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Transnational Feminist Examination into the Machine Learning (ML) Algorithm: Argumentation Mining (AM) and Wearable Reasoner (WR)

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Abstract: This article emphasizes the importance of scholars scrutinizing data sources and types, particularly focusing on training data and its relevance in developing Artificial Intelligence (AI) reasoning devices such as the Wearable Reasoner (WR). It highlights that the information embedded in the WR system carries significant rhetorical weight and that both the process of incorporating this data and the variety of output it generates are important. The article presents findings based on the use of Transrhetorical Practices (Wang, 2021) in combination with a Data Feminist approach (D'Ignazio & Klein, 2020). This analysis critically examines the processed data within the IBM Debater Claim and Evidence (C & E) dataset, a specific type of data set utilized for training the WR. The IBM Debater C & E dataset is part of a project developed by IBM to enhance AI capabilities in understanding and engaging in human-like debates. The IBM C & E data set was established in 2015 and has not been updated since. This dataset consists of a large collection of claims and corresponding pieces of evidence designed to train AI systems to better understand, generate, and evaluate arguments. In 2020, the MIT Digital Lab proposed the proof-of-concept WR, a wearable device that would analyze whether a given argument has sufficient evidence. As an individual embodying what Chandra Mohanty refers to as being "a part of the social minority now, with all its privileges," I inquire from the perspective of "a person situated in the One-Third World, but from the space and vision of, and in solidarity with, communities in struggle in the Two-Thirds World" (Mohanty, 2003, p. 507). Essentially, I am concerned about whether the data accurately represents gender, particularly in the context of Global South gender and politics.

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Data Mining (DM), Argumentation Mining (AM), and Wearable Reasoners (WR)

The discourse surrounding Artificial Intelligence (AI) is advancing towards enhancing the "artificial" aspect of AI by intricately incorporating human natural intelligence. One notable development in this trajectory is Argumentation Mining (AM), a convergence of Rhetoric, Communication, Computational Linguistics, Machine Learning (ML), Natural Language Processing (NLP), and Human Augmentation (HA). In essence, AM entails the process of identifying argumentation within a given text, aiming to instruct a machine on how arguments are structured and operate in the real world. This involves an algorithmic approach encompassing argumentation identification, extraction, claim detection, and evidence detection to unveil the underlying structure of human-made arguments in textual content.

The objective of AM is to "automatically extract arguments from generic textual corpora to provide structured data for computational models of argument and reasoning engines" (Lippi & Torroni, 2016, p. 2). Presently, the algorithmic techniques for extracting, evaluating, and analyzing arguments find practical applications in diverse fields such as education, finance, law, public policy, and other social sciences. These applications include argument web search, opinion analysis in customer reviews, argument analysis in meetings, and scientific writing (Wyner et al., 2012; Stab & Gurevysch, 2014; Wachsmuth et al., 2016; Lippi & Torroni, 2016; Mayer et al., 2018; Poudyal et al., 2020; Bhatti, et al., 2021; Fergadis et al., 2021; Brambilla et al., 2022). For instance, Fergadis et al. (2021) developed a Science, Technology, and Innovation (STI)-driven multidisciplinary corpus of scientific abstracts annotated for argumentative units related to sustainable development goals set by the United Nations. This AM supports the advancement of policy intelligence by employing a big data, STI-driven policy modeling approach, enhancing human judgment for evidence-informed policymaking. In a similar vein, Poudyal et al. (2020) applied AM in the legal field by designing an annotated corpus of 42 decisions from the European Court of Human Rights (ECHR). Annotating the case law with its argument structure, including premises, conclusion, and non-argument components, Poudyal underscores the significance of AM in law and legal reasoning to facilitate more reasoned decision-making. In summary, the concept and techniques of data mining have gained popularity across various fields where human-driven inductive decision-making is essential.

Recently, AM has transcended into the realm of daily life, aiming to enhance human cognition and reasoning. A notable innovation in this domain is the WR, introduced in 2020 by MIT media lab creators Valdemar Danry, Pat Pataranaraporn, Yaoli Mao, and Pattie Maes. This smart invention serves as a proof-of-concept wearable system, skillfully combining AM software with a computational linguistic design. The cognitive architecture of the WR system is derived from the IBM Debater C & E dataset[1], established in 2015. Notably, this dataset is built on the Context-Dependent Evidence Detection (CDED) model, where evidence supporting claims is integrated through a data mining process (Rinott et al., 2015, p. 1). All evidence within this architecture is sourced from Wikipedia's database. Following the categorization of Wikipedia into three fundamental types—study evidence, expert evidence, and anecdotal evidence—the data engineer manually annotated the database using AM technology. The WR stands out as an

[1] I will be using the word "IBM Debater C & E dataset to refer to IBM Debater Claim and Evidence dataset included in https://research.ibm.com/haifa/dept/vst/debating_data.shtml

explainable AI system, offering a proof-of-concept and explaining the validity or invalidity of specific claims. In a departure from traditional applications of AM, Danry et al. (2020) applied it to the creation of a device designed for cognitive augmentation. According to the creators, this device functions as a "second brain," enhancing users' thinking about thinking by exposing and reminding them of the varying quality of presented information (Danry, 2020, p. 10). Essentially, it assists individuals in making decisions on contentious topics related to the public (Danry et al., 2020, p. 6-7). The primary goal is to render users "more rational and less prone to heuristic influences in judgment and decision-making" (Danry et al., 2020, p. 4).

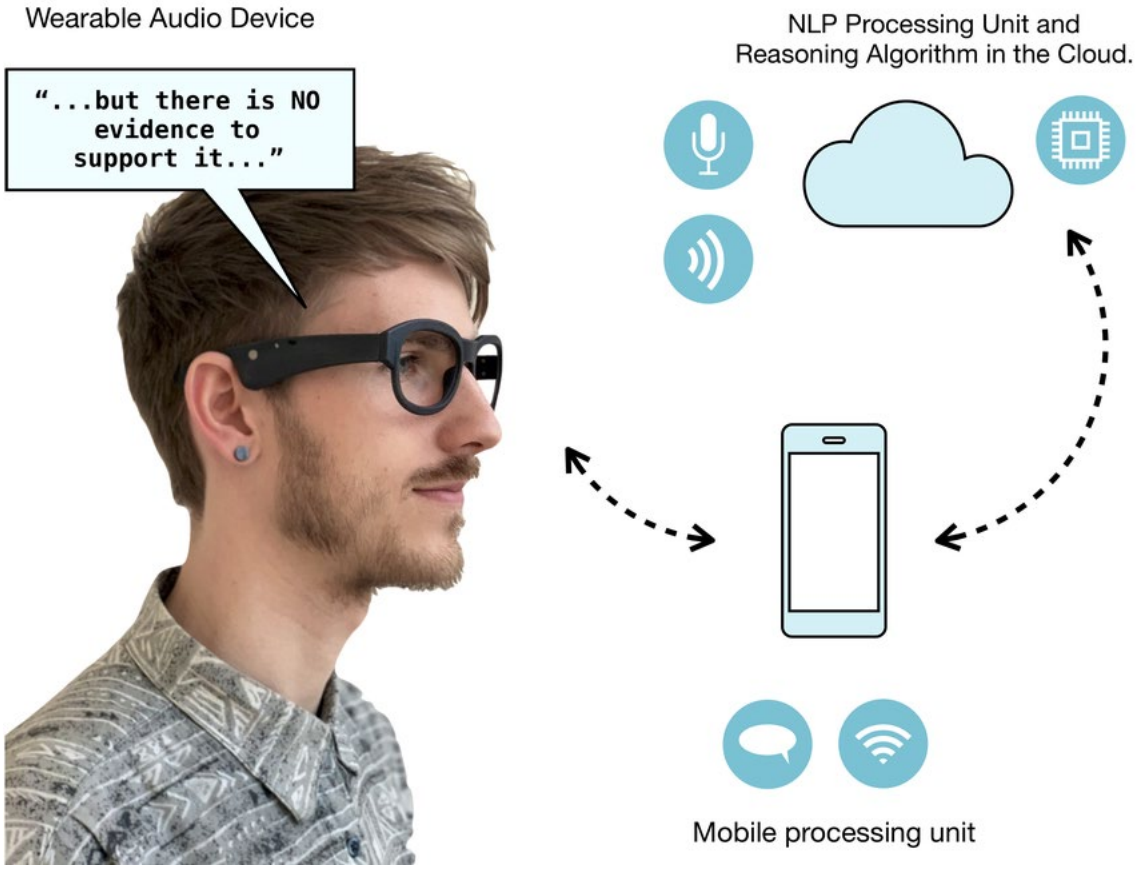

Fig. 1: The System Architecture of Wearable Reasoner (Danry et al., 2020, p. 5)

The utilization of AI and computational devices to assist users in constructing arguments represents a significant breakthrough, streamlining the process of finding evidence in texts without relying on manual logical thinking and calculation. However, it is crucial to critically examine the language and rhetoric used when asserting the "potential" of such technology and its applications. For instance, Danry et al. (2020) highlighted that the WR aims to cultivate rational citizens who are less susceptible to heuristic influences in judgment and decision-making. The underlying rhetorical assumption in such propositions may imply an inherent belief that computational thinking methods can address any form of irrational thinking and decision-making. The assertion of computational thinking's power prompts us to rhetorically pay heed to Kimball (2017), who stated, "Not all human communication is technical communication, but technical communication is a large and growing part of human communication" (p. 351). This

perspective underscores the significance of understanding the evolving role of technical communication within the broader landscape of human interaction.

This article raises a critical concern regarding technologies like WR and others that rely on specific dataset to provide limited results while promising broader possibilities. In the case of WR, explicit mention is made about replacing the brains of "human beings." The crucial question emerges: which "human being" or human brain is the technology addressing? Considering the potential existence of different human brains with varying distributions of differential agency, I delve into the pragmatic discrepancy inherent in using and applying limited dataset, all the while claiming to address the entire human species. This necessitates a comprehensive rhetorical examination to uncover the implications and nuances associated with such claims and applications.

Addressing the power dynamics surrounding the insertion and utilization of data is crucial. Questions arise about the entity wielding the power to insert data – whether it's an individual or an enterprise. In the case of an individual or enterprise, it becomes pertinent to examine their vested interests, particularly in the context of neoliberal capitalism. Understanding how personal interests are intertwined with the power to insert data is essential for a comprehensive analysis. Given that AM has become a fundamental methodological approach in computational science, AI, and ML, there is a need to delve into the science of AM. This exploration aims to elucidate both the scope and limitations of the field. Moreover, it becomes imperative to understand the potential ramifications when applied to technologies like WR, which is anticipated to be integrated into people's daily lives. Unpacking the implications of such applications is essential to navigate the ethical and societal dimensions associated with the widespread use of AM technologies. This research answers the following questions:

- R.Q. 1. What insights do "transrhetorical practice" and the principles of "data feminism" offer for analyzing and understanding the IBM Debater C & E dataset, and how can these insights be applied within WR?

- R.Q. 2. How could the incorporation of feminist decolonial practices, specifically "transrhetorical practice" and "data feminism," influence the design model of AM architecture to guarantee the incorporation of women's data, agency, and voices?

Literature Review: Looking at Machine Learning (ML) from a Social Justice Perspective

Scholars in Technical and Professional Communication (TPC) have made significant strides in understanding and dissecting the intricacies of Machine Learning (ML) practices and algorithms, which operate within the broader landscape of artificial intelligence (AI). Their efforts have been dedicated to rhetorically analyzing ML models to comprehend their broader implications, and to looking at the implications of technology produced in ML models in the classrooms (Duin & Pedersen, 2021; Majdik & Wynn, 2023; Graham & Hopkins, 2023; Aguilar, 2024). Central to these studies is the pressing need to address social justice concerns inherent in the development and deployment of ML technologies, particularly in light of the tendency for ML algorithms to perpetuate biases present in historical data. Advocating for greater transparency and social justice in ML endeavors, these scholars emphasize the crucial role of technical communicators in

scrutinizing data biases and collaborating closely with computer scientists to embed social justice principles into the design of ML algorithms.

Indeed, the suggestions and recommendations put forth by scholars in TPC regarding ML ethics and social justice align closely with the inquiries raised by feminist scholars such as "situated knowledge," (Haraway, 2007 & 2013), "strong objectivity" (Harding, 1995), "experiential knowledge" (Sauer, 1993), and "located accountabilities" (Suchman, 2002). Just as feminist scholars have challenged dominant knowledge structures and advocated for more inclusive and equitable approaches to knowledge production, scholars within TPC are similarly urging for a reevaluation of ML practices to ensure fairness, transparency, and social justice (Duin & Petersen, 2021; Hocutt, 2021; Graham, 2022; Gupta et al., 2024). Moreover, researchers in TPC are deeply engaged in examining how technology plays a role in molding and perpetuating existing social dynamics, frequently reflecting and reinforcing patriarchal norms (Koerber, 2000; Jones, 2021). The literature review presented here navigates the intersection of three distinct yet interconnected domains: ML Technologies and Women's Data In/Justice, the Logic of AM Technique and in Computational Science and Rhetoric, and Issues of Social Justice within Data Studies and TPC.

Machine Learning (ML) Technologies and Women's Data In/Justice

Feminist scholars play a critical role in scrutinizing the integration of data into algorithms, particularly highlighting the rhetoric of "data" as "power." This perspective underscores the potential of data to perpetuate injustices, especially for those with limited access to the processes of data processing, curation, and development. Notable scholars in this discourse include Buolamwini (2017), Noble (2018), Costanza-Chock (2020), and West (2020), who emphasize the power dynamics embedded in data practices. Similarly, scholars in the realm of social justice issues in technology and technical communication assert that the methodological paradigm underlying the design of technology and technical communication reflects systemic injustices inherent in patriarchal social structures. Key contributors to this field include Segal (1987), Cockburn & Ormrod (1993), Haraway (2007), Suchman (2002), Sanders (2017), and Frost & Eble (2020). For instance, critical health research scholars argue that biometrics used in digital self-tracking devices and FemTech (also known as female technology that includes menstrual tracking apps, fertility tracking devices, pregnancy and breastfeeding apps, menopause management tools, and so on) contributes to political biopower and microaggression. Sanders (2017) contends that these devices contribute to the formation of self-disciplined citizens, framing individuals as responsible for managing their health risks and making health-related consumption choices.

Moreover, feminine wearable devices are seen to intensify expectations for self-discipline and self-perfection, reinforcing patriarchal norms of beauty by constantly monitoring and improving women's fitness and bodies. Corbin's (2020) research on FemTech highlights the lack of diversity in biometrics, with devices often representing a prototypical dominant feminine that excludes the features of other women. The absence of diverse data and the development of systems without acknowledging cultural values may lead to digital microaggression, subtly conveying messages of gender dominance and normalcy, representing values and data only for specific segments of the population. This feminist perspective sheds light on the intricate

dynamics between technology, data, and social justice, urging for a more inclusive and conscientious approach to design and development processes.

The ongoing scholarly debate surrounding the use of diverse women's data in experimentation and technology training is increasingly shifting the conversation toward recognizing and addressing unintended consequences and experiences. This evolving discourse emphasizes the importance of experiential research, learning, and training within the fields of TPC. Applying a feminist methodology involves moving beyond the mere design and development of technology. Early examples of such interventions can be found in the work of scholars like Amy Koerber (2000). Koerber (2000) emphasizes that technologies, once designed and incorporated into existing institutions and practices, often reinforce the status quo meanings associated with phenomena such as race and gender, rather than fostering new meanings. This critical examination extends to the development and deployment of technology, with a focus on how data is trained into these technologies. Larson (2021) provides an example of how gender is embedded into the technological design, use, and implementation of rape kits, along with the spaces and interactions that involve these technologies. Larson's research reveals that DNA and other evidence are often considered as valid artistic proofs, while victim statements and emotional accounts are categorized as inartistic proofs. In the context of medical-legal proof in rape cases, reliance on biometric tools to support victim accounts may contribute to framing visceral testimonies as less reliable, further stigmatizing the role of embodiment in persuasion as feminized or irrational (Larson, 2021, p. 105). This research underscores the need for a nuanced understanding of the gendered dynamics in technological design and the potential impact on lived experiences.

Rhetoric, Computational Science, and Argumentation Mining (AM) Technique

In the realm of computational science, the concept of AM is predominantly drawn from the fields of language and rhetorical studies (Rinott, et. al., 2015; Lippi et al., 2016). The roots of rhetoric itself trace back to the notion of logical arguments performed in public by skilled speakers and orators. Scholars in the language studies field have developed various argumentative models, such as Toulmin’s Informal Model of Argument (1958), Whately’s Logic of Arguments (as explained by Berlin, 1980), and Freeman’s structures of argument (2001) to name a few.

However, these argumentative models are not exempt from criticisms and limitations. For instance, Lloyd (2005) criticizes Toulmin’s (1958) informal model of argument, viewing it as significant only for combative arguments or debates. Lloyd terms the Toulmin model as an agonistic model, cautioning against its use in the field of its origin. This skepticism arises from concerns that it may not be an ideal model for fostering rational thinking, argument, and decision-making. Stygall (1992) voices the concern that the model may not adequately represent and rationalize the variety of truths that persistently exist in real-life arguments. Stygall emphasizes that understanding arguments in the real world involves grasping underlying assumptions, which may not align with given categorical syllogisms. Similarly, Kendall (1978) contends that the Toulmin model lacks applicability in daily personal communication because it lacks a systematic idea of how interpersonal communication occurs. In informal settings, conversations between two people may not necessarily follow a literal argument structure. Kendall suggests considering other values, such as like perceptions, perspectives, and points of

view to describe the logic of arguments in daily conversations. Examining Toulmin's informal model of argument from a feminist perspective, Lloyd (2005) proposes that the feminist motive for including a personal and relational aspect is to question the false objectivity of "argument-as-is." Lloyd argues that the Toulmin model does not accurately represent the diverse forms of communication occurring in non-hegemonic settings. These critiques underscore the ongoing dialogue within the field about the applicability and limitations of argumentative models in various contexts.

The concern about the necessity of human logical intervention is also evident in the current utilization of computational argument models in fields where logical reasoning is essential. Vecellio Seagate (2021) asserts that the use of AI could limit privacy-related procedural safeguards, potentially leading to premature acquittals or misconducts affecting victims. Examining the application of Information Communication Technology's (ICTs) integration in the criminal proceeding system of International Criminal Justice, Vecellio Seagate, (2021) discovers that digital evidence in criminal proceedings may violate the defendant's right due to cognitive biases transferred to AI during the processing of raw data. These biases influence the sorting, distinguishing, appraising, discarding, pursuing, analyzing, reacting, and doubting of "big data" within the cognitive architecture system (Vecellio Seagate, 2021, p. 270-71). Before human judges assess digital evidence using subjective reasoning, it is already "presented with conclusions already incorporated without much effort on the part of judges" (Vecellio Seagate, 2021, p.268). The defendant's right to present or challenge evidence is constrained when machines are heavily relied upon for decision-making.

Another example is the criticism of the computational model used to design morality for autonomous vehicles, as discussed by Kochupillai, et al. (2019) in "Programming Away Human Rights and Responsibilities? 'The Moral Machine Experiment' and the Need for a More 'Humane' AV Future." The Moral Machine Experiment is a game-like platform gathering human perspectives on moral decisions made by AI in machines like autonomous cars. Moral questions, such as choosing to save a child or an elderly person in an accident, are presented. Responses are based on opinions collected from over a million people worldwide, aiming to establish a moral foundation for regulating automated cars. Kochupillai et al. (2019) argue that relying on machine-fed moral answers to guide decisions may lead to violations of human rights. For instance, a driver's choice based on the Moral Machine might violate the right to life of an elderly person when choosing a child over them. While ethical dilemmas exist in such decisions, relying on a machine designed from global opinions without situating them in specific contexts, such as accidents, is counterintuitive. Additionally, data collected in less relevant "ecology and more conceptual situations" (Kochupillai, et al., 2019, p. 288) lack users' value, termed as armchair intuitions by Kochupillai et al. AI based on such intuitions is seen as problematic from a human rights and responsibility perspective, with implications for the democratic setup of any country beyond legal liability considerations (Kochupillai, et al., 2019, p. 295).

TPC, Data Studies, and Issues of Social Justice

In the realm of TPC, scholars have extended the social justice perspective to investigate, analyze, comprehend, and critique the rhetoric surrounding data, data representation and misrepresentation, and big data cultures. Alternatively, TPC scholars apply a social justice lens

to scrutinize data sets, data processing, and structural inequalities generated by and through data (Jones, 2016; Walton et al., 2019; Gouge & Carlson, 2022; Atherton, 2022; Graham & Hopkins 2022). Gouge & Carlson's (2022) work explores the idea that the process of collecting, processing, and curating data constitutes a social culture similar to any other culture, thus susceptible to bias and omission like other sources of information. According to Gouge & Carlson (2022), TPC scholars can engage in intersectional coalition-building to promote just data practices by incorporating a social justice perspective in data settings and practices. TPC professionals play a crucial role in advocating for just data practices, emphasizing that data should be treated as captured, not uncovered; as expressing, rather than revealing. They stress the need to recognize that data collections are constructed interpretations of the phenomenal world, not inherent in it (Gouge & Carlson, 2022, p. 246). Gouge and Carlson propose four Rs as heuristics for cultivating just data practices: Recognize, Reveal, Reject and Replace. Similarly, Atherton (2022) suggests "unblack boxing" as a methodology to analyze the Fatal Force database and its accompanying data stories. Unblack boxing combines narrative and critical data study methods to "rebuild data's web of connections to place, people, culture, story, and system" (Atherton, 2022, p. 124). Atherton argues that employing an unblack boxing methodology allows TPC scholars to uncover counter stories that may exist behind data collection, processing, and curation. For instance, when examining the Fatal Force data stories alongside The Washington Post's Fatal Force database narrative, Atherton reveals implicit and explicit data stories that restore "events their time back" (Atherton, 2022, p. 130). In other words, data stories humanize the victims and foster empathy within the database.

TPC provides not only a social justice framework for examining data but also emphasizes the importance of exploring various data sets, their utilization, especially in ML, and the ways of communicating data. Graham & Hopkins (2022) illustrate that the social justice concept in technical communication not only guides technical communicators in using ML in a socially just manner but also encourages them to advise computer engineers on employing socially just methodologies when communicating about the AI and ML systems they are utilizing. They suggest several approaches for explaining ML in a socially just manner, such as elucidating the development of coding categories, archiving data, explaining dataset, reporting the reliability of ML techniques, providing open copies of coded datasets, and detailing the computational costs of data (Graham & Hopkins, 2022, p.101).

Building on these insights, this article responds to the call made by Huiling Ding in her keynote speech at the Association of Teachers of Technical Communication (ATTW) 2023, where she called for ways to bring out the human side of data and programming, highlight biases, and help design more responsible technologies. Ding's commentary in her keynote speech—"collaborat[ing] with marginalized communities and effect[ing] positive changes require[s] attention to the human side of technological problems" (Ding, ATTW, 2023)—can be addressed by employing data feminist techniques and transrhetorical practice, which aim to rhetorically examine ML's reliance on past data, emphasizing the importance of studying the components, forms, and functions of such data (Wang, 2021; D'Ignazio & Klein, 2020). Data feminism is an intentional practice of challenging the traditional foundations of data science and proposing alternative data that have not yet been integrated into the field due to their distinct characteristics yet are as authentic as other data (D'Ignazio & Klein, 2020, p.14). Similarly, transrhetorical practice aims to examine the power dynamics of how data is transferred, transcoded, and

translocated across borders, bodies, and spaces (Wang, 2016). Combining data feminism with transrhetorical practice creates a robust methodological approach for rhetorically examining the data of marginalized communities and their representation in data archives.

Method, Methodology, and Materials

This research is guided by transformative worldviews. According to Creswell & Creswell (2018), a transformative worldview combines research with political action to fight social oppression (p. 9). The main idea of a transformative worldview is to tackle important issues like empowerment, inequality, oppression, domination, suppression, and alienation (Creswell & Creswell, 2018, p. 9). In line with this perspective, I employ a "transrhetorical practice" and data feminist framework to analyze the texts and rhetoric of the IBM Debater C & E dataset, exploring its application in WR (Crenshaw, 1995; Foss, 2017).

Firstly, I use a "transrhetorical practice" to examine and analyze the IBM Debater C & E dataset. In the first step, I downloaded the CSV file of the database and converted it into a text file for reading the claims and evidence presented in the datasets. The “transrhetorical practice" comes from global rhetoric, comparative rhetoric studies, and a transnational rhetorical perspective. As defined by Wang (2021), "transrhetorical practice" is a transnational analytic tool that helps readers "talk back to the dominant discourses by recontextualizing what we read and by situating the texts, events, and representations concerning one another and to their historical mode of being" (p. 93). Wang describes "transrhetorical practice" as a methodology that helps examine the historical trajectories and persistence of cultural imperialism narratives existing in the West through various forms of media like images, memes, documentaries, and opinion pieces. She explains:

> Transrhetorical practice in part recontextualizes cultural imperative produced time, places, and spaces, connecting culturally specific rhetorical practices to larger geopolitical networks, disclosing asymmetries, inequalities, and power relations, and recognizing various forms of cultural imperialism and its many discursive and material consequences. But more importantly, transrhetorical practice invents new literacies, new rhetorics—or new ways of thinking and knowing—and lets them transform how we read, write and think in transnational spaces. (Wang, 2021, p.96)

Following Wang's suggestion, I apply critical thinking and self-reflexive practice by asking the following questions. These are not research questions, but rather questions guiding my examining and analysis of data:

1. What representations are made about marginalized groups?
2. What is explicitly stated?
3. What is left unsaid?
4. What meanings are derived from all the available information?
5. What meaning and representation are conveyed about individuals I am familiar with through non-dominant sources?

In the second phase, I use a "data feminism" framework to rhetorically analyze the IBM Debater

C & E dataset and its application in WR. The term “data feminism” is coined by Catherine D’Ignazio and Lauren F. Klein (2020). The notion of “data feminism” draws on the intersectional and transnational feminist perspectives, such as Donna Haraway’s idea of “feminist objectivity,” Sandra Harding's concept of “strong objectivity,” Linda Alcoff's notion of “positionality,” and Patricia Hills Collins's idea of “intersectionality.” Drawing on these ideas of feminism, non-Western feminism, and feminist studies, D’Ignazio and Klein proposed seven principles for examining data. These principles include examining power, challenging power, elevating emotion, rethinking binary and hierarchy, embracing pluralism, considering context, and making labor visible.

In the field of TPC, previous research, influenced by transnational feminist approaches to data studies, indicates that adopting a transnational feminist perspective is crucial for diversifying data, minimizing harm during data translation and transmission from databases to technology, and humanizing technology (Aguilar, 2022). Likewise, the "data feminism" approach has demonstrated its relevance in uncovering the hidden labor of data collection and curation, and in highlighting the lack of embodied knowledge in data (Paudel & Soden, 2023).
In the examination of IBM Debater C & E dataset and its application in WR, I apply five principles, combining pairs to create three distinct principles in total. This combination helps analyze IBM Debater C& E dataset while demonstrating the significance of these datasets in the context of WR. The redesigned principles of "data feminism" applied in this case are as follows:

1. Examining Power and Rethinking Binaries and Hierarchies,
2. Challenging Power and Examining the Context of Use, and
3. Embracing Pluralism.

According to D’Ignazio & Klein (2020), principles of examining power and rethinking binaries and hierarchies aim to bring attention to "naming and explaining the forces of oppression that are so ingrained in our daily lives—and into our datasets, our databases, and our algorithms—that [we] often don’t even see them" (p. 24) and to explore questions such as who is included in the data? (p. 122). They assert that this approach to "data feminism" "insists that we scrutinize, and if necessary, reconsider the assumptions and beliefs behind our classification infrastructures, as well as consistently question who is doing the counting and whose interests are served" (p. 123). Similarly, the principle of challenging power and examining the context of use involves investigating who creates the data and who is shaped by the data structures. D’Ignazio and Klein suggest that challenging power can be achieved by gathering counter-data, analyzing it, and envisioning outcomes for co-liberation. Co-liberation, a central goal of "data feminism," liberates individuals from data structures.

Another key principle of "data feminism" is the consideration of context. Recognizing the context in which data is produced involves acknowledging that data is not neutral or objective. On the contrary, data originates from an unequal distribution of power, underscoring the gap between "those who create data and those who are shaped by data structures" (D’Ignazio & Klein, 2020, p. 149). Similarly, they coin the term "zombie data" (p. 155) to describe datasets published without specific purposes. Thus, considering context of data entails investigating the "cooking process that generates raw data" (p. 160), essentially exploring the social power dynamics associated with the dataset (p. 172).

Finally, the principle of embracing pluralism recognizes that the most comprehensive understanding emerges when multiple perspectives are included, with a focus on local, indigenous, and experiential forms of knowledge creation. Embracing pluralism is the most crucial principle that I focused on during analysis. This is because it enabled me to identify the gaps in datasets that may have been overlooked in the data collection (relying solely on Wikipedia as a data source), categorization (selection, processing, and cleaning of data), and standardization (translation into different categories of evidence).

Following the framework of D'Ignazio & Klein (2020), I propose nine questions, which I outline in Table 1.

Data Feminism Framework	Working Definition	Application of Data Feminism in IBM Debater Claim and Evidence (2015) dataset	Questions used in applying Data Feminism in IBM Debater Claim and Evidence (2015) dataset
Examining Power and Rethinking Binaries	This principle involves critical analysis of power dynamics within the IBM Debater data, focusing on how certain groups or perspectives may be privileged and marginalized. It also entails challenging traditional binary and hierarchical structures embedded in the data.	Content of IBM Debater Dataset	1. What topics, claims, and evidence are encoded in the IBM Debater claim and evidence dataset? 2. What is the significance of incorporating these topics as critical or important in Wearable Reasoner?
		System of Classification in IBM Debater's Data Architecture	3. What classification system is employed in IBM Debater's data and architecture? 4. How does the chosen classification system relate to the use of Wearable Reasoner?
Challenging power and examining the context of use	This principle involves a dual approach. Firstly, it addresses the challenge to existing power structures inherent in the IBM Debater data. Secondly, it emphasizes the importance of understanding the context in which data is utilized, shedding light on how power dynamics play out in real-world applications.	Information about women in data mining technologies	5. What types of information about women, (mostly third-world women), are included in data mining technologies (it includes data sources, data types, data architecture, and data processing and cleaning)?
		Quality of evidence and	6. What was the quality of evidence utilized in a

		incorporation of lived experiences of women	discussion about women? 7. Are the lived experiences of women taken into account when addressing women's issues?
		Context of data curation in IBM debater dataset	8. In what context is data curated within the IBM Debater claim and evidence dataset?
Embracing Pluralism	This principle advocates for recognizing and incorporating diverse perspectives and voices within IBM Debater data. It encourages the inclusion of a variety of viewpoints, ensuring that the data reflects a rich and pluralistic representation of ideas and perspectives	Relationship between curator, immediate users, and potential users	9. What is the nature of the relationship between curator and user in the IBM Debater claim and evidence dataset?

Table 1: Applying "data feminism" in IBM Debater C & E (2015) dataset

The insights and methods offered by "transrhetorical practice" and "data feminism" are invaluable in analyzing IBM Debater dataset and anticipating their application in WR, touted as a "second brain" of human beings (Danry et al. 2020). Transrhetorical practice, a method of reading and analysis, encourages researchers to examine not only the explicit claim and evidence presented but also underlying assumptions, biases, and socio-cultural contexts that shape them. Furthermore, "transrhetorical practice" facilitates the connection between local and global contexts, elucidating how locally sourced and curated data can have global significance. By adopting a transrhetorical practice, analysts can gain a more nuanced understanding of the dataset and its implications, which can inform more robust interpretations and applications within WR.

"Data feminism" is a framework that applies feminist principles to data science and analysis. It emphasizes the importance of intersectionality, diversity, equity, and accountability in data practices. When applied to datasets like the IBM Debater C & E dataset, the principles of "data feminism" prompt researchers to consider questions such as: Whose voices are represented in the data? Whose perspectives are marginalized or excluded? How do power dynamics shape the production, collection, and interpretation of the data? Similarly, "data feminism" provides methodological approaches to integrate counter-narratives, fostering self-reflection among designers throughout the data collection, curation, and utilization processes. Engaging in "transrhetorical practice" and "data feminism" allows us to treat data as textual material, exploring its rhetorical qualities and features. Both methods remain sensitive to the evolution of discourses across geopolitical boundaries, shedding light on how data undergoes transformation from its source to design architecture to its application in technology.

Findings and Discussion

Finding #1: Reassessing Power Dynamics and the Binary Paradigm in the IBM Debater C & E Dataset

In the IBM Debater C & E dataset, there are 58 different topics organized in the data system. These topics cover a wide range of subjects, including issues such as drug problems in Mexico, the monarchy system of government globally, the one-child policy dilemma, gun violence in the United States, military conflicts in Gaza, and more. Each topic is accompanied by context-based evidence, which is categorized into expert opinions, studies, and anecdotes. All the archived evidence is sourced from 547 distinct Wikipedia articles. In terms of evidence distribution, the majority comprises expert opinions (59.6%) and studies (30.7%), while anecdotal evidence makes up less than one-tenth (9.7%) of the total evidence (refer to Figure 2).

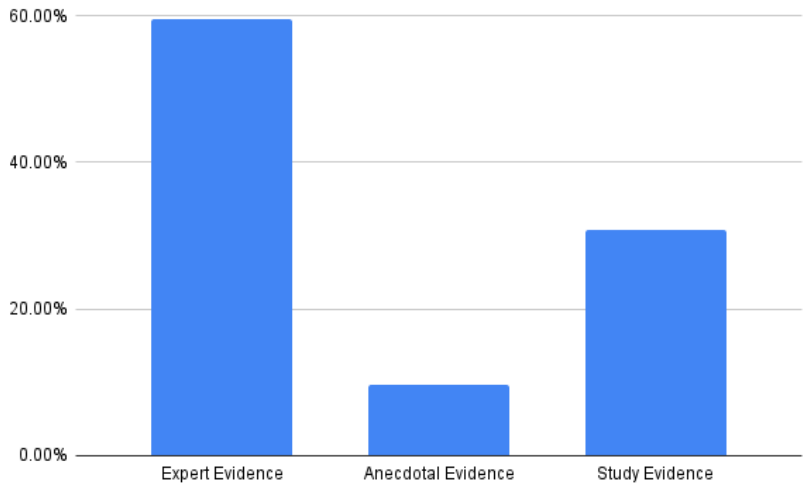

Fig. 2: Statistical representation of the different kinds of evidence in the IBM Debater C & E dataset

Among the different current and controversial topics included in the database, I found that only four out of fifty-eight different topics directly concern women. These four arguments are:

1. The house believes that countries with an imbalanced male/female ratio skewed towards males should encourage parents to produce girl children.
2. The house believes that housewives should be paid for their work.
3. The house supports the one-child policy of the Republic of China.
4. The house will ban partial-birth abortion.

Moreover, these four topics are about debates related to the male-dominated gender ratio, paid work, the child policy in China and abortion. It is interesting to note that argumentative topics related to women are considered and categorized as something that would relegate and disempower them by essentializing them. Additionally, the evidence related to these topics involving women is more interesting when looked at from the perspective of power and the way it is distributed. Of all these topics related to women, only two of them have anecdotal evidence.

Both of these anecdotes are on the issues related to abortion. Giving a verbatim example, on the claim "The house will ban partial-birth abortion," the anecdotal evidence included is as follows:

> *Claim: The house would ban partial birth abortions.*
>
> *Evidence: (1) Stenberg v. Carhart, 530 U.S. 914 (2000) is a case heard by the Supreme Court of the United States dealing with a Nebraska law which made performing partial-birth abortion illegal, except where necessary to save the life of the mother. Nebraska physicians who performed the procedure contrary to the law were subject to having their medical licenses revoked. Nebraska, like many states, banned the procedure on the basis of public morality. The Court struck down the law, finding the Nebraska statute criminalizing "partial birth abortion[s]" violated the Due Process Clause of the United States Constitution [EXPERT, ANECDOTAL]*
>
> *Evidence:(2) LeRoy Carhart, a Nebraska physician who specializes in late-term abortions, brought suit against Don Stenberg, the Attorney General of Nebraska, seeking a declaratory judgment that a state law banning certain forms of abortion was unconstitutional, based on the undue burden test mentioned by a dissenting opinion in Akron v. Akron Center for Reproductive Health[REF] and by the Court in Planned Parenthood v. Casey. Both a federal district court and the U.S. Court of Appeals ruled in favor of Carhart [EXPERT, ANECDOTAL]*

Both types of evidence mentioned above are classified as anecdotal evidence, which Rinott et al. (2015) define as "a description of an episode(s), centered on individual(s) or clearly located in place and/or in time" (p. 2). In other words, anecdotal evidence is primarily categorized based on the expertise of the individual on a particular topic or the credibility of the speaker's ethos. In the case mentioned above, regarding the topic of abortion, both lawyers and physicians, both of whom are male, are considered credible sources.

Furthermore, within the dataset, only one anecdote concerning women is featured, albeit not in the context of women's issues. This particular anecdote revolves around the subject of performance-enhancing drugs. Interestingly, while this anecdote about women is present, the identity of the individual sharing their experience remains undisclosed–unlike other anecdotal evidence included in the dataset–despite the use of the first-person pronoun in reference to the anecdote, as illustrated in the sentence below. As you can see in the example below, unlike introducing the anecdote of "LeRoy Carhart, a Nebraska physician," the anecdote of someone taking performance-enhancing drugs is reduced to the identification, such as cramps, voice becoming gruff, the appearance of mustache and periods, which are used to characterize the anecdote of women.

> *Claim: The house would permit the use of performance-enhancing drugs in professional sports.*
>
> *Evidence: There are harmful long-term effects of many doping agents. I soon had a cramp in my legs, my voice became gruff, and sometimes I couldn't talk anymore. Then I started to grow a mustache and my period stopped. (IBM Debater C & E, 2015).*

In reading these anecdotes and the language used to code them "transrhetorical practice" offers a global and transnational perspective in “link [ing] cultural specificities of language practices in a local environment with larger geopolitical forces and networks” (Wang, 2016, p. 135). In a similar vein, "data feminism" helped me think through the power dynamics by answering questions regarding the quantity and quality of the data and its implications in using such devices in technology such as WR.

Finding #2. Interrogating Power Structures and Contextual Application of IBM Debater C & E in Wearable Reasoner (WR)

Wang (2021) posits that "transrhetorical practice" entails scrutinizing power dynamics to evaluate the epistemic value associated with the speaker's positionality. This introspection prompts individuals to assess the ramifications of prioritizing specific epistemic stances and sources while sidelining others. Building upon Dotson's notion of epistemic injustice, Natasha N. Jones (2021) coins the term "testimonial quieting" to describe this phenomenon. Jones (2021) contends that the prevalent culture of delineating the validity, credibility, and authenticity of sources or experts in scientific discourse perpetuates the marginalization of certain groups, forms of knowledge, and modes of understanding. The "data feminism" approach aids in dissecting power structures by encouraging examination of the context and how power dynamics manifest in real-world applications. As enlisted in Table 1 above, the “data feminism” approach prompted me to ponder the following questions:

1. What classification system is employed in IBM Debater’s data and architecture?
2. How does the chosen classification system relate to the use of a Wearable Reasoner?
3. What types of information about women (mostly Third-World women) are included in data mining technologies (it includes data source, data types, data architecture, and data processing and cleaning)?
4. What was the quality of evidence utilized in a discussion about women?
5. Are the lived experiences of women taken into account when addressing women’s issues?

The data source for IBM Debater is Wikipedia articles, while the data source for the WR is the IBM Debater database. This raises questions about who contributes to Wikipedia articles and whose data is included in them. Additionally, the IBM Debater C & E dataset utilize a context-dependent argument mining (AM) technique. The process involves categorizing evidence into three groups, which are then extracted from Wikipedia articles. During this mining process, several steps are followed: Argument Detection, Argument Extraction, Relations Identification, and Stance Detection. Unlike traditional data mining approaches, this architecture translates unstructured text into structured data by leveraging human systems of logic, such as the Toulmin Informal Model of Argument. Similar to how individuals in fields like computational linguistics, rhetoric, and writing construct arguments, AM translates these logical skills into machine processes. This is achieved by categorizing evidence, establishing logical reasoning, and scrutinizing the validity of arguments.

Likewise, there are no parameters established regarding the types of topics, claims, and the distribution of evidence. This lack of balance in coding claims, evidence, and types of evidence

results in unique consequences—specifically, there is a significant disparity in the evidence available on issues related to women compared to those related to men, such as gun violence, video games, and the Gulf War. For instance, claims like "The house believes that housewives should be paid for their work" and "The house believes that countries with an imbalanced male/female ratio skewed towards males should encourage parents to produce girls" have only four to six pieces of evidence coded. This is in stark contrast to claims like "The house would limit the right to bear arms" and "The house believes that the sale of violent video games to minors should be banned," which have a larger number of pieces of evidence coded. Since I mentioned the claim regarding women's domestic labor, let me delve deeper into that to demonstrate the coding of expert evidence on the issue and the potential assumptions associated with it. For example:

> *Claim: The house believes that housewives should be paid for their work.*
>
> *Evidence: Feminist economists acknowledge care work as central to economic development and wellbeing. [Expert]*
>
> *Feminist economists have argued that unpaid domestic work is just as valuable as paid work and that measures of economic success should take unpaid work into account when evaluating economic systems. [Expert] (IBM Debater C & E)*

In the aforementioned claim, the issue of domestic labor performed by women is highlighted, with evidence provided by feminist economists. However, the specific names of these economists are not identified. In rhetoric, expert evidence, also referred to as "ethos," concerns the credibility of speech. In this type of evidence, the burden of proof lies not in the quality of evidence but in the credibility of the speakers. Sometimes, expert opinions are considered as evidence, and in such cases, the burden of proof lies in the credibility of the speaker. Since the architect has not explained how topics and claims are chosen, and the parameters for their selection are not clarified, we can presume that the data curator chooses to use expert evidence from feminist economists to validate the claim in situations where more than expert opinion is required. In other words, if the recognition of women's domestic labor in the family is to be supported solely with expert evidence, it gives credence to the issue primarily based on economic factors. This approach serves to highlight women's rights issues across various domains. Unpaid female domestic labor is a global issue with intersectional complexities. Categorizing this issue in a manner that simplifies the entirety of female care labor within the economy overlooks its multifaceted nature.

Finding #3. Promoting Pluralistic Perspectives in Data Curation and User Engagement

The main goal of the data feminist approach is co-liberation. Co-liberation, in essence, advocates for dismantling power and provides an alternative perspective. As D'Ignazio and Klein (2020) write, "...co-liberation doesn't mean "free the data," but rather "free the people" (p. 63). The notion of co-liberation and "transrhetorical practice" share a similar spirit. Both of them aim to dismantle dominant power. They examine and reassess the rhetorical concept and science of categorization across evolving cultural landscapes, especially in transnational contexts, as in the case of "transrhetorical practice" (Wang, 2021, p. 93). In the case of IBM Debater C & E dataset,

co-liberation means scrutinizing the politics of knowledge production, compiling the counter data, and rectifying oversights by institutions, thereby presenting alternative viewpoints aimed at challenging entrenched power structures.

Following the spirit of "transrhetorical practice" and the idea of "data feminism," I attempted to design a system architecture using IBM Debater C & E guidelines. For this purpose, I chose “Debacle of Afghanistan” as the topic. The topic was (and remains) significant for me as a transnational and decolonial feminist scholar as well as someone who is interested in the politics of knowledge production especially in and about the Global South. I selected this topic as well because the issue of Afghanistan and the United States' retreat from it continued to be a heated debate in the United States when I began my experiment in April 2021. The issue of contemporary debate is important for devices like Wearable Reasoner because it aims to equip users to be rational about current issues and events.

I used the keywords “Debacle” and “Afghanistan” because those were the words frequently used by the media during the time. Importantly, during the contemporary Taliban governance in Afghanistan, many news headlines, both national and international, featured the word “debacle” associated with the word “Afghanistan.” Upon entering the title "Debacle of Afghanistan" into the Wikipedia search, it yielded (as of the time of writing this paper) 3,950,000 results. I translated the topic into a claim: "The house believes that the United States is responsible for the debacle of Afghanistan," which indeed was a topic on the Wikipedia site: https://en.wikipedia.org/wiki/Fall_of_Kabul_(2021). This Wikipedia page comprises a total of 224 different articles on the topic. All the articles curated on this Wikipedia page are from international news sources such as *CNN*, the *New York Times*, *Reuters*, *South China Morning Herald*, and others.

Utilizing the feature engineering process in AM, I attempted to gather data for the topic of the "Debacle of Afghanistan" and structure it into a similar archetype as done by the IBM Debater C & E dataset. I collected evidence from Google and Wikipedia articles, which are major sources of data in the AM pipeline. After collecting the evidence, I categorized it into three categories: study, expert, and anecdote, following the AM data architecture. The sources mentioned above are considered powerful because they are visible in search engine results and can be codified. Figure 3 explains my curation of the keyword “Debacle of Afghanistan” in the manner of the IBM Debater C & E model.

Study Evidence:

The research conducted by Pew Research Center on 2020, shows that 54% of the American Public responded that the decision to withdraw from Afghanistan was the right decision, 27% of respondents opined that America was able to achieve national goals by withdrawing from Afghanistan and 42% opined that the jobs of the president were poor in the

Anecdote Evidence:

President Biden delivered a speech addressing the American withdrawal from Afghanistan.:

"I respectfully suggest you ask yourself these questions: If we had been attacked on September 11, 2001, from Yemen instead of Afghanistan, would we have ever gone to war in Afghanistan, even though the Taliban controlled Afghanistan in 2001? I believe the honest answer is 'no'."

Debacle of Afghanistan

Expert Evidence:

Laura Bush, who has worked extensively on issues related to Afghanistan, has written a book titled *We Are All Afghan Women* (Bush, 2017).

Ashraf Ghani, the former president of the Islamic Republic of Afghanistan, discusses the situation in his book Fixing the Failed States: A Framework for Rebuilding a Fractured World. He observes that "The presence of donors is an inescapable part of the landscape. Hundreds or even thousands of signs feature logos of donor countries and organizations, forever reminding the inhabitants of their perpetual dependence" (Ghani, 2009, p. 99).

Fig. 3. An Imaginative case for depicting alternative data in Argumentation Mining (AM) pipeline

The Context-Dependent Evidence Detection (CDED) model used in the IBM Debater C & E, allowed me to curate the data from Pew Research as an example of study evidence (Rinotte et al., 2015). For the anecdotal evidence, the data that was hyper visible is President Biden's speech where he mentioned: “I respectfully suggest you ask yourself these questions: If we had been attacked on September 11, 2002, from Yemen instead of Afghanistan, would we have ever gone to war in Afghanistan—even though the Taliban controlled Afghanistan in 2001?” Finally, for the expert evidence, renowned figures like Laura Bush and Ashraf Ghani appeared. What is missing from these results is important: the unarchived sources, the alternative evidence. At this point, I am reminded of Shirin-Gol, a character from Siba Shakib’s *Afghanistan, Where God Only Comes to Weep* (2002). Shirin-Gol was just a young girl when her village was leveled by Russian bombs in 1979. After the men in her family joined the resistance, she fled with the women and children to the capital, Kabul, beginning a life of day-to-day struggle in her war-torn country. This included a period of living in the harsh conditions of a Pakistani refugee camp, being forced into a marriage to pay off her brother's gambling debts, engaging in prostitution for a living and begging for money to feed her growing family, an attempted suicide, and an unsuccessful endeavor to leave Afghanistan for Iran after the Taliban seized control of her country.

Shirin-Gol's story can serve as an example of subjective and relativist evidence, reflecting transnational feminist perspectives that prioritize non-Western, decolonial, and Indigenous ways of knowing and reasoning (Mohanty, 2003; Swarr & Nagar, 2012). As a decolonial transnational feminist, the “Debacle of Afghanistan” makes me question the superficial accountability provided by instrumental reasoning in the quest for certainty. In contrast, for me, the story that Siba Shakib tells is not fictional; it could be real and likely reflects the experiences of many women in Afghanistan. But how can such stories be encoded into data mining tools? Is it possible to include the “truths” of common people in the discourse of objectivity? If not, how can objectivity be considered a rational truth?

To reaffirm, while categorizing and analyzing the evidence obtained from the Wikipedia article into the system architecture of AM as proposed by Rinott et al. (2015), I found myself unconvinced. As Rinott et al. (2020) suggested, CDED may offer a system architecture for obtaining evidence for a given claim. However, the question arises: is that alone sufficient for presenting an argument on a controversial topic in the real world? The curation of the dataset on the topic "Debacle of Afghanistan" indicates that AM aligns with what Bender et al. (2021) refer to as the technique of *stochastic parroting*. The implication here is that the information generated by AM, which is merely regurgitated from the training data, is an example of *stochastic parroting*—a potential hazard associated with the utilization of the Large Language Model (LLM). This suggests a need for critical examination of the authenticity and originality of the output generated by such systems, as well as the broader ethical considerations surrounding their deployment.

Analyzing the dataset of IBM Debater C & E and its uses in the WR through the perspective of Bender et al. (2021) raised two main points: 1) Deliberate promises made by computer scientists in their prototype designs and publications, and 2) Epistemic injustice perpetuated through these promises. As shown in Finding #1, the IBM Debater C&E’s use of data sources reliant on

Wikipedia articles and claiming them as truthful and "rational" should raise skepticism, as numerous researchers argue that Wikipedia datasets do not adequately represent women (Gauthier & Sawchuk, 2017; Vetter et al., 2022). In the case of the WR, the technology employing Wikipedia data sources may generate only partial truths, representing only a fraction of the global population.

This brings us to questions regarding subjects of inquiry inserted in datasets and whose voices are included or excluded. In the IBM Debater C&E, the absence of lived experiences of women and gendered representation of women is notable. Meanwhile, Danry et al. (2020) apply the IBM Debater C & E to WR without adequately addressing the concerns mentioned above. For me, in the IBM Debater C & E, testimonial quieting is actively happening. Jones (2021) refers to testimonial quieting as a gatekeeping practice used to define the boundaries of "what is 'validated' knowledge(s) and by deciding what counts as disciplinary work in complicity with ways that academia (writ large) marginalizes certain groups, certain knowledge, and certain ways of knowing" (p. 62). Danry at al. (2020) transported the testimonial quieting into WR without a hesitation to claim that WR would function as a "second brain." In other words, the system architecture of IBM Debater C & E is extremely limited to argue that devices produced by using this source can function as a "second brain" and provide an ability to make decisions rationally (Danry et al., 2020). Therefore, rather than asserting that AM can replace human cognitive reasoning, it becomes essential to examine what truths are constructed as rational, in the case of IBM Debater C & E and WR, or who is *enabled* in the dataset, and who are *disabled* from a dataset? More critically, although this is not the scope of this article, it is important to note that visibility and appearance in search engine results do not inherently assure the validity and reliability of the evidence. In other words, simply being visible in a search engine's output does not intrinsically confirm the rationality of the evidence provided.

Recommendations

Until now, WR is a proof-of-concept and advertises itself as an explainable AI system that can provide transparent assistance to users by allowing individuals to speculate, internalize, and learn from the AI system, thereby preventing overreliance on technology (MIT Media Lab, n.d). However, upon examining its usage from a "transrhetorical practice" and through the lens of "data feminism," it does not ensure *liberated futures*, especially for women and other marginalized groups (Edwards & Walwema, 2022). For example, if WR were to become an everyday technology, akin to ChatGPT, it is alarming to consider the types of knowledge and reasoning it would produce and deliver among its users. While the IBM Debater C & E suggests that it can be used for academic purposes, utilizing data developed without a clear intended use presents challenges (IBM Research, n.d.). It's essential to recognize and critically examine the potential drawbacks of such datasets when they are applied to diverse and important purposes such as WR. As reiterated in this article, to critically analyze the datasets and their deployment in cases like this is to avoid replicating biases in future applications. Additionally, open datasets are not like bakery items left to be consumed whenever one is hungry, to borrow the metaphor of data as cake used by Graham (2022). Users of the data, such as WR, need to approach these datasets with critical awareness.

TPC scholars and researchers offer an interdisciplinary toolkit to support data creators, curators,

designers, ML engineers, computer scientists and ultimately, technology users. They are among the first ones to raise the issue of validity, accountability, critical AI literacy, postdigital critical literacy, and so on (Long & Magerko 2020; Gupta et al., 2024; Deets et al., 2024). The goal is to critically analyze the datasets and their deployment to avoid replicating biases in future applications. Importantly, scholars in TPC can contribute social justice perspectives to researchers and practitioners in the field of ML. Practices such as Gouge and Carlson's intersectional coalition building (2022), Natasha N. Jones' work in this area (2016), participatory design practices suggested by Agboka (2013), and critical contextualization proposed by Ding (2020) are examples of valuable approaches. These practices are essential at every stage of the data lifecycle, including collection, processing, and utilization. The role of technical communication scholars extends to addressing several critical issues in the classroom through our practices and pedagogy. The students we teach in First Year Composition courses and Technical and Professional Writing courses are future contributors who might write Wikipedia articles or code arguments in the AM pipeline. As Byrd (2023) suggests, writing instructors need to teach students how to critically inquire into corpus texts, preparing them to write for algorithmic audiences. This paper serves as an example of critical inquiry into a corpus database. In our roles as teachers and instructors in technical communication, we must recognize that we are educating students who will, at some point, contribute to the creation of algorithms. What we teach matters, and our guidance plays a significant role in shaping the future contributions of our students to algorithmic systems.

TPC scholars interested in social justice must guide our students to think critically, ensuring that they do not inadvertently produce biased data in their roles as data scientists and analysts. Two primary suggestions have been proposed in this regard: the first involves eliminating gender from data entirely, thereby shifting the responsibility to users themselves with a stance of "No gender please!" (Wellner & Rothman, 2020). The second suggestion is to be fair and transparent, especially on critical issues like gender. However, as demonstrated by other scholars, transparency and fairness alone have not effectively addressed the problem (West, 2019). To enhance critical thinking, we can draw inspiration from the field of critical pedagogy, as recommended by Costanza-Chock (2020), and transnational feminist scholars, as suggested by Sandoval (1995). This approach helps students and future designers adopt perspectives centered on liberation and empowerment, offering a more holistic and transformative way of addressing bias and social justice issues in data science.

Limitations and Future Research

This research is grounded in small sets of data, employing a transnational feminist method with a focus on amplifying “transrhetorical practice(s).” It is important to extend this approach to larger datasets, especially Large Language Models (LLMs) and other cloud data sources, by applying a data feminist lens. For instance, ChatGPT models, which maintain secrecy about their data sources and the way certain prompts generate specific responses, can be subject to examination from a data feminist perspective. Technical communicators can contribute valuable scholarship to the ML community by scrutinizing data through a social justice lens. The methodology employed in this research involves textual analysis and rhetorical analysis, aiming to thoroughly examine each piece of data (claim and evidence) and the logical connections between them. However, modern data analysis technologies, such as Python, R, pandas, and others can be

utilized to conduct similar textual analysis on LLMs. One social justice concern that has not been extensively interrogated in this research is the environmental and labor cost of language models. Future research can focus on exploring the environmental and labor implications of language models, considering gender nuances and their broader consequences. This would contribute to a more comprehensive understanding of the social justice implications of AI technologies.

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