The Recruitment and Selection HR process through Artificial Intelligence: an analysis of the aspects of acceptance, validity and interaction with the human decision maker

Andrea Rezzani[1]

[1]*Università degli studi di Torino, Via Verdi 8, Torino, Italy*

Abstract

The problem I intend to address in my industrial PhD is the lack of data regarding the acceptance and experience of users involved in the transformation of recruitment and selection processes as a result of the hypothetical, but now quite realistic, application of Artificial Intelligence. The program aims to bring advanced research into an industrial environment within an IT company. It aims to explore theoretical issues about the level of acceptance towards AI technologies and human/artificial factors involved in decision making, including associated biases and ethical concerns. Here, I present an overview of the literature conducted during the first year of my doctoral program and a preliminary study regarding candidates' perceptions of initiating a computer-based selection process. Finally, I discuss some future research that I would like to develop over the course of my upcoming studies.

Keywords

Artificial Intelligence, Human Computer Interaction, Recruitment and Personnel Selection

1. Problem statement

The problem I am dealing with is the lack of data on the reliability and acceptance of Artificial Intelligence (AI) recruiting technologies.

Human resources are considered the heart of any organization, regardless of corporate's size, structure or culture. Indeed, one of the most important factors in a successful business, large or small, is the people who build it.

In recent years, we have seen two trends that are the affirmation of the central role of human capital in driving corporate competitive advantage and the progressive difficulty in retaining talent also referred to as the "War of the talent" [1]. As a result, recruiting has become a strategic business activity rather than a tactical HR activity [2].

During my experience as a HR Specialist in a Technology Consulting Company I approached the emerging market trends in this area and I found that AI, as the broad discipline that studies and implements systems that simulate human behavior and thinking [3], is the most promising solution to improve and optimize HR activities.

AI plays and will play an increasingly central role within organizations to cope with the changes imposed by digitalization to attract talent, reduce time and costs, and improve the matching between supply and demand [4]. In this scenario, some questions arise: what is the impact of human-computer interaction during recruitment and selection processes? Will it be possible to replace humans in such a sensitive decision-making process as personnel selection? What are the ethical concerns involved in this transformation?

CHItaly 2021 Joint Proceedings of Interactive Experiences and Doctoral Consortium, July 11-13, 2021, Bolzano, Italy
EMAIL: andrea.rezzani@unito.it (A. Rezzani)

2. Current status of the problem domain and related solutions

Current investigations about the application of AI to recruitment and personnel selection processes are often difficult to compare and put questions about reliability, validity, ethical concerns, personal data treatment and user's perception [5, 2].

Literature is more focused on the technical aspects and there is little empirical research on how candidates and HR professionals react to AI-based recruitment.

Although the various companies that are beginning to use AI technologies testify their improvement in terms of diversity and cost-efficiency, such as the case of Unilever [6], their data do not give insight into the dynamics and impacts related to human-computer interaction.

Evidence that these technologies are objectively effective, in terms of reliability and validity, does not imply that they are perceived or experienced as such. In fact, an aversion towards AI tools could cause a long-term failure to exploit the potential of the tools currently on the market.

On the one hand, AI might be appreciated by candidates for its innovativeness and by HR professionals for its ability to reduce stressful activities by automating repetitive and unrewarding tasks. On the other hand, it is also plausible that AI could generate mistrust towards companies for both users - candidates might not feel adequately considered and HR professionals might feel easily replaced by computers.

The major challenge for AI-recruitment is the application to the stages where human-computer interaction is needed due to its potential biases and ethical concerns [7, 8].

The opacity and lack of transparency of the operating mechanisms of Artificial Intelligence systems make these tools sometimes perceived unreliable and even potentially dangerous [9].

Moreover, the blind application of machine learning runs the risk of amplifying biases present in data [10].

The use of AI can breach fundamental rights such as non-discrimination based on sex, racial or ethnic origin, religion or belief, disability, age or sexual orientation, protection of personal data and private life. These risks might result from flaws in the overall design of AI systems or from the use of data without correcting possible bias.

The solution often mentioned - tweaking the AI systems to make them neutral to sensitive information - is quite complicated because it does not guarantee that the algorithm would not devise other ways of sorting candidates that could prove discriminatory. In fact, data masking is a partial solution and not always applicable. While some data represent a potential source of bias, they could be necessary also for an in-depth evaluation and for the establishment of decision-making strategies such as cognitive heuristics, which guarantee faster decision-making.

Hence, the aforementioned questions and issues are not exclusively related to technical disciplines. The purpose of my Ph.D. program is to propose a human-centric approach to the problem that can contribute to define, in collaboration with other disciplines, the theoretical and methodological aspects highlighting opportunities and advantages as well as risks and limits.

3. Approach and preliminary results achieved so far

During my first year of the Ph.D. program, I explored theoretical issues about the level of acceptance toward AI tools and human and artificial factors in decision-making, including associated bias and ethical concerns.

As accomplishments so far, I wrote a survey of the existing literature to provide an up-to-date overview of potential or actual changes related to the use of Artificial Intelligence in recruitment processes. I also conducted a preliminary study to the job attitudes towards AI-recruitment technologies by replicating an online questionnaire in order to obtain candidates' opinions on engaging in a computer-based rather than human-based recruitment process.

In the literature review, we focused on the potential AI activities in the Recruitment and Selection phases and ethical concerns. An overlap of different theories and hypotheses emerged and it was difficult to compare them due to the large number of disciplines with different theoretical and methodological perspectives.

In general, there is a common agreement in considering AI technologies as a valuable support for the HR area, because of their theoretical ability, to: automate data collection, grow the number of candidates per position, screen candidates, answer common problems and questions, provide feedback, and schedule interviews [8].

There are many solutions and applications in the field of AI technologies due to innovative techniques in natural language processing, natural language understanding, natural language generation, machine learning, predictive algorithms and computer vision. In the HR area, they are able to manage the recruiter's meetings and tasks, as well as to assess the match between candidates and job positions by analysing personal information, hard skills and soft skills of candidates through an analysis of their glossary, tone of voice, manner of speaking and body language to name a few [11, 2].

Van Esch et al. reported how several companies, e.g. Unilever, Adidas, Hilton, CVS Health, Delta, Public Storage, and Staples are starting to ask for the services offered by digital recruitment companies – e.g. Pymetrics, Hirevue, Paradox, Restless Bandit – in order to improve their processes, increase convenience, reduce costs and evaluate candidates more effectively [2].

Pymetrics is a talent matching platform that aims to help companies build the workforce of the future, using behavioral science and audited AI technology, resulting in more diverse teams and more efficient processes.

Hirevue provides an end-to-end hiring experience with different solutions as video interview software, conversational AI, and assessments. The company aims to reduce hiring bias and increase diversity, increase velocity without sacrificing quality and make companies leaders in the new reality of virtual hiring.

Paradox has developed a chatbot named Olivia that aims to be not only a bot but a conversational AI for a better candidate's experience because they assume that people want to feel like they are talking to people and not being limited by what a bot is programmed to do.

Finally, Restless Bandit combines machine learning and artificial intelligence to find candidates for right opportunities algorithmically, defining itself as the world's most intelligent recruiting platform.

However, in spite of the many different solutions, they still represent only a valid support and not a replacement of human work. Although the hypothesis regarding a possible replacement of recruiters in the process of research and selection through AI tools appears to be suggestive, the state of art shows that it is not possible to realise it.

It appeared quite critical the necessity to create guidelines and understand the specific risks associated with them [5]. For example, deep neural networks have been shown not only to be able to detect a person's data, as gender and ethnicity, but also information like sexual orientation from face analysis [13].

The AI companies aforementioned are already subject to European legislation on fundamental rights (e.g. data protection, privacy, non-discrimination), consumer protection, product safety and liability rules. However, the opacity and lack of clear definition of the functioning mechanisms of their systems make it difficult to verify the implementation of the legislation.

It would be necessary to examine whether the current regulations about AI systems are able to address the risks of AI and how they can be effectively enforced, whether adaptations are needed or whether new legislation is required.

In 2021, the European Commission has proposed to establish a regulatory framework on AI that aims to ensure the protection of fundamental rights and the security of users, as well as confidence in the development and adoption of AI. A classification of risks has been agreed according to the function performed, the specific purpose and the way in which AI systems are used: the use of AI for recruitment and employment was defined as a high risk.

In order to ensure trust and a consistent and high level of protection of safety and fundamental rights, some mandatory requirements have been suggested. They cover the quality of data sets used; technical documentation and record keeping; transparency and the provision of information to users; human oversight; and robustness, accuracy and cybersecurity.

The commission has proposed a human-centric approach to AI that means to ensure AI applications comply with fundamental rights legislation. Hence, accountability and transparency requirements for the use of high-risk AI systems, combined with improved enforcement capacities, will ensure that legal compliance is observed at the development stage.

They underlined that AI recruitment systems also need to be trained and tested with sufficiently representative dataset to minimise the risk of unfair biases embedded in the model and ensure that these can be addressed through appropriate bias detection, correction and other mitigating measures. AI systems must also be traceable and auditable, so developers must ensure that adequate documentation is kept, including the data used to train the algorithms.

Although this AI framework is an important contribution, it is only at an emerging stage, so it is not specific to different types of applications such as recruitment and employment.

Abandoning a black box approach and understanding how AI systems do what they do is the first step to improve its application.

Moreover, it is also important to consider the user's acceptance and experience with AI systems. To this end, we conducted a preliminary study in order to explore the attitude of job seekers to interact with artificial systems.

It resulted that candidates, faced with a choice, seem to prefer humans for activities such as their CV screening, interviewing and salary negotiation.

Even if this study had several methodology limitations we considered important to highlight the need for assessing the acceptance or aversion of candidates to AI tools and not just the AI products reliability or validity.

Nowadays, we would like to investigate the impact of the type of human-computer interaction, the factors related to a positive or negative interaction, and how we can make the working mechanism of these systems more transparent.

Based on the literature, we know that some factors in candidates can be relevant in determining their commitment with an AI recruiting process such as social media use, intrinsic rewards, fair treatment, and trendy [2]. It would be interesting to see, on a practical level, whether the positive or negative quality of interaction with AI systems varies based on the same candidate intrinsic factors.

Another line of research could be aimed at defining guidelines for developing AI systems with high performance in human-computer interaction during recruitment. To this end, we can start assessing factors indicated by Value-based Adoption Model (VAM) [14], which has emerged as the model that best explains consumer acceptance of AI-based products [15]. It retains the technical characteristics, as usefulness and technicality, of existing technology acceptance theories, adding enjoyment and perceived fee by adopting a cost-benefit perspective. Among the factors that influence the adoption of AI products, it emerged that enjoyment was the most influential factor, followed by subjective norms even more than the influence of usefulness. These results have been discussed considering that AI is in its early stages so its hedonistic versus utilitarian aspects tend to emerge. In addition, the finding that subjective norms had the next largest proportion, on the other hand, indicates that AI technology is a very interesting technology from a social point of view, but it probably still lacks practical user experience.

However, I suppose that these results might change depending on the use of AI. If it is for a chat room or as a customer service, one may be annoyed if AI fails, but if it is used for the evaluation of one's CV and thus one's future, it is a different matter and has a different relevance.

A human-centred approach can be obtained by combining information from different perspectives. To this end, it might be useful in the future to administer questionnaires and collect feedback on these systems from stakeholders such as AI developers, recruiters and candidates.

Only in this way, it will be possible to define what data are needed for a good performance of AI algorithms; what data are important for recruiters in order to evaluate candidates; what kind of data candidates are willing to provide to an automatic processing system.

4. References

[1] E. Derous and F. De Fruyt. Developments in Recruitment and Selection Research. International Journal of Selection and Assessment (2016). 24. 10.1111/ijsa.12123.

[2] P. Van Esch, and J. S. Black. Factors that influence new generation candidates to engage with and complete digital, AI-enabled recruiting. Business Horizons, (2019) 62(6), 729-739.

[3] S. Russell, and P. Norvig. AI a modern approach. Learning 2.3 (2005) 4.

[4] R. Geetha, and D. Sree Reddy. Recruitment through artificial intelligence: a conceptual study. International Journal of Mechanical Engineering and Technology 9.7 (2018) 63-70.
[5] E. Van Den Broek, A. Sergeeva, and M. Huysman. Managing Data-Driven Development: An Ethnography of Developing Machine Learning for Recruitment. Academy of Management Proceedings. (2020) 1 Briarcliff Manor, NY 10510: Academy of Management, 2020.
[6] R. Feloni. Consumer good giant Unilever has been hiring employees using grain games and artificial Intelligence d and it's a huge success. Business Insider Australia. (2017) Available at: https://www.businessinsider.com.au/unilever-artificial-intelligence-hiring-process-2017-6).
[7] N. Nawaz. How far have we come with the study of artificial intelligence for recruitment process. Int. J. Sci. Technol. Res 8.07 (2019) 488-493.
[8] N. Nawaz and M.A. Gomes. Artificial intelligence chatbots are new recruiters. International Journal of Advanced Computer Science and Applications 10.9 (2019).
[9] O. A. Osoba, and W. Welser. An intelligence in our image: The risks of bias and errors in artificial intelligence. Rand Corporation, (2017).
[10] T. Bolukbasi, K.W. Chang, J. Zou, V. Saligrama and A. Kalai. Man is to computer programmer as woman is to homemaker? debiasing word embeddings. (2016). arXiv preprint arXiv:1607.06520.
[11] P. Gupta, F. Semila, and J. Manish. Automation in recruitment: a new frontier. Journal of Information Technology Teaching Cases 8.2 (2018) 118-125.
[12] Q. Jia, Y. Guo, R. Li, Y. Li, and Y. Chen. A conceptual artificial intelligence application framework in human resource management. In Proceedings of the International Conference on Electronic Business (2018) 106-114.
[13] Y. Wang and M. Kosinski. Deep neural networks are more accurate than humans at detecting sexual orientation from facial images. Journal of personality and social psychology 114.2 (2018) 246.
[14] H. W. Hee, H. C. Chan, and S. Gupta. Value-based adoption of mobile Internet: An empirical investigation. Decis. Support Syst. (2007) 43 (1), 111–126
[15] K. Sohn and O. Kwon. Technology acceptance theories and factors influencing artificial Intelligence-based intelligent products. Telemat. Informatics, 47 (2020), 101324. DOI:https://doi.org/10.1016/j.tele.2019.101324