LEVERAGING INNOVATIVE HEALTHCARE APPROACHES TO CROWD MANAGEMENT AND MAJOR EVENT PREPAREDNESS: A TECHNOLOGICAL PARADIGM SHIFT

RANIA AMAR
Heart Disease and Surgery Center

Abstract

Iraq annually, specifically in the province of Karbala, a great millionaire visits with the fortieth anniversary of the martyrdom of Imam Hussein (peace be upon him), and it is from different parts of the world, where the number of visitors in recent years has reached about 22 million foreign visitors and in the shadow of all circumstances, even in the period of the COVID-19 pandemic. It is our responsibility to secure health care for visitors and manage it in innovative ways in line with the technological developments of health care that limit and almost prevent the occurrence of disease cases and fill the potential gaps for the spread of diseases, especially as we are in the era of technological development and artificial intelligence, where the use of advanced health care means would facilitate dealing with such huge numbers, ease of control, disaster prevention and crisis management.

In this research article, we will discuss the importance of advanced technological healthcare means and their contribution to facilitating the management of the health of visitors and the management of crowds in this major event, how to keep up with them gradually, starting with the simplest methods, what are the factors that help in their success, and what are the future visions to improve such a global million visit.

Semi-Annual Scientific Journal www.arbnj.com March 2025 - Ramadan 1446

Semi-Annual Scientific Journal www.arbnj.com Volume 2, Issue 2, Part 7, Year 2

(Introduction) CHAPTER1

Introduction

Arbaeen is an important religious gathering that brings together millions of faithful visitors in the streets of Karbala - Iraq. The climax of the gathering is on Arbaeen day, which means 40 days, which is the period of mourning for Imam Hussein Ibn Ali, the grandson of the Prophet Muhammad, beginning on the 10th of Muharram (Ashura), Imam Hussein and his companions had been killed during it in the Battle of Al-Taf in 680 AD, many Shiite Muslims flock to Karbala in the days and weeks preceding Arbaeen. While participation is not an obligation in the Shiite faith like the annual Hajj trip (the Hajj to Mecca), millions of Shiite believers cross About their love for Hussein and his sacrifice in Karbala and their commitment to what the prophet's family.(Nur Ayoubi, 2021; Sara Hassan, 2023; Sinan Mahmoud, 2023)

The matter is not limited to Shiites or even Muslims, we find the participation of some Sunnis and even Christians and Hindus, but the majority of people who participate in the Arbaeen march are Shiite Muslims, which makes this event one of the most important events in the Shiite calendar.

This walk is timeless even in the summer, when temperatures reach 120 degrees Fahrenheit during the day. On the way to Karbala, we find the visitors who wear black, and carrying children in strollers wearing hats or placing wet clothes on their heads to avoid sunstroke and sunburn. So many people choose to walk at night. However, Imam Hussein's sacrifices inspire many to do charity and service along the way. There

are more than a thousand stops, or processions, where people can rest. (Sara Hassan, 2023; Sinan Mahmoud, 2023; Syed Shahriyar, 2023)

People organize and sponsor booths (Mawkibs) along the route, during which water, meals, and tea are distributed and various services are provided for free. Some carry banners and flags. Medical sites have also been built to help visitors. For 15 years, the Imamiya International Medical Organization has been traveling to Iraq to provide free medical and dental services(Sara Hassan, 2023). There are also free foot massages for those who walk, as some people do not wear shoes and suffer from severe pain. Some of the visitors coming to this visit may have been sick and may have forgotten their medications or this Arbaeen visit may have exacerbated their illnesses. Some of them get sick while they are on the huge march as a result of fatigue, infection, etc., which may lead to creating a health crisis from small cases in the crowds.

Although the Iraqi authorities, in cooperation with various local and foreign Shiite religious groups, have worked to ensure the safety and well-being of pilgrims, on the other hand, some challenges create problems for the authorities and pilgrims. Dozens of pilgrims, most of them Iranians, died a year ago in car accidents, while border authorities struggled to cope with the number of visitors(Sinan Mahmoud, 2023).

Crowd management is a difficult task and organizing an event of this size comes with its share of challenges. These numbers are constantly increasing, even during the COVID-19 pandemic the attendance of visitors was slightly lower than the previous year compared to the Hajj in Mecca amid a set of precautionary measures and instructions, which these numbers quickly increased in the following year(Hussein et al.,

Semi-Annual Scientific Journal www.arbnj.com Volume 2, Issue 2, Part 7, Year 2

2022). However, crowd monitoring and management has become an important research topic in the pursuit of innovative technologies that can help mitigate these risks, and the rapid progress in digital transformation has led to accelerated growth in the healthcare field.

Aim and Research Questions:

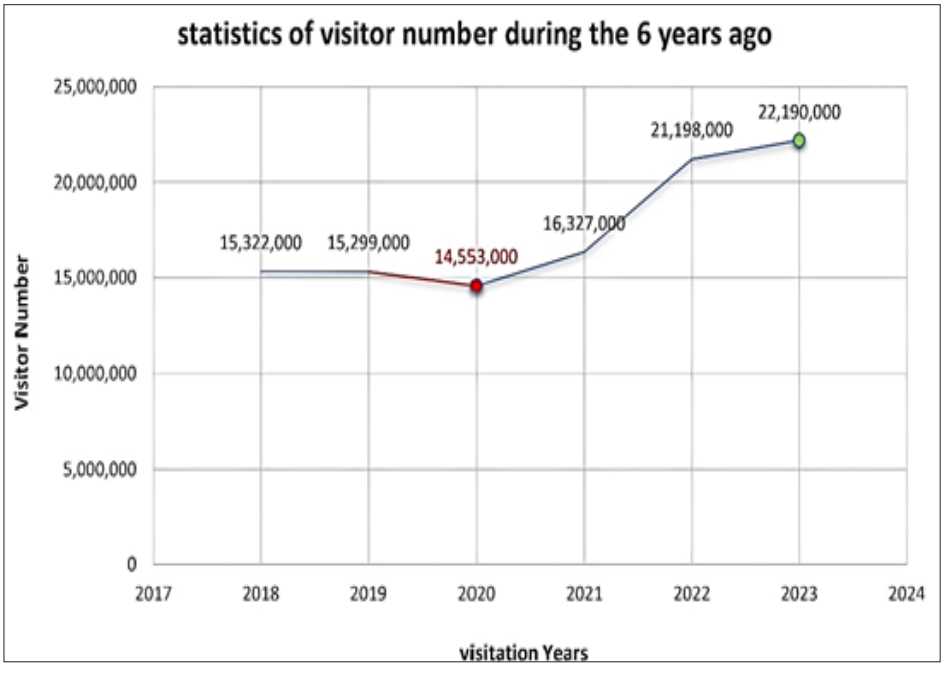
Based on the research gap in how to provide health care during the Arbaeen period and the use of advanced technologies and the possibility of keeping pace with artificial intelligence methods and being able to manage crowds and control emergencies in real-time, The questions were: What is the importance of the Arbaeen visit, what is the necessity of developing and implementing new strategies and technologies to provide health care services, how to avoid emergencies and control crowds, and what are the restrictions and possibilities that would advance the technological reality in the Arbaeen Event?

CHAPTER2

(importance and Challenges)

Importance of Keeping up with Healthcare Technologies Many researchers have indicated the importance of integrating technologies to use them as a tool to control the flow and management of crowds from the perspective of improving safety and quality of service, and the global impact of the COVID-19 pandemic has led to the rapid development in the use of advanced technology. Such as mobile phone applications, patient

Figure 1: The numbers show the size of the Arbaeen event and its importance, as the numbers of pilgrims from different countries and nationalities have been increasing over the years and continuing during the pandemic.(AlKafeel Global Network, 2023; مركز كربلاء للدراسات والبحوث, 2018, 2019, 2020, 2021, 2022)



Semi-Annual Scientific Journal www.arbnj.com March 2025 - Ramadan 1446

Semi-Annual Scientific Journal www.arbnj.com Volume 2, Issue 2, Part 7, Year 2

monitoring techniques, determining the extent of the progression of the disease stage, and remote communication to save time, ensure patient security, manage crowded places, etc... But Looking at the Huge and prominent global gathering (Arbaeen), we find a lack of technologies that would provide health care to crowds and manage them smoothly. Although, several technologies have been applied in Hajj.

Relying on research and statistics that show the continuation of the Arbaeen pil

grimage despite the country being exposed to several epidemics and crises that would hinder the million-man visit, and clarifying the small percentage of health care services and technologies compared to the number of visitors, it is necessary to employ modern technologies, which are represented by light shade in pres ence and abundant giving, to ensure the comfort of the visitors and Their safety and health by ensuring that their physical and mental condition is complete and that they are free of diseases, and by monitoring the health status of those suffer .ing from diseases during their presence and ensuring their return without aggra

vation and harm, especially in recent years when the visit became sync with the scorching summer season, so we find many visitor who wear black as part of the visitation ceremonies, wearing hats and carrying Umbrellas to avoid sunstroke and burns, and this is enough to improve them globally.

The researchers clarified the most important risks posed by large-scale events, the most prominent of which are health and safety risks, infectious and airborne diseases, crowd control, pressure in health care... etc. Mitigating and avoiding these risks is considered a basic line of

defense for responding at the same time to avoid long-term impact because it is usually not easy to see health risks, as their impact often has delayed consequences.

The Most Prominent Challenges Facing Visitors:

After lengthy research, we found nothing that reduces the extent of the challenges and problems facing visitors along the path. Most of the services provided are free of charge by residents and sometimes by visitors to Karbala for honorary service and visitation. Despite the presence of medical detachments, they are somewhat far apart. When a visitor is in bad condition, heading to the nearest detachment requires some time to reach through the huge crowd, or he may need some immediate advice when feeling tired, as the march routes are not all public roads.Lack of managing and directing foreign visitors to the correct path, controlling the crowd, preventing overcrowding in specific areas, preventing the spread of diseases, creating gaps that create certain diseases, creating an infected environment, and avoiding stampedes, as happened in some years on Ashura and during the Hajj ceremonies in Mecca.Many families and individuals participated in the Arbaeen Road with their children, the elderly, and friends. There was an urgent need to track and keep in touch with the individuals during the journey, and to know their presence and the ease and speed of reaching them when they go missing.

It is necessary to follow up on the patient's condition when he is diagnosed, communicate with him along the way, and share his health file with medical detachments and kiosks for easy access to the required services.

Semi-Annual Scientific Journal www.arbnj.com Volume 2, Issue 2, Part 7, Year 2

CHAPTER3(REVIEW TECHNOLOGIES)

Methods applied in health care and crowd management:

Several research articles were reviewed to identify the most important innovative healthcare methods for managing health and crowds.

In a study, a model was presented for crowd management in the emergency department using non-invasive wearable devices, using a mathematical model with an algorithm that can collect vital parameters that describe the patient's condition immediately and communicate them to the workers, thus helping the workers prioritize assisting with critical cases faster and controlling crowds instead of a basis on First come first served which is not always effective(Metuge et al., 2022)

low-cost work was proposed to track three conditions of pilgrims at the same time, which are the path of movement, physical activity, and physiological health, using GPS and biosensors, and linking them to an approved data center and distributing them to pilgrims, especially in crowded places, to avoid the occurrence of cases of fainting and fatigue that cause trampling and stampede accidents during crowding In the future, the study suggests using artificial intelligence to evaluate speed and density and deliver warning messages to pilgrims and direct them with instructions(Al-Shaery et al., 2022).

Applying technologies such as Crowd Management Mobile Augmented Reality application (CMMAR) mobile augmented reality has helped visitors and the local administration organize the movement of crowds by monitoring visitors, analyzing their movements, identifying

missing visitors, helping them find the right directions, and informing their groups. It also helps operators in control rooms and Hajj employees on the ground to detect dangerous crowds through data shared between pilgrims, manage them, provide pilgrims with the situation, and respond to organizers' instructions(Owaidah, 2014).

PTS (Pilgrim Tracking System) is an application designed to be compatible with Android devices. It uses GPS. Hajj agents and campaign managers can stay in touch and track the pilgrims and the latter can find the group if they get lost with a route guide to the specified destination(Alshalani et al., 2020).

The research showed the possibility of using health care technologies such as smart medical applications, medical robots, remote communication, and virtual communication, where patients can receive first aid directions in emergencies, and the possibility of communicating with medical teams remotely for diagnosis and receiving rapid intervention (حسين علي محمد- ٢٠٢٣).

During the COVID-19 pandemic, a system was used that consisted of a mobile phone application and a cloud server. Health information is collected by specialists through home visits or phone calls and is analyzed by artificial intelligence to make the correct diagnosis and then direct treatment or transfer it to the nearest health center(Sarker et al., 2023).

Thermal cameras were also used with the help of drones to measure the temperature of infected people, process the captured data, and enable it to be stored and sent for evaluation(Conte et al., 2021).

A fluorescence sensor that supports 5G technology has been developed and connected to mobile devices and smartphones via Bluetooth. It detects Covid-19 and allows remote monitoring of patients(Guo et al., 2021).

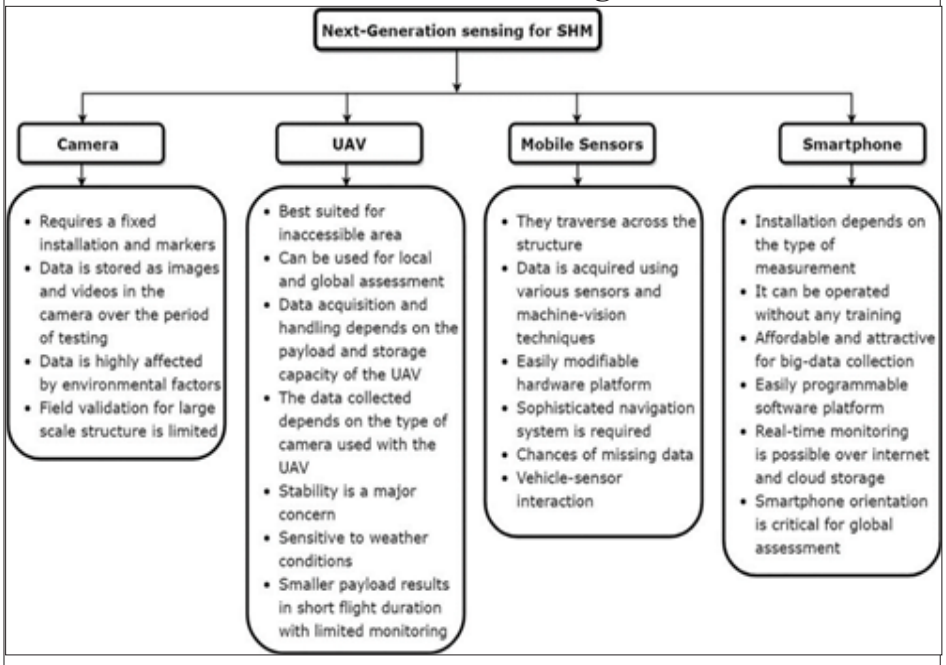
Creating an application in the form of a smartphone platform that measures vital parameters as well as coughing to detect COVID-19, supported with the blockchain system and 5G connectivity(Muhammad & Hossain, 2021).

In Mecca, a wearable system with simple manufacturing was successfully tested and proven to be sensitive to crowd density. It consists of biometric sensors and two-way wireless communication modules that provide user interface and processing with 65% extensibility. Using an expandable printed circuit board PCB, information is collected and an alert is sent to the user. Emergency cases and submit them to the management center(Rojas et al., 2022).

This study examined next-generation technologies for structural health monitoring and demonstrated the effectiveness of the ability of wireless sensors when combined with advanced image and signal processors to form a powerful, lower-cost system that is summarized in (Figure 2)(Sony et al., 2019).

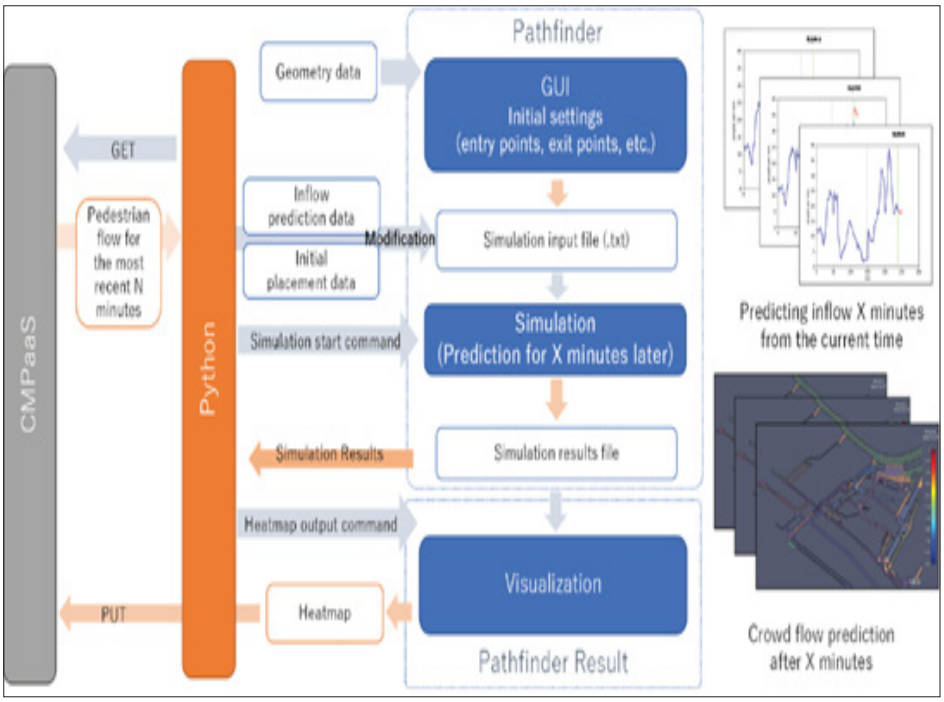
In this study, a system was developed that predicts crowd flow and congestion in real-time through agent-based simulation. Its effectiveness was tested in a large event in the vicinity of Tokyo Dome. The study discussed the scalability of the system and its application in large-scale events(Yasufuku & Takahashi, 2024).

Figure 3:Next – Generation Sensing for SHM (Structural Health Monitoring



Semi-Annual Scientific Journal
www.arbnj.com
Volume 2, Issue 2, Part 7, Year 2

Figure 4:Syatem Flow of Real-Time Crowd Flow Prediction



CHAPTER FOUR (DISCUSSION)

Constraints, Opportunities, and Future Scope:

To create a future for health care, manage it, and preserve the health of the individual, there must embrace scientific expertise and competencies capable of managing innovative technological technologies, keeping pace with them and developing them, and creating systems that will facilitate dealing in the medical environment and quickly collect health information for individuals from anywhere and transfer it to different system levels with high reliability and speed. Make the most of the time factor in indirect health care (IEH).

In developing countries, we find that keeping up with these medical developments and technologies is not just a vision, but a tangible reality. We need to work on a medical technological transformation to control the health of the huge number of visitors increasing annually during the Arbaeen event in a fixed area and other events that concern the health of the individual, such as the creation of diseases, the spread of epidemics, road accidents, stampedes, the time factor in receiving the necessary intervention...etc.

After extensive research in several studies and experiments, we find that these innovations revolve around almost fixed components:

1. Relevant components: biomedical sensors, which represent the beginning of any mobile medical system. The limitations lie in exploiting them for multiple uses, lightweight, and an acceptable, almost unobtrusive shape. There are sensors in the form of tattoos, gloves, shoes, bracelets,

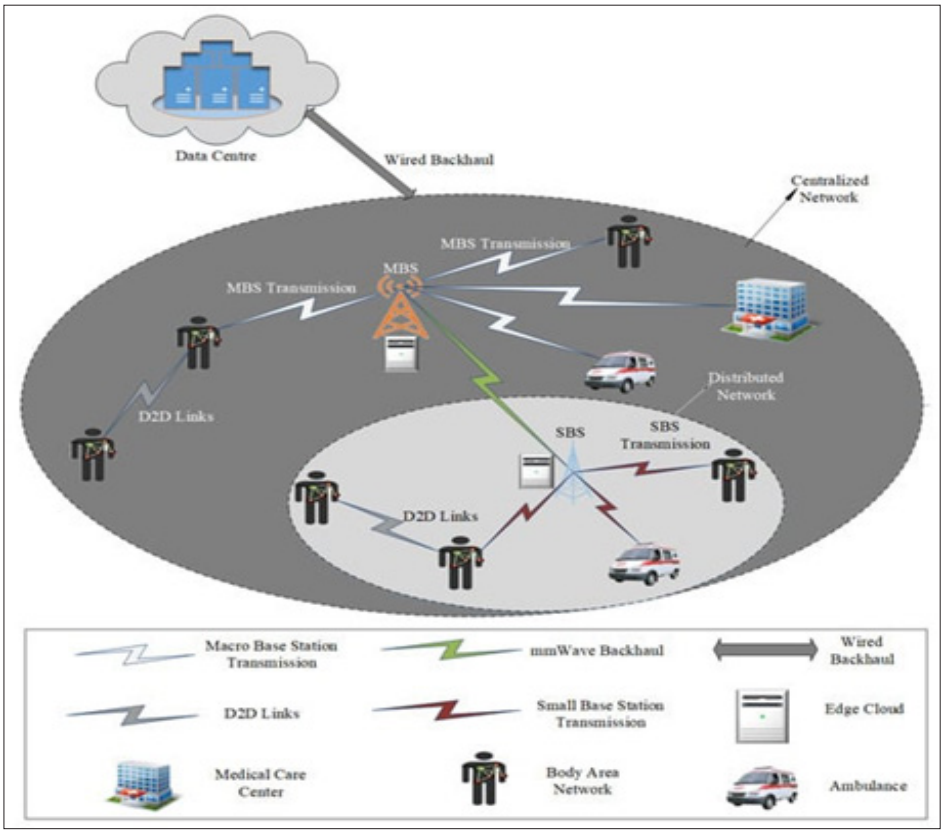
watches, and sensors built into phones...etc.

2. Transmission environment and means of communication: The use of 5G communications with IoT technologies plays an important role in creating smart health care. The integration of artificial intelligence (AI) in the future will contribute fundamentally to making the network more intelligent with healthcare applications. The possibility of 5G communication lies in low latency, wide-range coverage, and high energy efficiency(Ahad et al., 2020). These characteristics are required to transfer and exchange data between biosensors and mobile phones in healthcare applications framed in the Internet of Medical Things (IoMT), which brings billions of devices together(Chengoden et al., 2023; Moglia et al., 2022).

3. Data management and preservation: Data security and management are an important part of any medical system, so studies have shown that Blockchain technology meets the required standards (access to data at any time, fast and secure storage of medical data, collecting health entities in a unified system) as it is a management for system data across a network node that allows data to be exchanged and preserved. It is a peer-to-peer (P2P) network(Haleem et al., 2021) and cannot be hacked unless the resources of the shared public are collectively hacked(Abdellatif et al., 2020).

Identifying these technologies also requires medical awareness of the community and workers alike.

Figure 5: A general architecture of a smart healthcare network based on 5G(Ahad et al., 2020).



The technologies reviewed for healthcare and crowd control also emphasize the synergy between medical and engineering visions and the keeping pace of biomedical engineers with developments in the field of healthcare and crowd and disaster management in emergencies and crises. We note the absence of local capacity to sponsor biomedical engineering innovations that would advance local reality. Investing in these capacities, along with the capacity of local institutions, enhances disaster management with long-term, lower-cost solutions. With the local administration's recommendation to support investment in 5G communications and IoT, in addition to biomedical engineering.

Suggested models for implementation:

Given the noticeable absence of local administration in keeping up with health care technologies, or as it is known as mobile health (m-Health) or electronic health (e-Health), we propose in this research work some methods derived from the technologies discussed to be preliminary step towards a technological transformation for managing the Arbaeen event.

Creating an integrated mobile phone application that will be promoted by the local administration to all visitors as a guide to the fortieth visit, supported by GPS technology, allowing the visitor to know the routes of the march, while pinning the points of medical detachments locations on the map, with the possibility of requesting immediate support from the application in the event of an emergency, to guide him to the nearest medical detachment. It also allows the creation of groups that can communicate with each other and can show the locations of group members to track and avoid cases of loss.

The application can be supported by artificial intelligence, sending a notification to the group if one of the individuals strays a certain distance and being able to suggest less crowded routes.

Creating wearable devices with simple models for children and the elderly, for those who do not carry smartphones within the groups, and the possibility of linking them to one of the group's phones.

Applying the idea of using a thermal camera with a drone to monitor crowds, predict danger, alert visitors, and receive instructions via text messages sent by the event organizing department after they receive data from the camera.It can be integrated with sensors or connected to a mobile phone application to measure the health of the air and breathing rate, notify organizers to take the necessary action, and alert visitors as well.

Using IoT, it is also possible to connect medical detachments within a single system and enhance all areas with health care services, as portable devices can be distributed to agencies and the booths (Mawkibs) as a mini-medical system and linked to the rest of the detachments within a single environment. The goal of this proposal is the possibility of treating emergency cases by sharing his medical condition from the nearest Mawkib and following it up from the detachments others and receive the necessary instructions.

We hope that these proposals will be on the ground and the beginning of innovations that will invest in this broad and intelligent field and benefit as much as possible from the technologies that have been reviewed, and that the presented research will be a door for researchers to innovate in this field and study it.

Semi-Annual Scientific Journal www.arbnj.com Volume 2, Issue 2, Part 7, Year 2

CHAPTER FIVE (CONCLUSION)

Conclusion:

When researching the Arbaeen event, its importance, and the increase in numbers annually within a specific geographical area, we find the danger of huge crowds to the health and safety of visitors compared to the lack of crowd management methods and health care techniques and the laxity in keeping pace with this technological development. The literature indicates that crowd management has become an urgent need, especially after the COVID-19 pandemic and the spread of epidemics and Infectious diseases resulting from gaps amid huge crowds. Connected health, connected health (C-Health), has become mature and proven as a scientific field, and most developing countries have kept pace with technological development in health care for individuals and crowds and are in the process of supporting it with artificial intelligence to reduce the momentum in health institutions by using telemedicine and the ability to Crowd management and control during disasters and crises, with the necessity of having IoT systems and 5G communications, and the necessity of investing in the field of biomedical engineering.

List of Abbreviations

GPS:	Global Positioning System
e-Health	Electronic Health
m-Health	Mobile Health
C-Health	Connected Health
IoT	Internet of Things
IoMT	Internet of Medical Things
IEH	Indirect Health Care
P2P	Peer-to-Peer
SHM	Structural Health Monitoring
PTC	Pilgrim Tracking System
PCB	Printed Circuit Board
CMMAR	Management Mobile Augmented Reality

references

1. Abdellatif, A. A., Al-Marridi, A. Z., Mohamed, A., Erbad, A., Chiasserini, C. F., & Refaey, A. (2020). SsHealth: Toward secure, blockchain-enabled healthcare systems. IEEE Network, 34(4), 312–319. https://doi.org/10.1109/MNET.011.1900553

2. Ahad, A., Tahir, M., Sheikh, M. A., Ahmed, K. I., Mughees, A., & Numani, A. (2020). Technologies Trend towards 5G Network for Smart Health-Care Using IoT: A Review. Sensors 2020, Vol. 20, Page 4047, 20(14), 4047. https://doi.org/10.3390/S20144047

3. AlKafeel Global Network. (2023). The Al-Abbas's (p) Shrine announces the number of visitors participating in the commemoration of the Ziyarat Arba'een | News of the Shrine. https://alkafeel.net/news/index?id=20977&lang=en

4. Al-Shaery, A. M., Aljassmi, H., Ahmed, S. G., Farooqi, N. S., Al-Hawsawi, A. N., Moussa, M., Tridane, A., & Alam, M. D. (2022). Real-Time Pilgrims Management Using Wearable Physiological Sensors, Mobile Technology and Artificial Intelligence. IEEE Access, 10, 120891–120900. https://doi.org/10.1109/ACCESS.2022.3221771

5. Alshalani, H. J., Alnaghaimshi, N. I., & Eljack, S. M. (2020, September 9). ICT System for Crowd Management: Hajj as a Case Study. 2020 International Conference on Computing and Information Technology, ICCIT 2020. https://doi.org/10.1109/ICCIT-144147971.2020.9213769

6. Chengoden, R., Victor, N., Huynh-The, T., Yenduri, G., Jhaveri, R. H., Alazab, M., Bhattacharya, S., Hegde, P., Maddikunta, P. K. R., & Gadekallu, T. R. (2023). Metaverse for Healthcare: A Survey on Potential Applications, Challenges and Future Directions. IEEE Access, 11,

12764–12794. https://doi.org/10.1109/ACCESS.2023.3241628

7. Conte, C., De Alteriis, G., De Pandi, F., Caputo, E., Lo Moriello, R. S., Rufino, G., & Accardo, D. (2021). Performance analysis for human crowd monitoring to control COVID-19 disease by drone surveillance. 2021 IEEE International Workshop on Metrology for AeroSpace, MetroAeroSpace 2021 - Proceedings, 31–36. https://doi.org/10.1109/METROAEROSPACE51421.2021.9511671

8. Guo, J., Chen, S., Tian, S., Liu, K., Ni, J., Zhao, M., Kang, Y., Ma, X., & Guo, J. (2021). 5G-enabled ultra-sensitive fluorescence sensor for proactive prognosis of COVID-19. Biosensors and Bioelectronics, 181, 113160. https://doi.org/10.1016/J.BIOS.2021.113160

9. Haleem, A., Javaid, M., Singh, R. P., Suman, R., & Rab, S. (2021). Blockchain technology applications in healthcare: An overview. International Journal of Intelligent Networks, 2, 130–139. https://doi.org/10.1016/J.IJIN.2021.09.005

10. Hussein, P., Muhammad, Q., & Al-Yasiri, F. (2022).

11. Metuge, V., Valero, M., Zhao, L., Nino, V., & Claudio, D. (2022). Preliminary Data Collection for Collaborative Emergency Department Crowd Management using Wearable Devices. Proceedings - 2022 IEEE International Conference on Digital Health, ICDH 2022, 34–36. https://doi.org/10.1109/ICDH55609.2022.00013

12. Moglia, A., Georgiou, K., Marinov, B., Georgiou, E., Berchiolli, R. N., Satava, R. M., & Cuschieri, A. (2022). 5G in Healthcare: From COVID-19 to Future Challenges. IEEE Journal of Biomedical and Health Informatics, 26(8), 4187–4196. https://doi.org/10.1109/JBHI.2022.3181205

13. Muhammad, G., & Hossain, M. S. (2021). A Deep-Learning-Based

Edge-Centric COVID-19-Like Pandemic Screening and Diagnosis System within a B5G Framework Using Blockchain. IEEE Network, 35(2), 74–81. https://doi.org/10.1109/MNET.011.2000326

14. Nur Ayoubi. (2021, September 21). What is Arbaeen and how do Shia Muslims mark it? Middle East Eye.

15. Owaidah, A. A. (2014). Hajj Crowd Management via a Mobile Augmented Reality Application: A case of The Hajj event, Saudi Arabia.

16. Rojas, J. P., Rehman, M. U., Hussein, A., E'mar, A., AlRaei, Y., AlZaher, H., & Mohandes, M. (2022). Kirigami-Enabled Wearable Health and Crowd Monitoring System. Arabian Journal for Science and Engineering, 47(3), 3583–3595. https://doi.org/10.1007/S13369-021-06384-Y/METRICS

17. Sara Hassan. (2023). "I can get close to God": Millions from around the globe participate in religious Arbaeen walk in Iraq - The World from PRX. The World. https://theworld.org/stories/2023/09/06/millions-people-all-ages-around-globe-participate-arbaeen-walk-iraq

18. Sarker, F., Chowdhury, M. H., Ratul, I. J., Islam, S., & Mamun, K. A. (2023). An interactive national digital surveillance system to fight against COVID-19 in Bangladesh. Frontiers in Digital Health, 5. https://doi.org/10.3389/FDGTH.2023.1059446

19. Sinan Mahmoud. (2023). Millions flock to Iraqi city of Karbala for Arbaeen pilgrimage. The National. https://www.thenationalnews.com/mena/iraq/2023/09/06/millions-flock-to-iraqi-city-of-karbala-for-arbaeen-pilgrimage-2/

20. Sony, S., Laventure, S., & Sadhu, A. (2019). A literature review of next-generation smart sensing technology in structural health monitoring.

In Structural Control and Health Monitoring (Vol. 26, Issue 3). John Wiley and Sons Ltd. https://doi.org/10.1002/stc.2321

21. Syed Shahriyar. (2023). Photos: Arbaeen, one of the world's largest annual pilgrimages in Iraq. Aljazeera. https://www.aljazeera.com/gallery/2023/9/7/photos-arbaeen-worlds-largest-annual-pilgrimage-in-iraq

22. Yasufuku, K., & Takahashi, A. (2024). Development of a Real-Time Crowd Flow Prediction and Visualization Platform for Crowd Management. Journal of Disaster Research, 19(2), 248–255. https://doi.org/10.20965/jdr.2024.p0248

23. حسين علي محمد, د. ف. ا. (2023). دور التحول الرقمي في تطوير وتعزيز الطب التكميلي : دراسة حالة الاستخدامات الصحية البديلة وتطبيقات الذكاء الاصطناعي والواقع الافتراضي وأمان المعلومات الصحية. مجلة المعهد العالي للدراسات النوعية, 3(11), 2597–2647. https://doi.org/10.21608/hiss.2023.309273

24. مركز كربلاء للدراسات والبحوث. (2018). النشرة الاحصائية السنوية لزيارة اربعينية الامام الحسين عليه السلام المباركة:1440هـ-2018م.

25. مركز كربلاء للدراسات والبحوث. (2019). النشرة الاحصائية السنوية لزيارة اربعينية الامام الحسين عليه السلام المباركة:1441هـ-2019م.

26. مركز كربلاء للدراسات والبحوث. (2020). النشرة الاحصائية السنوية لزيارة اربعينية الامام الحسين عليه السلام المباركة:1442هـ-2020م.

27. مركز كربلاء للدراسات والبحوث. (2021). النشرة الاحصائية السنوية لزيارة اربعينية الامام الحسين عليه السلام المباركة:1443هـ-2021م.

28. مركز كربلاء للدراسات والبحوث. (2022). النشرة الاحصائية السنوية لزيارة اربعينية الامام الحسين عليه السلام المباركة:1444هـ-2022م.