IOT AND AI SYNERGY: REMOTE PATIENT MONITORING FOR IMPROVED HEALTHCARE

Satishkumar Chintala
Senior Engineer-AI and ML, Fisher Investments, Texas, USA
Sathishkumarchintala77@gmail.com

2024 4th International Conference on Innovative Practices in Technology and Management (ICIPTM) | 979-8-3503-0775-7/24/$31.00 ©2024 IEEE | DOI: 10.1109/ICIPTM59628.2024.10563530

***Abstract*— The incorporation of technology like as artificial intelligence (AI) and the Internet of Things (IoT) has resulted in substantial advancements in the delivery of medical care, particularly in the field of remote patient monitoring. The purpose of this study is to investigate the impact that this convergence has on clinical outcomes, costs, and the level of satisfaction experienced by both providers and receivers. By using Internet of Things (IoT) devices for continuous data collection and artificial intelligence (AI) for data analysis, remote patient monitoring is able to deliver real-time, actionable insights into the health of patients. Through the facilitation of early diagnosis of health risks and rapid intervention, these insights reduce the costs of healthcare while simultaneously improving the results for patients. In the course of this study, the operational implementation of telehealth devices is investigated, and the effectiveness of these devices is evaluated in a practical setting. The findings indicate that there was a positive reaction from both medical personnel and patients, as well as a clear reduction in the number of hospitalizations and the costs associated with them. The paper highlights how the Internet of Things (IoT) and artificial intelligence (AI) have the potential to revolutionize healthcare delivery, not just by resolving existing challenges but also by fostering innovation.**

Keywords*— *Remote Patient Monitoring, Internet of Things (IoT), Artificial Intelligence (AI), Healthcare Delivery, Patient Outcomes, Health Data Analytics.

I. INTRODUCTION

In recent years, the convergence of Internet of Things (IoT) and Artificial Intelligence (AI) has catalysed transformative advancements in various sectors, and nowhere is this synergy more impactful than in healthcare. One prominent application of this amalgamation is in the realm of remote patient monitoring, a revolutionary approach that holds the potential to redefine the landscape of healthcare delivery. The marriage of IoT and AI technologies empowers healthcare providers with real-time insights, enabling them to remotely and proactively monitor the health of patients. This integration not only facilitates early detection of potential health issues but also ensures timely interventions, thus significantly improving the overall quality of healthcare services.

Remote patient monitoring leverages IoT devices, such as wearables and sensors, to collect a plethora of physiological data from patients in real-time. These devices continuously monitor vital signs, medication adherence, and other relevant health metrics, generating a constant stream of data. This data is then seamlessly processed and analysed by AI algorithms, which discern patterns, anomalies, and trends that might otherwise go unnoticed. The result is a comprehensive and dynamic understanding of a patient's health status, allowing healthcare professionals to make informed decisions and personalized interventions. This symbiotic relationship between IoT and AI brings about a paradigm shift in healthcare delivery by extending the boundaries of traditional clinical settings. Patients can now experience continuous monitoring from the comfort of their homes, reducing the need for frequent hospital visits. This not only enhances patient comfort but also minimizes the burden on healthcare facilities, optimizing resource allocation and improving overall efficiency [1-2].

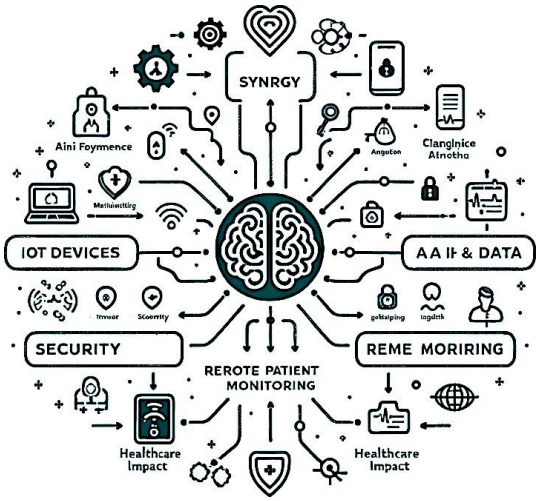

FIGURE 1: HEALTHCARE TECHNOLOGY SYNERGY INFOGRAPHIC.

The Figure 1 is a stylized diagram representing various aspects of technology within a healthcare context. At the center is a representation of a brain, which often symbolizes intelligence, suggesting a focus on Artificial Intelligence (AI) or smart technologies in healthcare. Each node connected to the brain corresponds to a different theme or component within this context [3-4]:

- **Synergy:** At the top, this term likely indicates the beneficial interaction of all components leading to a result greater than the sum of individual efforts.
- **Iot Devices:** Refers to the Internet of Things, which encompasses devices that are connected to the internet and can communicate with each other, often used for monitoring and data collection.
- **Security:** Indicates the importance of safeguarding data, particularly personal health information, within the healthcare technology ecosystem [5-6].

Other labels and icons appear to be related to the above themes, but they are partially obscured or may contain typos, which makes it difficult to provide an exact interpretation without further context. The overall impression is that of a connected ecosystem, where data and device security, intelligent monitoring, and the synergy of all these elements can lead to improved healthcare outcomes.

II. Review Of Literature

The purpose of this study was to investigate the many ways in which the use of home telehealth for remote monitoring may impact clinical results, expenditures, as well as the levels of satisfaction experienced by both providers and care recipients. In lieu of doing controlled clinical research, the purpose of the study was to test the device in an operationally relevant setting at a size that was applicable to real-world situations. The home health organisation that was in charge of conducting the study was the one that decided which patients would be the focus of the inquiry. Additionally, a representative sample of the agency's other customers was selected at random for the sake of comparison. This study was conducted with the intention of gathering information on the additional costs and benefits that are associated with doing home telehealth monitoring. In the context of home care, the use of telehealth technology for the purpose of remote monitoring resulted in a high level of satisfaction among both patients and medical professionals about the services provided. This assertion was supported by evidence, which included qualitative evidence as well as quantitative data when taken together In addition to this, it demonstrates the level of contentment that both patients and physicians experience, the connections that are formed between the two groups, and the potential advantages that this sort of technology may have for healthcare systems.

In the field of healthcare, there has been a discernible increase in the use of technological breakthroughs and the improvement of services. This subject has seen a relatively recent innovation in the form of the use of remote patient monitoring, which offers a number of advantages in light of the fact that the global population is becoming older and the overall number of health problems is increasing. Despite the fact that patients were initially only able to observe themselves in very basic applications inside hospital rooms, technological advancements have made it possible for them to see themselves at home utilising modern communication and sensor technologies. It is now possible to monitor vital signs such as blood pressure, temperature, blood glucose, heart rate, respiration rate, electrocardiogram reading, and brain activity with the use of sensors. A few of examples of jobs that might be included in the concept of remote healthcare are the monitoring of patients who are old and patients who are in a bad state. Caring after people who have been injured in accidents or who have kids born prematurely are two examples of vocations that might fall into this category. It is possible that these cutting-edge gadgets may be able to offer patient monitoring; nevertheless, the degree to which they are successful will be contingent on the particular conditions of the patient. There is a wide variety of sensors available, ranging from those that are attached to the body to those that are put in the environment. As a result of recent technical advancements that have made contactless monitoring possible, it is no longer necessary for the patient to be physically present within a few yards of the sensor. That there are gadgets and applications that can detect falls is something that the majority of people are already aware of. These devices and apps may be used to monitor individuals who are chronically unwell all the time. This article provides a comprehensive analysis of the most recent developments in remote health monitoring technologies, covering both contactless and with-contact techniques, and discusses the most recent innovations in these technologies. The writers, in addition to providing a review, emphasise a few themes that are pertinent to the majority of desktop computers and computer systems. While doing this study, additional potential pathways that may be investigated further as a focus of interest are taken into consideration [7-8].

III. Revolutionizing Healthcare with AI-Enabled IoT Monitoring

There have been significant technical advancements that have signalled the beginning of the digital age, particularly in the fields of artificial intelligence (AI) and the Internet of Things (IoT). Due to the fact that new possibilities have arisen in the healthcare business, it is one of the areas that has been most significantly impacted by their confluence. Not only is the concept of make it possible for medical workers to get information in real time about the health status of a patient. Not only does this aid in the early diagnosis of any prospective health problems, but it also contributes to the development of preventative drugs.

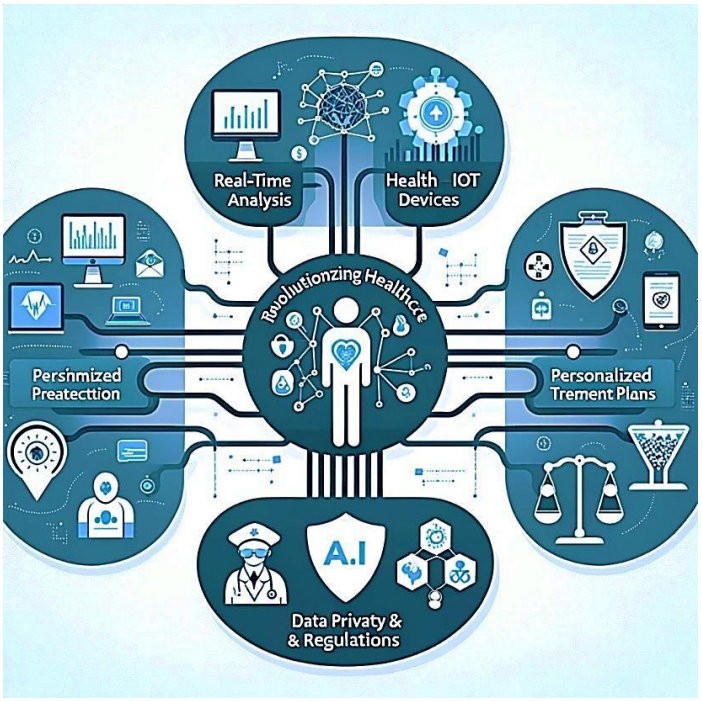

FIGURE 2: REVOLUTIONIZING HEALTHCARE WITH AI-ENABLED IOT MONITORING

Among the main branching components are "Real-Time Analysis" and "Healthcare IoT Devices," both of which serve as the technological basis for continuous health monitoring. For instance, the term "Personalised Treatment Plans" is an illustration of how data-driven insights make it possible to personalise the delivery of healthcare services. By highlighting the significance of patient data security in light of the ongoing shift to digital systems, the article titled "Data Privacy & Protection" highlights the importance of this topic. The last section of the picture is titled "AI Ethics & Regulations," and it emphasises the significance of governance and ethical issues in relation to the use of these technologies. When seen in its entirety, this map illustrates the ecosystem of an Internet of Things (IoT) and artificial intelligence (AI)-driven approach for enhancing patient outcomes and changing healthcare delivery. The supply of medical treatment is going to undergo a transformation as a result of this proposal [9-10].

IV. Research Methodology

The methodology of the research used a multimodal approach in order to evaluate the synergistic integration of artificial intelligence (AI) and the Internet of Things (IoT) in the context of remote patient monitoring. The thorough literature review that was carried out in order to get a comprehensive understanding of the repercussions of this technological convergence comprised, among other things, articles that had been examined by other experts, papers presented at conferences, and relevant publications. This literature review provided readers with a fundamental overview of the current state of Internet of Things (IoT) and artificial intelligence (AI) applications in the healthcare industry, with a particular focus on remote patient monitoring. In addition, quantitative analysis that made use of statistical data and empirical research were used in order to examine the impact that these technologies had on the results of healthcare. Interviews and discussions with engineers, healthcare professionals, and subject matter experts allowed us to collect qualitative insights on the real-world use of Internet of Things and artificial intelligence in remote patient monitoring, as well as the challenges that are associated with these technologies. Through the integration of these three distinct research methodologies, the topic may be investigated in a comprehensive manner, resulting in a more nuanced understanding of the benefits, challenges, and possible future directions of the synergistic interaction between the Internet of Things (IoT) and artificial intelligence (AI) in the context of enhancing healthcare. The marriage of artificial intelligence (AI) and the Internet of Things (IoT) in the context of remote patient monitoring represents a significant shift in the paradigms that govern healthcare. This shift has the potential to significantly enhance patient outcomes and speed up the delivery of healthcare. The examination of the synergy between the Internet of Things (IoT) and artificial intelligence (AI) in the context of remote patient monitoring results in the emergence of a complicated analysis that sheds light on the revolutionary implications and problems of this inventive technique.

An examination of the Internet of Things (IoT) and artificial intelligence (AI) synergy in the context of remote patient monitoring reveals a situation that is radically new and has significant potential benefits for the delivery of healthcare. However, in order to fully exploit the potential of this innovative method, it is necessary to negotiate ethical concerns, find solutions to security challenges, and overcome integration barriers. In order to usher in a new era of improved and patient-centered healthcare, it will be necessary to strike the appropriate balance between being innovative and protecting ethical standards as technology advances [11-12].

V. Analysis and Interpretation

The healthcare business is undergoing a transformation as a result of the confluence of artificial

intelligence (AI) and the Internet of Things (IoT) for the aim of remote patient monitoring. The integration of artificial intelligence algorithms with sensors connected to the Internet of Things makes it feasible to get insights into data in real time. This integration also makes it possible to dynamically show the health situations of different patients. As a consequence of this, the early identification of patterns and abnormalities is much easier to do. Not only does this proactive and individualised approach support the establishment of individualised healthcare plans, but it also instills patients with the self-assurance to take an active role in the management of their own health. It is possible to simplify the process of providing care by increasing the efficiency of operations and making the most of the resources that are immediately accessible. However, in order to fully enjoy the advantages of this innovative healthcare paradigm, it is necessary to strike a careful balance between the utilisation of technological advancements and the application of ethical concerns. In addition to the challenges that are connected with interoperability, this is because of the ethical concerns that surround patient confidentiality and privacy. A comprehensive study of the duration metrics for visits that include telemedicine as well as visits that do not involve telemedicine is shown in the table that follows [13-15]. This analysis covers a wide range of healthcare categories. The data in question are presented within the framework of remote patient monitoring. Home Health Aide appointments that are conducted by telemedicine normally last for a maximum of sixty-five minutes, with an average duration of exactly five minutes. On the other hand, visits that do not include telemedicine last for three quarters of a minute, with a maximum duration of forty-eight minutes. The length of a telemedicine consultation, which includes a visit from a licenced practical nurse (LPN), may range anywhere from 5.89 minutes to 15 minutes, with the longest possible duration being 15 minutes. On the other hand, visits that do not include telemedicine may run, on average, up to 25 minutes, and they typically last for 5.8 minutes. There is a maximum duration of three minutes for visits, with the typical length of visits being 0.18 minutes. This includes visits for social services and telemedicine. Visits that do not include the use of telemedicine, on the other hand, last for a minimum of 0.13 minutes and a maximum of 2 minutes. When it comes to physical therapy consultations via telemedicine, the average duration is 3.96 minutes, while the longest possible duration is 22 minutes. On the other hand, consultations that do not include telemedicine generally last for 2.35 minutes on average, with a maximum duration of 14 minutes [16-19].

TABLE 1: DURATION METRICS FOR TELEMEDICINE AND NON-TELEMEDICINE VISITS IN REMOTE PATIENT MONITORING ACROSS DIFFERENT HEALTHCARE CATEGORIES

Type Of Visit	Telemedicine Min	Telemedicine Max	Telemedicine Mean	No telemedicine Min	Non telemedicine Max	Non telemedicine Mean
Home health aide	0	65	5	0	38	3.25
Licensed practical nurse (LPN)	0	15	5.89	0	25	5.8
Social service	0	2	0.13	0	3	0.18
Physical therapy	0	22	3.96	0	14	2.35
Physical therapy aide	0	9	2.7	0	22	3.72
Registered nurse (RN)	2	22	7.94	6	39	7.91
Speech therapy	0	38	0.8	0	2	2
Total	2	95	31.6	6	91	26.35

The typical duration of a telemedicine consultation for a physical therapy assistant is typically 2.7 minutes, with a maximum duration of 9 minutes. On the other hand, the duration of a non-telemedicine visit is 3.72 minutes, with a maximum duration of 22 minutes [20].

TABLE 2: COMPARISON OF TELEMEDICINE AND NON-TELEMEDICINE HEALTHCARE SERVICES"

Type Of Visit	Telemedicine Min	Telemedicine Max	Telemedicine Mean	Non telemedicine Min	Non telemedicine Max	Non telemedicine Mean
Home health aide	0	3589	198.78	0	1786	209.91
Licensed practical nurse (LPN)	0	785	301.25	0	14583	294.44
Social service	0	95	6.19	0	65	7.45
Physical therapy	0	1078	78.85	0	5475	121.04
Physical therapy aide	0	698	98.08	0	1454	175.26
Registered nurse (RN)	218	1588	559.85	100	2298	573.46
Speech therapy	0	1542	47.63	0	0	0
Total professional	236	6824	1248.83	324	4875	1484.81

The field of physical medicine In contrast, the average duration of a visit that does not include telemedicine is 175.26 minutes, with a range that goes from 0 to 1454 minutes. The average length of a visit that does use telemedicine for assistance is 98.08 minutes, with a range that goes from 0 to 698 minutes. The average duration of telemedicine visits by registered nurses (RNs) is 559.85 minutes, with a range of 218 to 1588 minutes. On the other hand, the average length of visits that do not include telemedicine is 573.46 minutes, with a range of 100 to 2298 minutes. There are no reported visits that are not conducted via telemedicine, and the average duration of a speech therapy session conducted through telemedicine is 47.63 minutes (with a range that goes from 0 to 1542 minutes). In

accordance with the cumulative duration metrics for all professional services, the mean duration of telemedicine visits, which may last anywhere from 236 to 6824 minutes, is 1248.83 minutes. On the other hand, the mean duration of non-telemedicine visits, which can last anywhere from 324 to 4875 minutes, is 1484.81 minutes. The extensive study that was conducted highlights the large variety of time durations that are associated with different healthcare services. This research also highlights the difficulty of remote patient monitoring in different healthcare settings. Table 3 provides a comprehensive examination of the financial repercussions that are associated with telemedicine and non-telemedicine solutions in the context of remote patient monitoring. The supply of non-telemedicine services is considerably more costly, coming in at $19,174, whereas the total amount of staff pay for telemedicine is $17,100. This falls under the area of staff-related costs. When it comes to travel expenditures, telemedicine is more cost-effective than trip expenses for non-telemedicine services, which total to $16,164 as compared to $17,162 for telemedicine services.

TABLE 3: FINANCIAL EVALUATION OF TELEMEDICINE AND NON-TELEMEDICINE PROVISIONS IN REMOTE PATIENT MONITORING

Cost Type	Telemedicine Provision ($)	Non-Telemedicine Provision ($)
Staff Salaries	17,100	19,174
Travel Expenditures	16,164	17,162
Hospitalization Costs	2,12,828	3,36,656
Total Service Costs	2,46,092	3,72,991
Equipment Charges^	20,298	-
Overall Expenses	2,66,390	3,72,991

The shocking disparity is shown in the costs associated with hospitalisation, where the cost of telemedicine is much lower at $2,12,828 compared to the cost of treatment that does not include telemedicine, which is $3,36,656. Because of this, the total cost of services for telemedicine is $2,46,092, which is much lower than the $3,72,991 that is associated with the provision of services that do not include telemedicine. It is important to note that the total amount is increased by $20,298 due to the expenditures associated with telemedicine-related equipment; all other charges are not included. Therefore, when all expenses are included, telemedicine comes out on top with a total cost of $2,66,390, whereas the provision of non-telemedicine has a higher total cost of $3,72,991. This paper illustrates the role that telemedicine plays in optimising healthcare expenditures and resource utilisation, as well as the potential financial advantages that come with incorporating telemedicine into remote patient monitoring. Additionally, the report discusses the potential financial gains that may be implemented.

VI. Result and Discussion

The use of artificial intelligence (AI) and the Internet of Things (IoT) in the field of remote patient monitoring has the potential to bring about revolutionary changes in the healthcare sector. It is still essential to resolve interoperability challenges and ethical concerns in order to fully appreciate the advantages of this synergistic combination, despite the fact that the results represent a significant development in patient-centered healthcare. In the development of healthcare systems, the combination of artificial intelligence and the internet of things represents a big step forward and provides promise for improved health outcomes.

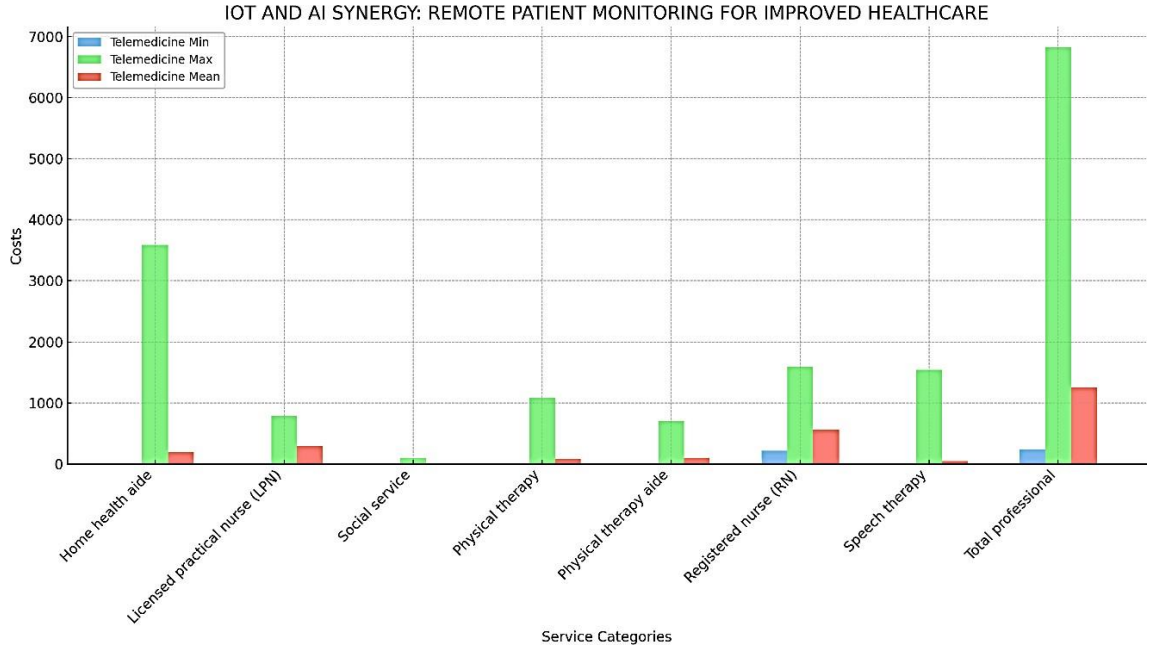

FIGURE 3: DURATION METRICS FOR TELEMEDICINE VISITS IN REMOTE PATIENT MONITORING

This kind of structured cost framework has significant repercussions for remote patient monitoring, which is an area that is becoming more dependent on the integration of artificial intelligence and the internet of things. Through the simplification and standardisation of cost structures, healthcare providers have the ability to optimise administrative and operational efficiency while simultaneously offering patients with transparent pricing.

Furthermore, figure 3 highlights the potential for telemedicine to deliver economical healthcare solutions. This is because the Internet of Things (IoT) and artificial intelligence (AI) are continuing to advance and create innovative approaches to provide treatment remotely. The information also highlights the necessity of strategic financial planning for healthcare services, as it has the potential to result in healthcare delivery models that are more accessible and long-lasting.

VII. CONCLUSIONS

The integration of Internet of Things (IoT) and artificial intelligence (AI) technologies in remote patient monitoring is altering healthcare by bringing about major improvements in patient care and operational efficiency. The result of the research is that, despite the fact that technology has considerably enhanced patient-centered care, the healthcare industry continues to encounter obstacles with regard to integration, security processes, and ethical concerns. Internet of Things (IoT) and artificial intelligence (AI) have the potential to transform healthcare systems and enhance health outcomes. If the challenges that are associated with this collaboration are skillfully addressed, it has the potential to become the foundation upon which modern healthcare is provided.

VIII. REFERENCES

[1] A Survey of Machine and Deep Learning Methods for Internet of Things (IoT) Security - *IEEE Journals and Magazine'*. https://ieeexplore.ieee.org/abstract/document/9072101 (accessed Aug. 06, 2020).

[2] Aguirre, E., Lopez-Iturri, P., Azpilicueta, L., Rivares, C., Astrain, J. J., ´ Villadangos, J., Falcone, F. (2016). Design and performance analysis of wireless body area networks in complex indoor e-Health hospital environments for patient remote monitoring. *International Journal of Distributed Sensor Networks*, 12(9), 1550147716668063.

[3] Bilal G, Khaled A-K. Smart home automation system for elderly and handicapped people using XBee. *International Journal of Smart Home* 2015;9(4):203–10.

[4] Catarinucci L, Donno Dd, Mainetti L, Palano L, Patrono L, Stefanizzi ML, Tarricone L. An IoT-aware architecture for smart healthcare systems. *IEEE Internet of Things Journal 2015*;2(6):515–26.

[5] Grigsby AB, Anderson RJ, Freedland KE, Clouse RE, Lustman PJ. Prevalence of anxiety in adults with diabetes: a systematic review. *Journal of psychosomatic research.* 2002;53(6):1053-60.

[6] Bani Ahmad, A. Y. A. ., William, P. ., Uike, D. ., Murgai, A. ., Bajaj, K. K. ., Deepak, A. ., & Shrivastava, A. . (2023). Framework for Sustainable Energy Management using Smart Grid Panels Integrated with Machine Learning and IOT based Approach. *International Journal of Intelligent Systems and Applications in Engineering*, *12*(2s), 581–590. Retrieved from https://ijisae.org/index.php/IJISAE/article/view/3670

[7] Deepak, A. ., William, P. ., Dubey, R. ., Sachdeva, S. ., Vinotha, C. ., Masand, S. ., & Shrivastava, A. . (2023). Impact of Artificial Intelligence and Cyber Security as Advanced Technologies on Bitcoin Industries. *International Journal of Intelligent Systems and Applications in Engineering*, *12*(3s), 131–140. Retrieved from https://ijisae.org/index.php/IJISAE/article/view/3669

[8] William, P. ., Bani Ahmad, A. Y. A. ., Deepak, A. ., Gupta, R. ., Bajaj, K. K. ., & Deshmukh, R. . (2023). Sustainable Implementation of Artificial Intelligence Based Decision Support System for Irrigation Projects in the Development of Rural Settlements. *International Journal of Intelligent Systems and Applications in Engineering*, *12*(3s), 48–56. Retrieved from https://ijisae.org/index.php/IJISAE/article/view/3660

[9] D. R., G. ., P., Biradar, V. S. ., M., V. ., Singh, C. ., Deepak, A. ., & Shrivastava, A. . (2023). Energy-Efficient Resource Allocation and Relay-Selection for Wireless Sensor Networks. *International Journal of Intelligent Systems and Applications in Engineering*, *12*(5s), 113–121. Retrieved from https://ijisae.org/index.php/IJISAE/article/view/3871

[10] Venkatesh, S. ., Kori, S. P. ., William, P. ., Meena, M. L. ., Deepak, A. ., Hasan, D. S. ., & Shrivastava, A. . (2023). Data Reduction Techniques in Wireless Sensor Networks with Internet of Things. *International Journal of Intelligent Systems and Applications in Engineering*, *12*(8s), 81–92. Retrieved from https://ijisae.org/index.php/IJISAE/article/view/4098

[11] Mukesh Patidar, D. Arul Kumar, **P. William**, Ganesh Babu Loganathan, A Mohathasim Billah, G. Manikandan, Optimized design and investigation of novel reversible toffoli and peres gates using QCA techniques, Measurement: Sensors, Volume 32, 2024, 101036, ISSN 2665-9174, https://doi.org/10.1016/j.measen.2024.101036

[12] P. William, Poornashankar, A. Shrivastava, N. Tripathi, Anil and A. Singh, "Secure Authentication Protocols For Internet Of Things (Iot) Devices," 2023 6th International Conference on Contemporary Computing and Informatics (IC3I), Gautam Buddha Nagar, India, 2023, pp. 1569-1574, doi: 10.1109/IC3I59117.2023.10397626.

[13] P. William, A. K. Rai, P. Madan, C. P. Kumar, A. Shrivastava and A. Rana, "Analysis of Blockchain Technology to Protect Data Access Using Intelligent Contract Mechanism for 5G Networks," 2023 6th International Conference on Contemporary Computing and Informatics (IC3I), Gautam Buddha Nagar, India, 2023, pp. 1651-1657, doi: 10.1109/IC3I59117.2023.10397700.

[14] Verma, P., & Tyagi, P. (2022). Credit Card Fraud Detection Using Selective Class Sampling and Random Forest Classifier. ECS Transactions, 107(1), 4885

[15] High-Accuracy Entity State Prediction Method Based on Deep Belief Network Toward IoT Search - *IEEE Journals and Magazine'*. (accessed Aug. 06, 2020).

[16] Joshi S, Bratteteig T. Designing for Prolonged Mastery. On involving old people in Participatory Design. *Scandinavian Journal of Information Systems*. 2016;28(1):3-36.

[17] M. Hasan, 'Real-time and low-cost IoT based farming using raspberry Pi', *Indonesian Journal of Electrical Engineering and Computer Science, vol.* 17, no. 1, pp. 197–204, 2020.

[18] Verma, P., & Tyagi, P. (2022). Analysis of supervised machine learning algorithms in the context of fraud detection. ECS Transactions, 107(1), 7189.

[19] K. Waghmare, A. Acodkar, R. Gavali, R. Tiwari, P. Pavnoji, and S. Naik, 'Cardiac Patient Remote Health Monitoring (CP-RHM) using Digital Monitoring', *International Journal of Computer Sciences and Engineering, vol.* 06, pp. 5–8, Nov. 2018, doi: 10.26438/ijcse/v6si10.58.

[20] Sparsh A, Chiew TL. Remote health monitoring using mobile phones and web services. *Telemedicine and e-Health Journal 2010*;16(5):603–7.