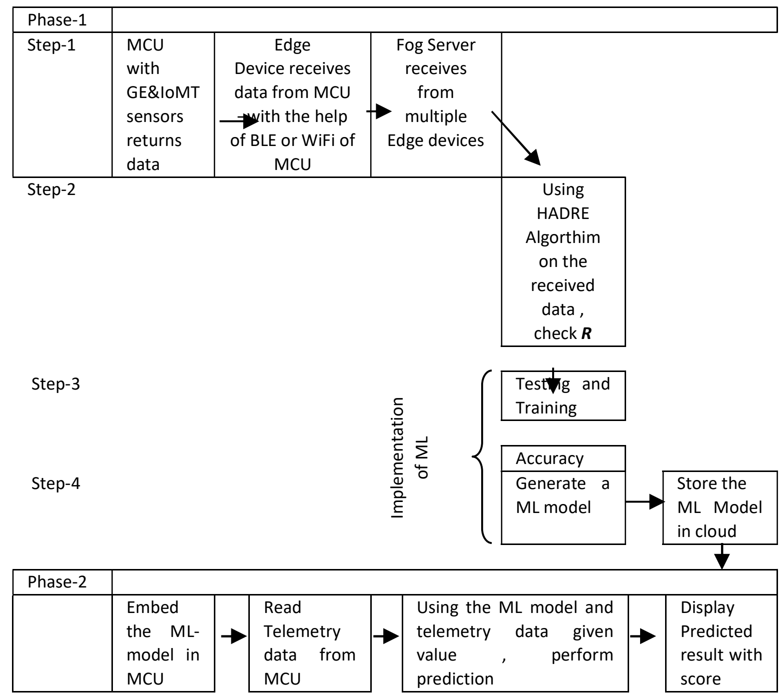

Fig.3 : Algorthim authored for data aggregation repeatedly believe ideal data behavior and unlimited computational resources, which is not the case for good environment sensors-connected healthcare sensor systems. Our unique algorithm addresses this by pairing data correctedness with resource consumption, ensuring the efficient transmission of relevant health data while minimizing redundancy of telemetry data in different phases shown in Fig.3,
Work related novel HADRE Algorthim

The HADRE has been performed with a efficient method having intervention with machine learning strategy,. Data which is preprocessed by HADRE , using a ensemble methods for consistent data, healthprofiles can leverage machinelearnng to improve performance and accuracy of their predictions necessary for recovery process of the patient outcome, the indicators during recovery process challenges the system implemented at various stages,

Theorem: Hirearchial Aggregation with Dynamic Redundancy Elimination (HADRE) Reduces Data Volume while Preserving Critical Metrics: Let $S = \{s_1, s_2, \ldots\ldots s_n\}$ be a set of sensor devices, each generating time-series data $x_i(t)$ over a time interval T .

Define :

W as a fixed sliding window of length w

A cluster structure $C=\{C1,C2,\ldots Cn\}$ such that each cluster $C_j \subseteq S$.

Let d predefined deviation threshold.

HADRE Algorthim processes data as follows:

1. $\forall$ sensor s_i, collect data $x_i(t)$ and computes $\sum^{w} m_i(t)$ over window W.
2. $\forall$ cluster C_i , cluster head h_j aggregates $M_j(t)=\{m_i(t) | s_i \in C_j\}$
3. Dynamic Redundancy Elimination is performed: $\forall$ c pair $(m_p,m_q) \in M_j(t)$, m_p is $\ominus$ if $|m_p - m_q| < d$.
4. Aggergated, non-redundant data $M_j(t)$ is transmitted to higher tiers.

Proedure HADRE implementation in conjunction with ML:

Step-1: MCU returns with sensors data
All the raw data is accumulated vital at sensor level(sliding window) ,
Step-2: Using HADRE on received data perform data summarization, cluster head aggregation and dynamic redundancy elimination.
Step-4 processed data transmit to edge or Fog Servers
Step-5 perform ML on the data for Logistic Regression,Random forest, MLP(ANN), Naïve Bayes, SVM
Step-6: Check the performance of HADRE for accurarcy
Step-7 Check the performance of HADRE for F1-Score
Step-8 Check the performance of HADRE for Precision
Step-9 Check the performance of HADRE for Recall

HADRE has performed all traditional ML and ANN models significantly overall metrics, ANN's MLP had next level higest recal but lower precision and accuracy, while SVM did very poorly due to unsuitable and class imbalance, during the process the additional fields were identified for HADRE for best performance, as intervention of sliding window mean, std dev, trend factor, change detection, clusterid ,aggregation-level,transmission done with a sampling frequency of once per as overall twelve readings per hour making eight hours a day upto a recovery of patient, as a catch of formula recovery is calculated based on healthcare professional oral prediction based on ailment , during dataset real-time data of IoMT sensors : 1) IR_Temperature sensor:MLX90614E 2)Heartbeat Cup Sensor : KY039 , 3) ECGSensor: AD8232 4)Airway Presure sensor: MPX5010DP ,fusion with good environment sensors, 5) Wet Sensor:with LM393 comparator 6)Digital Humidity Temperature Sensor: DigitalHT22 , 7) MQ Series Air quality sensor:MQ9, 8) Dust sensor: GP2Y1010AU0F,sensors were applied to

These sensors provide digital and analog type data , typically logged with a synchronized timestamp ,the fusion of these sensors produces a vector , from this vector preprocessing is done are filtering values returned by noise value from sensors, thereby extracting features based on the requirement using ECG(heart rate value), wet sensor over the floor, moisture in air, temperature from these analog and digital outputs – handling missing data ,. and patient live IoMT sensor data in context with the room conditions,air quality etc. for example a patient with fever with bad air would cause a rapid increase and decrease in heartbeat with high corbon monoxide etc., here we get ML model labeling it as "Normal" or "Alert" return by ML model as a predictive hypothesis. As in the case of a patient data with environment data a classification is made with the provision of real-time alert ,event process data as symbolic at caring centers. Healthcare professional in conversation with patient collects the information and assumes no of days to recover , the assumed index value is used in fraction with actual days of sick , days of recovery can be calculated as 1 –(actual days sick)/(expected recovery days) , the resultant would be 1.0,0.8,0.5,0.2 etc means fully recovered,recvering,normal improve,deteriorating,critical , fr example a typhoid expected recovery is 14days ,patient is at 7th day , the recovery score is 0.5 ,round between 0 and 1,. The intervention f good environment score can influence recovery with a good room having comfort and temperature and humidity the recovery score increases, otherside dust,gas with extreme humid condtions the recovery score decreases , with vital signs of heart rate, body temperature or EEG – composite health score reaches overall with as 0.4*body temperature + 0.3*SPO2>95% , 0.3*environment quality with a value ,here we normalize to (0-1),. for DHT22 aided with patient recovery

$$\text{Recovery Score}=\begin{cases} 0.9-0.01\times(\text{Temp}-25)^2 \;-0.01\times(\text{Humidity}-55)^2 & =\text{Good environment} \\ 0.5-0.02\times(\text{Temp}-25)^2 \;-0.02\times(\text{Humidity}-55)^2 & =\text{Bad environment} \end{cases}$$

Based on ideal room comfort zone would be 25^0C55% humidity . further based on more stress added results a lower recovery. In significance to sensor generated values temperature at value between 20 and 30 carries a stressful temperature, humidity between 40 to 70 ,a poor humidity ,under no room ventilation it accumulated CO^2 with dust over surface , dust resulting high > 100microns : discomfort tobreath ,in conjunction with a disease COVID19,pneumonia the recovery will be severe and complex. The scenario of recovery score around 0.3 is shown in table 2, table -3

Table-2:

Disease	Environment	Notes
COVID-19	Hot and humid room	Breathing difficulty, fever stress
Asthma	Dusty room, poor air	Airway irritation
Pneumonia	High humidity >70%	Triggers lung inflammation

Typhoid	Very warm room >32°C	Fatigue, poor appetite worsens

Table-3 data collected by IoMT sensors showing intervention with environment sensors.

Timestamp	Soil_Moisture (%)	Room_Temp (°C)	Humidity (%)	Patient_ID	Disease	Health_Status	Recovery_Score	Env_Label (Good/Bad)
########	45	26.5	55	P001	Normal	Stable	1	Good
########	20	29	40	P002	Asthma	Weak	0.3	Bad
########	65	24.5	70	P003	Pneumonia	Moderate	0.6	Moderate
########	75	23.5	80	P004	COVID-19	Deteriorating	0.25	Bad
########	50	25	60	P005	Fever	Recovering	0.8	Good

Based on the type of diseases illness severity as epidemic,endemic,pandemic or sporadic classification need to do, the mortality rate, contagious score with environmental risk,.

Recovery Score

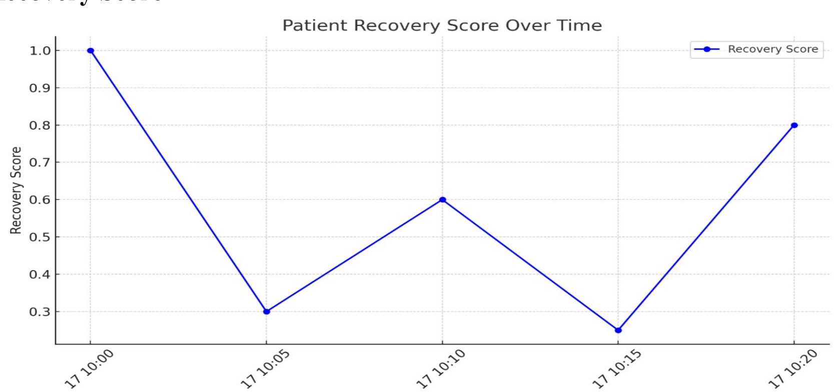

Fig.4 Results obtained for Recovery Score showing with time

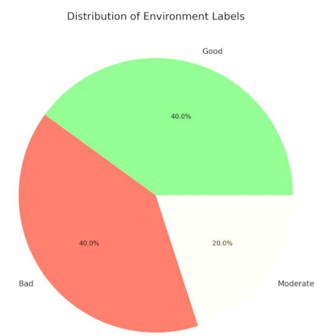

Fig 5. Showing recovery percentage based on good environment

Conclusion

The intelligent thing in this is health profile generation in perspective of good environment ,it's a very known thing good serine environment is also become a parameter for good health this proactive approach is possible to it framework to implement all these with help of Hierarchical Data Aggregation a noval approach using ML, the intervention of HADRE with useof GED and IoMT Data a precise recovery is made possible. Further it can be carried using further factors,with the framework built yielding potential benefits, this approach is patient centric with predictive diagnostics. The long run telemetry is also useful for the disease prediction.

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