journals.unizik.edu.ng/jcpl/index ISSN: 2736-0342
NNAMDI AZIKIWE UNIVERSITY, AWKA
JOURNAL OF COMMERCIAL AND PROPERTY LAW Vol. 12(5), October, 2025

ARTIFICIAL INTELLIGENCE AS AN INSTRUMENT TO NIGERIAN IMMIGRANT'S SOCIETAL INTEGRATION AND HEALTHCARE ACCESSIBILITY: A LEGAL PERSPECTIVE

Ezinne Olivia ONWUGBENU*
Ngozi Eunice EMEKA**

Abstract
Immigrants are often identified as vulnerable population; that is, at elevated risk of poor health and inadequate medical care. This has resulted in the deployment of AI in relation to migrants globally. Many countries especially least developed countries lack critical IT infrastructure for AI in migration, while Nigerian migrants experience obstacles such as proper health care services while engaging with digital channels within the same processes. The aim of this paper is to provide legal insights to encourage the use of Artificial Intelligence to enhance societal integration and the health status of Nigerian migrants in other countries. Consequently, the study adopted the doctrinal research methodology, which involves examining journal articles, textbooks, periodical articles and the likes. This study found that the factors that make immigrants vulnerable to poor health and inferior medical care can be remedied in parts, through Artificial Intelligence. The emergent findings from this study can guide the Nigerian government and policymakers in decision-making as regards deployment of artificial intelligence and machine learning for healthcare delivery for Nigerian emigrants. The study recommends the need for health policies targeted at supporting the use of Artificial Intelligence to expand access to healthcare and improve quality of care for Nigerian immigrants.

Keywords: Artificial Intelligence, Migration, Health Care, Migrants, Nigerians

1. Introduction
Information and communications technologies (ICT) have become leading features of contemporary immigration waves.[1] The Oxford Dictionary of English[2]defines Artificial Intelligence as 'the study and development of computer systems that can copy intelligent human behaviour'. This new technology uses AI to recognize character features in the same way a human brain does which captures how in the last decade industries and web science have been responding to increased immigration by developing specialized mobile applications to facilitate immigrants' needs.[3]Artificial Intelligence (AI) technologies underpin daily activities around the globe, and migration is no exception. AI is present in every phase of migration, from administrative processing for visa applications and automated border security to surveillance of irregular migration and algorithms for Internal Displaced Persons (IDP) resettlement.[4]It also focuses on practices around automated processing of applications, evidence gathering and decision-making systems, as well as new uses of technologies, such as speech recognition and electronic monitoring of migrants. In recent years, the healthcare sector has emerged as a primary beneficiary of AI's potential, leveraging its capabilities to enhance various aspects of patient care and administrative efficiency. Integrating AI technologies in healthcare is not just a futuristic vision but a present reality, driven by the

***Olivia Ezinne ONWUGBENU, LLB, BL, LLM, PhD** is a Lecturer, Faculty of Law, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria. Phone Number; 08066647575Email: eo.onwugbenu@unizik.edu.ng,
****Ngozi Eunice EMEKA, LL.B, B.L, LLM, PhD** is a Lecturer Faculty of Law, Nnamdi Azikiwe University, Awka Anambra State, Nigeria, Department of Clinical and Legal Education. Email: ne.nwafor@unizik.edu.ng, 07035114683.
[1] M E Opas and D A McMurray, 'Under the Gaze of the State: ICT Use and State Surveillance of Eritrean Refugees in Italy'. *Refugee Survey Quarterly*, (2015) 34(4): 105-125.
[2]Oxford Dictionary of English (2010). Oxford Dictionary of English. Oxford: Oxford University Press.
[3]J Hendler, N Shadbolt, W Hall & ors 'Web Science: An Interdisciplinary Approach to Understanding the Web Communications of the ACM, (2008) 51(7): 60-69.
[4]C Menjívar, 'Immigration Law beyond Borders: Externalizing and Internalizing Border Controls in an Era of Securitization'. *Annual Review of Law and Social Science*, (2014) 10, 353-369.

exponential growth in healthcare data, advancements in computational power, and significant breakthroughs in machine learning algorithms.[5]

This paper introduced the subject AI and immigrant integration'. This framework is developed to form a vector of applications including, among others, m-Government, m-Learning and m-Health applications which could be positively associated with immigrants' outcomes in relation to their levels of integration and health/mental health status.[6]Additionally, in the present study we examine whether AI applications can be associated with better integration of migrants, health, and mental health outcomes. The use of AI can expedite the decision-making processes to the benefit of government agencies and some applicants.[7] However, they can also lead to new vulnerabilities. While the use of AI has the potential to facilitate some decision-making processes, their inherent risks for bias, discrimination, and potential 'machine mistakes' pose a significant threat to (potential) migrants and asylum seekers who are already disenfranchised and face challenges in seeking remedies.[8] The use of AI can also lead to new relationships between the public and private sectors to develop, sustain and implement these technologies. These require new governance structures and legislative frameworks to regulate who becomes responsible for data protection risks and possible 'machine mistakes' and related inaccurate or discriminatory outcomes.[9]

This research work will explore the benefits and challenges of the integration of AI in enhancing the health care accessibility of immigrants and also provide practical tips and strategies that can be used in managing the risks it presents. It further emphasized the need for enactment of policies and practices to define use of AI in Migration to foster easier immigration processes and enable the migrants' better access to quality healthcare facilities.

2. Conceptual Clarifications

Artificial Intelligence

AI, or Artificial Intelligence, refers to the creation and development of computer systems that can perform tasks that normally require human intelligence. These tasks include things like learning from experience, recognizing patterns, solving problems, making decisions, understanding language, and even interacting with humans. AI enables machines to mimic cognitive functions and adapt their behaviour based on the data they process, without being explicitly programmed for each specific task. Artificial Intelligence (AI) is a multifaceted field that involves various components working together to create intelligent systems.[10] Here are some key parts of AI:

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[5]YK Dwivedi, L Hughes, E Ismagilova & Ors. Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. International Journal of Information Management, (2021) 57, 101994.

[6]N Jones, N. and M Moffitt, M. Ethical Guidelines for Mobile App Development within Health and Mental Health Fields. Professional Psychology: Research and Practice, (2016) 47(2): 155–162. D J Amante, T P Hogan, S L Pagoto, and ors Access to Care and Use of the Internet to Search for Health Information: Results from the US National Health Interview Survey. Journal of Medical Internet Research, (2015). 17(4): 1-10. Bradley, L. Lindstrom, N. B. and Hashemi S. SIntegration and Language Learning of Newly Arrived Migrants Using Mobile Technology. Journal of Interactive Media in Education, (2017). 1(3): 1-9.

[7]N Drydakis, 'Mobile Applications Aiming to Facilitate Immigrants' Societal Integration and Overall Level of Integration', Health and Mental Health. Does Artificial Intelligence Enhance Outcomes? Computers in Human Behavior, (2021) 117(April): 106661.

[8]P Molnar and L Gill, Bots at the Gate: A Human Rights Analysis of Automated Decision Making in Canada's Immigration and Refugee system. Toronto: Faculty of Law, University of Toronto and Citizen Lab, Munk School of Global Affairs and Public Policy, University of Toronto. (2018). https://citizenlab.ca/wp-content/uploads/2018/09/IHRP-Automated-Systems-Report-Web-V2.pdf

[9] A Beduschi, 'International Migration Management in the Age of Artificial Intelligence', Migration Studies, (2021) 9 (3), 576–596; Trauttmansdorff, P. 2017. The Politics of Digital Borders, in Border Politics: Defining Spaces of Governance and Forms of Transgressions, edited by Günay, C. and Witjes, N. Cham: Springer, 107-126; Achiume, E.T. 2020. Report of the Special Rapporteur on Contemporary Forms of Racism, Racial Discrimination, Xenophobia and Related Intolerance, UN Doc. A/75/590 (Nov. 10, 2020). www.ohchr.org/EN/newyork/ Documents/A-75-590-AUV.docx.

[10]P Jeyaraj and T Narayanan, 'Role of Artificial Intelligence in enhancing Health Delivery' International Journal of Innovative Science and Modern Engineering (IJISME), 2023 11(12).

a) **Machine Learning (ML):** This is a subset of AI that focuses on algorithms and techniques that allow computers to learn from data. Instead of explicit programming, machine learning enables systems to improve their performance over time by recognizing patterns and adapting their behaviour.
b) **Deep Learning:** Deep learning is a specific type of machine learning that involves neural networks with multiple layers. It's particularly effective in tasks like image and speech recognition due to its ability to process complex data.
c) **Neural Networks:** These are computational models inspired by the human brain's structure. They consist of interconnected artificial neurons that process and transmit information, enabling the system to learn and make decisions from input data.
d) **Natural Language Processing (NLP):** NLP involves teaching computers to understand, interpret, and generate human language. It's what powers chatbots, virtual assistants, and language translation services.
e) **Computer Vision:** This area focuses on enabling computers to interpret and understand visual information from the world, like images and videos. It's used in facial recognition, object detection, and more, such as images of radiographs, Ultra sonograms, Doppler and CT / MRI Scans.
f) **Data Mining and Analysis:** AI often relies on large datasets for training and learning. Data mining involves extracting valuable insights and patterns from these datasets.

These parts of AI work together to create intelligent systems that can learn, adapt, and perform tasks that were once considered exclusive to human intelligence.

Migrants

The UN Migration Agency, International Organization for Migration (IOM), defines a migrant as any person who is moving or has moved across an international border or within a state away from his/her habitual place of residence, regardless of:

- the person's legal status
- whether the movement s voluntary or involuntary
- what the causes for the movement are
- what the length of the stay is

While, the term 'immigrant' is an umbrella term used to refer to people who live in a host country who might, or might not, have been granted a permit to live and work in the host country. An immigrant is also someone that is not a Nigerian citizen but who has sought to enter or has already entered into Nigeria in any capacity that is not within the contemplation of those that enjoys immunity or diplomatic waivers[11].

Societal Integration

Social integration is the process during which newcomers or minorities are incorporated into the social structure of the host society.[12] Social integration, together with economic integration and identity integration, are three main dimensions of a newcomers' experiences in the society that is receiving them. A higher extent of social integration contributes to a closer social distance between groups and more consistent values and practices, bringing together various ethnic groups irrespective of language, caste, creed, etc. It gives newcomers access to all areas of community life and eliminates segregation.

Compared with other dimensions of integration, social integration focuses more on the degree to which immigrants adapt local customs, social relations, and daily practices. It is usually measured

[11] Section 116 of the Immigration Act, 2015.
12 R Alba, Richard & V Nee, 'Rethinking Assimilation Theory for a New Era of Immigration'. *International Migration Review* (1997). 31, 4 (4): 826–874.

through social network, language, and intermarriage.[13]The most commonly used indicator of social integration is social network, which refers to the connection that immigrants build with others in the host society. While some researchers use the total number of immigrants' friends as a measure, others use the frequency of interaction with friends.

3. Artificial Intelligence in Healthcare

The significance of AI applications in healthcare cannot be overstated. AI has the potential to revolutionize how we diagnose diseases, tailor treatments to individual patients, monitor health conditions in real time, and manage the operational aspects of healthcare delivery. For instance, AI-driven diagnostic tools can accurately analyze medical images, often identifying subtleties that may elude human eyes.[14] This precision translates into earlier and more accurate diagnoses, significantly impacting patient outcomes. Similarly, in treatment personalization, AI algorithms can sift through vast datasets to identify patterns and predict which treatments will be most effective for specific patient profiles, marking a leap towards truly personalized medicine. Moreover, AI applications extend to patient monitoring, where wearable devices and remote monitoring systems offer continuous oversight of patient health, enabling timely interventions and reducing hospital readmissions.[15] In terms of healthcare delivery, AI can streamline operations, from scheduling appointments to optimizing hospital workflows, thereby improving efficiency and patient satisfaction. The potential impact of AI in healthcare can be identified around four emerging trends:

i. Patient Monitoring

Patient monitoring is one of the first and most common application of AI in healthcare. This allows a faster and cost- efficient way of conducting regular doctor-to-patient consults to assess the patient's current state and clinical results. The objective of this trend is to provide accessibility, ease, efficiency, and reduce costs compared to physical patient monitoring. Recent designs of telepresence robots are designed to be able to autonomously move around hallways and rooms by being remote-controlled using a software interface connecting the user to the robot through a Wi-Fi connection[16]. This concept has been recently developed by adding the use of the combination artificial intelligence and vision systems for navigation and obstacle detection. It features an intuitive vision system that instructs the cameras to follow the movements and gestures of the doctor and a micro-projector for collaborative examinations and procedures[17]. This robot, as well as other designs or telepresence robots, have already been deployed in several hospitals.

ii. Healthcare information technology

With the large scale of healthcare data being recorded in hospitals not only through manual registration but also through the developing use of self-diagnosing technology, medical information will be difficult to retrieve and store. Also, considering the goal of telemedicine connect medical professionals and patients from around the world, there is a need to create a universal record system for all participating institutions[18]. The trending technology of using the concept of big data analytics and neural networks to manage and properly retrieve electronic health care records. The trend of applying AI in systemizing the retrieval and analysis of data also addresses the difficulties encountered in hospital procedures. A study by the American College of Physicians state that doctors spend 50 percent of their time on EHR and desk work so they came up with Remedy. This

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[13] J. Vigdor, Jacob "Civic Report No. 53: Measuring Immigrant Assimilation in the United States". *Manhattan Institute for Policy Research*. (May 2008). Archived from the original on 2012-09-08. Accessed 11th August 2024.

[14] M Alshamrani, IoT and artificial intelligence implementations for remote healthcare monitoring systems: A survey. Journal of King Saud University-Computer and Information Sciences, 2022 34(8), 4687-4701.

[15]Shaik et al, Remote patient monitoring using artificial intelligence: Current state, applications, and challenges. Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery, 2023 13(2), e1485.

[16] I Robot Corp., "FDA Clears First Autonomous Telemedicine Robot for Hospitals | Business Wire." [Online]. Available: http://www.businesswire.com/news/home/20130124005134/en/FDA-Clears-Autonomous-Telemedicine-Robot-Hospitals> [Accessed: 24-Jun-2023].

[17]S Choudary, "Dr Rho - Medical Telepresence Robot: Create the Future Design Contest," 2014-07-2, 2014. [Online]. Available: https://contest.techbriefs.com/2014/entries/medical/5078>[Accessed: 24-Jun-2023].

[18] G. Demiris, 'American Medical Information Association' (2003) 10(4), pp. 310–4 .

is a system that manages patient records effectively by replacing the manual process of examining the patients vitals with a chat interface questionnaire, recording it in storage, and sending the results to the doctor, speeding up the process[19]. This allows faster sending of prescriptions and other information directly to the patient as they can send photos or videos directly for examination.

iii. Intelligent assistance and diagnosis

Another trending feature for the robotic technology is the addition of assisting mechanical components and the use of collected medical information and results for intelligent diagnosis. Both features aim to assist patients either physically or by analyzing initial patient evaluation to aid the current hospital system. These tools can operate under the programmed application of neural networks and machine learning. This will allow the technology to continuously develop using the information and results introduced to the system. There are existing technologies launching the use intelligent diagnosis applied in various types of software and smart phone applications for self-diagnosis technology in telehealth[20]. With the known trend in medical devices, there has been a development of self-diagnosing applications and devices in the market that is for quick evaluations of vital signs such as pulse, heart rate, breathing, and the like. An example is a start-up company called Lemonaid Health which developed and AI model of screening and evaluation of a patient through a questionnaire and fulfillment to a few requirements.[21] The patient will then be categorized after screening based on the complexity case of the case.[22]

4. Artificial Intelligence: A Contemporary Facilitator for Immigrants Healthcare Accessibility

The introduction of AI in health care could improve the delivery of health care, such as prevention, diagnosis and treatment of disease.[23]The more integrated immigrants are in a host country, the higher their corresponding net economic contribution to the host economy.[24] Furthermore, integrated immigrants may prove integral in changing the attitudes of natives toward newcomers.[25] If immigrants experience adverse working conditions this pattern might challenge their smooth integration.[26] If integration policies prove ineffective, immigrants' health deteriorates.[27] It is found that immigrants reported deteriorated health in exclusionist 20 countries, resulting in increased health inequalities between immigrants and natives.[28] The use of AI in health care system would help in addressing issues of emergency relating to immigrants as the goal of emergency medical

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[19] AM Bankson, "Can Artificial Intelligence Expand Health Care Access? - MIT Sloan School of Management," January 20, 2017. Available: <http://mitsloan.mit.edu/newsroom/articles/can-artificial-intelligence-expand-health- care-access> [Accessed: 23-Jun-2023].

[20] World Health Organization, "2010 Opportunities and developments Report on the second global survey on eHealth Global Observatory for eHealth series -Volume 2 Telemedicine in Member States WHO Library Cataloguing-in- Publication Data," Report, WHO Press, 2010.

[21]Lemonaid Health – Healthcare, Refreshingly Simple. <https://www.lemonaidhealth.com/#how-it-works> accessed: 24-Jun-2023.

[22] C Wang, How Telemedicine and Health AI are Transforming Healthcare Experience | Chuhan Wang | Pulse Linked In December 13, 2016 < https://www.linkedin.com/pulse/how-telemedicine-health-ai- transforming-healthcare-experience-wang. accessed: 23-Jun-2023.

[23]R Vinuesa, H Azizpour, I Leite, Domisch S et al., 'The Role of Artificial Intelligence in Achieving the Sustainable Development Goals'. *Nat Commun.* 2020; 11:233.

[24]N Drydakis, 'The Effect of Ethnic Identity on the Employment of Immigrants'. *Review of Economics of the Household*, (2013) 11(2): 285-308.

[25] N Drydakis, 'Health-Impaired Employees' Job Satisfaction: New Evidence from Athens, Greece'. *Applied Economics Letters*, (2012) 19(8): 789–793.

[26]United Nations Transforming Our World: The 2030 Agenda for Sustainable Development. NY: United Nations 2015.

[27]Giannoni, M. Franzini, L. and Masiero, G. (2016). Migrant Integration Policies and Health Inequalities in Europe. BMC Public Health, 16, 463. J Simon, N Kiss, A Taszewska and S Mayer, Public Health Aspects of Migrant Health: A Review of the Evidence on Health Status for Labour Migrants in the European Region. (2015) Copenhagen: World Health Organization.

[28]K Puchner, E Karamagioli, A Pikouli, C Tsiamis and ors Time to Rethink Refugee and Migrant Health in Europe: Moving from Emergency Response to Integrated and Individualized Health Care Provision for Migrants and Refugees. International Journal of Environmental Research and Public Health, (2018) 15(6): 1100.

system is to provide universal emergency care that is, emergency care should be available to all who need it.[29]

Regulation could differ according to risk, such that those who are especially vulnerable, including people with mental illness, children and the elderly, are protected from misinformation and bad advice from health applications that exploit rather than assist such individuals.[30] People living in resource-poor settings, in countries with inadequate resources to regulate and monitor adverse consequences of AI applications, with diseases that result in marginalization and discrimination, such as HIV/AIDS or tuberculosis, also require greater protection and oversight by regulatory agencies than users of applications for lifestyle or wellness. That large number of Nigerian immigrants are normally found in the European Union (EU) regions and this represents a challenge for host countries and the immigrants themselves.[31] Consequently, Nigerian Immigrants tend to strive to survive, find a job and integrate into the EU as the EU works to address their needs in relation to housing, health, education, and employment to create suitable conditions for their smooth transition.[32]Despite the EU's intentions to integrate immigrants, the practices seem to undermine immigrants' lived experiences.[33]

Immigrants, regardless of their skills, tend to receive manual and low-paid jobs.[34] International studies found that immigrant workers often take on 3-D roles, which refer to dirty, dangerous, and demanding.[35] Studies from Australia, the EU, the US and Canada indicate that poor human capital and lack of job protection could weaken immigrants' ability to avoid working in adverse environments associated with vulnerability, Nigerians, Indians and Pakistanis being the directly affected recipients of such vulnerabilities.[36] Studies on immigrants' workplace experiences, found dimensions of precariousness and forms of precarious work, such as lack of workplace contracts and regulatory protection, a low level of employee control over wages, hours and working conditions, instability, powerlessness to exercise legal rights, threatening treatments, or any combination of these.[37] Employers might show a willingness to engage in work unregistered by or hidden from the state for tax or welfare purposes for profitable purposes, and undocumented immigrant workers may undertake such a task because they cannot find a formal job due to their irregular status.[38] Illegal immigration status, limited knowledge of the language, lack of confidence,

[29]Ngozi Eunice Emeka, The Legal Framework for Emergency Medical care in Nigeria: Messiah or Mirage. *International Journal of Comparative Law and Legal Philosophy* (IJOCLLEP) 4(2) 2022.

[30]Artificial intelligence in healthcare. London: Academy of Medical Royal Colleges; 2019 (https://www. aomrc.org.uk/reports-guidance/artificial-intelligence-in-healthcare/, accessed 18 July 2020)

[31] European Commission (2020). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Brussels: European Commission.

[32] Migration Policy Institute Europe. Deciding Which Road to Take. Insights Into How Migrants and Refugee in Greece Plan Annual Movement. Belgium: Migration Policy Institute Europe. (2018).

[33]N Drydakis, 'Measuring Labour Differences between Natives, Non-Natives, and Natives with an Ethnic-Minority Background'. *Economics Letters*, (2017) 161: 27-30.

[34]E Gemi and A Triandafyllidou, *Migration in Greece: Recent Developments in 2018*. Paris: OECD. (2018).

[35]S C Moyce and M Schenker, 'Occupational Exposures and Health Outcomes Among Immigrants in the USA.' *Current Environmental Health Reports*, (2017) 4: 349–354. Moyce, S. C. and Schenker, M. (2018). Migrant Workers and their Occupational Health and Safety. Annual Review of Public Health, 39(April): 351–365. A Ziersch, M Walsh, C Due, C. and A Reilly, (2021, on-line first). Temporary Refugee and Migration Visas in Australia: An Occupational Health and Safety Hazard. International Journal of Health Services.

[36] T Sterud, T Tynes, I Sivesind Mehlum and ors,, 'A Systematic Review of Working Conditions and Occupational Health among Immigrants in Europe and Canada'. *BMC Public Health*, (2018) 18: 770. S Premji, 'Its Totally Destroyed Our Life: Exploring the Pathways and Mechanisms Between Precarious Employment and Health and Well-being Among Immigrant Men and Women in Toronto'. *International Journal of Health Services*, (2018) 48(1): 106-127.

[37] K Strauss and S McGrath, Temporary Migration, Precarious Employment and Unfree Labour Relations: Exploring the 'Continuum of Exploitation' in Canada's Temporary Foreign Worker Program. Geoforum, (2017) 78: 199-208. A Vives, M Amable, M Ferrer, S Moncada and ors, 'Employment Precariousness and Poor Mental Health: Evidence from Spain on a New Social Determinant of Health'. *Journal of Environmental and Public Health*, 2013(978656): 1-10.

[38]B Anderson, *Precarious Work, Immigration and Governance*, in C. Schierup, R. Munck, B. Likic-Brboric, and A. Neergaard (Eds), Migration, Precarity, and Global Governance: Challenges and Opportunities for Labour (pp. 68-82). Oxford: Oxford University Press (2015). F Schneider and C Williams, *The Shadow Economy*. London: Institute of Economic Affairs. (2013).

poor employment relations knowledge, insecure employment conditions, lack of inspections, inexistence of health insurance and discrimination negatively affect immigrant's integration and well-being.[39]

AI technologies rely on underlying data capture and digital capabilities. "Digitalization" of aspects of migration systems is necessary for the application of AI, but digitalization does not necessarily result in AI technologies being developed and implemented. Compared with digitalization, AI in migration is currently much more limited. Backlogs of migration-related applications can cause stress for the people affected, and AI systems can speed up the processing of visa- and asylum-related procedures, while also performing security screening. However, this must be a transparent process with recourse for appeal given the margin for error in AI systems. Examples of extracting personal data from mobile phones stem into migration and mobility management practices, as it is becoming common among authorities to use personal electronic devices as a verification tool, gaining access to call data, text messages, location history and more. Advocates call for the establishment of firewalls between health and immigration authorities to encourage the uptake of Health care technologies and protect the rights of migrants.[40]

There is a range of technological interventions that migrants, and citizens alike, are subject to at border points upon entry. Drone technology, which relies on AI applications, for example, has become particularly significant in the context of COVID-19, due to its ability to survey and observe crowds, conduct thermal imaging to screen for those with a high body temperature, sanitize public spaces, and even carry essential medical supplies.[41] Unmanned aerial vehicles have become a large part of migration management technologies and are regularly used to monitor border sites.[42] The European Commission's ROBORDER project, is an example of how such technologies are advancing, as the project seeks to create a "fully-functional autonomous border surveillance system with unmanned mobile robots including aerial, water surface, underwater and ground vehicles."[43]

5. Some Technologies used to automate Immigration in Nigeria for Nigerians in Other Jurisdictions

New technologies can be used long before Nigerian migrants and asylum seekers reach other territories. These technologies include using forecasting tools, which can ideally prepare states and humanitarian organizations for the arrival of large numbers of displaced people into Nigeria and for Nigerian in the EU and other jurisdictions,[44]or potentially lead to more border controls and pushbacks at the EU borders.[45] Other technologies include automated risk profiling at the EU level and automated processing of visa applications at the national level.[46] Finally, it is not only potential

[39]O Keidar, D S Srivastava, E Pikoulis, E. and A K Exadaktylos, 'Health of Refugees and Migrants. Where Do We Stand and What Directions Should We Take?' *International Journal of Environmental Research and Public Health*, (2019). 16(1319): 1-8. See B Anderson, 'Migration, Immigration Controls and the Fashioning of Precarious Workers.' *Work, Employment and Society*, (2010)24(2): 300-317

[40] M Fisher & C Sang-Hun, 'How South Korea Flattened the Curve'. The New York Times, 23 March 2020.

[41]B Chukwudi Okara& F Al-Turjman, *Smart Technologies for COVID-19: The Strategic Approaches in Combating the Virus*. Artif. Intell. Mach. Learn. 2021, 924, 1–23.

[42]E EKorkmaz, 'Refugees Are at Risk from Dystopian 'Smart Border' Technology, The Conversation', 2020. Available online: https://theconversation.com/refugees-are-at-risk-from-dystopian-smart-border-technology-145500 (accessed on10th August, 2024).

[43]ROBORDER. Available online: https://roborder.eu/ (accessed on 19th August 2021). A Toh, 'Big Data Could Undermine the COVID-19 Response: Blind Spots in Location-Tracking Data Can Threaten Both Public Health and Human Rights'. WIRED. 2020. Available online: https://www.wired.com/story/big-data-could-undermine-thecovid-19-response/ (accessed on 10th August, 2024).

[44]J Bither and A Ziebarth, *AI, Digital Identities, Biometrics, Blockchain: A Primer on the Use of Technology in Migration Management.* Berlin: Bertelsmann Stiftung, The German Marshall Fund of the United States, Robert Bosch Stiftung., (2020) 10.

[45]EDRi. Regulating Migration Tech: How the EU's AI Act can better protect people on the move. (2022)<https://edri.org/our-work/regulatingmigration-tech-how-the-eus-ai-act-can-better-protect-people-on-the-move/>

[46]ibid, Note 17.

migrants that are scrutinized but also those who support their applications. For example, risk assessments may extend to the screening of sponsors.

Technologies that are included in this paper are used for the following functions: i. forecasting of future mobility, ii. risk assessments and profiling, iii. processing of visas, travel authorizations and citizenship applications, iv. identity verification and fraud detection, including technologies used for document verification and behaviour/emotion recognition, speech recognition, mobile phone data extraction, v. categorization of applications according to their perceived risks or type/complexity, vi. electronic monitoring, vii. distribution of welfare benefits, and viii. matching tools used for the distribution of, broadly, place of residence. Although the list is extensive, the report does not claim to be exhaustive.[47] It deliberately excludes some new technologies that are initiated by migrants and emerging uses of tools for matching between employers and workers, and instead focuses on practices by authorities at the state and EU levels.[48]

Among these, automated decision-making systems can speed up the process to the advantage of public administrations and some applicants, but can also result in new vulnerabilities. While they have the potential to facilitate some decision-making processes, their inherent risks for bias, discrimination[49] and potential 'machine mistakes' pose a significant threat for (potential) migrants and asylum seekers who are already disenfranchised and face challenges in seeking remedies.[50]The introduction of new technologies can also lead to new relationships between the public and private sectors in order to develop, sustain and implement these technologies.[51] These require new governance structures and legislative frameworks to regulate who becomes responsible for data protection risks and possible 'machine mistakes' and related inaccurate or discriminatory outcomes. Questions around accountability, and therefore transparency, are vital,[52] especially for those whose mobility is constrained and whose protection needs are unmet.

6. Challenges in the use of AI to enhance the delivery of Healthcare Services to Immigrants

While the applications of Artificial Intelligence in the delivery of healthcare services to immigrants promise to revolutionize the sector, they are not without significant challenges, which includes;

i. Data Privacy and Security: One of the foremost concerns with deploying AI in the delivery of healthcare services to immigrant is the management of data privacy and security. AI systems require access to vast amounts of sensitive patient data to train algorithms and provide personalized care. However, this raises significant concerns about such data's collection, storage, and use. Ensuring the confidentiality and integrity of patient information is paramount, as breaches can lead to unauthorized access to personal health information, potentially resulting in identity theft, discrimination, and other forms of harm to patients. Healthcare providers and AI developers must adhere to stringent data protection regulations, such as the Nigeria Data Protection Act, 2023, is the legislation which provides a legal framework for the protection of the personal data of Nigerian citizens.

[47]C Blasi Casagran, et al. 'The Role of Emerging Predictive IT Tools in Effective Migration Governance'. Politics and Governance, (2021), 9(4), 133–145. For an overview of existing studies using scenario-building and traditional forecasting methods, see de Valk, H. A. G., et al. 2022. How to Predict Future Migration: Different Methods Explained and Compared, in Introduction to Migration Studies, edited by Scholten, P. IMISCOE Research Series. Cham: Springer, 463–482

[48]For existing research on matching tools for employment. See S Uribe, et al. *Skill Matching for Migrant Guidance Based on AI Tools, in Information and Communications Technology in Support of Migration*, edited by Akhgar, B., et al. Cham: Springer (2022).

[49] Regarding the Overarching Problem of Discrimination, see V Eubanks, *Automating Inequality: How High-Tech Tools Profile, Police and Punish the Poor*. New York: St Martin's Press. 2018.

[50] M Leese, 'The New Profiling: Algorithms, Black Boxes, and the Failure of Anti-discriminatory Safeguards in the European Union'. Security Dialogue, (2014) 45(5), 494–511.

[51] P Molnar, *Surveillance Sovereignty: Migration Management Technologies and the Politics of Privatization, in Migration, Security, and Resistance*, edited by Hudson, G. and Atak, I. (2022) New York: Routledge.

[52] Regarding the Overarching Opacity Problem related to New Technologies, see F Pasquale, *Black Box Society: The Secret Algorithms That Control Money and Information.* Cambridge, (2016) MA: Harvard University Press.

ii. Ethical and Legal Considerations: The integration of AI in the delivery of healthcare services to immigrant also brings to the forefront a range of ethical and legal considerations. One of the most pressing issues is algorithmic bias, where AI systems may exhibit prejudices based on the data they were trained on, potentially leading to unequal treatment outcomes for different demographic groups. Addressing these biases requires transparent algorithm design and continuous monitoring to ensure fair and equitable patient treatment. Additionally, legal challenges surrounding liability and accountability arise when AI systems are involved in patient care, particularly in misdiagnosis or treatment errors. Determining responsibility-whether with the healthcare provider, the AI developer, or the technology itself-complicates the legal landscape and necessitates clear regulations and guidelines.

iii. Interoperability and Integration: Integrating AI technologies into existing healthcare IT systems presents another significant challenge. Many healthcare systems operate on legacy platforms that may not be compatible with the latest AI solutions, hindering the seamless data exchange and limiting the effectiveness of AI applications. Furthermore, ensuring interoperability between different platforms and technologies-each with its own standards and protocols-is crucial for the comprehensive, coordinated care that AI promises to enhance. Achieving this requires concerted efforts from technology developers, healthcare providers, and regulatory bodies to establish and adhere to universal standards that facilitate interoperability and data exchange.

iv. Human-AI Interaction: Finally, the dynamics of human-AI interaction in healthcare settings raise important considerations. Trust in AI systems by healthcare professionals and patients are essential for the effective use of technology. However, issues of over-reliance on AI, potential deskilling of medical professionals, and the need for meaningful oversight of AI decisions are critical. Ensuring that AI acts as a support tool rather than a replacement for human judgment is vital for maintaining healthcare workers' quality of care and professional integrity. This requires ongoing education and training for healthcare professionals to work effectively alongside AI technologies, understanding their capabilities and limitations.

In conclusion, while the use of AI in enhancing immigrant's access to quality healthcare services offers transformative potential, addressing the challenges of data privacy and security, ethical and legal considerations, interoperability and integration, and human-AI interaction is crucial for realizing its full benefits. Overcoming these challenges requires a collaborative effort among AI developers, healthcare providers, policymakers, and the wider community to ensure that AI technologies are implemented in a way that is secure, ethical, accessible and enhances the quality of healthcare for all[53].

7. Conclusion and Recommendations

The use of advanced technology such as AI to deliver health care services has proven to be one of the defining medical revolutions of the 21st century.[54]The use of AI for health raises trans-national ethical, legal, commercial and social concerns. Many of these concerns are not unique to AI. The use of software and computing in health care has challenged developers, governments and providers for half a century, and AI poses additional, novel legal and ethical challenges that extend beyond the purview of traditional regulators and participants in health-care systems. These legal and ethical challenges must be adequately addressed if AI is to be widely used to improve human health, to preserve human autonomy and to ensure equitable access to such technologies. Whether AI in mobile applications could provide better outcomes for immigrants' integration needs has not yet received significant empirical attention. However, AI technology is vulnerable to amplifying human

[53]F Udegbe, O Ebulue, C Ebulue, & C Ekesiobi 'The role of Artificial Intelligence (AI) in healthcare; A Systematic review of Applications and challenges' *International Medical Science Research Journal*, 2024, 4(4) 500-508.
[54]B.N Okpalaobi & Ngozi Eunice Emeka 'An appraisal of the legal framework for Telemedicine in Nigeria' *International Review of Law and Jurisprudence* (IRLJ) 5(1) 2023.

biases, thus it has the potential to systematize and institutionalize these biases, leading to discrimination and exclusion of people based on race and ethnicity. For example, commercial facial recognition systems have proven to be more prone to misidentify faces with darker complexions.

The primary readership of this guidance document is ministries of health, as it is they that determine how to introduce, integrate and harness these technologies for the public good while restricting or prohibiting inappropriate use. The development, adoption and use of AI nevertheless requires an integrated, coordinated approach among government ministries beyond that for health. The stakeholders also include regulatory agencies, which must validate and define whether, when and how such technologies are to be used, ministries of education that teach current and future health-care workforces how such technologies function and are to be integrated into everyday practice, ministries of information technology that should facilitate the appropriate collection and use of health data and narrow the digital divide and countries' legal systems that should ensure that people harmed by AI technologies can seek redress.

Governments should be transparent about the use of AI for health, Governments and national health authorities should ensure that decisions about introducing an AI system for health care and other purposes are taken not only by civil servants and companies but with the democratic participation of a wide range of stakeholders and in response to needs identified by the public health sector and patients.

Finally, this paper is intended to guide the companies, universities, medical associations and international organizations with governments and ministries of health, that will set policies and practices to define use of AI in Migration to foster easier immigration processes and enable the migrants better access to quality healthcare facilities.