IJARSCT

ISSN (Online) 2581-9429

International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Impact Factor: 7.53

Volume 4, Issue 1, February 2024

Smart Health Recommendation using Vitals

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Abstract*: The term "artificial intelligence" (AI) in healthcare means the application of machine-learning algorithms and software to mimic how humans think in the analysis, presentation, and comprehension of intricate medical and health care data, or to outperform human capabilities by offering novel approaches to illness diagnosis, treatment, and prevention. New customer wellbeing gadgets are being created to effortlessly screen various physiological boundaries on an ordinary premise. A considerable lot of these crucial sign estimation gadgets concentrated on in a clinical setting as now spread broadly all through the purchaser market. The purpose of this investigation was to examine the exactness and accuracy of pulse (HR), blood pressure (BP) and estimations by taking dataset through smartwatch. This paper provides information and methods employed in the health monitoring system utilizing K-means Clustering tasks such as monitoring blood pressure or ECG readings, Db scan for arranging unstructured data, SVM for Forecasting healthcare solutions and human health patterns and creating medical answers by combining devices, instruments, and cases. Neural Network for enhancing medical hardware, software, and instruments. Forecasting Healthcare Solutions for Utilizing machine learning for creating predictive healthcare solutions. Overall the paper gives detail knowledge about the technique used for a machine learning and artificial intelligence-based health recommendation system.*

Keywords: DbScan, K-means, Neural network, SVM

I. INTRODUCTION

In the evolving landscape of healthcare the combination of machine learning (ML) and artificial intelligence (AI) has ushered in a new era of personalized and efficient medical services. The groundbreaking applications in this domain is the creation of Vitals-powered AIML recommendation systems for smart health. This innovative approach leverages advanced technologies to analyze vital signs and health parameters, providing tailored recommendations for individuals to manage and optimize their well-being [1].Vitals, encompassing essential health metrics likepulse, circulatory strain, internal heat level and other physiological markers, serve as critical indicators of an individual's health status [3]. The amalgamation of these vital signs with AIML technologies empowers healthcare systems to move beyond traditional diagnostics towards proactive and preventive care.The Smart Health Recommendation System operates as an intelligent advisor, utilizing AIML algorithms to process vast amounts of health data in real-time [4]. By continuously monitoring and analyzing an individual's vital signs, the system gains insights into their unique health profile. This personalized understanding enables the generation of targeted recommendations encompassing lifestyle modifications, dietary adjustments, exercise routines, and other interventions tailored to enhance overall health. The goal is to empower individuals with actionable insights that facilitate informed decision-making regarding their health and well-being. Developing human interaction applications for personal fitness and wellness requires automatic recognition of human activity. Step counts, distance travelled, altitude climbed, and the pace at which you walk or run are all examples of helpful fitness tracking metrics that are now seamlessly integrated into smartphones [6]. Position sensing is also helpful because a person's level of sedentary time is a strong indicator of future health issues [7].The implementation of Smart Health Recommendation Systems using Vitals is particularly impactful in enabling remote healthcare monitoring. With the rise IoT devices and wearables, individuals can seamlessly include tracking of vital signs into their daily lives. These devices continuously feed real-time information to the recommendation system, creating a comprehensive health profile that enables timely interventions and adjustments [8].

II. HEALTH RECOMMENDATION TECHNIQUES

The integration of health recommendation techniques into Smart Health Recommendation Systems transforms healthcare from a reactive model to a proactive and preventive one like predictive modeling, personalized profiling, collaborative filtering, behavioural analysis .These AIML-powered technologies enable people to take control of their health by giving them knowledgeable advice for managing and improving their well-being. Recommendation techniques marks a paradigm shift in healthcare, fostering a future where personalized, data-driven recommendations become instrumental in promoting healthier lifestyles and preventing potential health issues. Here are the papers that describe about Health recommendation techniques.

2.1 Smart Health Monitoring Using Deep Learning and Artificial Intelligence [1]

The article "Smart Health Monitoring Using Deep Learning and Artificial Intelligence explains how artificial intelligence and deep learning are being used in health monitoring systems. It emphasizes the IoT devices to collect health data from individuals, which is then processed using deep learning algorithms. The proposed system aims to provide real-time, remote health monitoring with the potential to offer personalized recommendations for therapy and lifestyle changes. The methodology involves the integration of cloud computing, blockchain technologies, and deep learning algorithms to ensure data security, privacy, and fast, responsive monitoring.

Advantages: Advantages of the suggested intelligent health tracking technology include fast and responsive remote monitoring, personalized recommendations for therapy and lifestyle changes, and the potential to meet specific needs of critically ill patients. Additionally, the system aims to achieve individual health goals and healthy lifestyles.

Disadvantages: Inadequate packet forwarding ratio, QOS reputation, confidentiality, and clean, trained data for artificial intelligence algorithms. Elevated electricity usage connected to data transmission through machine learning software, devices, and bandwidth.

2.2 Smart Health Monitoring System Using IOT and Machine Learning Techniques [2]

The document discusses about IoT and Machine Learning Techniques. The system aims to predict cardiovascular diseases byprocessing medical parameter data using machine learning techniques and categorization. The methodology involves using IoT sensors, Arduino, and IFTTT to collect and process the data, followed by analysis in Python using machine learning algorithms.

Advantages: The system include early prediction of cardiovascular disease, remote monitoring of patients, and potential for mass screening in rural areas.

Disadvantages: Potential disadvantages include concerns about data security and IoT device management. More accuracy not achieved.

2.3 Accuracy of Vitals Signs Measurements by a Smartwatch and a Portable Health Device: Validation Study [3]

The review planned to survey the precision of imperative signs estimations by two novel across the board physiological checking gadgets, a smartwatch, and a clinical tricorder. The approach utilized in the review included enlisting 127 patients from the Thomas Jefferson College Medical clinic Preadmission Testing Center. The review evaluated the exactness and accuracy of pulse (HR), systolic circulatory strain (SBP), diastolic circulatory strain (DBP), and oxygen immersion (SpO2) estimations of two novel across the board observing gadgets: the BodiMetrics Execution Screen and the Everlast smartwatch.

Advantages: Both the smartwatch and the versatile wellbeing gadget are conservative and simple to heft around for regular estimation of indispensable signs. The compact wellbeing gadget requires the contribution of client explicit data like sex, date of birth, level, weight, and an underlying alignment for systolic circulatory strain, considering customized estimations.

Disadvantages: The investigation discovered that the smartwatch was not sufficiently exact to be utilized as an imperative sign estimation gadget, showing a limit in its exactness for clinical use. While the BodiMetrics gadget was more precise than the smartwatch, it actually neglected to meet predefined exactness rules for systolic pulse and oxygen immersion, proposing an absence of accuracy for specific fundamental sign measurements.

2.4 The application of wearable smart sensors for monitoring the vitals signs of in epidemics: a systematic literature review [4]

The objective of using sensors for tracking vital signs during epidemics is to enable early detection and continuous monitoring of patients' vital signs, such as body temperature, heart rate, and respiratory rate. This can aid in early diagnosis, timely intervention, and reducing the spread of communicable diseases. The methodology involves the application of various types of sensors, including wearable devices and BAN sensors, to monitor and record vital signs continuously. These sensors can utilize image processing, facial recognition technology, and real-time data transmission to track patients and enable healthcare providers to identify and respond to changes in vital signs promptly.

Advantages: Early detection of infected patients, continuous and accurate recording of vital signs, remote monitoring for patients hospitalized at home, reduced patient traffic to hospitals and interactions between individuals.

Disadvantages: Inadequate evidence concerning the variety of smart sensors and limited availability of studies and funding for sensor construction and body networks

2.5 Machine Learning of Health Care Radars: Recent progresses in Human Vital Sign Measurement and Activity Recognition [5]

The objective of the document is to discuss how machine learning (ML) can overcome the limitations of conventional radar data processing chains for healthcare radars. The methodology involves presenting recent generative ML concepts used in healthcare radars, exploring the use of ML in vital sign monitoring algorithms and activity recognition, and discussing the most broadly utilized algorithms for these applications, such as Convolutional Neural Network and SVM. The document also aims to present recent trends, lessons learned from these trends, and future directions for healthcare applications, covering a wide range of topics from neonates to elderly individuals.

Advantages: Radar sensors can provide non-contact, continuous monitoring of vital signs and activity, allowing for unobtrusive and privacy-preserving healthcare solutions. They can also be deployed in home environments for medical recommendations, such as exercise routines.

Disadvantages: Radar sensors may face challenges in accurately measuring vital signs, as these measurements can be altered by slight body movements.

2.6 Intermodulation – Based Nonlinear Smart Health Sensing of Human Vital Signs and Location[6]

The target of the review was to demonstrate the advantages of using intermodulation-based nonlinear smart health sensing for target localization and vital signs monitoring. The methodology involved operating in both Doppler and frequency shift keying (FSK) modes. The Doppler mode was used to detect the heartbeat and breathing of the target subject, while human subject localization was achieved in the FSK mode. The study aimed to realize target localization and smart health sensing using 3rd order intermodulation, which was expected to have less path loss and no licensing issues compared to its harmonic counterparts. The design effectively made the amplitude of the heartbeat signal component more prominent, thereby avoiding interference from the sidelobes and harmonics of respiration. The experiments were performed on multiple subjects to demonstrate the advantages of this nonlinear smart health sensing system.

Advantages: The system can identify and suppress undesired signals and interferences reflected from other objects, improving the accuracy of target localization and vital signs monitoring. The plan of the framework upgrades the nature of vital sign signals, making the detection of heartbeat signals more prominent and reducing interference from respiration harmonics.

Disadvantages: While the system uses 3rd order intermodulation for target localization and vital signs monitoring to reduce path loss, however signal degradation over distance. The system may require careful calibration and sensitivity adjustments to ensure accurate detection of vital signs and target localization.

2.7 Artificial Intelligence Agents and Knowledge Acquisition In Health Information System[7]

The research paper discusses the use of AI agents and knowledge acquisition in health information systems. The objective of the research is to explore the role of AI agents, particularly chatbots, in improving healthcare delivery and

knowledge acquisition within health information systems. The methodology involves a review of existing literature, case studies, and surveys to understand the design, implementation, and impact of AI agents in healthcare settings.
Advantages: Chatbots can handle multiple patient queries simultaneously, thereby reducing waiting times and improving response times. Chatbots can be trained and customized to work in various healthcare domains without extensive development changes.Chatbots provide systematic and non-discriminatory responses, treating all users equally and professionally.
Disadvantages: AI agents, including chatbots, may have limitations in understanding nuanced or complex user queries, leading to potential miscommunication. The use of AI agents in healthcare raises ethical concerns, particularly in maintaining patient privacy and confidentiality.

2.8 Conversational Artificial Intelligence In The Health Care Industry [8]

The objective of the developed social robot artifact in the healthcare industry is to improve patient outcomes, reduce waiting times, and enhance communication between patients and practitioners in emergency departments (EDs). The methodology involves the utilization of AI markup language (AIML) to restore domain knowledge of EDs and develop a goal-oriented conversational system. This system incorporates contextual knowledge and performs interactive dialogue-based information stored in a local data repository for analysis and improved personalized health services in various scenarios.
Advantages: The developed social robot artifact is that it serves as a coworker to facilitate healthcare practitioners and patients, catering to patients' needs and communication to enhance care delivery experience and improve information flow processes using interactive services within EDs. It is also an effective tool for developing goal-oriented conversational systems, which can improve communication between patients and healthcare practitioners.
Disadvantages: The study's focus on EDs means its findings may need to be more generalizable to other healthcare settings. Additionally, the study's design did not allow for comparing the developed social robot artifact with other conversational systems, which limits the assessment of its effectiveness with reference to other AI-driven applications.

2.9 AI for Human Health Life: A Critical opinion from Medical Bioethics Perspective [9]

The target of the review related to AI in healthcare is to analyzethe turn of events and use of AI from an ethical perspective. The methodology involved a thorough search of literature addressing precision medicine, with a focus on exploring the basic principles of AI ethics and the existing AI guidelines, especially for the fields of medicine and healthcare. The search included publications discussing common ethical issues in the application of AI, and the terms employed in the search strategy were "artificial intelligence," "machine learning," "medicine," and "ethics." The search was conducted in English and Indonesian, and 70 published works were gathered. All forms of research studies were taken into account, while unpublished data, articles that had not yet been accepted, and technical notes were eliminated.
Advantages: It stresses on privacy measures to Maintain confidentiality and compliance with data protection transparency and algorithmic fairness. Strict monitoring of AI with caution approach. Search for correct guidelines.
Disadvantages: It becomes costly with advance medical case for certain populations. Balancing technological advancements with ethical consideration in challenge.

2.10 Smart Health Care in Age of AI: Recent Advances, challenges and feature Prospects [10]

The paper discusses the urgent need for innovative healthcare models, focusing on smart wearable devices, machine learning for disease diagnosis, and assistive frameworks, including social robots. The review covers software integration architectures and addresses research challenges, providing insights into recent developments and future prospects for smart healthcare. After collecting the data using smart sensors, machine learning techniques are employed to interpret and present predictive analytics, such as predicting illnesses and detecting abnormalities in the patient's health.
Advantages: Smart sensors in the IoMT environment allow for continuous monitoring of health vitals using wearable devices and smartphone solutions, enabling real-time health tracking. Machine learning techniques interpret and present predictive analytics, such as predicting illnesses and detecting abnormalities in the patient's health based on the data collected from smart sensors.

Disadvantages: Ensuring the security and privacy of patients' health records in IoMT environments is a challenge for the data and the challenges of network attacks. Data collected from smartphone cameras may contain noise, leading to misinformation. Handling noisy environments and ensuring the accuracy of data are ongoing challenges. Challenges include dealing with missing or incomplete data, power outages leading to data loss, and the need to respond quickly to patients with severe conditions.

2.11 Optimization of IOT Based Artificial Intelligence Assisted Telemedicine Health Analysis System [11]

The objective of the document is to discuss the technical challenges and application scenarios in the "people-oriented" health Internet of Things (IoT) concept. The focus is on quality of service (QoS), quality of experience (QoE), and other important evaluation indicators of IoT, the integration of health care resources for telehealth monitoring services. The document also aims to explore the application of the latest technologies and research results to improve the service level of health IoT. The methodology involves a comprehensive review of the current state of IoT technology, the challenges it faces, and the potential applications in the healthcare sector.

Advantages: By leveraging the latest technologies and research results, health IoT can provide better QoS and QoE, leading to improved user satisfaction and more effective health services. The integration of cutting-edge technologies can streamline processes, leading to increased efficiency in health IoT systems. This can result in faster response times, better resource utilization, and overall improved service delivery.

Disadvantages: The integration of the latest technologies and research results into health IoT presents technical challenges due to the cross-disciplinary nature of IoT, involving sensors, microelectronics, computers, and communications. This can lead to complexities in implementation and system optimization. Incorporating the latest technologies and research results requires a focus on QoS and QoE, which can be challenging to achieve, particularly in the context of health IoT where the reliability and accuracy of data are crucial.

2.12 Application of artificial intelligence methods in vital signs analysis of hospitalized patients: A systematic literature review [12]

These paper discusses the investigate technological aspects related to AI methods in a hospital environment as a decision support system without evaluating or comparing the clinical outcomes. It uses to identify and assess the outcomes obtained by AI techniques in improving patient health outcomes. And also understand how AI methods are used in the processing of patient vital signs. The study protocol included defining research questions, search strategy, article selection criteria, quality assessment, and data extraction. The research questions were refined into specific questions covering detailed information considered important for inquiry with respect to general research question. A search string was defined using a mix of natural language words and controlled vocabulary words to be used in the electronic databases.

Advantages: AI methods have the capability to handle large datasets efficiently, which is crucial in a hospital environment where a significant amount of patient data is collected and stored. AI can provide better evidence to support the decisions of health professionals, ultimately leading to improved patient health outcomes in hospitals. AI methods can analyze vital signs and other patient data in real-time, providing timely insights for health professionals.

Disadvantages: There is a concern about the trust of physicians in the results obtained from AI methods, especially due to scarcity of interpretability in certain machine learning techniques, which may limit their adoption. Some AI techniques lack interpretability, making it challenging for health professionals to understand and trust the results, especially when making critical decisions on the analysis of vital signs. There is a need of detailed information in some articles about how the data were collected and the preprocessing steps applied to handle noise and missing values in the vital signs data.

2.13 Review of the open datasets for contactless sensing [13]

The objectives of providing a complete picture of contactless sensing technologies and their typical applications. It aims to comprehensively summarize open-access datasets for contactless sensing, provide a comparative discussion, and include relevant links. The methodology involves reviewing open datasets on various contactless sensing technologies, including WiFi-based, UWB-based, mm Wave-based, visible-light-based, IR-based, and audio-based contactless sensing. Each section is further divided by the enabled applications with open accessible datasets. The discussions also cover underlying problems, potential solutions, and the expected conditions for establishing an open dataset.

Advantages: Contactless sensing technologies offer several advantages, including high sensitivity, long-distance capabilities, and not relying on a light source. They are widely employed in various applications such as emotion recognition, respiration monitoring, activity recognition, sleep monitoring, gesture recognition, and face recognition.

Disadvantages: For instance, it is affected by environmental factors like temperature, movement, and background noise.Some technologies may be susceptible to interference, have high energy consumption, or face challenges related to data transmission speed and bandwidth.

2.14 UbiMeta: A Ubiquitous Operating System Model for Metaverse [14]

The UbiMeta model visions the metaverse environment by optimizing ubiquitous resource management, ensuring privacy and security, processing information efficiently, and fostering innovation. It focuses on developing a specialized operating system tailored for the metaverse, with four layers: URML, AIML, GIML, and MEML. The methodology of the UbiMeta model involves the use of advanced algorithms within the AIML layer to provide real-time insights and recommendations for optimizing irrigation, fertilization, and crop management. Additionally, UbiMeta facilitates farm automation and robotics by integrating gesture interaction and visual interaction technologies, enabling farmers to remotely control and monitor agricultural machinery and robots.

Advantages: UbiMeta facilitates farm automation and robotics, enabling farmers to remotely control and monitor agricultural machinery and robots. In the medical field, UbiMeta allows for virtual doctor-patient consultation, enabling patients to interact with healthcare professionals in a virtual environment and receive timely medical advice from the comfort of their homes.

Disadvantages: One potential concern could be the security of sensitive data, especially in scenarios where federated computing and collaborative model training are involved. Ensuring the protection of sensitive and confidential data while benefiting from collective knowledge and expertise may pose challenges in terms of data privacy and security.

III. ANALYSIS TABLE

The following table gives the analysis of techniques and methods used in research papers on image processing and identification.

Sr. No	Paper Title	Techniques	Addressed Issue
1	Smart Health Monitoring Using Deep Learning and Arificial Intelligence	Collection of data from the human body using mobile medical devices,Processing of the collected data by various deep learning algorithms.	Theproposed smart health monitoring system, including the integration of IoT with specialized disciplines, such as flawlessness, dependability, and cross-device portability.
2	Smart Health Monitoring System Using IOT andMachine Learning Techniques	Decision Tree Algorithm and Random Forest Classifier Algorithm, Support Vector Machine (SVM).	The potential issue of early prediction and prevention of cardiovascular diseases, especially in areas with limited access to healthcare facilities.
3	Accuracyof Vitals Signs Measurements by a Smartwatch and a Portable Health Device: Validation Study.	The study enrolled 127 patients and utilized two novel all-in-one monitoring devices, the Bodi Metrics Performance Monitor and the Everlast smartwatch, to measure heart rate (HR), systolic blood pressure (SBP), diastolic blood	It ensure the accuracy, reliability, and clinicalapplicabilityoftheinvestigational devices.

		pressure (DBP), and oxygen saturation (SpO2).	
4	The application of wearable smart sensors for monitoring the vitals signs of in epidemics: a systematic literature review	Cascade classification algorithm, viola - Jones algorithm, cloud computing algorithm.	Reviewing the use of wearable electronic sensors for disease management and vital sign monitoring during epidemic outbreaks was the goal of the portable smart sensor study.
5	Machine Learning of Health Care Radars : Recent progresses in Human Vital Sign Measurement and Activity Recognition.	Convolution Neural Network, SVM, Electro Cardiogram Sensors.	The document discusses the integration of radar sensors and machine learning in healthcare applications.
6	Intermodulation – Based Nonlinear Smart Health Sensing of Human Vital Signs and Location	Frequency Spectrum Analysis, Short Time Fourier Transform (STFT), Error Analysis	The conventional RF sensors masking the heartbeat response with sidelobes and harmonics of respiration tones.
7	Artificial Intelligence Agents and Knowledge Acquisition In Health Information System.	Natural language processing (NLP), machine learning (ML),	The development of AI agents utilizing NLP techniques to improve medical assistance, increase flow, reduce workloads, and anxiety levels.
8	Conversational Artificial Intelligence In The Health Care Industry.	Contextual knowledge and practitioners' cognitive-tacit knowledge-ability into the health information system (HIS) to improve information flow processes and healthcare outcomes within Eds.	It aimed to improve patient outcomes, reduce waiting times, enhance communication between patients and practitioners in emergency departments, and elevate information flow processes during peak hours.
9	Artificial Intelligence for Human Health Life : A Critical opinion from Medical Bioethics Perspective.	Algorithmic Fairness and Biases, Data Privacy and Sharing Regulation.	The context of the ethical considerations and challenges posed by the use of AI in the medical and healthcare fields.
10	Smart Health Care in Age of AI : Recent Advances, challenges and feature Prospects.	Machine learning algorithms for data analysis and prediction, wearable sensors and smartphone applications for health monitoring, and the use of IoT (Internet of Things) for collection and transfer, edge/fog/cloud servers for data processing.	Provides a comprehensive overview of smart healthcare systems, addressing the various technological aspects and their potential integration to advance personalized healthcare.
11	Optimization of IOT Based Artificial Intelligence Assisted Telemedicine Health	Multimodal Information Acquisition, Multi-level Service Quality Assurance.	It increases the coverage of health care facilities to nearly everyone, including those who are injured in accidents,

	Analysis System		pregnant women, newborns, elderly or disabled patients, those with chronic illnesses, emergency room patients, and people who are not well enough to require medical attention.
12	Application of artificial intelligence methods in vital signs analysis of hospitalized patients: A systematic literature review	Machine learning (ML), deep learning, neural networks, and data mining.	It draws attention to the difficulties and possibilities involved in using AI techniques to assess hospitalized patients' vital signs, and stresses how critical it is to resolve these issues in order to successfully apply AI in healthcare settings.
13	Review of the open datasets for contactless sensing	Radio frequency-based sensing, vision-based sensing and acoustic-based sensing	The retrieval and use of personal data obtained through contactless sensing technologies revolve around privacy, consent, and security.
14	UbiMeta: A Ubiquitous Operating System Model for Metaverse	Complexity, data privacy concerns, and adoption challenges.	This ensures that the system can manage the complexity of interactions while maintaining individual control.

IV. CONCLUSION

The development of a Smart Health Recommendation System integrating AIML and Deep Learning has a promising approach to enhance personalized healthcare services. The system's ability to offer precise and individualized health recommendations is made possible by the combination of rule-based AIML for structured knowledge representation, deep learning for pattern detection, and data-driven insights. The integration of deep learning models, such as neural networks, has enabled the system to learn complex patterns and relationships within large datasets. This allows for the extraction of meaningful insights from diverse health-related data, contributing to more accurate and personalized recommendations. Continuous efforts are required to update the knowledge base, refine the deep learning models, and address emerging challenges in the dynamic field of healthcare. Collaboration with healthcare professionals and adherence to ethical guidelines are crucial for the responsible deployment and evolution of the Smart Health Recommendation System.

REFERENCES

[1]. Philip J, Gandhimathi SK, Chalichalamala S, Karnam B, Chandanapalli SB, Chennupalli S. Smart Health Monitoring Using Deep Learning and Artificial Intelligence. Revue d'Intelligence Artificielle. 2023 Apr 1;37(2).

[2]. Pandey, Honey, and S. Prabha. "Smart health monitoring system using IOT and machine learning techniques." In 2020 sixth international conference on bio signals, images, and instrumentation (ICBSII), pp. 1-4. IEEE, 2020.

[3]. Hahnen, C., Freeman, C.G., Haldar, N., Hamati, J.N., Bard, D.M., Murali, V., Merli, G.J., Joseph, J.I. and van Helmond, N., 2020. Accuracy of vital signs measurements by a smartwatch and a portable health device: validation study. JMIR mHealth and uHealth, 8(2), p.e16811.

[4]. Mohammadzadeh, N., Gholamzadeh, M., Saeedi, S. and Rezayi, S., 2020. The application of wearable smart sensors for monitoring the vital signs of patients in epidemics: a systematic literature review. Journal of ambient intelligence and humanized computing, pp.1-15.

[5]. Ahmed, S. and Cho, S.H., 2023. Machine learning for healthcare radars: Recent progresses in human vital sign measurement and activity recognition. IEEE Communications Surveys & Tutorials.

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ISSN (Online) 2581-9429

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Impact Factor: 7.53

Volume 4, Issue 1, February 2024

[6]. Mishra, A., McDonnell, W., Wang, J., Rodriguez, D. and Li, C., 2019. Intermodulation-based nonlinear smart health sensing of human vital signs and location. IEEE access, 7, pp.158284-158295.

[7]. Fareedi, A.A., Ghazawneh, A. and Bergquist, M., 2022. Artificial Intelligence Agents and Knowledge Acquisition in Health Information System.

[8]. Fareedi, A.A., Ghazawneh, A., Bergquist, M. and Ismail, M., 2023. Conversational Artificial Intelligence (AI) in the Healthcare Industry (No. 10849). EasyChair.

[9]. Hisan, U.K. and Amri, M.M., 2022. Artificial Intelligence for Human Life: A Critical Opinion from Medical Bioethics Perspective–Part II. Journal of Public Health Sciences, 1(02), pp.112-130.

[10]. Nasr, M., Islam, M.M., Shehata, S., Karray, F. and Quintana, Y., 2021. Smart healthcare in the age of AI: recent advances, challenges, and future prospects. IEEE Access, 9, pp.145248-145270.

[11]. Yu, H. and Zhou, Z., 2021. Optimization of IoT-based artificial intelligence assisted telemedicine health analysis system. IEEE access, 9, pp.85034-85048.

[12]. Kaieski, N., da Costa, C.A., da Rosa Righi, R., Lora, P.S. and Eskofier, B., 2020. Application of artificial intelligence methods in vital signs analysis of hospitalized patients: A systematic literature review. Applied Soft Computing, 96, p.106612.

[13]. Liang, K., Chen, J., He, T., Wang, W., Singh, A.K., Rawat, D.B., Song, H. and Lyu, Z., 2024. Review of the Open Datasets for Contactless Sensing. IEEE Internet of Things Journal.

[14]. Chen, Y., Huang, W., Jiang, X., Zhang, T., Wang, Y., Yan, B., Wang, Z., Chen, Q., Xing, Y., Li, D. and Long, G., 2023. UbiMeta: A Ubiquitous Operating System Model for Metaverse. International Journal of Crowd Science, 7(4), pp.180-189.