

Diversity, Equity, and Inclusion, and the Deployment of Artificial Intelligence Within the Department of Defense

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Abstract

Artificial Intelligence (AI) adoption has seen substantial growth across industries. This paper explores the escalating use of AI within the United States Department of Defense (DoD) and the implications that diversity, equity, and inclusion (DEI) have on Service members and Civilians across the Department. More specifically, this paper explores the DEI considerations within AI technologies on individual, team, and Department readiness. The DoD's AI usage spans various strategic and operational capabilities, however this paper explores two critical domains: healthcare and recruitment.

In healthcare, AI offers the promise of early disease detection, enhanced diagnostic capabilities, and streamlined administrative processes. However, potential biases stemming from homogenous training data threaten the accuracy and reliability of these systems, jeopardizing Service member health and eroding trust in AI-assisted medical decision-making and potentially the DoD at large.

In recruitment, while AI promises efficiency in identifying ideal candidates, its deployment can perpetuate biases, especially when the training data used is not representative of all demographics. Despite efforts to design "unbiased" systems by excluding demographic data, such strategies may inadvertently overlook the unique challenges faced by marginalized communities, further entrenching existing disparities.

Both case studies underscore the importance of considering DEI in the development and deployment of AI systems. As the DoD continues to integrate AI into its operations, this paper's recommendations stress the necessity of continuous DEI assessment to ensure that AI serves as an asset rather than a liability. The authors recommend the following:

1. Data diversity & review
2. Continuous monitoring and calibration
3. Stakeholder engagement
4. Adoption of DEI requirements within Ethical AI Frameworks
5. Further research

Introduction

The use of AI is on the rise across industries. Since 2017, adoption of AI in business settings has more than doubled (McKinsey & Company 2022). Investment in AI technology has also grown, with 52% of businesses dedicating 5% or more of their budget to AI (Smith & Green 2018). Additionally, with recent advancements in AI and the rise in popularity in AI tools such as ChatGPT, it is reasonable to consider public perception of AI (Ibid).

As reliance on AI continues to grow, questions related to the implications for marginalized communities remain unanswered. Literature indicates that a variety of biases persist in the application of AI, presenting new and continuing challenges for users and administrators. For an employer as large and vital as the DoD, these challenges must be acknowledged to allow for the Department's mission to move forward.

The digital revolution, spearheaded by rapid advancements in AI, has transformed the global landscape, bringing forth unprecedented opportunities and challenges. According to Smith and Green (2018), industries ranging from finance to healthcare are experiencing a paradigm shift in operational efficiency, decision-making, and customer engagement due to AI.

However, the enthusiastic embrace of AI does not come without its caveats. A critical concern that resonates across academic and industry discourses is the potential for AI to perpetuate, or even exacerbate, societal biases. Researchers advise that "data is frequently imperfect in ways that allow these algorithms to inherit the prejudices of prior decision makers" (Barocas & Selbst 2016). Such biases in AI systems could have far-reaching consequences, especially when these systems are employed in decision-making processes that directly affect human lives. For marginalized communities², the implications could be particularly profound. As recent literature suggests, unchecked biases in AI can inadvertently reinforce systemic inequalities, creating a loop of

¹ Here, marginalized communities are defined as "groups that are excluded due to race, gender identity, sexual orientation, age, physical ability, or language." (Pratt & Fowler 2022)

discrimination that becomes harder to break with each iteration (Sharif et al. 2022).

DEI was selected as a focus for a number of reasons. The first is its use as an organizational framework that works to integrate all stakeholders and eliminate biased and uninformed decision-making. The second is the positive impact DEI has had on institutional outcomes in a variety of arenas, ranging from winning and retaining talent to improving customer experiences (McKinsey & Company 2022). Finally, the DoD currently acknowledges and adopts the DEI framework in other areas of its work, making it the ideal lens through which to improve AI efforts withing the Department.

In the context of large organizations, especially those vested with significant societal responsibilities like the DoD, the stakes are even higher. The DoD, beyond its obvious defense mandate, is a key employer and influencer of socio-technological trends (U.S. Office of Personnel Management 2017). Hence, understanding and mitigating AI biases within such a pivotal institution does not just ensure operational excellence but also sets a precedent for ethical and inclusive AI applications across the public and private sectors. As the Department continues to innovate and reimagine warfighting, it is not immune to the equity and inclusion concerns that permeate AI broadly.

Background

Like many organizations, the DoD has increased its investment in Artificial Intelligence. However, unlike other industries, the DoD has a unique warfighting mission that is being supported using AI. The DoD currently utilizes AI in training, cybersecurity, recruitment, transportation, and more. As global competitors make advancements in military AI, the United States races to remain ahead of the latest AI technology and push it into the field. As such, DoD has requested \$1.8 billion to research and develop AI in the Fiscal Year 2024 National Defense Authorization Act and an additional \$1.4 billion to centralize data from the DoD's AI-enabled technologies and sensors into a single network (Chatterjee 2023).

Methods

The authors conducted a survey of the literature to ascertain the connection between DEI and AI in a DoD context. Two case studies were then selected that exemplify the concerns about using AI: Service member healthcare and recruitment. These areas were selected for their relevance to the current policy agenda of the DoD: Service members face a myriad of challenges when attempting to access healthcare, and military recruitment is currently facing a historic shortage (Ziezulewicz 2023) (Kesling 2023). The authors reviewed and synthesized the literature to provide a complete image of these two areas and how they exemplify the equity and inclusion considerations of AI, particularly in a military set-

ting. Based on the findings of our research, we provide recommendations that the DoD should use to incorporate AI in an equitable manner, particularly in the Service member healthcare and recruitment domains.

Limitations

This study has some limitations that impacted the analysis, the first being security. Due to the nature of its mission, the DoD does not publicly share every advancement in the development and application of AI. Given the security constraints of such information, the authors relied on publicly available information and analysis.

Another constraint of this study is the limitation historically placed on marginalized communities when participating in military activity. For instance, data on women in combat roles is limited. Women were barred from participation in combat roles until 2013, when Secretary of Defense Leon Panetta lifted the Pentagon's 1994 ban. This reversal wasn't fully actualized until 2016, when women were deemed eligible for every combat role. Additionally, the military's past segregationist policies led to biased contemporary sources, ultimately impacting historical data. Furthermore, the significant racial disparity that currently exists between enlisted and officer ranks may also impact the quality of available data (Kraus et al. 2023).

Women are similarly underrepresented across the military at large. As of 2021, women make up only 17.3% of the active-duty force and 21.4% of the National Guard and reserves (U.S. Department of Defense 2022). As the representation of women in the military grows, the lack of historic data to inform AI systems puts female Service members at a disadvantage. AI is informed by the data it is fed. With information collected regarding Service member experiences and demographics largely skewing male, these systems are likely to be biased towards male Service members and could deliver unacceptable or subpar services for women.

Discussion

Case Study 1: Artificial Intelligence for Department of Defense Healthcare

The DoD's commitment to maintaining the health and readiness of military personnel can significantly benefit from AI-powered clinical decision support systems, whether they are improving the accuracy of diagnoses, addressing post-operation complications, or streamlining the administration process. These systems can detect patterns indicating early disease stages, ensuring that Service members receive timely interventions and remain deployment-ready (Jiang et al. 2021). In medical imaging, where prompt and accurate diagnoses are essential for service-related injuries, deep learning algorithms offer superior accuracy in identifying anomalies like tumors, sometimes outpacing even seasoned radiologists (Shen et al. 2017). Predictive analytics, built upon machine learning foundations, allow DoD healthcare

facilities to proactively address potential post-operative complications or readmissions, thereby enhancing the welfare of military personnel and ensuring a consistent readiness status (Bellini et al. 2022). The vast data in Electronic Health Records (EHRs) can be of immense strategic value to the DoD, and, with Natural Language Processing (NLP), actionable intelligence can be gleaned from previously chaotic and unstructured records (Meystre et al. 2008). On the operational front, AI's capability to streamline administrative processes can aid the DoD in resource optimization, from managing medical facility appointments to swiftly processing medical claims (Meskó, Hetényi, & Györffy 2018). Additionally, AI's accelerating impact on drug discovery holds special significance for the DoD, as timely and innovative treatments can be devised for bio-threats or conditions that military personnel might uniquely encounter (Chen et al. 2018).

The foundation of any AI system is the dataset upon which it trains. If AI within DoD healthcare is primarily exposed to non-diverse data, its outputs could perpetuate, or even amplify, existing biases. Drawing upon the earlier emphasis on medical imaging, where deep learning algorithms potentially surpass human expertise in detecting anomalies (Shen et al. 2017), the impact of bias becomes evident. Should these algorithms disproportionately train on data from individuals of a single demographic, their diagnostic precision could wane for others, particularly underrepresented groups. Such biases could lead to systemic misdiagnoses, jeopardizing Service member health. Furthermore, addressing these errors after the deployment of the system might demand extensive recalibration, costing both time and resources. On the ground, this would translate to delays in treatment, prolonged recovery times, and diminished operational readiness. Collectively, data biases threaten both individual health outcomes and the broader mission of maintaining a robust, ready force.

Trust is a cornerstone in the doctor-patient relationship, even more so within the unique confines of military service. The rapid evolution of AI has seen it play a role in complex medical decision-making. However, the lack of DEI considerations risks further undermining this trust, particularly for Service members of color. Consider the transformative potential of predictive analytics, capable of preemptively flagging post-operative complications (Bellini et al. 2022). If these predictions are tainted by biases, it could lead to unnecessary or even harmful medical interventions for Service members from marginalized communities (Louie & Wilkes 2018). Over time, Service members might develop perceptions of an unreliable or discriminatory system and second-guess AI-driven recommendations or avoid seeking care altogether, fearing misdiagnoses or inappropriate treatment. This erosion of trust not only complicates medical care but might also lead to undetected or untreated conditions, compromising both individual and unit readiness.

Any system that consistently misunderstands Service members will dissolve trust and exacerbate the very problems the DoD seeks to use AI to solve. Mental health remains a pivotal, albeit complex, component of overall military readiness. AI's promise in this realm is the personalized care it can offer. However, without DEI considerations, these tools might inadequately cater to the diverse needs of Service members. For one, NLP may miss important nuances when extracting actionable intelligence from EHRs (Meystre et al. 2008). Cultural, racial, or gendered expressions of distress or trauma might not align with dominant patterns present in the data. Consequently, non-inclusive AI could overlook or misinterpret these indicators, leading to ineffective interventions.

AI's allure often hinges on its potential for efficiency. Indeed, streamlined administrative processes and diagnostic aids can expedite and improve healthcare delivery (Meskó et al. 2018). However, non-inclusive AI systems can introduce unseen inefficiencies. For instance, a system not calibrated for diverse health needs might lead to repeated medical evaluations for patients due to lack of initial accuracy. Overreliance on human oversight, necessitated to correct or validate AI determinations, can strain both medical personnel and resources. Additionally, addressing disparities post-deployment can entail time-consuming retraining and system adjustments. While the upfront time and cost savings of AI are evident, the hidden costs of rectifying non-inclusive systems might offset these advantages, leading to not just financial implications but also potential delays in care delivery.

In the broader strategic realm, the DoD's mandate is clear—defense, deterrence, and effective warfighting capabilities. Comprehensive healthcare is intertwined with this mandate. As previously noted, AI's promise extends to accelerated drug discovery for unique conditions or bio-threats military personnel might encounter (Chen et al. 2018). Yet, the absence of a DEI lens here is particularly concerning. Conditions or threats more prevalent in specific demographics might go under-researched or inadequately addressed. Consequently, non-inclusive AI could lead to gaps in medical defense capabilities, leaving segments of the force vulnerable. Researchers note, for instance, the damage caused by medical robots that deliver erroneous evaluations due to biased functioning (Howard & Borenstein 2018). Beyond the immediate health implications, this could impact deployment strategies, force compositions, and broader defense postures. While AI has the potential to be a strategic asset in healthcare, lacking DEI considerations could inadvertently transform AI into a pronounced vulnerability.

Case Study 2: Artificial Intelligence for DoD Recruitment

Recruitment is another area in which AI is gaining popularity. As the competition for talent rages on, the need to quickly and efficiently discover and recruit employees

grows. A 2020 report revealed that 24% of surveyed businesses had already begun to incorporate AI into their hiring process and an additional 56% intended to integrate it in within the next year (Drage & Mackereth 2022). Large companies like Amazon and Facebook have turned to AI tools to identify ideal job candidates. In the case of Amazon, text filtering looks to the resumes and applications of currently successful employees to identify key words and attributes. The system then analyzes applicants' materials against these characteristics, identifying those that are most likely to perform at a high level within the company (Caliskan 2021). This is just one example of the many ways AI is used in recruiting, which include, but are not limited to "writing job ads, screening of applicant resumes, and analyzing video interviews via face recognition software." (Hunkenschroer & Luetge 2022).

The DoD can take a similar approach. In one case study, researchers identified machine learning as a tool to enhance the Marine Corps' enlisted recruiting process (Frerichs 2019). The recruitment process follows eight steps: obtaining names, prospecting, screening, selling, processing, pool program, shipping, and command recruiting. Machine learning was identified as a potential tool for four of the eight steps: obtaining names, prospecting, screening, and processing. This paper argues that using AI in these processes will increase efficiency and maximize human interaction in other steps during recruitment.

According to GigEagle, another use case is AI as a method to identify talent within the reserves and the National Guard.³ Performance reviews often contain helpful information about a Service member's skills and abilities but aren't frequently reviewed to identify those skills. Reservists also often gain skills in their private sector roles that are unknown to their Services. The DoD has developed an application called GigEagle that applies user-supplied information to match Service members with relevant roles. The application reviews individuals' skills and uses NLP to scan open roles that have similar keywords, then promotes the open roles to relevant users. GigEagle's website notes that demographic information like race and gender are used to account for bias in its functions.

Military recruitment is at a historic low and innovative solutions are necessary to address this shortage. However, the application of AI in recruiting comes with notable shortcomings, particularly when it comes to DEI. Utilizing NLP to assess recruits' materials often yields biased results in candidate selection due to a lack of representation in the data used to inform filters. In other words, the data feeding NLP algorithms is often pulled from homogenous sources that do not account for diverse experiences and perspectives. Furthermore, software that pairs Service members with relevant roles is totally reliant on applicants supplying information about their skills. Research indicates that there is a large gender gap when it comes to self-promotion; women are less

likely to speak highly of themselves and their skills than men (Exley & Kessler 2019). Another study indicated that employees of color, particularly Black employees, have even been penalized for self-promotion (Wayne et al. 2022). Thus, such software is more likely to support white male applicants, who have a higher propensity for self-advocacy.

In the two examples given, AI advocates assert that using the tool will make recruiting fairer. The notion that AI consistently results in fairer recruiting systems has also been debunked (Drage & Mackereth 2022). Researchers identified two statements that are often made in support of AI's ability to be a great equalizer:

"(1) recruitment AI can objectively assess candidates by removing gender and race from their systems, and

(2) this removal of gender and race will make recruitment fairer, help customers attain their DEI goals, and lay the foundations for a truly meritocratic culture to thrive within an organization."

Scholars state that these assertions are faulty for a number of reasons. First, removing demographic attributes such as race and gender from an applicant's profile reveal a lack of understanding of the role these attributes play in the workplace and instead categorizes them as "isolatable attributes rather than broader systems of power" (Drage & Mackereth 2022). Additionally, the notion that removing these characteristics from applications will promote a meritocratic process fails to acknowledge the historic overrepresentation of white male candidates. By not recognizing gender and race in applications, employers are overlooking the potential considerations that certain groups may need to be evaluated fairly.

AI hiring tools are also often used to identify attributes that employers deem desirable, such as a candidate being outgoing or altruistic. AI identifies these traits as objective even though the process has an inherent bias. First, these characteristics manifest themselves differently across groups, rendering analysis of text or video biased towards presentations that adhere to historic norms of behavior. In order for AI to identify feelings and characteristics, it assumes that all people exhibit these things in similar ways. Experts argue that this "naturalizes attributes as biological universals, obscuring how they might be learned as well as how they are always culturally contingent." (Drage & Mackereth 2022).

Conclusion

The widespread adoption and integration of AI into the strategic and operational aspects of the DoD presents both significant advantages and profound challenges. As this study illustrated, from the healthcare domain to the recruitment sector, AI has the potential to reshape traditional methods and propel the DoD into unprecedented levels of efficiency and capability. However, the risk of perpetuating or even

² <https://gigeagle.mil/features>

amplifying systemic biases remains a significant concern, especially given the foundational role of data in training and refining AI systems. The concern surrounding system bias does not stand alone. Amplifying systemic biases can, as discussed throughout this paper, increase distrust among Service members, damage morale, hinder recruitment, and hurt operational readiness.

For AI to truly serve as an asset rather than an inadvertent liability, the DoD must prioritize DEI considerations in the development and deployment of these systems. Relying on AI systems trained on historically skewed or homogenous data sets could lead to inadequate or even harmful outcomes, whether in medical diagnostics or the recruitment process. Such errors not only jeopardize individual Service members but can compromise broader defense strategies, unit cohesion, and mission outcomes.

To this end, several recommendations emerge:

- **Data Diversity and Review:** Before deploying any AI system, a rigorous review of the data on which it's trained is essential. Ensuring that this data is representative of diverse demographics, proportional to the diverse makeup of the United States' population, can help reduce inherent biases.
- **Continuous Monitoring and Calibration:** Post-deployment, regular audits of AI-driven decisions against actual outcomes can highlight areas where biases might be emerging, enabling timely recalibration.
- **Stakeholder Engagement:** Engaging with diverse groups of Service members and stakeholders in the development phase can provide invaluable insights into potential areas of concern or oversight.
- **Ethical AI Framework:** The DoD should develop a DEI framework for AI, emphasizing fairness, accountability, transparency, and inclusivity. Such a framework can serve as a guiding document for all AI initiatives within the department.
- **Given the nascent stage of AI adoption in many sectors, including the defense domain, further research is paramount. Key areas of investigation should include:**

- 1: The long-term implications of biased AI decisions on Service member health and well-being.
- 2: The impact of AI-driven recruitment decisions on unit diversity and effectiveness.
- 3: Mechanisms to ensure transparency and accountability in AI decision-making within defense contexts.

While many of these findings are applicable to the general public, they have significant implications for the DoD due to the nature of the organization's mission. Furthermore, the military's unique operational context and mission requirements offer a valuable perspective for the broader AI community. By addressing DEI considerations proactively and sharing best practices, the DoD can provide leadership not just for national defense but in the ethical deployment of advanced technologies (Meystre et al. 2008). The potential of

AI to revolutionize various facets of the DoD's operations is undeniable. Yet, this revolution comes with a responsibility. Ensuring that AI tools serve all Service members equitably and effectively is not just an ethical imperative but essential for the future readiness and efficacy of the defense apparatus.

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