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(Gender) Bias in AI from the perspective of recruitment process

Kuba Piwowar

SWPS University in Warsaw, Poland

1. Introduction

Filling jobs in the market is a multi-faceted and multi-stage process. Recruitment is hard and time-consuming, hence many companies outsource it to employment agencies. In Poland they can choose among just below 9000 of them¹, contributing to a market valued at 7.2 billion PLN (approx. 1.6 billion Euro)². Being crucial in the way businesses operate, the recruitment process contributes to the workforce's diversity, getting to which can be challenging. For instance, according to the research "Gender equality in Poland, Romania & The Czech Republic" conducted in 2020, the average gender equality score in Poland is 35%, meaning that just over 1/3 of the workforce are women and it is lower than the European average (43%)³.

Usage of software-based solutions in recruitment requires closer look at the workforce diversity in ICT. Gender inequality and low representation of women in this sector is one of the contributing factors to potentially biased outcomes of algorithms. With 14.8% of women in ICT (17.2% in the European Union), 45% having basic digital skills (55% EU average) or 74% regularly using the internet (82% in EU), Poland ranked on the 20th position among the EU countries "Women in Digital Index" in 2019⁴.

1.1 Using AI in the recruitment process

1.1.1 Using AI in recruitment

Companies seeking help in the recruitment process started using new technologies to facilitate it. Since the usage of artificial intelligence algorithms across numerous industries stimulated the public debate in Poland for several years, AI has become a tool that not only draws attention, but also raises hopes. Among over 260 AI companies operating in Poland, 7% provide services for the staffing and HR Tech

¹ <http://stor.praca.gov.pl/portal/#/kraz/wyszukiwarka> (access: October 25th 2020).

² S. Duchna "Zaden nowy algorytm ani czarodziejstwo sztucznej inteligencji nie zastapi rekrutera", August 20th 2019, <https://hrbusinesspartner.pl/artykul/zaden-nowy-algorytm-ani-czarodziejstwo-sztucznej-inteligencji-nie-zastapi-rekrutera> (access: October 25th 2020).

³ "Gender Equality in Poland, Romania & The Czech Republic. Assessing leading companies workplace equality", June 2020, http://odpowiedzialnybiznes.pl/wp-content/uploads/2020/06/Equileap_EuropeanReport_Poland-Romania-CzechRepublic.pdf (access: October 25th 2020).

⁴ Women in Digital Scoreboard 2019 - Country Reports, <https://ec.europa.eu/digital-single-market/en/news/women-digital-scoreboard-2019-country-reports> (access: October 27th 2020).

sector, although this number does not cover all possible use cases in the recruitment process. For instance, 22% of AI companies provide services in “customer service and chatbots”, which companies can use when searching for new employees⁵.

The debate among HR specialists in Poland revolves mostly around the uses and benefits of these tools. To name a few, they are perceived as tireless **time savers** that can work around the clock and help **reduce costs** related to pre-selecting and identifying candidates. They are also less prone to error when it comes to dealing with mundane, data-heavy tasks, like comparing data available in CVs and matching them to the ideal’s candidate set of skills⁶. They also influence a metric called „candidate experience”, part of which relies on the employer’s response to the candidate’s application. Lack of it can worsen the company’s perception in the job market, hence AI-based solutions are helpful in addressing this issue⁷. AI can be used in parsing data from many CVs. In the selection process employers can use **chatbots** that have an initial conversation with candidates, asking about their experience and expectations, initially matching them to potential open position or deciding not to advance to further phases of the recruitment⁸.

In the Polish context, AI has not been used on a broad scale⁹, but it spans across the entire recruitment. It helps in understanding organisation’s needs, creating job descriptions and promoting job listings, actively and passively recruiting candidates, screening, conducting job interviews, creating recommendations, creating offers and onboarding new employees. To facilitate the process, recruiters can use a variety of tools: machine learning, robotic process automation, machine vision, natural language processing, sentiment analysis, chatbots and recommender systems¹⁰.

1.1.2 Polish HR representatives’ attitude towards using new technologies in recruitment

In 2017 Emplocity, one of the companies delivering AI solutions for HR departments, conducted a research on 300 HR representatives and CEOs of companies

⁵ Digital Poland “Map of the Polish AI”, 2019, <https://www.digitalpoland.org/assets/reports/map-of-the-polish-ai--2019-edition-i.pdf> (access: October 25th 2020).

⁶ Zielona Linia, Interview with Jacek Krajewski “Maszyna nie zastąpi człowieka? Roboty w rekrutacji”, <https://zielonalinia.gov.pl/-/maszyna-zastapi-czlowieka-roboty-w-rekrutacji-wywiad-> (access: October 25th 2020).

⁷ Zielona Linia, Interview with Jacek Krajewski “Maszyna nie zastąpi człowieka? Roboty w rekrutacji”, <https://zielonalinia.gov.pl/-/maszyna-zastapi-czlowieka-roboty-w-rekrutacji-wywiad-> (access: October 25th 2020).

⁸ Grzegorz Pilawski “Praktyczne zastosowanie sztucznej inteligencji w rekrutacji”, August 9th 2019, <https://rekrutacjapracownikow.pl/metody-rekrutacji-2/praktyczne-zastosowanie-sztucznej-inteligencji-w-rekrutacji> (access: October 25th 2020).

⁹ “Założenia do strategii AI w Polsce. Plan działań Ministerstwa Cyfryzacji”, November 2018, https://www.gov.pl/documents/31305/436699/Za%C5%82o%C5%BCenia_do_strategii_AI_w_Polsce_-_raport.pdf/a03eb166-0ce5-e53c-52a4-3bfb903edf0a, p. 211 (access: October 25th 2020)

¹⁰ Based on a presentation “Human vs. AI” by Krzysztof Tomanek, presented during the 17th Polish Sociological Congress in Wrocław, <http://17zjazdpts.uni.wroc.pl/en> (access: October 25th 2020).

employing 50-250 people in Poland. The aim of the study was to understand their attitudes towards using new technologies in recruitment. Results showed that:

- 48% believe that technology will be used in finding new candidates, whereas 72% claim that they would use this functionality today, if it were available.
- 24% would outsource calling to candidates to technology, but only 5% believes it will happen in the future.
- **From the selection process point of view**, only 28% of companies claim they would entrust a machine with an analysis and selection of applications, but 59% thinks AI will take over this part of recruiters' job in the future.
- 50% of companies have a system to gather applications, but 30% does not have one and claims they do not need it; 20% have a system that automatically selects candidates (70% do not have one).
- 40% of the companies have tools that automate communication process with candidates.

Moreover, 59% of companies claim AI-based solutions are resistant to stress and fatigue, hence more effective. At the same time, 55% claim they work faster and more efficiently. Interestingly, **45% of interviewees said they think solutions that are based on AI are less biased.**

The study showed that, although hopes are quite high, knowledge about specific products is relatively low: 45% agree that the main obstacle in implementing AI in recruitment is lack of knowledge about possibilities available on the market.

1.1.3 Examples of companies using AI-based solutions in recruitment

Usage of AI in recruitment is not wide-spread in Poland. Moreover, there is no publicly available information about solutions used by companies in the country, as it is protected by the confidentiality clause by companies who develop these solutions or provide consulting services in using them. Nevertheless, a few examples of using AI in recruitment have been made public:

- [Element](#): recruitment software that helps in recruitment processes, including sourcing and candidate selection, including usage of A.I.
- [PricewaterhouseCooper \(PwC\)](#) introduced MatchBeta, a solution that used artificial intelligence in helping young people in planning their careers. It used data coming from professionals and matched their career paths with young people's aspirations.
- [Emplocity](#): a company that uses AI in their chatbot solutions that companies on the Polish market can use in the recruitment process, for instance [Medicover](#) (private medical care provider) and [PKO BP](#) (the biggest Polish bank).

2. Policy debate

2.1 Anti-discrimination in the Polish labor law: a selection of documents

Polish law (Article 18[3a]) prohibits discrimination in employment on any ground, but it explicitly enumerates discrimination based on the grounds of sex, age, disability, race, religion, nationality, political beliefs, trade union memberships, ethnic origin, denomination or sexual orientation, as well as employment for definite or indefinite terms, or on a full-time or part-time basis. The Labour Code defines direct and indirect discrimination, both of which make equal treatment in the workplace impossible. It also points at sexual harassment as one type of discrimination on the basis of employee's gender¹¹.

From the recruitment perspective, the Labour Code (Article 22[1] §1) points at data that employers can ask candidates for when seeking to employ a person in a vacant position. These data are: name and surname, parents' names, date of birth, place of residence (correspondence address), education and employment history. Using automated systems in the recruitment process is allowed in the Polish law, but according to the Article 13(2f) of the Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 candidates (data subjects) shall be provided with information about "the existence of automated decision-making, including profiling, referred to in Article 22(1) and (4) and, at least in those cases, meaningful information about the logic involved, as well as the significance and the envisaged consequences of such processing for the data subject"¹².

2.2 Profiling the unemployed: the debate

In 2014 and 2015, a debate sparked around a ruling in the topic of algorithmic decision making in profiling the unemployed¹³. A report published by Fundacja Panoptykon¹⁴ pointed out that the system: a) lacked transparency about what constituted being segmented to a particular profile, b) is based on an assumption

¹¹ Ministerstwo Rodziny i Polityki Społecznej "Równe traktowanie w zatrudnieniu" <https://www.gov.pl/web/rodzina/rowne-traktowanie-w-zatrudnieniu> (access: October 25th 2020)

¹² Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016, <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32016R0679&from=EN#d1e2244-1-1> (access: October 28th 2020).

¹³ The report reads: "Profiling of active labor market programmes for the unemployed was introduced in May 2014 along with the amendment to the Act on the Promotion of Employment and Labor Market Institutions (Act on the Promotion of Employment 2004), as well as the adoption of the ordinance on the profiling of assistance for the unemployed (Ordinance on the Profiling of Assistance)": J. Niklas, K. Sztandar-Sztanderska and K. Szymielewicz, (2015). *Profiling the Unemployed in Poland: Social and Political implications of algorithmic decision making*, https://panoptykon.org/sites/default/files/leadimage-biblioteka/panoptykon_profiling_report_final.pdf (access: October 25th 2020), page 10 (access: October 28th 2020).

¹⁴ op.cit. (access: October 28th 2020).

that a machine can make better decisions than humans, and although creators of the mechanism argued that the result of algorithmic decision should only inform a decision made by humans, only 0.58% of machine-based decisions were changed, and c) there is no way to appeal the decision of the system¹⁵. This was problematic in many ways, including being marked as Profile III unemployed if a person is a single mother or having a disability. Profile III “comprises persons with serious life problems or those who do not want to cooperate with the employment office”¹⁶. In 2018 the Constitutional Court ruled that the system was a breach to the Polish constitution and it was abolished in 2019^{17,18}.

2.3 Using AI in the job market

Polish government has worked on a pathway to create an AI strategy¹⁹ that resulted in several consultations and documents that referred to using AI in the recruitment process:

- Assumptions of the AI strategy in Poland and the Action Plan of the Ministry of Digitization (November 2018): the document points out at potential data-based discrimination that affects marginalized communities, as well as individuals by the process of selection and activation of specific type of data. It emphasises AI’s ambiguous role in addressing discrimination, especially in the job market: on one hand these tools can help mitigate human bias (ie. stereotypical assessment of the candidates based on their appearance), but also multiply it (i.e. by using non-representative data or proxies)²⁰.
- Artificial Intelligence Development Policy in Poland for 2019-2027 published in August 2019 was based on the previous document. It points out that introduction and development of AI systems poses a set of challenges and threats, including those that can affect equal treatment. Discrimination can be a result of using sensitive data, including proxies, as well as not taking into account the interests of marginalized communities. The document’s authors recommend introducing an **AI Observatory for the Labor Market** “whose task will be to monitor, study and analyze the impact of AI on the labor market and social policy as well as to

¹⁵ Wojciech Klicki “ Profilowanie bezrobotnych niezgodne z Konstytucją”, <https://panoptykon.org/wiadomosc/profilowanie-bezrobotnych-niezgodne-z-konstytucja-0> (access: October 27th 2020)

¹⁶ op.cit., page 37 (access: October 28th 2020)

¹⁷ Jędrzej Niklas, April 16th 2019, “Poland: Government to scrap controversial unemployment scoring system” <https://algorithmwatch.org/en/story/poland-government-to-scrap-controversial-unemployment-scoring-system/> (access: october 28th 2020)

¹⁸ “Bez profilu. Urzędy pracy nie będą już profilować bezrobotnych”, March 11th 2019, <https://samorzad.pap.pl/kategoria/prawo/bez-profilu-urzedzy-pracy-nie-beda-juz-profilowac-bezrobotnych> (access: October 28th 2020)

¹⁹ Polska droga do strategii AI, <https://www.gov.pl/web/cyfryzacja/ai> (access: October 25th 2020)

²⁰ “Założenia do strategii AI w Polsce. Plan działań Ministerstwa Cyfryzacji”, November 9th 2018, https://www.gov.pl/documents/31305/436699/Za%C5%82o%C5%BCenia_do_strategii_AI_w_Polsce_-_raport.pdf/a03eb166-0ce5-e53c-52a4-3bfb903edf0a (the link downloads the document) (access: October 25th 2020)

take legislative and regulatory initiatives in this area”²¹. In July 2020, the policy made it to the list of legislative works of the government with a positive opinion of the Center for Strategic Analysis. The document was forwarded for further legislative work²².

- In October 2020 Poland refused to support a text of the conclusions of the German presidency of the EU Council on Artificial Intelligence and human rights, due to “the inclusion of ‘gender equality’ on the grounds that «neither the Treaties nor the EU Charter of Fundamental Rights uses the term ‘gender’»”²³. Polish Ambassador to the EU Andrzej Sadoś said that “Poland strongly supports equality between women and men, which appears in all EU documents, based on the terminology adopted in primary law. The treaties deal with equality between women and men, as in the Charter of Fundamental Rights. The meaning of the word «gender» is unclear; the lack of definition and unambiguous understanding for all Member States can cause semantic problems. Neither the Treaties nor the Charter of Fundamental Rights use the term «gender»”²⁴. Presidency Conclusions’s document states that “[o]ther Member States were opposed to the deletion of this term, in particular because it is commonly used in more recent Union documents, such as the Council conclusions on shaping Europe’s digital future and in ‘Council Conclusions on EU priorities for cooperation with the Council of Europe 2020-2022’ adopted on 13 July 2020”²⁵.

3. Recommendations

3.1 The Discussion Paper

The Discussion Paper describes several sources of existing gender bias and points out at the structure and implementation of machine learning algorithms that entails: a) designing towards or leading to concrete results or solving particular problems (which is a decision made by humans) b) using data that are produced by and about humans, c) deciding which data to use for the decision-making process, d) deciding

²¹ “Poland AI Strategy report”, https://ec.europa.eu/knowledge4policy/ai-watch/poland-ai-strategy-report_en (access: October 25th 2020).

²² “Rozwój sztucznej inteligencji w Polsce – ważna decyzja”, September 14th 2020, <https://www.gov.pl/web/cyfrizacja/rozwoj-sztucznej-inteligencji-w-polsce-wazna-decyzja> (access: October 28th 2020).

²³ Samuel Stolton “Poland rejects Presidency conclusions on Artificial Intelligence, rights”, October 26th 2020), <https://www.euractiv.com/section/digital/news/poland-rejects-presidency-conclusions-on-artificial-intelligence-rights/?fbclid=IwAR3Pd6YfbHvNdlj2fzvBL2wjQr2d4RhXIX6ijnsGHXhx9UIYcj8dF9qLG7E> (access: October 28th 2020).

²⁴ Anna Słojewska “Polska blokuje gender w sztucznej inteligencji”, October 26th 2020, <https://www.rp.pl/Unia-Europejska/201029459-Polska-blokuje-gender-w-sztucznej-inteligencji.html> (access: October 28th 2020).

²⁵ “Presidency Conclusions - The Charter of Fundamental Rights in the context of Artificial Intelligence and Digital Change”, 21 October 2020 (page 2), <https://www.consilium.europa.eu/media/46496/st11481-en20.pdf> (access: October 28th 2020).

which software will be used in an organisation. Working on a large scale and using multiple data sources, algorithms can spot patterns unavailable to humans. Being fast, they can process much more data than humans, hence can be helpful in a work that needs reviewing large number of data, i.e. resumes. Human recruiters are not themselves free of bias, so using automated systems can help in mitigating them. On the other hand, depending on human decision-making, recruitment algorithms can be biased at every stage of the recruitment process. Using historical data, these tools pose a threat of reinforcing disadvantaged positions of already disadvantaged groups.

3.2 Addressing the potential risk of (gender) discrimination of algorithms in recruitment processes

The Discussion Paper offers five steps in addressing bias: awareness raising, leveraging EU legal frameworks, risk assessment, auditing and measuring outcomes. It points at an important issue of finding common ground between technical and non-technical experts. The paper mentions lawyers and public engagement through NGOs, emphasising that developing algorithms requires interdisciplinary efforts of specialists spanning across academia and business. The idea of automated decision making being a high-risk in terms of impacting workers' rights is juxtaposed with New Zealand's approach in risk assessment that relies on transparency, inclusive approach to algorithms' development, identifying biases in data and importance of human oversight. The paper also proposes auditing for algorithms and measuring outcomes of different tools.

In order to approach the algorithmic (gender) bias mitigation in a systematic way, I propose a non-exhaustive framework to address it at every stage of the recruitment process:

Phase of the recruitment process	Potential source of bias
Understanding organisation's needs	Historical data about employees
Active and passive recruitment	Using proxies (ie. when male engineers know and refer mostly male engineers)
Screening	Using "gendered" words in CVs (not applicable in every language)
Job interviews (If conducted by a machine, ie. NLP)	Lack of diversity in language data (ie. specific accents or dialects not present in training data)
Recommendations	History of employment

Phase of the recruitment process	Potential source of bias
Creating offers	Creating job offers with pay aligned to gender
Onboarding	Lack of inclusive culture (resulting in less people of a particular gender applying for a job)

Majority of the sources of bias in algorithms come from the training data, but the issue of bias goes deeper into the organizational and societal levels. Hence, addressing bias means working at each level simultaneously, and including a variety of stakeholders:

- at the **data level**, it means understanding where the data used in the recruitment process come from and what do we know about them; this can be problematic, as not all training data are available for scrutiny, but transparency is crucial in making informed decisions. One of the ways to approach that is by creating thorough documentation²⁶. De-biasing at the data level also means making sure training data are diverse, precise, and complete,
- at the **human level**, it means making sure a trained individual is involved in the recruitment process (which entails making them aware of potential biases baked into the algorithmic decision-making, as well as their own positionalities),
- at the **organisational level**, it means recruiting with a clear definition of the goal fed into the algorithm (including gender quotas) and creating culture that encourages diverse workforce to apply. This also means creating documentation and testing that includes societal metrics and making sure that informed decisions are being made,
- at the **contextual level**, it means giving independent auditors access to the automated recruitment process, introducing clear policies of usage of such systems and creating a platform for interdisciplinary debate between those who create datasets, train the algorithms, use them at work and are affected by them.

3.3 Raising awareness of the issue of gender bias in algorithms

Awareness raising should be crafted both in short and long-term perspective. From the short-term perspective it entails making the public (candidates) aware of and understanding pitfalls of technologies being used in the recruitment process through

²⁶ T. Gebru et al. "Datasheets for datasets", March 2018, <https://arxiv.org/abs/1803.09010> (access: October 28th 2020).

full transparency, when such technologies are being used. Some even propose that the code used in recruitment should be a part of work regulations²⁷. Moreover, in each case when automated systems are used in recruitment, it should be clear how and to whom to appeal if a candidate wishes to do that.

This also means that algorithms should be licensed (as the Discussion paper proposes), but also available to public scrutiny, i.e. by making code and data sets used by the software available to interdisciplinary expert groups, individual researchers or journalists. In the long-term, it will require training non-technical specialists and equipping them in tools and knowledge useful in such cases, which means working with (technical and non-technical) universities on creating relevant courses where such a career path can be pursued. There is still little to no overlap between technical specialist training with relevant courses in social sciences and humanities.

HR specialists, departments and companies that use AI-based recruitment software should “always be in the loop” of the process and be encouraged to question data-based results. In short-term it can be done by excluding the use of AI in parts of the recruitment process and comparing results on different levels (ie. percentage of women being hired). In the long term, it requires training empowered specialists who are not afraid to question technology’s suggestions at any point. This can be done in many ways, including changing the narrative about technology as “objective”, “neutral”, “hard” and “unquestionable”.

Being directly involved in software development, engineers should be aware of how technology is entangled with social fabric. This means developing trainings throughout their education process and within companies developing code that provide practical tools to spot, name and address these challenges. Professional organisations provide industries with standards around algorithmic bias that can be used when developing a product, for instance IEEE’s P7003²⁸.

Diversity in employment is not only a function of gender (or other) quotas, but also a result of an inclusive corporate culture. One of the possible ways to achieve it is through trainings in managing bias, some of which were made publicly available²⁹, and through inviting the representatives of underprivileged groups to shape companies’ policy to help shape diversity & inclusion policies.

²⁷ Paweł Żebrowski, “Kadrowe algorytmy - komputer może dyskryminować pracowników”, November 20th 2019, <https://www.prawo.pl/kadry/algorytm-komputerowy-moze-dyskryminowac-pracownikow,496004.html> (access: October 25th 2020).

²⁸ IEEE: P7003 - Algorithmic Bias Considerations, <https://standards.ieee.org/project/7003.html> (access: October 28th 2020).

²⁹ <https://managingbias.fb.com/>