Texas A&M Journal of Property Law

Volume 5
Number 3 *Student Articles*

Article 8

6-1-2019

Algorithm-Based Recruiting Technology in the Workplace

Spencer Mainka
Texas A&M University School of Law (Student), spencermainka@tamu.edu

ALGORITHM-BASED RECRUITING TECHNOLOGY IN THE WORKPLACE

Spencer M. Mainka†

ABSTRACT

Traditional recruiting methods are inefficient and cost employers valuable time, money, and human resources. Additionally, traditional recruiting is subject to the biases and prejudices of a human recruiter. Machine learning, algorithm-based recruiting technology promises to be an efficient and effective solution to employee recruiting by utilizing 21st century technology to engage, screen, and interview top talent. While the promise of algorithm-based decision-making is attractive to many business owners, the practical legal considerations of its use for an ordinary small-to-medium sized employer have not been discussed. Legal scholarship in the area of algorithm-based employment decision making has primarily focused on data-driven unlawful discrimination and proposed government regulation. This Comment fills that gap by providing a summary of algorithm-based recruiting technology, its legal effects, and the best practices for an employer or an unfamiliar employment lawyer interested in adopting algorithm-based recruiting technology.

† Spencer M. Mainka is a J.D. Candidate at Texas A&M University School of Law, class of 2019. Special thanks to Professor Angela Morrison for her invaluable guidance and support.

I. INTRODUCTION

In 2016, recruiters and human resources ("HR") personnel reported that staffing and budget constraints were in conflict with the increased hiring demand as they entered 2017.[1] Many companies also reported increasing diversity and initiatives to differentiate themselves from competitors and boost engagement as priorities for 2017.[2] It makes sense then that companies listed "a focus on big data" as their "#1 trend for 2017."[3] Big data can be utilized for various HR employment decisions including decisions about, hiring, promoting, pay-level, bonuses, and termination. In the past, companies may not have been able to draw value from its employment data because the data was large and unstructured.[4] Now, new technologies enable the analysis of this data. Recruiting technology driven by big data analytics facilitates the recruitment of top talent, increases the speed of screening candidates, ensures the candidates stay engaged through a positive company perception, and distinguishes the hiring company from its competitors, all while saving a company time and money.

This Comment will focus on machine learning, algorithm-based recruiting technology. Part II will discuss what machine learning, algorithm-based recruiting technology is, why employers should care about it, and how employers can use the technology. Employers' uses of algorithm-based recruiting technology include applications such as screening, sorting, testing, and candidate engagement. Part III covers the potential liability of algorithm-based decision making under federal law. This Comment will then end with practical advice for employers about adopting algorithm-based recruiting technology. Part IV(A) speaks to the process of developing an algorithm, which includes the pitfalls of development and what an employer should be doing to protect itself—specifically: transparency, auditing, and validation. Alternatively, Part IV(B) addresses the risks of licensing a preexisting form of algorithm-based recruiting technology for an employer, including practical advice for an employer partnering with a third-party vendor.

1. *See Global Recruiting Trends 2017*, LINKEDIN, http://hrs.wsu.edu/wp-content/uploads/2015/09/linkedin-global-recruiting-trends-report.pdf [https://perma.cc/3G5Y-PP6V] (last visited Sept. 28, 2018).
2. *Id.*
3. *Id.*
4. *See* Susan McLean et al., *Big Data and Human Resources: Letting the Computer Decide*?, SCITECH LAW., Winter 2016, at 20.

II. MACHINE LEARNING ALGORITHMS AND RECRUITMENT PRACTICES

A. *Why do companies care about recruiting technology?*

The term "big data" refers to vast, complex, rapidly accumulating data sets that cannot be stored on a single computer or processed with typical software.[5] Consequently, big data would be relatively useless without a system for processing it. At its core, this system consists of algorithms. Defined broadly, an algorithm is "any process that [can] be carried out automatically."[6] It is a formula that runs data inputs through a sequence of steps to produce an output that solves a problem.[7] An algorithm can identify patterns, relationships, and categories in big data that humans would not be able to identify from that volume of data.[8] Researchers can then use patterns to predict behavior.[9] This is extremely useful in recruiting and when making hiring decisions.[10]

Algorithms are useful to hiring companies because they allow the computer system to teach itself the hiring needs of the company. This process is called machine learning. Machine learning is a type or set of algorithms that can teach itself by analyzing data to increase the accuracy of its solution.[11] Instead of a programmer asking, "how can this algorithm solve this problem?" a machine learning algorithm programmer asks, "how can this algorithm *learn* to solve this problem?" Machine learning enables computers to learn without being specifically programmed.[12] Most people are already familiar with machine learning algorithms through their Amazon or Netflix account. Both companies use machine learning algorithms to compare one user's activity to millions of others and make recommendations on what to buy or binge-watch next.[13] In a similar process, a machine learning algorithm can compare the hiring needs and current employees of one company with thousands, perhaps millions, of resumes and predict which applicants are likely to be successful in the company.

5. *See* Roger W. Reinsch & Sonia Goltz, *Big Data: Can the Attempt to be More Discriminating be More Discriminatory Instead?*, 61 ST. LOUIS U. L. J. 35, 36 (2016).
6. EVELYNE BARBIN ET AL., A HISTORY OF ALGORITHMS: FROM THE PEBBLE TO THE MICROCHIP 2 (Jean-Luc Chabert ed., Chris Weeks trans., 1999).
7. Ji-a Min, *The 5 Best Innovations in Recruitment of 2017*, GREENHOUSE BLOG (Mar. 23, 2017), https://www.greenhouse.io/blog/recruiting-innovations-2017# [https://perma.cc/SZ7B-MJ9Z].
8. *See* Reinsch & Goltz, *supra* note 5, at 37.
9. *Id.*
10. *Id.*
11. Min, *supra* note 7.
12. *See Machine Learning*, TECHOPEDIA, https://www.techopedia.com/definition/8181/machine-learning [https://perma.cc/2FRE-DDAY] (last visited Feb. 27, 2018).
13. *See* Bernard Marr, *The Top 10 AI and Machine Learning Use Cases Everyone Should Know About*, FORBES (Sept. 30, 2016), https://www.forbes.com/sites/bernardmarr/2016/09/30/what-are-the-top-10-use-cases-for-machine-learning-and-ai/#2ed6e78b94c9 (last visited Feb. 27, 2018) [https://perma.cc/AEJ8-LQ9S].

Hiring is essentially a prediction problem.[14] Thus, machine learning algorithms, the base unit of recruiting technology, are especially helpful at solving prediction problems.[15] It follows then that recruiting technology could help improve the decision making of hiring personnel.[16] The goals of HR personnel have shifted from just hiring the best candidate to hiring the best candidate quickly, spending less money, considering diversity, and keeping the company's image in mind.[17] The internet now makes it easier to meet these goals; however, it also comes with the risks of over-recruiting and unengaged candidates. Machine learning, algorithm-based recruiting technology can certainly ease this burden placed on HR personnel because it capitalizes on the benefits of internet recruitment while mitigating the less desirable side effects.

B. *How do companies use big data recruiting technology?*

Traditionally, hiring a new employee can be a long and arduous process for HR personnel. Months typically pass between the time an employer posts a position to the time an employer extends an offer. Recruiting technology is economical for a company's resources. Responsibilities like sorting resumes and ensuring a candidate is qualified are easily automated and machine learning algorithms are an obvious solution. Furthermore, recruiting technology can also serve an employer's more complex hiring needs such as candidate engagement, diversity, and reputation. For example, Google, Uber, Marriott, and Deloitte have all adopted recruiting technology in an effort to increase candidate engagement, shorten screening time, and build brand awareness.[18]

1. Screening, Sorting, and Testing

On average 1,000 people will see an online job posting and 200 people will apply.[19] In 2011, Starbucks received 7.6 million applications for 65,000 corporate and retail job openings over the span of twelve months.[20] In that same year, Proctor & Gamble, Inc. received nearly 1

14. Oren Danieli, Andrew Hillis, & Michael Luca, *How to Hire with Algorithms*, HARV. BUS. REV. (Oct. 17, 2016), https://hbr.org/2016/10/how-to-hire-with-algorithms [https://perma.cc/58TT-Z7EW].
15. *Id.*
16. *Id.*
17. *Global Recruiting Trends 2017*, *supra* note 1.
18. Sarah Fister Gale, *Gaming the System to Boost Recruiting*, WORKFORCE (Jan. 17, 2017), http://www.workforce.com/2017/01/17/gaming-system-boost-recruiting/ [https://perma.cc/SW8M-VZMW].
19. John Sullivan, *Why You Can't Get A Job . . . Recruiting Explained By the Numbers*, ERE (May 20, 2013), https://www.ere.net/why-you-cant-get-a-job-recruiting-explained-by-the-numbers/ [https://perma.cc/5QMF-LUVQ].
20. Lauren Weber, *Your Résumé vs. Oblivion*, WALL ST. J., (Jan. 24, 2012), https://www.wsj.com/articles/SB10001424052970204624204577178941034941330.

million applications for 2,000 job openings.[21] Recruiters and hiring managers are, understandably, overwhelmed by the volume of applications being submitted.[22] To manage the volume of applications, companies use an Applicant Tracking System ("ATS").[23] Initially an ATS was used for record keeping and compliance.[24] Using an ATS, a company can digitally track who has applied for jobs and, therefore, comply with state and federal discrimination laws.[25]

The first innovation in ATS was resume screening.[26] The system would scan the resumes it was storing for keywords like the name of schools attended and former employers to identify candidates of interest for a recruiter or HR manager to then review.[27] Through machine learning algorithms, this process has become automated.[28] Automated resume screening analyzes the job description and the existing resume database to learn the characteristics of which candidates became successful, and unsuccessful, employees without human review of resumes.[29]

Of the approximately 200 applications submitted per online job posting, half are eliminated for lacking basic qualifications through automated resume screening .[30] The other half, the qualified applicants, are then stored in the ATS as candidates.[31] Although only one candidate will eventually get the job, employers often tell other candidates that their resumes will remain on file for open positions in the future.[32] Recruiters and HR personnel could manually mine this data by running individual searches through their ATS system.[33] However, reviewing each search result for qualified candidates for open positions would be tedious and time consuming.[34]

Alternatively, HR personnel could choose to ignore previous candidates on file and post the position to an online job board and receive a

21. *Id.*
22. *Id.*
23. *Id.*
24. Ryan Craig, *The Importance of Applicant Tracking Systems: An Interview with Talent Tech Labs*, FORBES EDUCATION (April 28, 2017, 9:00 AM), https://www.forbes.com/sites/ryancraig/2017/04/28/the-importance-of-applicant-tracking-systems-an-interview-with-talent-tech-labs/#670887d93a81 [https://perma.cc/7W6W-FYZR].
25. *Id.*
26. Min, *supra* note 7.
27. Weber, *supra* note 20.
28. Min, *supra* note 7.
29. *Id.*
30. Weber, *supra* note 20.
31. *See id.*
32. Shaun Ricci, *4 Transformative Benefits of AI in Hiring*, IDEAL. (Sept. 28, 2017), https://ideal.com/ai-in-hiring/ [https://perma.cc/B7FX-6TZ4].
33. Ironically, the search function of the ATS system is an algorithm. *See* Ji-a Min, *7 Recruiting AI Technology Terms You Need to Know*, IDEAL BLOG: AI RECRUITING (Nov. 9, 2016), https://ideal.com/recruiting-ai-technology/ [https://perma.cc/TZ9K-2RBM].
34. Ricci, *supra* note 32.

new batch of 200 applicants.[35] With automated candidate rediscovery, recruiters and HR personnel can source candidates from both previous and new applicant pools. Like resume screening, a machine learning algorithm can automatically mine the resume data contained in the ATS to match previous candidates to the current job requirements.[36]

A combination of these processes can create video games that employers may use to recruit and test talent. Large companies use this form of recruiting technology in a variety of industries. The U.S. Army, L'Oreal, and Marriott have used video games in their recruitment process to yield a better candidate.[37] The Hungary location of Price Waterhouse Cooper ("PwC"), a multinational accounting and consulting firm, introduced a game called Multipoly into their recruitment process hoping to yield a better candidate.[38] The game tested how ready the candidates were to work at PwC by placing them on teams and having them handle business problems similar to what they would encounter on the job.[39] PwC reported that its job candidate pool grew by 190% since introducing Multipoly and that overall the game was a successful recruitment tool.[40]

On a larger scale, beginning in the fall of 2016, Unilever shifted from campus recruitment and resumes to machine learning, algorithm-based recruiting technology.[41] The process begins with targeted ads on career advice sites and Facebook.[42] Individuals who click on the ads are redirected to Unilever's application for entry level positions.[43] Unilever's algorithm then sorts through the applicants to find candidates qualified for the open position, which eliminates more than half of the candidate pool.[44] The qualified candidates are then asked to play a set of twelve short online games that measure their skills.[45] Pymetrics, a firm that specializes in game and artificial intelligence-based candidate assessment and matching developed through

35. Weber, *supra* note 20.
36. Min, *supra* note 7.
37. *See* Louis Efron, *How Gaming Is Helping Organizations Accelerate Recruitment*, FORBES (June 12, 2016, 11:00 AM), https://www.forbes.com/sites/louisefron/2016/06/12/how-gaming-is-helping-organizations-accelerate-recruitment/#6229d26b53d5 [https://perma.cc/P5TT-YMBZ].
38. Heong Weng Mak, *PwC's Multipoly Boosts Employee Recruitment and Retention*, GAMIFICATION (Sept. 21, 2015), http://www.gamification.co/2015/09/21/pwcs-multipoly-boosts-employee-recruitment-and-retention/ [https://perma.cc/NLM4-JF47].
39. *Id.*
40. *Id.*
41. *See* Kelsey Gee, *In Unilever's Radical Hiring Experiment, Resumes Are Out, Algorithms Are In*, WALL ST. J., (June 26, 2017, 2:07 PM), https://www.wsj.com/articles/in-unilevers-radical-hiring-experiment-resumes-are-out-algorithms-are-in-1498478400.
42. *Id.*
43. *Id.*
44. *Id.*
45. *Id.*

neuroscience, developed these games.[46] Pymetrics games measure skills of interest to an employer like attention duration, flexibility in multitasking, and distraction filtering ability.[47] Pymetrics also claims that the game's analysis of a candidate's skills is more accurate than a candidate's self-reported skills.[48] Unilever then invites the top candidates to submit a video interview.[49] Algorithms then review the submissions and are programmed to identify data points such as vocabulary, facial expressions, and question response speed all of which are indicators of a potentially successful employee.[50] The final step in the recruitment process is an in-person interview with a Unilever HR manager.[51] Unilever has reported that hiring has become faster, more cost efficient, and more accurate, meaning the number of offers extended is close to the number of acceptance.[52] Furthermore, Unilever has increased its workforce diversity without also increasing its consumption of time and resources. The algorithm-based recruitment process yielded applicants from more than 2,600 colleges whereas campus recruitment and resume collection received applicants from only a third of those schools, while also being time and resource intensive.[53]

2. Candidate Engagement

Candidate engagement is crucial to securing top talent.[54] Over half of job applicants have a negative impression of companies if they do not hear back after submitting an application.[55] A clunky website, a confusing online application process, or a poorly worded job posting can all create a negative reputation for a company in the eyes of the applicant. With limited time and money, employers cannot afford to lose top talent because of weak candidate engagement but also do not have the resources to respond to every question or application received.[56] However, recruiting technology seems to be the solution to weak candidate engagement.

For example, an artificially intelligent chatbot—a form of recruiting technology—can help solve this engagement problem by immediately

46. *Id.*; *see Science,* PYMETRICS, https://www.pymetrics.com/science/ [https://perma.cc/5SEG-BUE3] (last visited Sept. 8, 2018).
47. PYMETRICS, PYMETRICS: USING NEUROSCIENCE AND DATA SCIENCE TO REVOLUTIONIZE TALENT MANAGEMENT, *available at* https://www.pymetrics.com/ (last visited Sept. 28, 2018).
48. *Science,* PYMETRICS, https://www.pymetrics.com/science/ [https://perma.cc/5SEG-BUE3] (last visited Sept. 8, 2018).
49. *See* Gee, *supra* note 41.
50. *Id.*
51. *Id.*
52. *Id.*
53. *Id.*
54. Min, *supra* note 7.
55. *Id.*
56. *See Global Recruiting Trends 2017*, *supra* note 1.

responding to an applicant's submission or question.[57] Artificial intelligence ("AI") allows a set of machine learning algorithms to mimic human abilities like learning, planning, perception, and problem solving.[58] Moreover, an AI chatbot is programmed to have a conversation with an individual on the other side of the screen.[59] It can recognize and understand spoken or written human speech through a series of algorithms called natural language processing.[60] The AI chatbot is not limited by resources or technology when responding to an application like a human would be.[61]

Beyond an initial reply, an AI chatbot is able to communicate with the applicant and correctly respond to any questions.[62] The chatbot is always available and can quickly sift through data to communicate with the applicant.[63] A well-developed AI chatbot can even personalize its responses to the applicant by learning from the language used by that specific applicant.[64] It can even read and respond to the opinions, emotional state, or intended emotional effect of the applicant's language.[65] Like natural language processing, sentiment analysis humanizes the technology.[66] AI chatbots use sentiment analysis to categorize the language of the applicant.[67] This allows the AI chatbot to appropriately respond to the applicant.[68] Sentiment analysis allows the chatbot to quickly understand the applicant's tone and attitude and react accordingly.[69] However, without natural language processing and sentiment analysis, the purpose of the AI chatbot to increase candidate engagement is futile.

Employer action and sometimes inaction during the recruitment process, aside from being unresponsive, can create a negative com-

57. Min, *supra* note 7.

58. *Id.*

59. Blake Morgan, *What Is A Chatbot, And Why Is It Important For Customer Experience?*, FORBES (March 9, 2017, 5:57 PM), https://www.forbes.com/sites/blakemorgan/2017/03/09/what-is-a-chatbot-and-why-is-it-important-for-customer-experience/#2836a2e17188 [https://perma.cc/2J78-NZP2].

60. Min, *supra* note 7.

61. *See* Morgan, *supra* note 59.

62. *Id.*

63. *See id.*

64. *Id.*

65. Min, *supra* note 33.

66. *See id.*

67. *Id.*

68. *See generally* Morgan, *supra* note 59.

69. Sentiment analysis is also known as opinion mining because it determines the opinions, emotional tone, and attitude behind text. Teaching a machine to analyze the various grammatical nuances, cultural variations, slang terms, and misspellings is difficult enough in natural language processing. Sentiment analysis goes one step further and attempts to teach a machine to understand context. *See generally* Kristian Bannister, *Understanding Sentiment Analysis: What It Is & Why It's Used*, BRANDWATCH (Feb. 26, 2015), https://www.brandwatch.com/blog/understanding-sentiment-analysis/ [https://perma.cc/8CLX-CBMS].

pany perception.[70] For instance, a poorly worded job description can also hurt a company's corporate reputation and weaken the applicant pool.[71] Natural language processing and sentiment analysis can analyze a job posting for "potentially biased language and suggest alternatives to attract a more diverse candidate pool.".[72] By contrast, screening job postings without natural language processing and sentiment analysis disregards the emotional reaction of humans to words.[73]

Some companies have recognized the connection between candidate engagement and employee retention. Candidate engagement in the recruitment process was another goal of PwC's implementation of Multipoly. PwC noticed that applicants were passing through the company's website too quickly.[74] PwC HR management thought that increasing the engagement of the candidate pool would result in employees who would stay with the company longer after being hired.[75] Thus, PwC implemented Multipoly into its hiring scheme.[76] "The game allows job candidates to see how ready they are to work at PwC by placing them on teams and presenting them business problems similar to those they would encounter on the job."[77] As a result, candidates came into their interview more informed and prepared because the game introduced them to PwC and emphasized the skills needed for success.[78] The game was a success in terms of minutes spent engaging with PwC in the application process,.[79] Candidates spent approximately ten minutes on the PwC webpage and ninety minutes playing Multipoly.[80] PwC's candidate pool increased by 190% and users reporting interest in learning more about working at PwC increased by 78%.[81] The Multipoly result is further proof of the benefit of algorithm-based recruiting technology.[82] Other gaming mechanics have been implemented as part of an effort to boost candidate engagement in the recruitment process. Other examples of gaming mechanics would be including a status bar that informs candidates where they are in the application process and awarding badges to employees for submitting good referrals.[83] Considering the cost of hiring

70. Min, *supra* note 7.
71. *Id.*
72. *Id.*
73. *See id.*
74. Mak, *supra* note 38.
75. *Id.*
76. *Id.*
77. *Id.*
78. *Id.*
79. *See id.*
80. Mak, *supra* note 38.
81. *Id.*
82. *Id.*
83. Gale, *supra* note 18.

and training, finding a committed candidate is almost as important as finding a qualified candidate.[84]

Machine learning, algorithm-based recruiting technology can reduce the duration of the hiring process, the recruitment budgets, and the energy expended by HR managers who ensure that candidates are engaged and that the company's goals of diversity and positive image are maintained. Fortune 500 companies are adopting recruiting technology and praising its benefits.[85] Even reluctant holdouts have been converted after experiencing the quality candidates that recruiting technology can produce.[86] Not only are employers happy with the recruiting technology, so are the applicants. Candidate engagement and overall job satisfaction skyrocketed for PwC after implementing recruiting technology.[87] Although machine learning algorithms in recruitment benefit companies by reducing hiring costs, employers may still incur other potential costs using artificially intelligent decision-making systems.

III. POTENTIAL LIABILITY OF ALGORITHM-BASED RECRUITING TECHNOLOGY

Nothing good in life is free. Algorithm-based recruiting technology certainly is good for a company hoping to reduce costs and expand its applicant pool during the hiring process. However, algorithm-based recruiting technology is not free of liability costs. The legal issues that arise with their use are either "brand new or develop[ing] in a context that makes yesterday's compliance paradigm difficult to apply."[88] This technology alone cannot remove personnel hiring biases from the traditional hiring process. In fact, algorithm-based recruiting technology may even enforce them.[89] Thus, recklessly developed or utilized algorithm-based recruiting technology may cause disparate impact and disparate treatment of protected classes. Additional risks associated with the reckless development of algorithms arise if they are not thoughtfully created, validated, and audited for ingrained bias.[90] Further, creating an algorithm requires collecting a large data set that could violate federal privacy law.[91]

84. *See generally Global Recruiting Trends 2017*, *supra* note 1.
85. Gee, *supra* note 41.
86. *Id.*
87. Jeanne Meister, *Future of Work: Using Gamification for Human Resources*, FORBES (Mar. 30, 2015, 11:51 AM), https://www.forbes.com/sites/jeannemeister/2015/03/30/future-of-work-using-gamification-for-human-resources/#16d9b60b24b7 [https://perma.cc/QN4U-L3UJ].
88. Reinsch & Goltz, *supra* note 5, at 35 (citing to Marko Mrkonich et al., THE LITTLER REPORT, *The Big Move Toward Big Data in Employment* 1 (2015)).
89. *Id.* at 41.
90. *Id.*
91. Pauline T. Kim & Erika Hanson, *People Analytics and the Regulation of Information Under the Fair Credit Reporting Act*, 61 ST. LOUIS U. L. J. 17, 18 (2016).

A. *Unlawful Discrimination*

Although machine learning algorithms can help avoid biased decision making by HR personnel in the hiring process, algorithms also risk introducing new sources of bias into the process.[92] Algorithms are at risk of discriminatory output if developed using inaccurate, biased, or unrepresented data because algorithms learn by example.[93] Recruiting technology could violate portions of federal employment discrimination laws. The following paragraphs summarize those statutes and discuss how they could apply to recruiting algorithms.

Title VII of the Civil Rights Act of 1964 and the Civil Rights Act of 1991 ("Title VII") prohibits employment discrimination "because of race, color, religion, sex, or national origin."[94] If a machine learning algorithm is developed to match potential applicants for an open position based on current or past successful employees, that result could violate Title VII.[95] For example, if the current and past successful employees are mostly white men, the algorithm will reflect that bias in applicant selection over time if race and sex are not accounted for in the algorithm.[96] Alternatively, recommendation algorithms that use the assessments and reviews of coworkers may rely on potentially prejudicial data that could violate Title VII.[97]

The Pregnancy Discrimination Act of 1978 ("PDA"), an amendment to the Civil Rights Act of 1964, prohibits an employer from discriminating against a pregnant woman because of her pregnancy; a pregnancy-related condition; or because of the prejudices of coworkers, clients, or customers toward pregnant women in an employment decision.[98] A machine learning algorithm developed with data from the company's current and past employees could over time learn to discriminate against pregnant women and women who may become pregnant if sick leave is unaccounted for.[99] The PDA requires employers that offer sick leave to also offer it to pregnant women.[100] A pregnant woman may use more sick leave than a non-pregnant woman, which the algorithm learns as it analyzes the company's sick leave data.[101] If sick leave is a performance metric or is unaccounted for, the company may inadvertently discriminate against women who are cur-

92. Pauline T. Kim, *Data-Driven Discrimination at Work*, 58 WM. & MARY L. REV. 857, 857 (2017).

93. *See id.* at 19.

94. 42 U.S.C. § 2000e-2(a)(1)–(2) (2012).

95. *See* Reinsch & Goltz, *supra* note 5, at 43.

96. *Id.*

97. *See* Solon Barocas & Andrew D. Selbst, *Big Data's Disparate Impact*, 104 CAL. L. REV. 671, 700 (2016).

98. Reinsch & Goltz, *supra* note 5, at 43–44. *See also* 42 U.S.C. § 2000e(k) (2012).

99. Reinsch & Goltz, *supra* note 5, at 43–44.

100. 42 U.S.C. § 2000e(k).

101. Reinsch & Goltz, *supra* note 5, at 43-44.

rently pregnant or may become pregnant after she is hired, violating the PDA and probably Title VII too.[102]

The Age Discrimination in Employment Act of 1967 ("ADEA") protects applicants and employees who are forty years of age and older from discrimination on the basis of age in hiring; promotion; discharge; compensation; or terms, conditions, or privileges of employment.[103] Most recruiting technology is online or, at the very least, involves a computer. These recruiting games and quizzes may inadvertently screen out older candidates simply because they are being tested on an unfamiliar platform.[104]

The Americans with Disabilities Act of 1980 ("ADA") as amended by the ADA Amendments Act of 2008 ("ADAAA") prohibits discrimination based on disability.[105] The ADA defines an individual with a disability as an individual who has "a physical or mental impairment that substantially limits one or more major life activities," has "a record of such an impairment," or is "regarded as having such an impairment."[106] The data pulled from social media sites may reflect different activities for an able-bodied person versus a disabled person. If the machine learning algorithm identifies a soft skill like playing team sports as a corollary to retention, the algorithm may learn to discriminate against disabled individuals.[107] There are even theories that the data tracked by wellness fitness devices (like an employer-provided Fitbit) can be obtained and used in the algorithm, which could also violate the ADA.[108]

Title II of the Genetic Information Nondisclosure Act of 2009 ("GINA") makes it illegal for employers to use an individual's genetic information when making employment decisions.[109] If employers are not wary about where their data comes from, they may unintentionally use genetic information in an employment decision.[110] For example, if the developer has bought data from a website that can map a customer's DNA or chart a user's ancestry with a cheek swab, genetic information will be considered by the algorithm.[111]

Employers are most at risk of a systemic disparate impact suit, rather than a systemic disparate treatment, because of discriminatory employment practices caused by machine learning algorithms.[112] In a

102. *Id.*
103. *See* 42 U.S.C. §§ 621-634 (2012).
104. *See* Reinsch & Goltz, *supra* note 5, at 44.
105. *See* 42 U.S.C. §§ 12101-12213 (2012).
106. *Id.* § 12102.
107. *Cf.* Sharona Hoffman, *Big Data and the Americans with Disabilities Act*, 68 HASTINGS L. J. 777, 780-82 (2016).
108. *Id.* at 782.
109. *See* 42 U.S.C. §§ 2000ff(4) (2012).
110. Reinsch & Goltz, *supra* note 5, at 45.
111. *See id.*
112. *Cf.* Barocas & Selbst, *supra* note 97, at 701.

systemic disparate impact case, an employee must show that a particular facially neutral employment practice, such as using an algorithm, causes a disparate impact against a protected class.[113] For example, if an algorithm continues to recommend candidates who are of the same race, gender, or other protected trait, the employer is creating a disparate impact. If the employee can prove this burden, the employer may "demonstrate that the challenged job practice is job related for the position in question and consistent with business necessity."[114] Thus, it is imperative that the employer know how the algorithm works to explain the validity of its output. Fortunately, for employers in the case of a disparate impact suit, damages are limited to equitable relief and attorney's fees—compensable and punitive damages are unavailable.[115]

Although unintentional discrimination by an algorithm is much more likely, intentional discrimination by an algorithm is still possible.[116] Disparate treatment discrimination covers intentional discrimination against a protected class that is either explicit or through formal policy.[117] Intentionally using a protected class as an input in recruiting technology algorithms is a prima facie case for a disparate treatment claim.[118] Even if the intentionally discriminatory input was the least significant feature considered by the algorithm and the employer's intent did not necessarily carry through to the output, the disparate treatment has still occurred.[119] The burden of proof is then placed on the employer to prove the input used was a bona fide occupational qualification.[120] An employer will likely find it difficult to prove that a protected class such as race was a bona fide occupational qualification.

In a 2016 study sponsored by LinkedIn, multiple companies reported increasing diversity as a priority for 2017.[121] But, another recent survey found that more than 80% of employers worldwide cited cultural fit as a top hiring priority.[122] While cultural fit could create a productive and profitable workplace, the risk of disparate hiring is greater because there is no check on biased, human decision mak-

113. 42 U.S.C. § 2000e-2(k)(1)(A) (2012). *See also* Griggs v. Duke Power Co., 401 U.S. 424 (1971).

114. 42 U.S.C. § 2000e-2(k)(1)(A)(i) (2012).

115. *See* 42 U.S.C. § 1981a(a) (2012).

116. *Cf.* Barocas & Selbst, *supra* note 97, at 694-695.

117. *See* 42 U.S.C. § 2000e-2(k)(1)(A) (2012).

118. *See* Barocas & Selbst, *supra* note 97, at 696. *See also* McDonnell Douglas Corp. v. Green*,* 411 U.S. 792 (1973); Price Waterhouse v. Hopkins, 490 U.S. 228 (1989).

119. *Id.*

120. 42 U.S.C. § 2000e-2(k)(1)(A) (2012).

121. *Global Recruiting Trends 2017*, *supra* note 1.

122. Lauren A. Rivera, Guess Who Doesn't Fit in at Work, N.Y. TIMES (May 30, 2015), https://www.nytimes.com/2015/05/31/opinion/sunday/guess-who-doesnt-fit-in-at-work.html.

ing.[123] If a company's hiring priority is increasing diversity, then cultural fit hiring can be counterproductive.[124] Machine learning, algorithm-based recruiting technology, if developed and adopted properly, can check human decision making to ensure that employment decisions are made with minimal bias.[125]

Ultimately, machine learning algorithms are black boxes.[126] They can select candidates from a pool of likely successful applicants without identifying what traits they focused on to make their selections.[127] Discriminatory practices in employment decisions occur when those decisions are based on data containing stereotypes or other assumptions regarding sex, race, age, religion, ethnicity, ability, or those who are pregnant or may consider becoming pregnant. Using a biased output could result in a claim of adverse impact on a protected class.

B. *Regulation Under the Fair Credit Reporting Act*

In order for a machine learning algorithm to effectively predict behavior and make decisions, it needs to draw insight from a large data set. Thus, developers and third-party data collection companies mine data from the internet, including social media and job sites.[128] Information collected about a candidate may involve the collection and consideration of sensitive personal data, which is highly regulated by federal and state law.[129] Although the Fair Credit Reporting Act ("FCRA") is generally not considered a workplace regulation, one of its purposes is to ensure that consumer information is fairly used in employment decisions.[130]

In 1970, Congress enacted the FCRA to regulate the credit reporting industry by requiring reporting agencies to adopt reasonable procedures to protect individuals when their consumer information is transmitted.[131] The FCRA allows consumer information to be released by consumer reporting agencies and used to determine "the consumer's eligibility for . . . employment purposes."[132] The FCRA, however, only regulates the employer's use of data obtained from third parties, which includes consumer reporting agencies, but not data obtained on their own.[133] So a large employer's use of data col-

---

123. *Id.*
124. *See Global Recruiting Trends 2017*, *supra* note 1.
125. *See* Kim, *supra* note 92, at 873-74.
126. Michael Luca, Jon Kleinberg & Sendhil Mullainathan, *Algorithms Need Managers Too*, HARV. BUS. REV. (Jan.–Feb. 2016), https://hbr.org/2016/01/algorithms-need-managers-too [https://perma.cc/W7A2-URJY].
127. *Id.*
128. McLean et al., *supra* note 4, at 20
129. *Id.* at 20–21.
130. *See* 15 U.S.C. § 1681(a) (2012).
131. § 1681(b).
132. § 1681a(d)(1).
133. § 1681a(d)(2)(A)(i).

lected from past and present employees would not be governed by the FCRA's procedural requirements.

Under the FCRA, a machine learning algorithm used to make employment decisions may be considered a consumer report.[134] Algorithms that produce a report used to assess an applicant's "credit worthiness, credit standing, credit capacity, *character*, *general reputation*, *personal characteristics*, or mode of living" are arguably considered a consumer report.[135] The Federal Trade Commission ("FTC"), the agency primarily responsible for enforcing the FCRA, has gone so far as to promulgate rules for a business's use of reports derived from information on social media as that are considered consumer reports.[136] Algorithm developers may be considered consumer reporting agencies if their software is arguably assessing the applicant and communicating findings to the employer.[137] The FCRA provides no relief for an applicant who was denied an opportunity based on inaccurate data because the FCRA only regulates the process.[138] Nonetheless, even if the employer makes the ultimate hiring decision, the FCRA could regulate the decision process.[139]

Like traditional employment decision making, algorithm-based decision making can easily run afoul of federal laws that govern the employment recruiting, interviewing, and hiring process.[140] Algorithm-based decision making may even be regulated by federal laws that are not traditionally considered by employers.[141] Regulation of algorithms is a "hot button" issue right now. Judges are using algorithms in sentencing.[142] Facebook owns a patent on a process in which a user can be denied a loan because of the creditworthiness of his or her friends.[143] IBM has an algorithm that allegedly can distinguish refugee from terrorist, "the sheep from the wolves."[144] While employment

134. § 1681a(d)(1) (emphasis added).

135. § 1681a(d)(1).

136. Lesley Fair, *The Fair Credit Reporting Act & Social Media: What Businesses Should Know*, FED. TRADE COMMISSION (June 23, 2011, 10:23 AM), https://www.ftc.gov/news-events/blogs/business-blog/2011/06/fair-credit-reporting-act-social-media-what-businesses [https://perma.cc/X92D-5Q53].

137. Kim & Hanson, *supra* note 91, at 31.

138. *Id.* at 21.

139. *Id.* at 32.

140. *See generally* 42 U.S.C § 2000e-2 (2012); 42 U.S.C. § 2000e(k) (2012); 42 U.S.C. §§ 12101-12213 (2012); 42 U.S.C. § 2000ff (2012).

141. *See* 15 U.S.C. § 1681(a) (2012).

142. *See* State v. Loomis, 2016 WI 68, ¶ 12–19, 371 Wis. 2d 235, 245–46, 881 N.W.2d 749, 754–55 (evaluating the use of an algorithm that purports to predict whether an criminal defendant will reoffend).

143. *See* Robinson Meyer, *Could a Bank Deny Your Loan Based on Your Facebook Friends?*, ATLANTIC (Sept. 25, 2015), https://www.theatlantic.com/technology/archive/2015/09/facebooks-new-patent-and-digital-redlining/407287/ [https://perma.cc/453T-3654].

144. Patrick Tucker, *Refugee or Terrorist? IBM Thinks Its Software Has the Answer*, DEF. ONE (Jan. 27, 2016), http://www.defenseone.com/technology/2016/01/refu

recruiting technology may not be quite as impactful on society as these examples, the way these examples are handled will surely influence how algorithms are widely used.

IV. AVOIDING LIABILITY OF ALGORITHM-BASED RECRUITING TECHNOLOGY

A. *Prevention: Transparency, Auditing, and Validation in Development*

The process of hiring is well suited for machine learning algorithms because hiring is a prediction problem that the program can learn to solve.[145] Recruiting technology, however, has limitations and must be managed in application to avoid liability. Whether considering licensure with a developer for technology already created or coding an original, artificially intelligent decision maker, the following principles should be considered.

1. Monitoring Data and Where It Comes From

Employers can obtain data from a vast array of information sources ranging from social media to data brokers. First, employers have access to their own employee records from which to pull data. Employers may also scour Facebook, Twitter, and other social media platforms where former, current, and prospective employees reveal abundant details about themselves.[146] Besides collecting data on their own, employers can purchase data from a data broker. Data brokers collect personal information from different public and private sources and create individual profiles that they then market to interested parties.[147] Data brokers collect data from sources like social media profiles, personal websites, United States census records, retailers' purchasing records, and insurance claims.[148] Data purchased from a data broker will often be de-identified. De-identification, however, does not fully protect data subjects because de-identified data can be reidentified by a skilled expert.[149] It is necessary to know where the data being used by an algorithm is coming from and if it is identifiable to then ensure both the data and resulting outputs are neutral.

Algorithms learn by example, and what a program learns depends on the data that it has been exposed to. If algorithms are exposed to biased data while learning, their outputs will likely be discriminatory.

gee-or-terrorist-ibm-thinks-its-software-has-answer/125484/ [https://perma.cc/Q3HM-XFSL].

145. Danieli et al., *supra* note 14.

146. Steven L. Thomas et al., Social Networking, Management Responsibilities, and Employee Rights: The Evolving Role of Social Networking in Employment Decisions, 27 EMP. RESP. & RTS. J. 307 (2015).

147. Hoffman, *supra* note 107, at 782.

148. *Id.* at 782-83.

149. *Id.* at 783.

Data is biased when it is incorrect, partial, or unrepresentative of protected classes.[150] The data's representation and quality might vary in ways that correlate with protected classes.[151] For example, people "who live on big data's margins, whether due to poverty, geography, or lifestyle . . . are less 'datafied' than the general population[ ]."[152] Similar errors in data may disparately effect protected classes who were historically discriminated against by creating algorithms that deselect for those protected classes.[153]

Machine learning algorithms are particularly sensitive to statistical bias because an algorithm attempts to discover patterns.[154] If a dataset includes a disproportionate representation of a particular class, the program may skew in favor of or against the over- or under-represented class.[155] An algorithm's effectiveness is fundamentally dependent on the quality of the data used to train it. To address bias in the data collection, an employer will need access to the data, which due to proprietary interest, is a protected trade secret. Unless an employer is collecting its own data, an employer will have to rely on the validations provided by a third-party developer. More information on access to the data, algorithm, and validation procedures will be addressed below.

2. Setting Target Goals

It is essential to understand the technology—machine learning algorithms—behind artificially intelligent decision-making processes to identify areas of concern. A programmer begins by identifying a problem, such as employee retention. The programmer then defines the problem, such as employees leaving the company within a year of hiring.[156] If one of the company's goals is difficult to measure quantitatively, it is called a *soft goal*.[157] Soft goals, such as candidate diversity, must be quantified by their values to the company, so the algorithm has parameters to provide output within.[158] To illustrate this, consider the employee retention problem above. An algorithm can be programmed to select candidates who have similar backgrounds and traits to the company's most tenured employees. Machine learning algorithms are extremely literal and require explicit direction.[159] They will follow the instructions provided even if detrimental to the com-

150. Barocas & Selbst, *supra* note 97, at 684.
151. *Cf. see* Reinsch & Goltz, *supra* note 5, at 48-50
152. Jonas Lerman, Big Data and Its Exclusions, 66 STAN. L. REV. ONLINE 55, 57 (2013).
153. *Cf.* Reinsch & Goltz, *supra* note 5, at 48-50.
154. *Id.*
155. *Id.* at 57.
156. Danieli et al., *supra* note 14.
157. *Cf.* Luca et al., *supra* note 126.
158. *Id.*
159. *Id.*

pany's ultimate goal.[160] Without a highly valued soft goal like candidate diversity, the algorithm would probably recommend candidates of the same race or sex for sociohistorical reasons rather than the employer's bad intentions.

Google ran into trouble when it forgot to consider soft goals in setting its performance metric—maximizing clicks on advertisements—for its machine learning algorithm that determined which ads to display depending on the user's search.[161] Without a soft goal, the machine learning algorithm taught itself to display ads for arrest records when a search involved names typically adopted by African-Americans, but not in searches involving names shared with or predominantly adopted by other races.[162] Race-based advertising was not Google's ultimate goal but was perpetuated because soft goals were not considered.[163] This performance metric should be considered while, and even before, companies select developers or different technology.

Companies should also be sure to gather many data points or ensure that the developer's data set is large enough.[164] While big data is often characterized by its *length*, which refers to the number of individuals that the data broker has collected data from, a *wide* data set is also important.[165] A *wide* data set refers to the amount of data gathered from a single individual.[166] The wider the data set, the more potentially accurate and predictive the machine learning algorithm can be. Like in hiring, data diversity matters for a machine learning algorithm set to provide accurate outputs.[167] The data sets should be relatively unrelated to each other.[168] If the data sets are too similar, the program does not learn much from the set. The output is less informed, and therefore, less accurate.[169]

It is also necessary to understand the limitations of the algorithm set's output.[170] Machine learning algorithms use existing data to make predictions.[171] Each program transfers insight from one situation to another, and it is important to understand why the formula might not be transferrable to a new problem.[172] Most HR managers do not come

160. *Id.*
161. *See* Latanya Sweeney, *Discrimination in Online Ad Delivery*, COMM. ACM (May 2013) http://cacm.acm.org/magazines/2013/5/163753-discrimination-in-online-ad-delivery/ [https://perma.cc/UQF5-KKB4].
162. *Id.*
163. Luca et al., *supra* note 126.
164. Danieli et al., *supra* note 14
165. *Cf.* Luca et al., *supra* note 126.
166. *Id.*
167. *Id.*
168. *Id.*
169. *Id.*
170. *Id.*
171. *Cf.* Luca et al., *supra* note 126.
172. *Id.*

from a computer science background, which makes developing an original algorithm-based recruiting technology unlikely and unrealistic. Licensing with a developer is likely the most cost- and time-effective option, but licensing will not allow companies, specifically HR managers, to opt out of understanding the utilized technology and attendant liability.

3. Auditing and Validation

Employers have other preventative options besides understanding the data behind the machine learning algorithms and the process behind the technology. The first is to validate with an outside firm that specializes in auditing machine learning algorithms.[173] While employers and human resource personnel can do their best to understand the process behind the recruiting technology, they are not likely to have mathematics and computer-science degrees to self-check.

Machine learning algorithms can be audited by outside firms like O'Neil Risk Consulting & Algorithmic Auditing ("ORCAA").[174] ORCAA helps companies and organizations "manage and audit their algorithmic risks."[175] Its mission is to help companies and organizations, which rely on cost- and time-effective machine learning algorithms to get ahead of the pending wave of litigation by developing methodologies and standards in the new field of algorithmic auditing.[176] ORCAA audits data and machine learning algorithms by analyzing each step of the development process, which it refers to as "Data, Define, Build, and Monitor."[177] Auditing the actual outcomes produced by an algorithm can reveal when it disproportionately screens out protected groups, which allows the employer to reflect and revise its process to remove implicit biases.

Furthermore, auditing machine learning algorithms is necessary for compliance with the Equal Employment Opportunity Commission's Uniform Guidelines on Employee Selection Procedures ("UGESP").[178] The regulations apply to all employers using tests to make employment related decisions.[179] Employers should ensure the algorithms, data input, and target goals are job-related and tailored for that position and that the algorithms' results are appropriate for the employer's intended use.[180] Documentation of validation from the

173. Gideon Mann & Cathy O'Neil, *Hiring Algorithms are Not Neutral*, HARV. BUS. REV. (Dec. 09, 2016), https://hbr.org/2016/12/hiring-algorithms-are-not-neutral [https://perma.cc/7UTC-6ZG7].

174. *See* ORCAA: O'NEIL RISK CONSULTING & ALGORITHMIC AUDITING, http://www.oneilrisk.com/ [https://perma.cc/5PLW-DUJJ] (last visited Feb. 27, 2018).

175. *Id.*

176. *Id.*

177. *Id.*

178. 29 C.F.R. § 1607.16(C) (2017).

179. *Id.* § 1607.2(B).

180. *See id.* § 1607.5(B).

developer may help if litigation ensues, but validating the test and ensuring compliance is ultimately the responsibility of the employer.[181]

Additionally, employers must be on notice for outputs that act as proxies. Proxy outputs occur when traits, which are genuinely relevant to making a rational and well-informed decision, happen to serve as reliable a substitute for members of a protected class.[182] The result is algorithm-based recruiting technology that properly sorts candidates by likelihood of success, but also incidentally sorts the candidates according to a protected class.[183] Proxies may result from unconscious bias. Disparate impacts and prejudicial outcomes caused by proxies are likely unintentional by ordinary programmers and employers . They had reasonable priorities as business owners that unintentionally replicated the inequality that exists in society into their program.[184] This problem is hard to combat because the recruiting technology is performing the task that it was programmed to perform. There is one proposed solution to proxies that is quite ironic: make the program less accurate.[185] With proxies, the only way to ensure that the program does not systematically disadvantage members of a protected class is to break it, minimally, and trade utility for fairness.[186]

Finally, an employer should keep a human involved in the hiring process.[187] Employers can avoid algorithmic risk by having a human, who is familiar with machine learning algorithms, review employment decisions before finalization by the company.[188] In the European Union, data protection laws require employers that use big data analytics to ensure that there is an element of human judgement involved.[189] Human involvement should not be limited to those in-house either. An employer should also consult an employment lawyer to ensure its processes, machine learning algorithms, and technologies comply with local, state, and federal laws.

B. *Prevention: Licensing an Existing Algorithm*

For many employers, creating their own algorithm is not a practical HR expense, especially if the purpose of adopting recruiting technology is to save time and money. Licensing an existing algorithm may be the more economical option. Licensing an existing algorithm, however, will not remove liability from the employer. The employer must consider how a potential lawsuit could arise and negotiate its service contract with the developer accordingly to limit liability.

181. *Id.* § 1607.7(A).
182. *See* Barocas & Selbst, *supra* note 97, at 691.
183. *Id.*
184. *Id.*
185. *Id.* at 721-22.
186. *Id.*
187. Mann & O'Neil, *supra* note 173.
188. *Id.*
189. McLean et al., *supra* note 4, at 20.

1. Breach of Contract: Indemnity and Access

If any of the claims discussed above were brought against an employer that uses a licensed algorithm, access to the algorithm itself may be an issue if not properly considered before adopting the algorithm.[190] Whether a suit is brought against both the employer and the developer, or if the employer must bring a separate suit against the developer, the services contract must include access to the algorithm, its inputs, and outputs. An algorithm's developer will usually assert that the algorithm is proprietary and a trade secret and, therefore, protected by Federal Rules of Civil Procedure Rule 26.[191] Rule 26 allows a court to protect the developer by "requiring that a trade secret . . . not be revealed or be revealed only in a specified way."[192] The developer could also argue that the employer need not access the algorithm if the employer understands the basic principles underlying it.[193] However, a court could compel disclosure if it is necessary to avoid injustice. Regardless of what a court could decide, this issue should be addressed when considering a licensing agreement with a developer.

If access to the algorithm is restricted or the developer is not a party to the suit, an employer's best option may be to rely on an indemnity provision in its services contract. For some HR managers and hiring personnel, it seems as though there is a new recruiting technology company popping up every day.[194] For example, Pymetrics' goal is to make the world a fairer place by dismantling hiring discrimination.[195] Pymetrics is an artificial intelligence start-up that promises to identify the traits of a company's top performing employees and recommend people like them without the discriminatory bias of traditional recruiting.[196] They have a company's top performers play Pymetrics' set of games that measure objective behavioral traits through artificial intelligence.[197] From there, Pymetrics determines which traits the employer equates with high performance, which Pymetrics uses to match with recruiting candidates in its database who have played the games and received similar *scores* to the employer's high performers.[198] Their pitch makes sense and their product is appealing, but an employer must protect itself. What if a third-party developer's program, like Pymetrics, recommends applicants who are proxies for a pro-

190. *Cf.* Kim, *supra* note 92, at 920–21.
191. FED. R. CIV. P. 26(c)(1)(G).
192. *Id.*
193. *See* Andrea Roth, *Machine Testimony*, YALE L.J. 1972, 2028 (2017).
194. *See* Min, *supra* note 33.
195. Josh Constine, *Pymetrics attacks discrimination in hiring with AI and recruiting games*, TECHCRUNCH, (Sept. 20, 2017), https://techcrunch.com/2017/09/20/unbiased-hiring/ [https://perma.cc/6SXG-96SA].
196. *Id.*
197. *Id.*
198. *Id.*

tected trait? Or what if the program is creating a disparate impact, and the third-party developer has restricted access to the algorithm and collected data? An employer must protect itself from liability, especially when utilizing emerging technologies that are not quite regulated by law yet.

Even though computers are considered better at decision-making than humans, it is important to remember that people should monitor the inputs for potential bias.[199] Auditing the algorithm's outcomes is another essential strategy for detecting unintentional bias and prompting the reexamination and revision of algorithms to reduce their discriminatory effect and to avoid litigation.[200] Auditing can also prompt an inquiry into the methods of data collection. Ultimately, it is not the role of algorithms to replace human decision makers. The human decision makers should be the last check to avoid liability. Whether it is deciding to audit the outputs of an algorithm or negotiate an indemnity provision, algorithms cannot avoid liability on their own.

V. CONCLUSION

Machine learning algorithms "identify[ ] patterns too subtle to be detected by human observation, and [use] those patterns to generate accurate insights and inform better decision making."[201] Insight like this is invaluable for an employer and can be crucial to a company's long-term success. Recruiting technology, however, cannot replace human decision makers and cannot be relied on to provide the perfect answer without human supervision.[202] Machine learning, algorithm-based recruiting technology can advance a company's goal to minimize unconscious bias in the hiring process and increase diversity. However, the risk of bias and prejudice cannot be completely eliminated, and an employer would still be liable for its unlawful discrimination through technology.[203] Additionally, an employer must also be practical by considering potential disputes between a third-party developer and itself and by negotiating a contract that reflects those concerns. The challenge for an employer adopting recruiting technology is to understand the risks and limitations of machine learning algorithms and their use in recruiting technology.[204] Ultimately, an employer can accomplish this through effective human management and a deeper understanding of the recruiting technology.[205]

199. *Cf.* Barocas & Selbst, *supra* note 97, at 687.
200. *Id.* at 719.
201. Luca et al., *supra* note 126.
202. Danieli et al., *supra* note 14.
203. Mann & O'Neil, *supra* note 173.
204. Luca et al., *supra* note 126.
205. *Id.*