



Transforming Healthcare, Poultry Science, and Cybersecurity with AI and ChatGPT

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Abstract

Artificial Intelligence (AI), Machine Learning (ML), and conversational AI like ChatGPT are transforming various sectors by improving the decision-making, efficiency, and communication. This literature review discusses how they have changed the functions in healthcare, poultry science, and cybersecurity. In the healthcare field, AI is used in the sphere of diagnostics, targeted therapies, and interaction with patients, and ChatGPT enhances access to telemedicine. Precision farming, disease prediction, and feed optimization, which AI is used to provide in poultry science, are complemented by the use of ChatGPT in the education of farmers. In information security, AI helps enhance cybersecurity detection and response, but generative models also create the risk of abuse. The interdisciplinary perspectives both identify shared opportunities and challenges, and the necessity of developing ethical frameworks, transparency, and integrative adoption in order to innovate sustainably and safely.

Key words: AI, Machine Learning, ChatGPT, Healthcare, Poultry Science, Cybersecurity, Ethical Adoption

1. INTRODUCTION

Artificial intelligence (AI) is now one of the most disruptive technological trends of the 21st century that has changed the way data are analyzed, decisions are made, and services are rendered in various sectors. In healthcare, agriculture, and cybersecurity, AI systems that are run by Machine Learning (ML) algorithms are making it possible to be more efficient, more accurate, and predictive [1]. Simultaneously, the emergence of Large Language Models (LLMs), exemplified by ChatGPT, an open-source project of OpenAI, has also offered novel possibilities in the realm of human-computer interaction, where advanced AI is not only computationally efficient but also communicative and adaptive and reachable by more people [2].



The revolutionary impact of AI on healthcare is especially impressive. The setback of traditional healthcare systems is the lack of resources, increased number of patients, and the necessity of accuracy in their diagnosis and treatment. The tools that are being used to fill these gaps are AI-based, such as medical image analysis, predictive diagnostics and personalized treatment plans. Meanwhile, ChatGPT also holds potential in fields such as patient communication, triage, and medical education where the natural language can be used to assist the medical staff and enhance the patient outcomes. These changes indicate that there is a change toward smarter, patient-centered, and data-driven healthcare ecosystems [3].

AI is also having its own impact in the agricultural industry and especially in poultry science. Rearing poultry is a vital sector towards global food security but the sector is affected by various issues such as outbreak of diseases, optimization of feeds and animal welfare. Precision poultry farming is becoming possible through AI-enabled sensors, computer vision, and predictive models that enable farmers to track the health of their flocks, detecting possible diseases and optimizing the utilization of resources [4]. In addition to these technical uses, ChatGPT can be used as a knowledge-sharing platform, where farmers (especially those in rural and developing areas) can receive expert advice in their own languages in real-time. This merging of AI and conventional agricultural methods points to the way in which new innovative technologies can be adapted to ensure worldwide sustainability and farm resilience [5].

Another area in which AI and ChatGPT are working in two directions is cybersecurity. On the one hand, AI-based systems are being implemented to identify, forecast, and react to all more complex cyber threats in real-time. AI can detect anomalies in large datasets of network activity and prevent breaches much more effectively than conventional methods can. ChatGPT, conversely, also helps in the human interface aspect of cybersecurity through education, training, and automated customer support [6]. Nonetheless, it is also the new technologies that pose a new threat: enemies can use AI and generative models to create more believable phishing attacks, deepfakes, and automated hackers. This two-fold character brings about the need to ensure that the innovation goes hand in hand with an effective security program [7].

Although healthcare, poultry science, and cybersecurity might seem rather different areas, they are interconnected by the shared problems and possibilities in terms of AI and ChatGPT adoption.



They are ethical use of data, the confidence in the results of AI, the consideration of biases, and the availability beyond socio-economic limits [8]. An interdisciplinary assessment is thus not only beneficial to trace innovations in each sector but also to draw conclusions on what can be learned in common, to responsibly and effectively integrate AI. This paper is a review of existing and future uses of AI, ML, and ChatGPT in the fields of healthcare, poultry science, and cybersecurity. It explains the potential transformative power of these technologies, mentions the main challenges, and presents the way forward towards sustainable, ethical, and safe adoption [9].

2. AI AND CHATGPT IN HEALTHCARE

Healthcare is among the areas that undergo the most radical change with the introduction of Artificial Intelligence (AI) and Machine Learning (ML). The increasing access to medical data, including imaging scans and electronic health records, has generated potential to use AI-controlled systems to aid in the diagnoses, treatment, and management of patients. AI is aiding clinicians to make quicker and more precise decisions and assist health care systems to be more efficient and patient-centered by examining patterns that are not feasible to humans [10].

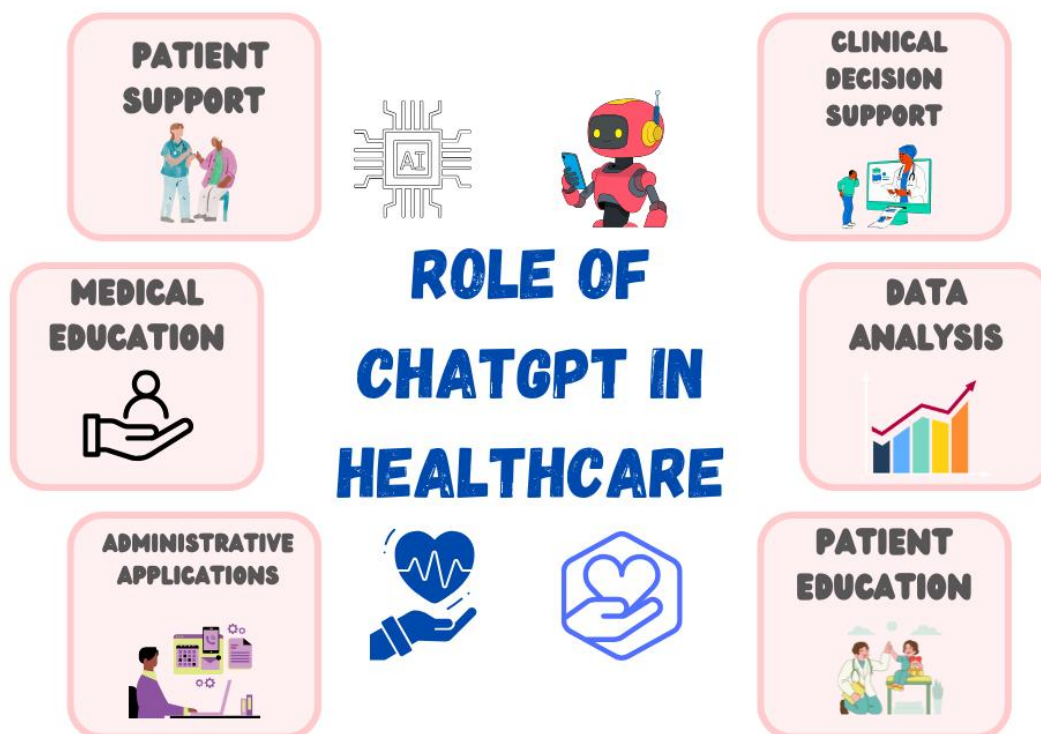


Figure: 1 showing role of ChatGPT in healthcare



Diagnostics and Imaging are now one of the flagman AI applications in healthcare. Radiological images (X-rays, MRIs, CT scans, etc.) can be processed using machine learning algorithms at an impressive rate of accuracy, identifying early symptoms of various diseases including cancer, pneumonia, or cardiovascular diseases [11]. Not only do these tools ease the work burden of radiologists, they can assist in the reduction of diagnostic errors. Moreover, AI models are also implemented into wearables and biosensors, which allow them to monitor chronic conditions (diabetes or heart-related diseases) in real-time. Another promising field is personalized medicine [12]. Integrating patient information with genomic data, AI systems can propose patient-specific treatment regimes, anticipate the potential reaction of a patient to a specific drug, and minimize the process of trial and error that characterizes clinical practice. Such data-oriented practice will guarantee that patients also get therapies that are specific to their needs, enhancing their effectiveness and safety [13].

ChatGPT and other Large Language Models (LLMs) introduce a new level of healthcare by improving communication and the availability of knowledge. Clinically, ChatGPT can be of help to doctors, summarizing patient histories, generating medical reports, or giving them rapid access to the most recent medical literature [14]. It may be used as a virtual health assistant to patients - answering frequently asked medical questions, providing treatment directions in easy-to-understand language, and even offering mental health support via supportive, conversational, dialogue. Notably, ChatGPT has the power to close the disparities in telemedicine through the provision of scalable services to underserved populations with limited healthcare professionals [15].

Nevertheless, AI and ChatGPT integration in the healthcare sector are problematic despite these advantages. The issues of ethics and privacy are the most important since patient data should be treated safely and conscientiously. There is also the problem of bias in AI models, which can cause different outcomes in terms of treating people unequally when the training data are not representative of different populations [16]. Though ChatGPT can be very promising, it needs to be thoroughly proved before it is entrusted to clinical decision-making, as any inaccuracies or hallucinations may have a devastating effect in medical practice. Healthcare professionals do not replace AI and ChatGPT but are useful tools that provide a complement to human knowledge. To



ensure that they are adopted successfully, they should be trust-based, transparent, and regulatory frameworks that can protect patient safety and encourage innovation [17].

3. POULTRY SCIENCE USING AI AND CHATGPT

Artificial Intelligence (AI) and digital technologies are taking over newly in poultry science as an essential branch of world agriculture, providing opportunities to enhance efficiency, sustainability, and productivity. As the demand in products related to poultry grows, and the challenges of animal health, food safety, and resources management continue to increase, AI-based solutions become indispensable in the contemporary poultry production. Precision poultry farming is one of the most important AI applications used in this area [18]. Farmers can observe the behavior of their flock, the feeding habits and the environmental conditions of their flock (in real time) through the help of sensors, cameras and computer vision technologies. AI algorithms are able to recognize abnormalities, e.g., slowed movement, abnormal feeding, among others, which can signal emerging disease or stress. This makes it possible to undertake timely interventions to lower mortality and enhance animal welfare [19].

The other significant field is the case forecasting and treatment. Poultry farms are susceptible to such infectious diseases as avian influenza or Newcastle disease, which may diffuse very quickly and devastating losses may be achieved. Predictive models built on AI are able to discuss big data - weather patterns, flock history, movement, etc. - to predict outbreaks before they take place. The early warnings enable farmers and veterinarians to be proactive in their efforts to reduce damages to the economy and risks to food security [20]. AI-driven solutions are also being used to optimize feed. Feed is a significant proportion of the cost of poultry production; therefore, feed management is important. Growth trends and nutritional requirements can be analyzed by AI systems and tailor-made feed plans could be proposed, which guarantee superior conversion rates and healthier flocks. This does not only minimize waste, but also contributes to more sustainable use of resources, which is a more crucial aim in agriculture [21].

ChatGPT is an addition to such technical applications, as it acts as a knowledge-sharing and advisory tool. Farmers particularly those in rural or resource-deprived areas are not usually accessible to expert veterinarians or extension services. ChatGPT can offer real-time,



conversational advice on best practice, disease management, biosecurity solutions, and optimization of farms [22]. Its natural language capabilities make it especially useful in training, troubleshooting and filling information gaps. ChatGPT can be much more accessible and adopted by accommodating local languages and cultural contexts. Nevertheless, there are still issues with implementation of AI and ChatGPT in poultry science [23].

The cost of implementation is high, rural areas have low internet accessibility, and the unwillingness to embrace new technologies may make the progress slow. There is also the issue of ensuring that the trustworthiness of the advice that is generated by ChatGPT is properly controlled since the wrong or simplistic answers may lead to misdirecting farmers [24]. The only way to overcome these barriers is to work together with researchers, policymakers, and technology providers in order to make sure that solutions are effective and practical [25]. The advent of AI and ChatGPT is marking the beginning of the era of smart poultry farming where data-based insights and digital technology can be used to enhance productivity, animal welfare, and sustainability. Their successful integration can add to the farm profitability as well as to the food security in the world [26].

4. ARTIFICIAL INTELLIGENCE AND CHATGPT IN CYBERSECURITY

One of the most significant problems of the digital era is now cybersecurity. Cyber threats have increased in magnitude, complexity and intensity as organizations, governments, and individuals become increasingly dependent on interconnected systems. Old security tools though still relevant, tend to be unable to keep pace with the speed and complexity of the new attacks [27]. Artificial Intelligence (AI) and Machine Learning (ML) become the key technologies in improving defense systems, whereas ChatGPT and similar Large Language Models (LLMs) emerge as more and more important in education and support, as well as in detecting cyber threats [28].

One of the most useful is AI in threat detection and prevention. In contrast to traditional rule-based systems, AI algorithms have the capacity to constantly continue to learn with large quantities of network traffic data, detecting patterns that are indicative of possible intrusions. To illustrate, the anomaly detection models can identify abnormal login activity or patterns that could be pointing at a breach [29]. AI enables security teams to mitigate the damage by issuing early warning and



automatic responses before it becomes a crisis. Automated incident response is another critical component area. AI-based systems can also rank alerts in cybersecurity operations centers, propose countermeasures, or may even act automatically without human intervention, like isolating infected systems, to contain threats [30]. This not only helps to offload human analysts but also accelerates time to respond to attacks, which is important in countering attacks such as ransomware or distributed denial-of-service (DDoS).



AI CONTRIBUTIONS TO CYBERSECURITY FUNCTIONS

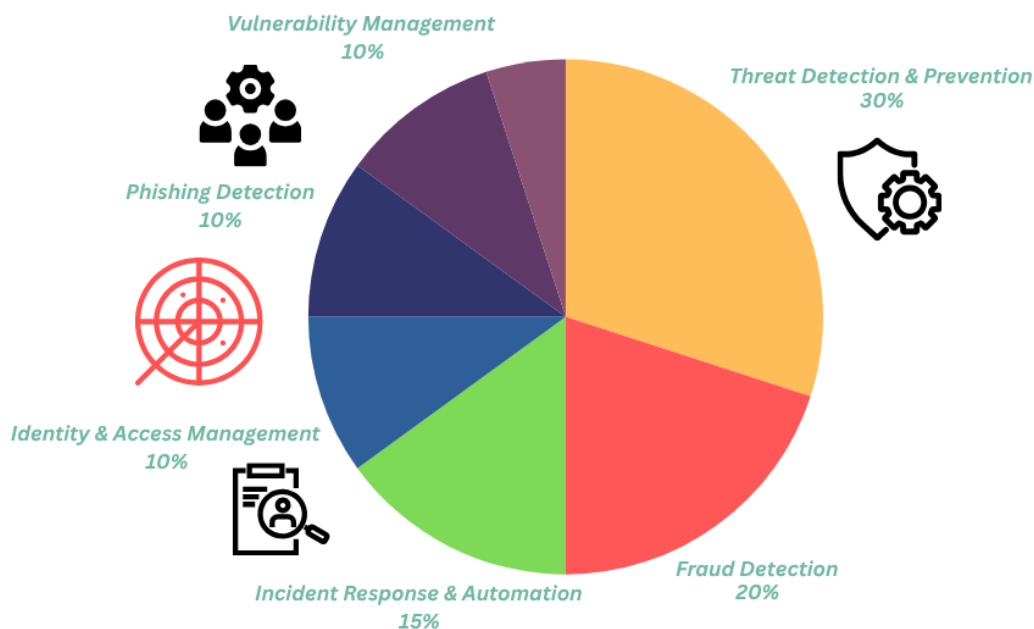


Figure: 2 showing AI contributions to cybersecurity functions

ChatGPT is not intended as a security tool, but it has a wide potential in cybersecurity awareness and support. It will be able to create easy-to-follow training resources, respond to frequent cybersecurity questions, and help employees to identify phishing attacks or suspicious behavior. Technical applications ChatGPT can assist in explaining difficult vulnerabilities, summarizing threat intelligence reports, and instructing novice professionals in security practices [31]. It is an interactive communicator which renders it an effective companion to experts and non-experts alike. Nonetheless, these technologies are dangerous at the same time. Cyber attackers can use



generative AI to generate very believable phishing messages, generate malicious code snippets or manipulate misinformation with deep fakes [32]. The fact that it is easy to create real-life text and media also increases the stakes of social engineering attacks, which involves the manipulation of trust to obtain unauthorized access. This bi-dimensional functionality of AI points to the pressing necessity of accountable governance, responsible use practices and effective protection against abuse [33].

Artificial intelligence and ChatGPT are transforming the world of cybersecurity by enhancing security measures, creating a better awareness process, and simplifying the response. However, they bring in new weaknesses which need to be tended to keenly. The future of cybersecurity will not be based only on the use of AI to protect, but also predict and combat its abuse. Regulators, computer programmers, and information security experts will have to cooperate to guarantee the security and reliability of digital space [34].

5. CROSS-DISCIPLINARY PERSPECTIVES

Despite the apparent difference between healthcare, poultry science, and cybersecurity as fields, the incorporation of Artificial Intelligence (AI), Machine Learning (ML), and ChatGPT provide unexpected similarities in the opportunities and challenges. Comparing these spheres, it is evident that the advantages and threats of AI do not belong to a specific field, but they are common to most of them. Such cross-disciplinary approach will be useful in finding universal solutions as well as in making the use of AI responsible and sustainable [35].

A significant common opportunity is the use of AI in the pattern recognition and prediction. In healthcare, AI is used to detect disease indicators in medical imaging; in poultry farming, it is used to detect signs of illness in flocks early; in the field of cybersecurity, it is used to analyze the traffic of the network and can identify any anomalies [36]. The same principle is behind it: The processing of large quantities of data is much faster and more precise than human beings can do it, which unveils the trends that otherwise they would not have been identified. Such a predictive ability can potentially save lives, minimize expenditures, and enhance productivity in all three areas [37].

One more similarity is in the decision support. Regardless of whether you are guiding the decisions of doctors on how to treat a patient, farmers on how to optimize their livestock feed or analysts on



what to do in case of an incident, AI and ChatGPT act as an assistive tool that complements human expertise [38]. They lessen the load of mundane chores in both instances and give professionals something to act upon, leaving them with more advanced decision-making. The conversational features of ChatGPT specifically enable AI to be more user-friendly to non-technical users and provide a bridge between professionals and non-professionals [39].

These opportunities, however, share common risks. The problem of bias of AI systems is one of the issues. When the training data fails to capture a variety of populations or settings, the outputs can be biased, as in the case of incorrect diagnosis in healthcare or incorrect suggestions in agriculture or incorrect alerts in information security. Data privacy and security is another problem, and it is paramount in all three areas [40]. Medical records, farm production data and security logs in the organization cannot be abused or accessed by unauthorized personnel. Ethical frameworks and regulations are universally needed. Unless appropriately monitored, the use of AI and ChatGPT may result in excessive reliance or information distortion, or even intentional misuse. Building trust needs to be done by creating clear rules and accountability and by engaging stakeholders in the development of AI systems [41]. Interdisciplinary knowledge indicates that similar to the differences in the particular uses of AI and ChatGPT, the guiding principles, advantages, and dangers are strikingly comparable. Through their experience, healthcare, poultry science, and cybersecurity can come up with more responsible AI adoption strategies, which will eventually lead to innovation, sustainability, and general wellness of society [42].

6. FUTURE DIRECTIONS

The development of Artificial Intelligence (AI), Machine Learning (ML), and ChatGPT has been moving at a very fast pace, so its role in healthcare, poultry science, and cybersecurity is only going to grow over the next few years. Although the advantages of the existing applications are evident, the further development stage will probably be more fully integrated with innovative technologies, more ethical approaches, and more widely adopted on a global scale [43]. The incorporation of AI in other sophisticated technologies is one of the ways to go. In medicine, AI might be used together with robotics and the Internet of Things (IoT) to create smart hospitals in which interconnected devices keep an eye on patients and feed doctors with real-time information [44]. IoT sensors combined with AI systems have the potential to transform poultry science into a



completely automated farm that can monitor the environment, have automated feed delivery, and identify any potential health hazards in real-time [45]. AI can be used together with blockchain in cybersecurity to enhance data protection and provide transparency to threat detection infrastructures. These ecosystems of multi technology will probably characterize the future of smart, adaptive solutions [46].

The other area of focus is the creation of multimodal AI models, which will be able to handle not only text and numbers but also images, audio, and video at the same time. In the case of healthcare, this would be the incorporation of radiology scans, patient history and genetic data into cohesive diagnostic platforms. Poultry science Multimodal systems might be able to process visual flock behavior, temperature measurements, feed data, and other data simultaneously to make a more accurate decision [47]. Multimodal AI may be used in cybersecurity to combine log files, network activity, and user communication information into an overarching perspective of possible threats.

AI and ChatGPT will also have their future determined by trust, transparency, and ethics. The stakeholders in the three industries understand that the advantage of these technologies should be weighed against risks, like the risk of bias, misinformation, or malicious uses. The future studies will require investigating explainable AI, or systems that are capable of explaining their actions in a way that is comprehensible to users, allowing users to confirm and rely on the results. International standards and policies will be vital in order to have safe and fair adoption among the different populations [48].

The way forward will be the need to work towards inclusive and sustainable AI implementation. Numerous rural farmers, poorly-resourced hospitals, and small organizations do not have the infrastructure to embrace AI. Some of the ways of bridging this gap will include developing affordable and accessible solutions, influencing the level of digital literacy, and investing in infrastructure [49]. With help of assuring the fact that these technologies are adopted not only by well-resourced areas but also by the marginalized communities, AI can transform the world in the most remarkable way. Deeper integration with new technologies, emergence of multimodal models, more robust ethical principles and inclusive adoption approaches are the future of AI and ChatGPT. These guidelines will not only enhance efficiency and safety but they will also make sure that AI is used in a responsible and sustainable way by humanity [50].



7. CONCLUSION

Artificial Intelligence (AI), machine learning (ML), and chatbots like ChatGPT are not just a thing of the future anymore but are in fact tangible solutions that are transforming industries and practices. This review has examined how they have transformed the three different fields that are inseparable but intertwined: healthcare, poultry science, and cybersecurity. All of these spheres show the vast potential of the solutions powered by AI to increase efficiency, accuracy, and accessibility, as well as address ethical, social, and technical concerns that need to be handled with care.

The field of healthcare is no exception to the changes that AI is bringing to the diagnostics, treatment planning, and management of patients. Medical images can be run through algorithms trained to spot the subtle abnormalities that can be missed by humans, and predictive analytics can allow customized treatment plans. ChatGPT can help improve communication with the patient, provide clear explanations of medical procedures, and facilitate telemedicine programs. Combined, these tools are an indication of a more data-driven, patient-centered healthcare system. Nevertheless, data privacy breach risks, algorithm bias, and over-reliance on AI-driven recommendations are all indicative of the fact that this practice should be implemented carefully. Confidence and transparency are important towards safe adoption.

AI is taking over the field of poultry science to the age of precision farming. Constantly tracking flocks and forecasting diseases and AI-optimized feed formulations have already provided substantial productivity and sustainability benefits. ChatGPT is a digital advisor to farmers, which means that expert knowledge is on-demand and can be provided in local languages and settings. It will particularly be useful to small-scale farmers in developing countries who might not have access to veterinarians or extension services. However, the barriers of high prices, insufficient digital infrastructure, and the necessity of trustworthy AI outputs that need to be adopted do not only stress that technological adoption will not be a simple task but also imply that it will need policy-makers, education, and inclusive innovation strategies.

The twofold nature of AI and ChatGPT is especially prominent in the field of cybersecurity. On the one hand, AI enhances security, identifying anomalies, forecasting threats and automatizing



the process of responding to incidents. The ChatGPT helps to create awareness, train employees, and provide easy-to-understand explanations of complex security problems. However, these tools can equally fall into the hands of bad actors to produce plausible phishing, write scripts to automate attacks, or share fake news using deep fakes. This two use dilemma explains why ethical principles and regulatory control of cybersecurity is more crucial than any other industry.

In the three areas, general themes can be singled out. To start with, AI can easily handle large amounts of data and find hidden patterns, be it those patterns are disease indications, flocking, or suspicious network traffic. Second, AI and ChatGPT work as assistive technologies, which facilitate human knowledge, and not supplant it. Third, the adoption issues are also strikingly similar: the problem of bias, privacy, infrastructure, and accessibility should be resolved in case such technologies can bring beneficial changes only equally. Last, governance systems and ethical systems are not optional, they are necessary to make safe, transparent and responsible use.

In the future, AI and ChatGPT may be more integrated with other technologies, like IoT, robotics, and block chain, and multimodal systems that can analyze text, images, audio, and video simultaneously may become a reality. These advancements will further extend AI to other fields like intelligent hospitals, automated farms, and cyberspace that are proactive in security. Simultaneously, the effectiveness of these innovations will be based on trust, users will have not only to be sure of the accuracy of AI results but also of fairness, security and accountability of the systems themselves.

It is also critical that AI should be adopted in an inclusive and sustainable way. More sophisticated solutions will not be that useful when they are only available to affluent hospitals, large-scale farms, or big companies. To make AI and ChatGPT useful to the small clinic, family owned farm, and under resourced organizations around the globe, policy makers, researchers, and technology developers need to cooperate to ensure that the advantages of AI and ChatGPT are anywhere, at any time. The digital divide not only concerns equity but is a strategic requirement of international health, food security, and digital resiliency.

AI and ChatGPT are disruptive technologies that defy borders of disciplines, with solutions to some of the most urgent problems of humanity. It can be saving life in hospitals, ensuring food



availability in poultry farms, or preventing cyber-attacks, in any case, the systems can grow smarter, more adaptive, and more human-friendly due to these technologies. Nevertheless, this possibility can be achieved in full by considering an integration, ethical governance, and international cooperation. Healthcare, poultry science, and cybersecurity can find their way to a corner of responsible AI adoption one that balances innovation with responsibility, efficiency with inclusivity, and technological advancement with human values and values by learning to follow in each other footsteps of what ultimately proved successful and what fell short.

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