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GENDER EQUALITY AND ARTIFICIAL INTELLIGENCE

Abstract

In recent years, artificial intelligence has made significant progress, leading to a wide variety of applications, such as speech recognition, product recommendations, language translation, and many other applications. Although gender equality and artificial intelligence can be considered separate fields, they are closely related and mutually influence each other. The purpose of this paper is to outline various aspects of relationship between gender equality and artificial intelligence, to identify interrelationship between them, and to present challenges and possible solutions to problems arising from their connection. This text will present the issue of gender equality in the development of artificial intelligence, but also the impact of artificial intelligence on gender equality; challenges and possible solutions, successful examples and case studies, legislation and policies supporting gender balance in artificial intelligence, the impact of gender equality on quality and innovation in artificial intelligence; the future of dynamics of development of relationship of gender equality and artificial intelligence.

Keywords: *gender equality, artificial intelligence, ChatGPT3, STEM, multidisciplinarity.*

Introduction

The direct occasion for this essay on gender equality and artificial intelligence (AI) is the emergence of ChatGPT3 technology in late 2022, presented by the research laboratory OpenAI Inc (Tingiris and Kinsella 2021). This event is so revolutionary that it has caused a tectonic shift in the AI and ICT sectors that we are already feeling at the beginning of 2023. ChatGPT is a large artificial intelligence language model that is trained to understand and generate text based on large amounts of semiotic data. As part of the class of "large language models", it works through a machine learning process, whereby the system learns from data in order to understand the structures and dependencies in language. One of the most famous large language models is GPT-3 which is able to process texts in different languages, to answer questions, generate texts, and participate in conversations with users. However, although large language models are very advanced, they still have limitations. They may make mistakes, generate incorrect or irrelevant information, and lack awareness or understanding of the linguistic material being processed and the communication context. GPT models use a special type of machine learning known as "unsupervised machine learning". In unsupervised machine learning, models are "trained" on large amounts of unlabelled data, without guidance on explicit tasks or responses to such data. During the "training" process, GPT uses a technique called "next word prediction" and thus "trains". During the training process, GPT models are exposed to large amounts of text, such as literature, news, websites, and other information sources. The task of the model is to learn to predict which word (character) will follow in communication text, based on "previous" communication context. It is through such language models of AI that we can see the horizon of dynamics of connections between artificial intelligence and society.

Artificial intelligence (AI) is a field that deals with development of algorithms and computing systems that can imitate or surpass the capabilities of human mind in certain tasks. In recent years, artificial intelligence has made significant progress, leading to a wide variety of applications, such as speech recognition, product recommendations, language translation, and many other applications. Although gender equality and artificial intelligence can be considered separate fields, they are closely related and mutually influence each other. Gender equality can influence the development of artificial intelligence, by including people's perspective in the field of research and development of intelligent designs, and can contribute to more innovative and efficient algorithms and systems. Also, AI can have a significant impact on achieving gender equality, when the algorithms and technologies used are designed to fight discrimination and promote gender diversity.

The aim of this essay is to outline various aspects of relationship between gender equality and artificial intelligence, to identify interrelationship between them, and to present challenges and possible solutions to problems arising from their connection. This text will present the issue of gender equality in the

development of artificial intelligence, but also the impact of artificial intelligence on gender equality; challenges and possible solutions, successful examples and case studies, legislation and policies that support gender balance in artificial intelligence, the impact of gender equality on quality and innovation in artificial intelligence; the future of dynamics of development of relationship of gender equality and artificial intelligence. With this text, I hope that readers will gain a deeper understanding of the importance of gender equality in the development of artificial intelligence, and of the potential of artificial intelligence to alleviate and transform gender inequalities in society.

Gender equality and the development of artificial intelligence

Gender equality has a great importance in the development of artificial intelligence, and as an indicator of this we can point out several "gender issues" that are manifested in several key areas of AI. From the low representation of women in the fields of science, technology, engineering and mathematics (STEM), it can be concluded that this under-representation of women is also present in the artificial intelligence sector. This phenomenon can have serious consequences on the quality and innovation of artificial intelligence and its application. If we analyse the impact of gender equality in the field of education and research, we will notice the presence of stereotypes and prejudices in the context of relationship "women and technology", which can affect the choice of study programs and directions of research, and to potentially limited opportunities, accesses and resources for women in artificial intelligence. Increasing access and support for women in STEM fields can break down stereotypes and facilitate more effective and inclusive education, research and development (Walther et al. 2023).

The "gender issue" in AI is the issue of gender stereotypes and prejudices in the very development of artificial intelligence. Artificial intelligence algorithms learn from large masses of data, which are usually extracted from the Internet or other textual sources. These data often reflect existing attitudes, opinions and cultural norms of society, including negative aspects such as gender stereotypes and prejudices. When algorithms learn from this data, they can learn and apply stereotypes and biases in their responses and predictions. This happens because algorithms learn from patterns in the data, without understanding the context, moral values, or social consequences behind those patterns. Thus, if the data contains gender stereotypes or biases, the algorithms are likely to adopt and emphasize them. In this context, it is important that researchers and computer programmers develop methods and algorithms that will reduce bias in artificial intelligence. This can include better representation of different groups in the training data, applying techniques to deal with bias at the algorithm level, and actively testing artificial intelligence for bias.

As a starting principle, we must assume that gender equality plays a significant role in the development of artificial intelligence, and increasing gender diversity in this sector can contribute to a better understanding of the

needs and challenges brought by gender differences and facilitate development of innovative and efficient technologies. In order to achieve such goals, it is necessary to take active measures for promotion of gender equality and to develop systemic steps that will remove gender stereotypes and prejudices (Schwartz et al. 2022).

The Interaction of Artificial Intelligence and Gender Equality

Artificial intelligence can have a significant impact on gender equality in society, as it can influence reduction of gender discrimination in various aspects of life. We can present several examples of application of AI in reducing gender discrimination. First example concerns a possible role of artificial intelligence in promotion of gender equality in workplaces. Algorithms and systems of artificial intelligence can be used to identify and analyse factors that influence gender discrimination in the processes of employment and career advancement. By using this information, organizations can take action to remove these barriers and work toward creating equal opportunities for all (Myers West 2020). However, the United Nations (UN) report: "The Effects of Artificial Intelligence on the Working Lives of Women" (United Nations Educational 2022) analyses the impact of artificial intelligence on women in the labour market, and warns of possible unintended consequences of the relationship of AI and gender inequality. The study looks at the challenges and opportunities offered by AI in five key areas: access and digital skills, women's participation in AI, skilling and up skilling, gender stereotypes and algorithmic transparency, concluding that more needs to be done in order to retain women at their jobs and enable them to progress in their careers by investing in their digital skills. The study also highlights the need to tackle the "gender digital divide" which reduces women's chances of finding jobs that require digital skills

Second, AI can be used to improve services and support for victims of gender-based violence. One example of the use of artificial intelligence (AI) in the fight against gender-based violence is cited by UNWOMAN (UNWomen–Headquarters 2023). It is a chatbot that supports survivors of sexual violence and assault. This AI chatbot allows victims to access information and resources in a safe and confidential space, without fear of stigma or judgment. This helps women try to seek help and use available support resources if they need it. AI programs can be developed in such a way that they can identify and respond to incidents of violence and provide support information and resources to victims. These technologies can increase the capacity of social work and justice services to deal with these problems in a timely and effective manner.

The potential of artificial intelligence to promote gender equality in education is indeed huge. Algorithms can be developed to analyse and understand the causes of gender differences in pupil and student achievement, and suggest interventions that can reduce discrimination and increase equity. Also, artificial intelligence can be used to develop personalized education that increases opportunities and performance of all students, regardless of gender.

However, there are also potential challenges and limitations in using artificial intelligence to achieve gender equality. Just as in the context of AI development, one of the main problems in the above examples is that algorithms can replicate and emphasize existing genders, stereotypes and prejudices, if they are developed and trained on a database with historical and cultural discrimination. Therefore, it is important to develop and use methods that are sensitive to gender issues and that actively seek to reduce prejudice and discrimination (Manasi et al. 2022).

How gender equality can contribute to a better understanding of the needs of users of artificial intelligence services in various commercial and non-commercial activities is also an important question. The inclusion of persons of different gender categories in the development and application of artificial intelligence technologies enables a better understanding of the needs, interests and challenges of different users. Such an approach can improve the quality and efficiency of services and products based on artificial intelligence. "Gender diversity" has a key impact on innovation and creativity in the AI sector. Teams made up of professionals from diverse gender backgrounds can bring different ideas, perspectives and solutions to problems.

Apart from the user aspect, gender equality can play a key role in the development and successful implementation of artificial intelligence technologies. When professionals from diverse gender backgrounds are involved in the process of developing, testing and deploying artificial intelligence, we can be sure that algorithms and systems will be designed with attention to the diverse needs and problems of all users. This can contribute to the development of innovative and effective algorithms, applications and systems, which will improve the quality and scope of artificial intelligence services. All of this can contribute to the achievement of personal and collective well-being, given the wide range of social, economic and cultural factors that influence creation of AI application solutions (Leavy 2018).

By ensuring conditions for gender equality in the artificial intelligence sector, efficiency and effectiveness of artificial intelligence-based services can be improved. Such a situation can enable responsible and ethical use of technologies, and also enable the sector to benefit from its potential to contribute to the advancement of society as a whole. Gender equality is of key importance to the success of artificial intelligence and should be a central element in the development of policies, laws and practices governing these technologies. The inclusion of people with different gender backgrounds in the artificial intelligence sector can contribute to improvement of quality and innovation, as well as to enable successful implementation of artificial intelligence. Also, this can contribute to moving towards a permanent and sustainable society, which reflects and satisfies the needs of all its members.

Challenges and possible solutions to the problems of gender equality and AI

Gender bias and discrimination in artificial intelligence "training data" are serious challenges that can have negative consequences for gender equality. The data used to train the algorithms is often based on historical and cultural practices that contain gender stereotypes and biases. Therefore, it is important to identify and limit the impact of this gender bias in the development of artificial intelligence. One way to address this challenge is to develop inclusive artificial intelligence algorithms that are gender sensitive and that actively seek to reduce bias and discrimination. This can include using data from various sources and with a wider range of gender perspectives, as well as using machine learning techniques that focus on detecting and removing bias (Lucy and Bamman 2018).

Preserving privacy and ethical standards when using artificial intelligence is also a key challenge. It is important to protect users' personal and sensitive information, and to regulate the processes of data collection, storage and processing. This can be achieved by implementing strict security and ethics protocols, and by ensuring transparency and accountability in working with artificial intelligence. Transparency and accountability are two more key elements in the process of preserving privacy and ethical standards. Companies and organizations that develop and use artificial intelligence should be transparent about the algorithms and processes they use, and be accountable for their impact on users and society. This may include providing information about how decisions are made and what data is used, as well as enabling transparency by third parties or regulatory authorities. Additionally, education and training of AI engineers and industry professionals is essential to improve ethical standards. They should be aware of the potential problems that can arise from improper use of technology and have the skills to identify and address potential ethical issues. This can be achieved through specialized training and courses that focus on ethical aspect of artificial intelligence, by introducing ethical modules in study programs and learning ethical practices at work.

Collaboration between different sectors, including private sector, academia, government and non-governmental organizations, is also of key importance to developing standards and regulations that will ensure privacy protection and ethical standards in the use of artificial intelligence. This would include dialogue and cooperation in the creation of laws and rules that will guarantee protection of user data and sensitive information, while also supporting innovative and technological progress. By introducing stronger standards and regulations, more transparency and accountability, as well as continuous education and development of ethical practices, better preservation of privacy and ethical standards in the use of artificial intelligence can be achieved. These efforts will ensure safe and responsible use of AI, along with the realization of positive and long-lasting impacts on society and the individuals who use these technologies.

Challenges related to gender bias and discrimination in artificial intelligence training data, development of inclusive algorithms, and preservation

of privacy and ethical standards can be met by engaging academia, industry, and society in a comprehensive AI research and development process. Cooperation and interaction between different disciplines, sectors and interest groups can be of crucial importance to achieving these goals. It is also important to strengthen mechanisms for supervision and control of the use of artificial intelligence, including development of regulatory frameworks and standards that will guarantee the use of technologies in an appropriate and ethical manner. Finally, in order to achieve continuous improvement in artificial intelligence and to ensure a positive impact on gender equality, academia, industry and society must remain engaged in an open and constructive dialogue. Joint efforts of all participants will enable development of artificial intelligence that is responsible, inclusive and appropriate for the needs of all members of society.

Successful examples and case studies and gender-sensitive AI legislation

Successful initiatives and projects that promote gender balance in the artificial intelligence sector are essential to achieving gender equality in this field. Some of these initiatives include scholarship programs, workshops and seminars for training and inclusion of women and marginalized communities in the technology industry. Examples of companies actively working to improve gender equality and inclusion are wide ranging. Some major tech companies, such as Google and Microsoft, invest in programs that support gender diversity and the development of girls and women in engineering and science. These include sponsorships, scholarships, seminars and workshops for female and male students, as well as supporting organizations that promote gender equality in the technology industry (Myonghee Kim et al. 2020).

The importance of mentorship and support networks in the tech sector cannot be understated. These resources allow people of different genders to develop their careers, acquire new skills and create connections with others who share the same goals. Successful examples of support networks and organizations include women in technology associations, LGBTI+ community support groups, and other groups focused on development of marginalized communities in the technology industry. Case studies also show that companies that apply effective gender equality strategies are more likely to achieve success and generate innovation (Insights on Diversity and Inclusion | McKinsey & Company 2023). This is proven through the emergence of new products and services that meet the needs of various users and members of society. Also, research shows that companies with a higher degree of gender diversification are better at adapting to market changes and retaining talent. Some of the successful case studies and examples of these strategies include companies that apply best practices for development of employees, such as providing non-reimbursable help and support for parents, offering work-life balance and implementing employment equity policies and the advancement of employees.

Successful examples and case studies show that gender equality and inclusive artificial intelligence can be achieved together. Best practices and

initiatives in this area should be adopted and integrated into the development of artificial intelligence, in order to ensure positive and inclusive progress in technological sector. Researching and adopting these successful examples will help academia, industry and society recognize and address issues and challenges related to gender equality in the field of artificial intelligence.

Regional and international laws and policies that ensure gender equality are crucial to achieving gender balance in the AI sector. Workplace equality laws, anti-discrimination policies and measures to support gender equality are examples of regulations that have a significant impact on ensuring gender equality in industry. The role of governments and international organizations in regulating the sector is essential. They have the responsibility to develop and implement laws and policies that will protect and promote gender balance. This includes application of international agreements and conventions, such as the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) and the Equality Strategy of the European Union (UNESCO 2020).

Best practices and recommendations for the development of gender-sensitive laws and policies are very important for achieving progress in this area. It is important to review successful initiatives and adapt them to different contexts. Some of the best practices include:

Inclusive employment and promotion processes;

Ensuring equality of education and training: it is very important to adopt measures to support gender equality in the field of education and professional development, in order to reduce gender gap in technical and scientific disciplines;

Promotion of gender equality in corporate culture: companies should create an inclusive corporate culture and eliminate stereotypes that can lead to discrimination and marginalization;

Providing support for mentoring and networks: governments and international organizations should support mentoring initiatives and networks that encourage women and other marginalized communities to get involved in the AI sector;

Monitoring and evaluation: to ensure effectiveness of laws and policies, it is necessary to conduct continuous monitoring and evaluation of their impact on gender equality in the artificial intelligence sector.

Cooperation between governments, international organizations, academia, industry and civil society can provide support for development and implementation of gender-sensitive laws and policies. This will allow all genders to be involved in the artificial intelligence sector and contribute to innovation and technological progress that reflect the needs and interests of society as a whole.

Conclusion: the future of gender equality and artificial intelligence

The vision for a gender-equal and inclusive future in the AI sector must be based on achieving gender-equal and inclusive technologies and algorithms.

This may include development of strategies to ensure gender equality at all levels of AI development and application process, as well as promotion of gender-sensitive policies and regulations.

Some of possible technological advances that will increase the impact of artificial intelligence on gender equality could be the improvement of algorithms for the analysis and recognition of gender-biased data, development of inclusive and gender-sensitive interfaces and user experiences, as well as construction of gender-equal technology teams and organizations. Preparing future generations for transformation of this sector and its gender aspects are crucial. In order to prepare future generations for transformation of the AI sector and its gender aspects, educational institutions and state authorities should work together to develop and implement gender-equal educational programs and practices. This may include developing textbooks and materials that encourage gender equality and diversity, promoting participation of young women and girls in STEM fields, and supporting mentoring and support networks for students of different genders. Collaboration between academic and private institutions can strengthen the AI sector's engagement in the area of gender equality. This could include creating partnerships between universities and companies developing artificial intelligence, in order to provide practical experiences and internships for students. In the future, gender equality in the field of artificial intelligence may result in the emergence of researchers who will develop and use artificial intelligence with more empathy, social awareness and responsibility (Lorentzen 2022).

This paper has outlined various aspects of gender equality in the AI sector, highlighting challenges, successful examples and the importance of legislative and policy content. Gender equality is a key element in development of innovative and responsible technologies, and the artificial intelligence sector is no exception. The importance of continued efforts to achieve gender equality in the AI sector should not be underestimated. With the development of a gender-equal and inclusive future in this field, we can remain hopeful that technologies will be created that will meet the needs of all users, regardless of their gender, and contribute to individual and societal benefits.

In the light of all this information, it can be concluded that a broad engagement is needed by all participants in the discussion about gender equality in artificial intelligence in order to contribute to the realization of this goal. This can be done through education, participation in the development of new technologies, sharing experiences and best practices, and actively supporting legislation and policies that ensure gender balance in the AI sector. Cooperation between different countries, international organizations, academic institutions, companies and individuals will be essential to achieve gender equality and increase innovation and performance in this area. Joint efforts should focus on development of gender-sensitive algorithms and technologies, provision of gender-sensitive laws and policies, and creation of inclusive mentoring programs and support networks.

In order to achieve gender equality in the development of artificial intelligence, several approaches and strategies can be implemented. Such strategic approaches include increasing gender diversity in teams working on the development of artificial intelligence, advancing the education and research concerning women in the STEM fields, and developing gender-sensitive algorithms and systems that actively seek to address them or minimize potential prejudice and discrimination.

In the future, we can expect artificial intelligence to have an ever-increasing impact on our society and our lives. It is important to ensure that future generations are prepared for transformation of this sector and its gender aspects. Educational system and academic institutions should be actively engaged in preparing students, especially girls and young women, to become part of this dynamic sector. Through innovation in artificial intelligence and continued efforts for inclusivity and equality, we can build a future that all members of society deserve.

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