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AI applications and gender bias in recruitment and selection processes – an outlook from Sweden

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1. Research overview of AI applications in recruitment in Sweden

AI's area of use in recruitment is extensive and can be applied to all parts of the recruitment processes. In Sweden, however, recent studies indicate that Swedish companies tend to use only certain aspects of AI such as AI assisted procedures to review job applicants' CVs and résumés and generally in the earlier phases of the process. In general, AI is not used directly to make decisions about which candidate to hire. The studies also show that, as well as the benefits of enhancing efficiency in the hiring process, the main argument among recruitment companies to use AI in recruitment, is the aim to avoid discrimination and obtain a recruitment process that is more equitable and support a decision-making process that is more rational than human recruiters.[1]

As mentioned in the discussion paper, there are today selection and recruitment software to assist in recruitment processes, however there are also AI tools that are not pure software-based, e.g. recruitment robots.

Interestingly the first recruitment company to develop and introduce a recruitment robot, Tengai, a fully automated interview robot with a diversity and inclusion software in Sweden, is a recruitment company focusing specifically on diversity and inclusion recruitment practices. Tengai has been lent out in pilot tests to municipalities to support their recruitment processes.[2]

2. Advantages with AI tools in the recruitment process

Advantages with AI tools in recruitment is that they can help to make the recruitment process more rational as some of the AI tools aim to eliminate the subjectivity often found in human recruiters and treat each applicant in the same consistent manner.

[1] http://his.divaportal.org/smash/record.jsf?pid=diva2%3A1326177&dswid=oktab985663407434074
[2] https://www.tng.se/tengai/tengai-valideringsstudie-anders-sjoberg/

Also, there are potential gains with respect to effectiveness, e.g. expanding the pool of candidates which potentially increase the possibility of access to a divers pool of candidates.[3]

Further, AI technology entails the possibility that suitable candidates have a greater chance of obtaining the desired position.

Considering the recruitment process as a social process, recruitment is often coloured by the recruiter's own conscious and unconscious prejudices. AI tools aim to eliminate the subjectivity often found in human recruiters. However, the use of post-measurements is necessary to evaluate and develop AI technology to ensure that they become even more reliable and non-biased. Thus, it is important to have processes in place to monitor and potentially rectify any detected problem.

As mentioned in the discussion paper, there are difference between human decision-making and algorithmic decision-making in that an algorithm decides on the basis of predefined parameters and historical data, whereas a human possesses freedom of choice and that intuition is a unique human characteristic. Even if this is correct, neither AI technology nor human recruiters can currently pursue a prejudice-free approach to recruitment process on their own. This means that it is problematic if we do not consider and deal with pros and cons with each approach. Interestingly, in other areas of decision making (e.g. cancer treatment) it is often argued that a combination of humans and AI is the best current approach.

A newly published article on AI in investment decisions conclude that in complex and uncertain decision environments, the central question is not whether human decision making should be replaced, but rather how it can be augmented with the combination of human and artificial intelligence, referred to as hybrid intelligence.[4]

3. Regulations and risks assessments

The fact that gender bias arises and comes from many different parts of the AI system not only makes it difficult to manage, but also makes it difficult to place responsibility on one or a few specific sources, and the fact that responsibility only holds to a certain extent, entails the risk that no one actually takes responsibility. Therefore, it needs to be ensured that the use of AI for automated or semi-automated hiring decisions, does not result in infringement of non-discrimination laws and/or create inequalities of any other nature.

Recently a legal investigation on the use of automated data processing with algorithms and big data and their possible connection to discrimination and / or risks

[3] Upadhyay, A. K., & Khandelwal, K. (2018). Applying artificial intelligence: implications for recruitment. Strategic HR Review, 17(5), 255-258. https://doi.org/10.1108/SHR-07-2018-0051FF

[4] https://hbr-org.cdn.ampproject.org/c/s/hbr.org/amp/2020/11/do-algorithms-make-better-and-fairer-investments-than-angel-investors?fbclid=IwAR2Oc0ESjceXP61OsGEoGkXhG6GnL2QGCaSsDg3V49f27hg_1lhYmUpcWds

for discrimination, was performed by our ombudsperson (Swedish Equality Ombudsman, DO).[5]

DO concluded that when artificial intelligence and automatic decision-making are used in recruitment, this is covered by the Discrimination Act. The prohibition of discrimination in the field of working life is intended to be comprehensive, as is clear from the preparatory work for the law. If the employer uses a digital tool or an algorithm that processes information or produces decision material with the support of AI, it is the employer's responsibility if a jobseeker is discriminated, regardless of the employer's insight into how the algorithm works.

In order then for DO to supervise, it will be important to have access to information about how an algorithm has made a decision or otherwise formed part of a decision basis, as well as what data has been used. The information needed to assess whether discrimination has taken place is thus essentially the following.

- Knowledge of how the tool used for automated decision-making is programmed;
- What material the tool was fed with and “trained” on;
- How the two previous points have been concretized in the individual case and
- How the generated information was used in the individual case.[6]

3.1 Risk scanning tools

As mentioned in the discussion paper there is a need for developing a framework that can assess the potential risks of gender biases in AI tools in general, as well as in HR management. A variety of measures have been discussed and developed in order to mitigate risk with AI tools. Vinnova – the Swedish innovation agency - has financed a risk scanning tool (AI Sustainability Framework) that identify, measure, and govern the ethical and societal implications of AI and data driven solutions. The Framework is applied to AI solutions with the purpose of detecting unintended ethical pitfalls and finding solutions to mitigate the them.

The AI Sustainability Framework has distinct phases: use-case scoping, risk scanning, risk assessment, risk mitigation, stakeholder engagement. The result of the risk scanning provides an organisation with a unique risk profile, a “health check”, which detects exposure to pitfalls and risks and identifies where an organisation may have vulnerabilities. It also gives them tools to control their AI applications based on their ethical values. Moreover, the long-term goal with the project is to contribute to the development of standards and certification in the area as well as research-oriented insights. The Swedish public employment service is one of the partners in this ongoing project, together with several other partners. [7]

[5] https://www.do.se/other-languages/english/discrimination-act/
[6] https://aktiva-atgarder.do.se/exempel/rekrytering-och-befordran/artificiell-intelligens-aijo
[7] https://www.aisustainability.org/publications/

4. Gender analyses and assessments – a necessary part of AI development

Vinnova's programme "AI to promote gender equality - addressing gender inequality challenges through AI", has brought attention to the importance of bringing gender expertise with gender knowledge into the AI development process.[8] There are several examples that quick solutions such as removing gender-related variables do not always solve the problems with gender bias, instead they can move them and sometimes make them more difficult to detect. This is due to the fact that gender aspects are pervasive parts of society and extend far beyond the categories of women and men. Thus, there might be several implicit associations to women and men in data, even when these categories have been removed.

As mentioned in the discussion paper, existing gender disparity in the workforce and biased datasets might amplify gender inequality and project the potential injustice into the future. Considering the labor market from a gender perspective, it is strikingly segregated, even in a country like Sweden that tends to rank high on indexes measuring gender equality[9]. The risk that data obtained from the labor market might be skewed and overrepresented by one gender while underrepresented by the other is probably high, not only when it comes to data related to leadership recruitment, which has been highlighted in the debate. Profiles, qualifications and standards might have evolved from the norms of the majority group, thus implicitly favoring one gender over the other.[10] While some research propose that algorithms based on researched frameworks such as psychometric data reduce the risk of gender bias as compared to algorithms that make decisions based on history that can result in previous patterns of discrimination, this assumption overlooks the fact that these frameworks also might be based on underlying gender biased norms.[11]

A Vinnova financed project is developing a scalable prototype for the implementation of a new algorithm for equal recruitment and salary setting. Using knowledge from gender research and algorithms as a method, the project explores how innovation in AI can reduce unconscious bias in order to reach gender equality in recruitment and salary setting.

The assumption in the discussion paper that detecting databased discrimination may be more difficult than detecting it in human decision-making could be challenged. The results from our projects show that patterns of biases which humans may not be able

[8] https://www.vinnova.se/m/ai-och-jamstalldhet/

[9] https://eige.europa.eu/publications/gender-equality-index-2019-sweden

[10] Stein, R, & De Bruin, G. P. 2020. An investigation of gender-based differences in assessment instruments: A test of measurement invariance. *Journal of industrial psychology*, 46 (4), p 1-12.

[11] Bodie, M. T., Cherry, M. A., McCormick, M. L., Tang, J. (2017). The Law and Policy of People analytics. University of Colorado Law Review, 88(4), 961-104.

to detect can be revealed when AI is developed from a gender perspective, and new indicators to achieve gender equal recruitment and salary settings can be proposed. Thus, the algorithm can help to visualize and address structural hinders which currently more or less subconsciously discriminate women.

Solutions proposed to mitigate risks of gender bias in AI systems are essentially about managing identified causal factors, however it is important to consider the problem from a holistic perspective, to see the connections between gender bias in AI systems and gender bias in society, and to reflect on how each causal factor depends on and correlates with other factors. It is not enough to change any of the parameters unless the structure of the system is changed at the same time. The gender bias that can be seen in AI systems both provides evidence of gender discrimination that exists but also the opportunity to open up for discussions on the subject to try to deal with it.