

NATHAN CUNNINGHAM: Hi, everyone, and welcome. We hope you're all doing well out there in the current climate and thank you for joining us for a virtual presentation today. We want to thank the organizers of the Future Date Conference for setting up this platform for us. We want to ask you all if you have any questions, please feel free to pose them in the chat function. We'll be online during the session to respond to questions as we go along.

So with that, we'll get started. So today, we'll be talking about making Artificial Intelligence, or AI, inclusive for hiring and HR professionals. My name is Nathan Cunningham. I'm a policy advisor in the US Department of Labor's Office of Disability Employment Policy.

CORRINE WEIBLE: And my name is Corinne Weible. I'm the Co-Director of the Partnership on Employment and Accessible Technology.

JUTTA TREVIRANUS: And my name is Jutta Treviranus, and I'm the Director of the Inclusive Design Research Center at OCAD University.

NATHAN CUNNINGHAM: Also, thank you all for joining us for the presentation. So Corrine and I work with ODEP and an organization called PEAT. And our mission is really focused on ensuring that workplace technology is accessible for people with disabilities.

In the past year, PEAT has started shifting its focus a little bit to emerging technologies, such as AI, and you can see up on the top right of the slides, PEAT's tagline is building a future that works. So we're really interested in making sure that these new technologies coming out are inclusive and accessible for people with disabilities to succeed in the workplace. Next slide.

So throughout the presentation today, we'll be sharing some information on AI, some overall basics about the technology. We'll also be covering AI in an HR context, specifically, and walking you through ways that it's being used in the pre-screening and interview processes.

We'll touch on areas of bias and concerns around the way that AI is being used in HR contexts and give you some ideas about how to address those issues. We'll also touch on the legal landscape, and finally, close with some questions you can pose to your vendors to make sure the technology you're procuring is accessible.

So just to start out, we want to give a foundation of technology and the employment gap. So what does that mean exactly? In the United States, the unemployment rate of people with

disabilities is 7.3%, and 3.5% for those without disabilities. So there's a gap here, and we're seeing ways that we can use technology to help close this gap.

On the left, we have a graphic. It shows a purple circle. This circle represents the global population of people with disabilities. Now take 60% of that circle, or almost 2/3, and you've got the working-age population of people with disabilities. Only 20% of that working-age population is actually in the workforce today.

But Accenture has found that advances in technology can enable 55% of this working-age population of people with disabilities to join the workforce. So you can really up the numbers through using technology responsibly and ethically. And this can add \$23 billion to the global economy overall. Next slide.

So what exactly is artificial intelligence? And what are some ways that it's showing promise for use in the workplace? Artificial intelligence generally refers to technologies that use computer systems to take the place of human intelligence or human sensing. So it's software that can learn to process images you see, sounds you hear, or linguistic expressions you understand, and all of these can benefit, including people with disabilities, in the workplace.

So there are some main umbrellas of AI technologies that's quite broad that I've included here. Number one is computer vision. Autonomous vehicles are a good example of this because they rely on many kinds of computer vision to operate and operate safely. Think about the ways that they use body recognition software to identify pedestrians and cyclists, and you want to make sure the data that they're getting to learn from includes pedestrians with disabilities, such as wheelchair users or cane users, so that they can operate safely.

Number two is speech systems. Is there any kind of text-to-speech, or the reverse of that, speech-to-text software that's being used? You might use your phone in this way. You might talk into your phone instead of typing into it, and AI is recording what you're saying down into the text interface or the web search interface.

There are applications for this in the workplace, as well. You can imagine ways that in meetings people who are deaf or hard of hearing or people with cognitive disabilities might need real-time and automated captioning in order to get information from various presenters. So AI, if it's done well, can really play an important role in that.

Number three is text processing systems. These are ways that large streams of text

information can be condensed down automatically into summaries using AI technologies. You might use these in an HR context if you're trying to screen resumes. You're interpreting information on a candidate's resume through an AI model and then pulling out the most important parts. This can also be useful for people with cognitive disabilities or people who are just busy and want some kind of summary of the information.

Finally, the fourth one here is chat bots and conversational agents. We're seeing these used in customer service contexts. People are interacting with those kinds of chat bots to get information and answers to simple questions. And we're also seeing them starting to become used in HR contexts so that prospective candidates can interact with the chat bot and get answers to some of their simpler questions. Next slide.

So what about AI in the HR context more specifically? This is where the machine learning and predictive analytics side of AI comes into play, and we can spend the whole presentation talking about this topic. It's really quite fascinating. But I'll try to condense it, and I know you will probably touch on it a little more later on. And it's the idea that you're taking a model that you've developed and putting training data into it.

So you might want it to identify candidates that are good fits for the job that you're putting out there. So you're trying to train the model based on what you think a good candidate will look like. And then you're sending that model out into the world and having it encounter new data. It's testing on that data. And it's trying to come back with accurate results to match what you're looking for.

According to the LinkedIn 2018 Global Recruiting Trends Report, 35% of those who responded said that AI is a top trend affecting how they hire. This number is not huge at this moment. We're kind of seeing that AI's on the cusp of really breaking into the HR space, and that's what's reflected in the Deloitte 2019 Global Human Capital Trends Report, where 81% of respondents predicted that their use of AI will grow in the future.

And with us being on the cusp of that, that's where PEAT's interest is. We want to make sure as the technology is rolled out, that it's inclusive and accessible for people with disabilities.

The last thing I'll say here is it's interesting to note that 56% of the hiring professionals in the LinkedIn study also noted that new interview tools are a top trend affecting how they hire. So we're seeing ways that AI coming into the interview space is causing us to rethink some of the ways that we're conducting interviews.

So we might introduce online skills assessments, or job auditions, or even video interviews that are analyzed by AI technologies. And we need to make sure in doing so that some of the human error and human bias that is present in analyzing interviews does not then carry over into the AI systems that we're building and pushing out. So with that, I'll turn it over to Corinne to talk more about the details of AI in prescreening and interviewing candidates.

**CORRINE
WEIBLE:**

Thanks so much, Nathan. This is Corinne. Next slide, please. So as Nathan was saying, PEAT, the Partnership on Employment and Technology, has been very interested in the increased use of AI. We have been focused on a lot of related issues over the years, such as accessibility of online job applications and if candidates are actually able to all access the same digital documents they need to in order to be considered for jobs.

And I think with AI, in general, people are very interested in the possibility of automating repetitive tasks and increasing productivity. But there is also this real interest in the idea of reimagining work, and HR professionals are very interested in the possibilities data is offering to really better predict hiring outcomes. So you're seeing a lot of new platforms focused on predictive assessments through the use of proprietary algorithms.

Prescreening candidates is one of probably the biggest growth areas because it enables hiring managers to very quickly sort a great volume of applicants and contacts. And they are increasingly interested in soft skills. This is a real interest area in general-- traits like teamwork or curiosity. The term culture fit comes up a lot. And people are very interested in this idea that a machine might be able to make these sorts of assessments, too.

So you see a lot of tools that are scanning resumes. There's also a lot of platforms that are working to scan current employees with the idea that they can identify a person for a promotion or identify when there's a skills gap and somebody is in need of training, with the idea that this will increase retention.

And they're also using these tools to analyze current job descriptions and to determine the success rates of past hires when determining their strategies for seeking new hires. And this strategy often feeds into the first, that this sort of data-- that a company might be looking at who they've hired in the past to determine who will be a successful candidate in the future, which, of course, is a complicated idea.

When you look at it from a disability inclusion lens, if a company has not traditionally hired a lot

of people with disabilities, they might not be in that data. But we'll be talking about that more. Next slide.

So the interview process also involves a lot of these platforms. And in particular, video interviews are rising in popularity, and with it, these also contain algorithms that are actually making predictive assessments themselves by analyzing facial expressions, vocal tone, and word choice. And with this, this assessment claims to be able to suss out those soft skills that I was mentioning earlier.

For example, the idea that it can get a sense of someone's emotional intelligence, or interpersonal skills, or honesty. And of course, this raises a lot of questions, as well. For example, an autistic candidate or a candidate who maybe has had a stroke in the past, there's a question of whether those use case scenarios have been considered.

There's also a lot of game-based pre-test assessments. These are very popular in the hiring world for really even the past decade. So these are tools that-- it's a gamified approach, testing out logic or problem-solving, and also a predictor of a successful hire. And a lot of this is an accessibility consideration because sometimes we're seeing that these tools have considered some disabilities, like they might have considered whether somebody is colorblind or if they're using a screen reader, but it might not be in every case.

And it also raises the question of if a candidate cannot take a test provided, such as this, is there an equivalent test they can take? And if there isn't, does that affect how the candidate is assessed compared to the other candidates?

Another accessibility issue comes up with chat bots, which are increasingly part of recruiting websites. And these streamline the initial communications process. HR professionals will tell you they increase engagement with prospective candidates and lead to more people applying to jobs. But of course, if they're a required part of the interview process and the application process, they need to be fully accessible.

And so it does raise that question of, what happens if they aren't? And in all these questions, there's also the question of how someone with a disability can request an accommodation and even to understand when they need to. For example, with a video interview, they may not realize that there's an algorithm involved. Next slide, please.

And so this also circles back to the question of, why are HR professionals using this AI? And

probably, the top primary reason is that there is a significant increase in efficiency and cost savings because they can process such an enormous volume of data and analyze it so quickly. But beyond that, we're hearing from a lot of companies that they believe it helps to meet their diversity inclusion goals.

With the idea that if they are trying to target and recruit specific diverse candidates, these type approaches, if customized, help them do that, that they help them meet their Section 501 hiring quotas. And there is also very strongly a belief that humans are biased, which of course, is true, and these types of solutions are looked to with the idea that it reduces human error, as well as unconscious bias and nepotism.

So it raises a big question because there is also the question of are these fully free of bias themselves? And with that, I will hand this over to Jutta to discuss that question in further detail.

JUTTA

TREVIRANUS:

Thank you, Corrine. And this is Jutta, and so I am going to discuss the challenges that we face in using AI systems, especially if the goal is inclusion and ensuring that there is greater employment of people with disabilities. When we look at disability AI in employment, and if you are someone with a disability, there are a number of sources of challenge.

The first is in how you are treated as a subject of the data-driven decisions that AI is used to make. Next is the barriers that exist in data science as a whole for you to participate in designing and developing data science, and therefore, in influencing the progress or the advance of data science in a more inclusive way.

There are barriers to interpreting the outcomes of data science, because frequently, many employers are using data science as part of your job description. And so you may have difficulty in certainly visualization tools if you cannot see the visualization, et cetera. There is also a greater vulnerability to data abuse and misuse. And I'll mention a few of the risks there.

And then lastly, because of the way that data science, and artificial intelligence, and smart systems are constructed, there is a vicious cycle in that once you are the subject or you are subject to this type of bias, then it amplifies and automates that bias.

And there are certain stages to any bias that builds up or bias that you may be subject to in the data gathering, in the processing of the data, in the analysis and interpretation of the data, in the training or machine learning processes that are used to use the data and to create the

predictive analytics, or even the learning models that would be used to do things like speech recognition or image recognition, and especially in these decisions that are based on the data and any assumptions that underlie those decisions.

The types of bias that can occur can be classified very, very broadly into three areas. The first is data gaps and the misrepresentation, or lack of representation, of individuals with disabilities in the data that is gathered to feed the artificial intelligence, or the machine learning, or data analytics systems.

Then the next, which Corinne and Nathan have both alluded to, are the embedded forms of bias that are caused by humans or that are within the data. So this might be implicit bias. It might be just simply the pattern of the past, because data is always from the past. And if there has been bias and discrimination in the past, the data will reflect that. And if the artificial intelligence system is optimizing for something that happened in the past, then it will optimize in that data bias.

But lastly, there is also a general discrimination or bias that occurs because of statistics and the position of individuals with disabilities with relation to statistics. With respect to the data gaps and representations, if you think about it, and if you have been to university and if you've seen any scholar or researcher recruiting individuals for studies where they're going to gather data, most often, having a disability is an exclusion criteria when population data is gathered.

People with disabilities, because of the digital divide and because of the lack of accessibility of many digital tools, are also frequently absent from the digital traces that are used in most data sets. A lot of the artificial intelligence is trained on data sets that come from use of other digital tools, or social media, et cetera.

And then when there are these data gaps or when there is insufficient data, then frequently, there are data proxies that are included. And those data proxies meaning that there is some set of data that stands in for data that is absent. And often, those are very inappropriately made based upon assumptions that don't really apply to people with disabilities.

The types of biases-- and I'm not going to go through all of them, but there are many different types of biases, or how the biases then are evident within the artificial intelligence systems, is either through the patterns of discrimination that are reflected in the data, the bias of developers designing the system, or algorithmic bias.

And that takes me to the last bias issue, which is an inherent bias that has been there well before artificial intelligence or data analytics, and that is what happens to people with disabilities when we're talking about population-based statistics. And the issue here is, as Nathan was mentioning, predictive analytics, which is often used to make very, very critical decisions in hiring and in other critical parts of a person's life.

The problem is that those predictions and probability statements or inferences are based on statistical significance or power, which of course, are focused on the majority or average. And if we look at a normal distribution or a multivariate scatter plot of a number of data elements that are used to make an artificial intelligence decision-- say, this particular one would represent all of the needs and requirements of a particular group of people-- then what it looks like is it looks like a starburst in two dimensions.

And there is a cluster of elements that are clustered in the center. Those are about 80% of the elements. And as you move away from the center, 20% of the elements spread out from that central core. And the thing to note there is that the elements that are in the middle are very close together. The elements that are out at the edges are far apart, meaning that the further you get from the center, the more likely you are different from anyone else.

And so what we have is an issue of representation. In order to adequately be represented within the decisions that are being made by artificial intelligence systems, it requires a large homogeneous number. And quite often, noting what happens to people that are out at that outer edge is that you may represent a sample of one because there's nobody else that is similar to you or nobody else within a data set that can represent you.

One of the other things that frequently happens when data is being processed is that those outliers are eliminated and data brokers, or the individuals that create data sets for artificial intelligence to make useful inferences as quickly and efficiently as possible, will emphasize the dominant patterns, which means that the other patterns will disappear.

And when there is a decision being made regarding a population or an optimal is being identified, then it usually means that it's biased towards the majority, and people with disabilities are not in the majority. So statistical significance which sways a decision or which a decision is biased towards would push someone away from the edges, or small minorities, or people with disabilities.

So what we can say about predictions is that if you're in that inner core of about 80% of the

data elements, then the predictions that are being made based upon predictive analytics are going to be highly accurate. But when you move away from it, they're inaccurate. And if you're out at the outer edge, they're wrong. They are likely to be completely inaccurate regarding your particular situation. And if a choice is being made, then the choice will be made against you.

The unfortunate thing with bias and social justice is that many of the systems that are being used to determine whether a system is biased don't work very well for people with disabilities because they're dependent upon a cluster analysis of a well-defined homogeneous group. So here is the cluster of individuals that are-- it may be based on race. It may be based on language.

But there's an easily definable characteristic that can be captured within data. People with disabilities are very, very different from each other. The only common set of data is difference from the norm. And so the tools that say, well, let's compare the performance of the artificial intelligence system with the majority or with the default and then with this particular identified cluster, there will be many people that will fall through the cracks or be stranded at the edges if you have a disability.

Data abuse and misuse is also an issue because people experiencing disability are most vulnerable to data abuse and misuse because they're highly unique and there are many threats with respect to insurance coverage, with respect to other issues. And the data protections don't work because they depend upon deidentification at source. And if you have a disability, you are unique and you're highly likely to be reidentified.

And also, individuals with disabilities frequently barter their privacy for essential services. The minute you ask for an exception from a particular rule with respect to data, you can be reidentified.

So Corrine has talked a little bit about the impact on employment in HR, and so I'll go through this fairly quickly because I think I'm saying some of the same things. But in terms of impact on hiring, as was mentioned, the recruitment channels-- quite often, individuals will use, companies will use, HR firms will use a system that allows you to filter a large set of applicants to determine who are the most likely ones that you should hire. It's based upon past data and on data sets that don't represent people with disabilities.

There are the application tests screening for competencies. And here, one thing that I want to

stress is the psychometric tests. The psychometric tests that are used for those soft skills are very frequently based upon a data set that does not include people with disabilities and a variety of different types of disabilities.

There is, of course, an impact on training and onboarding. Learning analytics is frequently used for orientation, training, and upgrading training, and there are inaccessible training interfaces, as Corrine mentioned. But the other issue here is that, especially if it's adaptive or personalized learning systems, then it becomes a vicious cycle in that the analytics are not likely to capture the actual needs of the person that is undergoing the training.

It becomes more difficult. You struggle with the test, and so the feedback loop that occurs there means that the next person is also going to have similar difficulties because the optimization of learning will not work for the individuals that are different from the majority of the data set.

And accessibility of data science tools and data visualization tools, of course, make it difficult to participate in the data science that is being adopted within a workplace. The impact on performance and promotion can also be quite extreme. There is an increase in work surveillance, especially within the gig economy and with a number of large employers, that are attempting to optimize the efficiency and the productivity of employees.

And of course, if you have a disability and are using alternative access systems or alternative ways of working, then those optimization routines will be a misfit for you and your work will not be deemed to be efficient and effective.

It also has an impact on discipline and termination. The analysis that is used to assign and address responsibility is frequently based upon specific large patterns. And so if there is an attempt to detect a bias on the part of the employee or employer and discrimination on the part of the employer, the patterns of discrimination and bias towards people with disabilities won't be recognized.

So if you are choosing to deploy artificial intelligence within an HR system or within an employment scenario, then there are a number of things to think about. Some of the questions you need to ask is, what data was used to train the artificial intelligence system and is that reflective of the employees or the potential recruits or applicants that you wish to make decisions about?

How was the data processed? What were the assumptions that were made and how were people classified when that processing occurred? Were the outliers and the individuals that were far from the norm eliminated and how will that affect the diversity of the applicants that you hope to recruit? How were the data gaps addressed? What were the proxies that were used to address those data gaps? And what are the assumptions applied in the analysis of the data that is used to train the machine learning system?

Other considerations are, are you getting a learning model that stops being trained? Meaning that are you using a training set and a training process that was trained somewhere else in a different context with a different set of individuals? If the learning model is adaptive, then what data will it use for adaptation within your workplace? So what are the types of sensors and the types of data that you can feed it?

What decisions will it support and how is this delegated? Is there an allowance for human intervention, human judgment? Are the decisions automated? And if they're automated, what happens to people that should be an exception to those decisions, especially people with disabilities?

How are the errors processed and do you have an opportunity to review and make judgments regarding the errors? And how can the tool be refined and bugs fixed? Is it a black box that you have very little control over adjusting?

In terms of the practices that you can use to ensure that your system is not unduly biased, don't choose automated decisions based only on overall accuracy. Quite frequently, vendors will sell an AI system saying it is 96% accurate, and therefore, more accurate than human decision-making. However, what you need to do is to look at the entire spectrum of accuracy, because frequently, what will happen is the accuracy will be very high in the middle and it will be very inaccurate at the edges. So when you make your decision to deploy automated decisions, then look at the full spectrum.

Perform a disability impact assessment before deploying a system within your place of work or within your HR practices to see what will be the impact, and especially with relation to the decisions that you're going to make using the AI system. And assume that there is going to be a data breach and develop a plan for preventing abuse and misuse.

Don't be overly concerned only with privacy because privacy will be breached for individuals with disabilities. So the additional things that you need to do is to figure out what you are going

to do to alleviate the risk of data abuse and misuse when there is a breach.

And so we have a project called Project We Count, where we are attempting to address access to shaping data science by people with disabilities. We're addressing data gaps and biases, co-designing protections against data abuse and misuse, and co-creating more equitable decision supports.

And we're also trying to develop alternatives to the binary terms of service agreements that allow an overreach in data capture, whereby there is an actual negotiation between the data provider, meaning the individual that has personal data, and the service that wishes to use that personal data, and a negotiation with appropriate use of the personal data.

We're also working on cooperative data trusts, whereby the individual whose data it is gets to determine who gets to use the data, both governs the data and gets to share in the value of the data. And we are looking at alternatives to data that is biased towards the average, which is a very experimental process where we're looking at something called the lawnmower of justice which takes the privilege of being like everyone else away and causes the machine learning model to attend to the edges.

And I will now pass it back to Corrine to tell you more about what employers should ask.

CORRINE

Thank you so much.

WEIBLE:

NATHAN

CUNNINGHAM:

Yeah. Thank you. This is Nathan. I'll go ahead and talk a little bit about the legal landscape quickly. In the US, we have the Americans with Disabilities Act of 1990, and Title I on employment prohibits discrimination in recruitment or job application procedures among all aspects of employment.

It's important to note that when the ADA was being drafted in the '80s and '90s, AI was not a part of the public consciousness in the way that it is today. So there's not an explicit reference to AI in that. And I also have to say-- this is a personal opinion and doesn't reflect my agency's views-- but it seems logical to me that even if AI is being used in recruitment and hiring, it should also adhere to non-discriminatory practices in the way that it's rolled out.

The other thing is a callback to Corinne talking about the video interviewing. Illinois actually passed a law last year, the Illinois Artificial Intelligence Video Interview Act, and it deals with

this explicitly. So she was talking about some of the ways that video interview analysis might look at facial expressions, or eye contact, or things like that.

And I'll say, I'm someone with low vision. And in a video interview, if AI is analyzing the way that I'm interacting with the camera, it might put me at a disadvantage as an interviewee. So it's important to have those disclosures presented to applicants so that they're aware of what they're consenting to in these new interview practices. Next slide.

**CORRINE
WEIBLE:**

And this is Corinne. I know we are close to running out of time, so I'll just mention that PEAT is also working on questions to ask HR vendors specifically. They're pretty similar to Jutta's list. Questions like, does the test evaluate factors that specifically relate to the particular jobs in question? And what kind of data does a company need to provide in order to analyze? And can these factors be customized? But look for that on our website, peatworks.org.

And we, in general, are very interested in continuing to promote these kind of questions because there really is potential here, too. We're also looking at some really interesting platforms for the potential to look for patterns of discrimination in hiring and promotion, or to scan job descriptions for requirements that are likely unnecessary, which AI might help out with.

So Nathan, why don't you switch to the last slide. And you can find contact information for any of us at these websites. And yeah, thank you so much for joining our presentation today.

**NATHAN
CUNNINGHAM:**

Thank you all.