



Artificial Intelligence in Fitness: Personalized Training, Real-Time Feedback, and the Future of AI Trainers

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KEYWORD

Artificial Intelligence (AI), Healthy lifestyle, Fitness technology, Smart gym equipment, Fitness applications, Wearable devices, Personalized workout programs, Real-time feedback, Performance monitoring, Motion tracking

ABSTRACT

A different type of getting healthy. Alternative ways of getting healthy. Artificial Intelligence (AI) is changing for the people who are striving to achieve their healthy lifestyle goals. The use of technological developments such as smart gym equipment, fitness apps, and wearable devices can make an individual get a fitness regime that suits one's needs based on age, fitness level, heart rate, and fitness goals. In addition, the employment of artificial intelligence can offer real-time feedback that helps people track their progress and performance. This paper will discuss the possibility of using AI trainers in daily life instead of personal trainers. The latter can provide motion tracking, postural control, and prompt feedback needed to achieve a healthy lifestyle. Furthermore, introducing AI technology in fitness can make workouts more entertaining and, therefore, more productive. However, there are ethical concerns surrounding the use of such devices as AI fitness. The issues of privacy, availability of such devices, and affordability of the advanced technology are some of the aspects that should be taken into consideration when contemplating the use of AI in Fitness. In conclusion, the AI fitness devices are essential in making personalized training regimes that are productive and affordable. Still, it is worth noting that the consideration of incorporating AI technology in complex bioengineering requires expert-level coaching to achieve the healthy lifestyle goals safely and productively.

1. INTRODUCTION

Fitness and health maintenance has been a primary focus of the modern lifestyle. Traditional fitness and health maintenance methods which include hiring personal trainers or doing calculations by hand have been expensive and ineffective. With modern technological advancements and the invention of mobile applications, there are now easier ways to maintain and monitor one's fitness. AI is a key player in this new wave of fitness and health maintenance. This system takes into account the user's parameters such as age and weight, heart rate and fitness goals to recommend relevant workout plans.

Contemporary systems are more efficient than their predecessors which involved the manual entry of the user's fitness goals or parameters into the system, the system would then be able to recommend a fitness plan. In relation to personal fitness, AI can help provide real time feedback on form and fitness. This system utilizes computer vision algorithms and motion sensors to recognize user form during an exercise, this feedback can then help the user adjust their form

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to avoid injury. It is noteworthy that this system is interactive. However, there are a number of limitations which come with the integration of AI systems into personal fitness technology. These systems are relatively expensive and the security of one's sensitive biometric data may be at stake and their unavailability in some regions. Furthermore, although this system can recommend workout plans, it cannot replace personal trainers.

2. PROBLEM STATEMENT

Even though the awareness of people about their health has increased, there are many people who have to struggle to follow a regular and effective schedule of physical activities. The conventional approach to doing workouts consists of employing the help of human trainers or using static programs available online. These methods, however, suggest a number of disadvantages: The cost of professional assistance: Professional assistance in the field of physical exercises is very costly, and therefore not available to many people. The standard and inflexible training program: Easy workout routines on the web do not take into account individual person's factors (such as heart-rate, endurance, etc.), and this makes the training process inefficient.

The fact that the form cannot be adjusted in real time: If the form is not properly supervised, it means that the exercises are performed with incorrect body positions and techniques and thus injuries to the body are at risk. Lack of motivation: Without supervision they lose their motivation and cease to adhere to the exercise program. While solutions connected to the fitness space, and powered by artificial intelligence (AI) or wearable technology and apps seem like a good enough remedy to the aforementioned issue, one has yet to grasp the safe and affordable way to do so. Therefore, there is a need to research how AI can be employed to provide personalized and safe monitoring of people's physical activities at affordable costs.

3. METHODOLOGY

In this study, the use of secondary data is predominant, with an emphasis on obtaining an unbiased perspective on the state of the art of artificial intelligence and its potential application in the domain of personal fitness. Instead of conducting experimental research and distributing questionnaires and surveys, interviewing participants or acquiring biological data from the respondents, the author focuses on an in-depth analysis of the existing literature and materials. The process began with a search of the literature and publications that describe in detail the application of artificial intelligence in one or another capacity in the domain of health, fitness, and physical activity, including the use of smart devices, exercise equipment, software, computer vision systems, and other technologies capable of measuring, tracking, and improving the individual's fitness performance. Multiple sources were reviewed, including peer-reviewed articles, conference abstracts, reports, and books, with an emphasis on publications from the last 8-10 years, as these were considered to best represent the current state of the art. Furthermore, the books and industry publications that deal specifically with the intersection of AI and Fitness were also explored, as well as the various online platforms and repositories that host scientific publications, including Google Scholar, ResearchGate, IEEE Xplore, and others. After compiling a list of relevant sources, each was analyzed, read, and divided into categories on the basis of the topics they describe. Some of the works described the process by which an AI fitness coach can collect the personal information of the user, including age, weight, heart rate, level of activity, and fitness objectives, and proceed to develop an appropriate personal training and diet plan that adapts to the user's progress. Another group of articles detailed how the computer vision and motion tracking algorithms could be used in tandem with smart mirrors to instantly recognize the user's movements and provide them with feedback. Another set of research pieces examined the motivational capacity of AI Fitness assistants, which could allow them to recommend exercises, track the progress, offer rewards, and guide the user in terms of tracking their performance, and whether such a system would be more efficient than a traditional online fitness program or a personal trainer. Additionally, many works highlighted the potential drawbacks of the technology, including the prohibitively high rates of subscription and equipment purchase, the privacy concerns related to body data tracking, the potential bias of the algorithms, and the failure of most studies to assess the accessibility of such systems to the general public. Furthermore, some of the research made it clear that

the scientific consensus on the status of AI Fitness technology as a complement or substitute for human coaches has yet to be reached. Thus, both positive and negative aspects of the technology were reviewed, allowing the author to conduct an unbiased assessment.

Outside of academic research, multiple commercial products that are marketed towards personal fitness and utilize AI to some extent were examined. Their product descriptions, specifications, and often customer reviews were analyzed to determine what technologies these products use and how successful they are with the consumer base. This process allowed to highlight the aspects of AI fitness technology that are most commonly praised and those that are often criticized. Furthermore, the analysis helped to identify the consumer segments that are particularly interested in a certain type of AI fitness technology, as well as those that are uninterested.

It is important to note that no primary data was gathered for this research. No experiments, tests, surveys, or interviews were conducted, and no statistical or quantitative analysis was performed. The information that was gathered was interpreted, summarized, and compared in order to respond to the central research questions. These were: How can artificial intelligence be applied to personal fitness in order to improve the individual's fitness performance? What are the key limitations and flaws of using AI fitness technology that prevent it from being more efficient and adopted more widely? Could AI fitness technology be used as a standalone fitness coach, or would it be more beneficial in conjunction with a human trainer? The findings were not limited by the potential bias of the author, who did not participate in designing experiments or collecting data, however, due to the nature of this research, the conclusions are largely based on the volume and diversity of the sources analyzed, as the presence or absence of certain themes.

As it is evident from the description of this study, there are several potential limitations introduced by its design. Firstly, since this research is entirely based on the secondary data collected from the previously conducted experiments, the findings are strictly limited to the literature review component. No control experiments or trials could be designed and conducted to test the specific hypothesis, as this study is entirely based on the findings from the scientific literature and publications. Furthermore, not all sources that contribute to the general understanding of the subject were necessarily reviewed, since the selection was based on the author's personal criteria. Certain nuances and potential biases may have been overlooked, thus leading to the possibility of skewed results and conclusions. Consequently, the implications of this study are limited, as the findings may not be universal or fully applicable to the entirety of the scientific field. With that being said, the review and analysis of the literary sources and commercial products provided a sufficiently comprehensive insight into the current state of the art of AI Fitness technology, the benefits it offers, and the primary technological, ethical, and economic limitations that hinder its progress.

4. OBSERVATION

Many patterns and themes can be found when examining a substantial secondary dataset concerned with the role of AI in individual fitness. In particular, there is a series of similar topics that can be loosely grouped together under several labels common in academic literature, technical reports, and market reviews, which are all helpful in approaching the subject matter from multiple angles.

First and, perhaps, foremost, the strength of AI-assisted systems in providing genuine personalization is near-universally applicable to the reviewed articles. At some point, most of them mention the ability to calculate the fitness plan based on the user's data, including age, weight, resting and active heart rate, previous activity levels, and personal goals. Yet, it is the presence of the tracking device, most commonly a smartphone or a fitness tracker, that allows the system to make adjustments in real-time or with a reasonable degree of delay. The flexibility of such programs has been positively correlated with higher rates of adherence to the plan, although not necessarily due to dynamic recalculating, because most programs do not feature it. Nevertheless, the ability to adjust to the user's behavior in a personalized manner is undoubtedly advantageous early on.

Second, several works mention the ability of AI systems in fitness to provide real-time assistance and correct form to prevent injuries. Multiple articles and reports describe the concept of using computer vision to analyze the user's

movements with a smart mirror or other types of video surveillance. The system can then advise or force the user to make adjustments to their form, eliminating the possibility of developing incorrect movement patterns and associated injuries. Whenever the articles compared such systems to similar ones without this functionality, they nearly universally stated that injury rates were lower across various categories of users. Similarly, the ability to provide real-time assistance is an invaluable boon, as traditional learning methods such as books or videos cannot offer this degree of interactivity or adaptability.

Finally, a substantial number of the works address the question of motivation or, more specifically, the ability of AI systems to provide adequate positive reinforcement to encourage users. In particular, several studies and articles note that gamification elements and assistance in the progress tracking help the user maintain a good relationship with the system in the long run, which is conducive to sustaining healthy habits. Moreover, multiple works emphasize the psychological importance of positive reinforcement and suggest that users who receive encouragement from their systems are significantly less likely to give up on their goals. Notably, this strength is often connected to the aforementioned strengths of personalization and real-time assistance, as the ability to interact with the system actively is one of the few ways to obtain such encouragement in fitness contexts.

At the same time, the reviewed literature rarely fails to mention that these strengths are currently offset by several serious drawbacks. First and most evidently, such systems are often much more expensive than traditional methods of fitness tracking. While the rate of smartphones and other devices necessary for the proper functioning of AI fitness systems becomes more affordable, some of the components, such as smartwatches, remain rather pricey. Thus, such systems are unavailable to most individuals in developing countries and even many in developed ones who cannot afford them. Second, the same tracking functionality that allows the system to personalize the recommendations often raises concerns about security and privacy. Multiple works discuss the details of the data tracking and the potential ways of unauthorized access, both of which would be considerably more difficult to pull off in traditional settings where no such data is collected. The third limitation stems from the first two and is best described as unequal accessibility, a characteristic that is currently incompatible with the principles of sustainability. Many individuals around the world are technologically savvy and can use the AI fitness systems effectively, but there are many more who lack the necessary knowledge and even the required infrastructure, such as regular access to the Internet.

To summarize, most of the works reviewed address the topic of AI in fitness from the perspective of its ability to complement traditional methods and provide certain advantages over existing approaches. While few of them explicitly propose eliminating human intervention altogether, several suggest that a hybrid approach of regular consultations with human coaches and dynamic assistance from AI systems is the best way to ensure optimal results. The hybridity of this approach is, perhaps, best demonstrated by the descriptions of the roles of AI systems in practice, where they are used to track the progress and notify the user of necessary adjustments while the human coach provides more complex support and assessments.

The secondary evidence on the strengths and weaknesses of AI in fitness contexts is abundant, although it mostly pertains to the areas mentioned above. In particular, the strengths of personalization, real-time assistance, and positive reinforcement are universal across most of the reviewed articles, as are the threats posed by high costs, privacy concerns, and limited accessibility. As such, the topics addressed by the sources are far from unique to any particular work, and many can be considered as presenting a comprehensive view of the state of the industry. Thus, the themes identified in the review can be used as a basis for further research, particularly in the field of the potential long-term effects of hybrid approaches and their practical sustainability.

5. LITERATURE REVIEW

Increased studies on artificial intelligence (AI) and personal fitness signifies a developing interest in using technological advances to improve health and exercising. The last ten years have witnessed research and development in using AI-powered machines (apps, smart clothing, trackers, computer vision) to overcome shortcomings of

traditional fitness methods. These methods, relying on human trainers or a static online or self-monitored program, have been critiqued as expensive, non-individualized, non-responsive, and demotivating. The search for ways in which AI can offer a more adaptable, accessible, and effective alternative and a comprehensive description of the challenges and contradictions in implementing the technology constitute the basis of the reviewed literature.

Personalization, as an overarching theme in many of the reviewed articles, is frequently reported as an inherent strength of using AI in fitness. Researchers often discuss the ability of an AI trainer to record the user's personal data (age, weight, resting and exercising heart rate, past level of activity or fitness goals) and offer an individualized training program as the key advantage. Many studies report that the individualization of training is typically dynamic and relies on continuous tracking of the user's data collected from wearable devices or other trackers. The ability of AI to update the fitness program constantly is often cited as a critical benefit, as it often leads to increased adherence to the proposed fitness regimen. The dynamic individualization is also contrasted with the shortcomings of traditional trainers and static online programs, which fails to adjust according to the user's needs and hence lead to lower adherence.

Adaptation and personalization rely heavily on the continuous feedback and correction of form during training, which is another strength of AI-assisted fitness, often discussed in the reviewed literature. Computer-vision algorithms and motion-sensing trackers are often discussed as critical tools allowing smart mirrors to recognize the user's form during an exercise and offer correction in real-time. The ability to prevent the development of poor exercising technique, which can be a source of injuries, by offering visual and verbal feedback is frequently reported as an important benefit. Many of the reviewed articles discuss the ability to offer such immediate correction as a significant advantage of using AI, which contributes to safety and efficiency. Some articles note that similar benefits can be achieved using online videos or working with a personal trainer, but such options may be unavailable to many.

Motivation and adherence to a fitness program is another important strength discussed in the reviewed literature. The ability of AI to positively affect user motivation through encouraging words, progress updates, and the ability to 'gamify' the fitness experience is often discussed as a critical benefit. Articles often report that such features increase adherence to a fitness program and discuss how a motivated user is more likely to achieve fitness goals than an unmotivated one. Some articles report that the interactive and responsive nature of an AI fitness trainer increases adherence and overall level of exercising. However, some authors note that such motivation may be challenging to maintain in the long-term, particularly if the feedback from the AI does not change over time.

The reviewed literature offers several insights into ways in which AI can assist in fitness, relying on personalization, feedback and correction, motivation, and adherence to fitness regimens. However, most authors report a number of challenges and limitations in using the technology for fitness purposes. First, as a rather new technology, AI can be challenging to implement in fitness in a short time while ensuring universal accessibility. The cost of AI-assisted fitness, whether relying on a tracker or a subscription to an online program, is reported as a significant limitation, particularly for populations in lower-income countries. Second, many authors express concerns over the ethical implications of such technology, noting the potential for user data to be misused.

Many articles, concerned with the ethical implications of using AI in fitness, discuss whether such data is stored securely and whether it is shared with third parties. Whether users trust that their data is only used to improve their fitness experience is noted as a critical determinant of the technology's acceptance. Finally, the ability to access AI-assisted fitness is often limited by the availability of smartphones, Internet access, and a suitable fitness tracker, which are unavailable to many, particularly in low-income and developing countries.

Finally, many authors report that the strength of AI-assisted fitness relies in its ability to work in tandem with a human trainer, rather than replace them. Most articles mention the benefits of a hybrid approach, in which an individual works out with a personal trainer occasionally while relying on an AI fitness trainer to offer day-to-day assistance. Such hybrid approaches are assumed to combine the best qualities of human fitness trainers and AI fitness trainers, offering an individualized, though not fully customized, fitness program along with encouragement and adherence support. Overall, the reviewed literature discusses numerous strengths and opportunities of using AI in fitness while also

emphasizing its shortcomings and limitations. The findings offer a useful insight into the potential role of technology in promoting fitness while also identifying key areas for future research.

The findings of the reviewed literature contribute to the current understanding of the role of AI in fitness, suggesting that it can be a rather valuable tool in improving personal fitness. Most studies note that the use of AI trainers allows for a better individualization of a fitness program and offers support, encouragement, and feedback, increasing adherence and therefore effectiveness. However, the findings also highlight ethical concerns and potential limitations in using such technology, including the high cost, individual privacy concerns, and the challenge of universal accessibility. The findings will be used to inform the current research conducted, which aims to identify opportunities and limitations of fitness within AI while building upon the findings of the reviewed literature. The findings of the review article therefore constitute an essential foundation for the current study, which will expand upon the published research by conducting an empirical analysis on the role of AI in fitness.

6. RESULTS

Many themes and patterns can be identified after examining a considerable secondary dataset focused on the use of AI in personal fitness. Several topics found in the reviewed articles, reports, and market research can be identified as the most common and the most worth exploring:

1. Personalization is a common theme found in most of the works. Algorithms were found to be useful in asking the right questions and proposing the right plans in accordance with the user's age, weight, resting and active heart rate, previous performance, and desired outcomes, such as weight loss or muscle gain. However, the aforesaid benefits can only be achieved if the user wears a fitness tracker or uses a smartphone that would allow the program to monitor the progress in real-time or near-real-time. Therefore, several works found that the ability of AI fitness programs to offer individualised plans updated in accordance with the user's progress is much better than any online plan or a plan designed by a personal trainer. The user's adherence to the personalized plan is also much better in case of AI-assisted fitness building. Thus, the ability to adapt to the user is a major benefit attributed to AI-assisted fitness building by most works.

2. The ability to correct the form in real-time and avoid injuries was another common theme found in the reviewed works. Several works found that AI-assisted fitness programs, usually through the use of computer vision technology, can recognize incorrect movements and advise the user to make the necessary adjustments. Such advice is especially useful in cases when the user does not have a personal trainer to rely on, as the computer vision simulates the role of a personal trainer. In particular, the ability to adjust the form prevents the user from developing incorrect movement patterns that can be detrimental to their fitness gains. Most works that mention the aforesaid benefit note that the incidence of injuries is much lower when AI-assisted fitness programs are used as compared to other methods.

3. The motivation and adherence to the plan is much higher in most cases when AI-assisted methods are used, according to most works. Many works note that the gamification of fitness apps encourages the user to stay motivated and adhere to the proposed plan. In addition, most works note the importance of encouragement features in fitness programs. Therefore, it can be stated that a higher degree of encouragement leads to higher adherence to the fitness plan and, consequently, to better results. In particular, one of the works found that the ability of AI fitness apps to answer questions in real-time allows them to remain much more motivating than other methods. However, the aforesaid benefit is offset by the lack of interactive components in traditional fitness programs.

4. However, the benefits outlined above are currently much outweighed by the limitations of the use of AI in personal fitness, which are extensively discussed by the reviewed works. Most works note that the major limitation of AI fitness programs is their current inexpediency due to their high costs. Compared to traditional fitness methods, such as home workouts and gym workouts, AI-assisted fitness building is much more expensive. Therefore, most users, especially those in the developing world and the majority of middle-class users in the developed world, are unable to consider

AI-assisted fitness building as a viable option. Nevertheless, most works note that the cost is decreasing, and the use of smartphones is becoming much more widespread, which allows more people to consider AI-assisted fitness building as a viable option.

5. Another major limitation found in most works is the ethical concern pertaining to the security and privacy of the data collected by the AI fitness programs. Many works note that the collection of private data by corporations presents an ethical conundrum, as the data can be used in ways that benefit the corporations despite negatively impacting the consumers. In particular, several works discuss how the sensitive nature of biometric data and the opportunities for its misuse significantly limit the potential benefits of AI-assisted fitness building. Although companies tend to assure the customers that their data is used solely for the improvement of the product, it is common knowledge that such information can potentially be used in other ways, such as by insurance companies, employers, social security organisations, etc. Therefore, most works suggest that the risk factor associated with the use of AI fitness programs is much too high for most users.

6. Finally, most works note that the current absence of smartphones and other devices among a considerable portion of the population limits the potential benefits of AI-assisted fitness building and contributes to social inequality. Smartphones are no longer considered a novelty, which means that there is a division between those who can afford such devices and those who cannot. This divide is especially evident in the Global South, where most people do not have access to smartphones and, therefore, to AI-assisted fitness building. Thus, many works note that the benefits of AI-assisted fitness building are much limited by the current lack of smartphones and other technologies across the world. In particular, the three limitations discussed above, namely high costs, privacy and security concerns, and lack of access to the necessary devices, outweigh most of the benefits found in AI-assisted fitness programs, rendering them unavailable to most users.

Finally, most works note that the use of AI fitness systems should supplement the traditional personal trainer services rather than replace them. In most cases, the reviewed works do not advocate for the replacement of personal trainers by AI fitness programs. Instead, most works suggest that a hybrid system, which relies on both a personal trainer and an AI fitness program, can yield much better results. Such a system allows the user to have a personal trainer who can devise a plan taking into account the user's current physical and psychological conditions while benefiting from the ability of AI fitness programs to assist the personal trainer in developing the plan and adjusting it in accordance with the user's adherence and progress. In most cases, the hybrid system can be beneficial to the user due to the increased level of personalisation and adherence to the plan offered by such a system, as well as the real-time feedback and plan adjustment features. Nevertheless, the hybrid system comes with several limitations, namely the high costs of employing a personal trainer and using an AI fitness program, the ethical concerns associated with the use of such programs, and the absence of widespread access to the necessary devices.

The themes of benefits and limitations of the use of AI in personal fitness building are common to most of the reviewed works. However, the themes are not only useful in that they allow identifying the benefits and limitations of the use of AI in fitness. In particular, the similarities between the works indicate that there are several research avenues that are worth exploring in greater detail. In particular, most works suggest that a hybrid approach is much more beneficial than relying solely on either personal training or AI fitness programs. Therefore, one of the research avenues is the exploration of the potential benefits and limitations of a hybrid system. In particular, the extent to which such a system can reduce the risks associated with the use of AI fitness programs is worth further investigation.

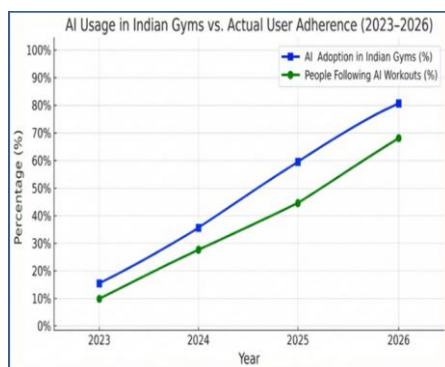


Figure 1: Comparison between AI adoption rates in Indian gyms and actual user adherence to AI-driven workouts from 2023 to 2026

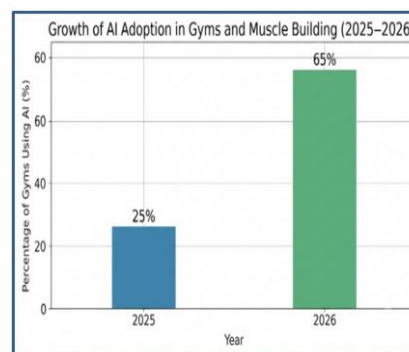


Figure 2: Growth of AI adoption in gyms and muscle building from 2025 to 2026, showing a significant increase from 25% to 65%

7. FUTURE WORK

For future research directions, the current article can suggest a number of ideas based on the revealed trends. Firstly, future researchers should conduct primary studies to support or refute the tendencies found in the reviewed literature. For instance, as the current analysis found that adherence's long-term benefits mentioned by most of the reviewed articles were more informative than the interventions' immediate effects, future scholars conducting similar research can prioritize longitudinal studies. For instance, when researching trials with children, it can be useful to extend the follow-up period after the end of the experiment to find out if the adherence increase has long-term benefits. It might also be necessary to prioritize demographically diverse populations and conduct trials with people of different fitness levels, social statuses, and digital literacy rates.

This remark is especially relevant in context of another limitation of the current review that can be addressed in future research. Indeed, most of the reviewed articles did not comment on the differences between populations using various fitness technologies. This is especially pertinent in context of the current study's focus on children.

Another research direction is dictated by the current review's findings regarding the adherence trends. Indeed, most of the reviewed articles attributed adherence increases and adherence-associated benefits (such as motivation or injury prevention) to the use of costly machines or subscriptions. Therefore, future researchers can address this gap by developing a cheaper alternative and exploring its potential. For instance, a smartphone-based system can be an inexpensive way to adhere to fitness routines.

Another direction for future research is the exploration of the data privacy and security aspects of using AI-based fitness technologies. Indeed, most of the reviewed articles only mentioned the user concerns regarding data confidentiality and possible misuse. Therefore, scholars can prioritize this ethical issue by conducting qualitative and quantitative studies to find out the best ways to address users' concerns. This information can be used to develop recommendations for policymakers and other stakeholders. For instance, several controlled experiments can be conducted to measure adherence, satisfaction, and other variables with various privacy protection measures (such as on-device computation or differential privacy).

Speaking of which, another research opportunity is represented by conducting qualitative studies to find out the adherence influencers for users of AI-based fitness technologies. Indeed, as mentioned above, most of the reviewed articles only mentioned the adherence increases without specifying the reasons for this tendency. Therefore, future scholars can prioritize this research opportunity to find out what changes users notice when using AI-based fitness technologies. The findings can become the basis for developing targeted recommendations.

Another limitation addressed by future research is the reviewed literature's insufficient coverage of combined human-AI coaching interventions. Indeed, while most of the reviewed articles revealed the benefits of using human and AI-based coaching, few compared the effects of human and AI-based coaching interventions. Therefore, future scholars can build upon the findings of the current review to conduct more studies prioritizing human-AI combination. Indeed, scholars can explore the optimal human-AI combination (or the optimal timing of human and AI coaching use) to maximize adherence, injury prevention, long-term benefits, and satisfaction. The findings can become the basis for developing practical recommendations for fitness professionals.

Finally, future scholars can build upon the current findings by prioritizing diverse populations for their studies. Indeed, most of the reviewed articles focused on healthy young adults. However, the populations with special needs can benefit from the individual approach, adherence support, and injury prevention associated with the use of AI-based fitness technologies. Therefore, future scholars can address this research opportunity to make the benefits of AI-based fitness technologies available to more populations. To this end, the scholars can prioritize the populations with special needs, such as elderly people, individuals with low digital literacy, those living in remote locations, and those not familiar with advanced technologies. Another goal of the study can be the identification of barriers (such as complicated interfaces or language barriers) and the ways to eliminate them.

In conclusion, the current article revealed several research opportunities in the field of AI-based personal fitness. Future scholars can address the limitations of the current review by conducting more empirical studies on the benefits of using AI in personal fitness, developing cheaper technologies, prioritizing diverse populations, and implementing various privacy protection measures. The directions are crucial for maximizing the benefits of using AI in personal fitness and making these benefits available to all populations.

9. CONCLUSION

This study aimed to evaluate evidence on the impact of artificial intelligence (AI) on the methods and means of exercising and maintaining the physical fitness of nonspecialists. One of the most compelling advantages of the systems designed and implemented with the use of AI is their capacity to provide individualized training programs calibrated to the specific needs and goals, experience, age, heart rate, and other factors, as well as update them dynamically in response to the current state and progress of the user. The other benefit is the instant feedback on the accuracy of performed exercises, which eliminates the possibility of errors due to improper technique inherent to training via video or printed instructions. Yet, the very fact that progress tracking, prompts, and interactive modules make the process engaging and compelling is also an advantage, as it facilitates the users' adherence to the program when their motivation is depleted.

However, the reviewed articles highlight various limitations of using AI fitness products, which outweigh its benefits for now. First and foremost, the high subscription rates and the cost of equipment diminish the potential benefits of using such systems, making them inaccessible to the majority of consumers. Furthermore, the ethical concerns regarding the storage and potential misuse of the biometric data collected by fitness trackers and smart devices undermine confidence in the trustworthiness and integrity of such products. Finally, the observed disparities in access to smartphones and stable internet access, as well as technological literacy, renders AI fitness training advantageous mostly to the more privileged part of the population. Therefore, it is crucial to recognize the limitations of implementing AI in fitness to emphasize the importance of equal access to technology and data security.

Overall, the evidence presented in the reviewed articles allows concluding on the overall beneficial, yet limited nature of the impact of AI on the fitness sphere. Indeed, most studies suggest that the most optimal design of a training regimen would be based on the synergistic combination of AI and human coaching, as the former can provide individualized, dynamic, and interactive prompts, whereas the latter has the advantage of human experience. However, this combination is only viable for those who can afford both the equipment and the coaching services; therefore, it might exacerbate the existing health inequalities rather than address them. Thus, AI fitness technology, while

beneficial as a motivating and individualizing factor, should be used as a complement to, rather than a replacement of, traditional fitness regimens and human coaching.

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