


The background features several abstract, organic shapes in shades of purple and blue. A large, irregular shape on the right side transitions from light blue at the top to deep purple at the bottom. A smaller, circular shape is positioned in the upper center, also with a purple-to-blue gradient. Another smaller, teardrop-shaped form is located in the bottom right corner.

# Artificial Intelligence & the Pay Gaps

Maya Welford

"Increase access to AI, technology and data, and provide opportunities for a wider range of people to shape its development. This will enhance diversity in the field and reduce biased outcomes."

- Maya Welford



The research was conducted between March and July 2020, to investigate **opportunities** and **threats of Artificial Intelligence** (AI) in relation to **gender** and **ethnicity pay gaps**. Pay gaps signify **inequity** in society, and narrowing them is an important way to move towards a **fairer world**. AI is a rapidly developing technology and field, **impacting industries globally**. While AI is increasingly being researched as it develops, there has been a lack of research directly into AI and **pay gaps**, as well as the perceptions of AI experts and academics, and the general public, on this topic. This research aimed to explore **perceptions from diverse groups** about the impacts of AI on pay gaps.

# How was the research conducted?

## Extensive literature review

- Researched and evaluated both academic and non-academic papers
- Summarised existing research into AI, bias, human resources processes, and factors influencing the pay gaps

## 100+ survey responses

- Surveyed over 100 individuals (of which 89 were fully complete) with varying levels of AI knowledge
- Surveys presented participants with statements about AI in society, the workplace, and threats of AI

## 10 interviews with AI experts

- 10 thought leaders within AI and AI ethics were interviewed
- Interviews involved discussions about AI and its potential opportunities and threats regarding pay gaps

The background is a dark purple gradient with several organic, glowing shapes in shades of blue and magenta. A large, irregular shape is on the left, a smaller bean-like shape is at the top, and a circular shape is at the bottom.

**What does the literature say?**

# Pay Gaps exist because...

## Well, it's complicated...

Pay Gaps are complex and are produced and perpetuated by a plethora of factors, including social norms, societal factors, and historical reasons (BBC, 2018; Silveira, Musse, Manssour, Vieira and Prikladnicki, 2019).

## Factors:

- Social and cultural norms
- Stereotypes
- Gender division of labour
- Unequal access to opportunities
- Reasons for migration
- Discrimination
- Biased recruitment and HR processes
- Cognitive biases
- Differences in negotiation

## Leading to:

Fewer women and ethnic minorities in senior positions (Eurostat, 2017), which therefore results in an overall pay difference between different genders and ethnicities, as well as the comparative devaluation of 'BAME' and women workers across roles.

## Did you know?

- In 2018, three ethnic groups had a higher median hourly pay than the White British group (£12.03) - these being Chinese (£15.75), Indian (£13.47) and Mixed/Multiple ethnic (£12.33) groups (ONS, 2018)
- The group with the lowest median hourly pay was Bangladeshi (£9.60), followed by Pakistani (£10.00) (ONS, 2018)
- The gap between the ethnic group with the highest (Chinese) and lowest (Bangladeshi) median pays widened between 2012 and 2018
- The Resolution Foundation has previously calculated that Britain's 1.9 million Black, Pakistani and Bangladeshi employees experience an annual pay penalty of £3.2bn (The Guardian, 2019).

# Bias within AI

## How?

- AI is not inherently biased, but **humans** are and the data it learns from can be (Osoba & Welser, 2017)
- AI depends on the **data** it receives to learn from, as well as the developers creating the algorithms
- 'Garbage in, garbage out'.

**Merve Hickok** • 1st  
AI Ethicist | Founder @Alethicist.org | 100 Brilliant Women in AI Ethics 202...  
1mo • Edited • 🌐

If you had built your AI model on this dataset of past, your model would not have predicted a future like this [#aibias](#) [#aiethics](#)

**Natalie Stute** • 2nd  
Chief Human Resources Officer at Gainwell Technologies LLC  
1mo • 🌐

Powerful.



🌐 🌐 🌐 280 • 24 comments

- [Merve Hickok](#)

MAYA WELFORD  
AI AND THE PAY GAPS



# Bias within AI



## Justice system

- A computer programme used by a US court for risk assessment was **prejudiced against black prisoners** and was more likely to mistakenly label black defendants as likely to re-offend (Angwin, Larson, Mattu and Kirchner, 2016)
- This raises questions about the disproportionate and unfair impacts of AI on different ethnic groups.

## Recruitment: Amazon TAY – Microsoft

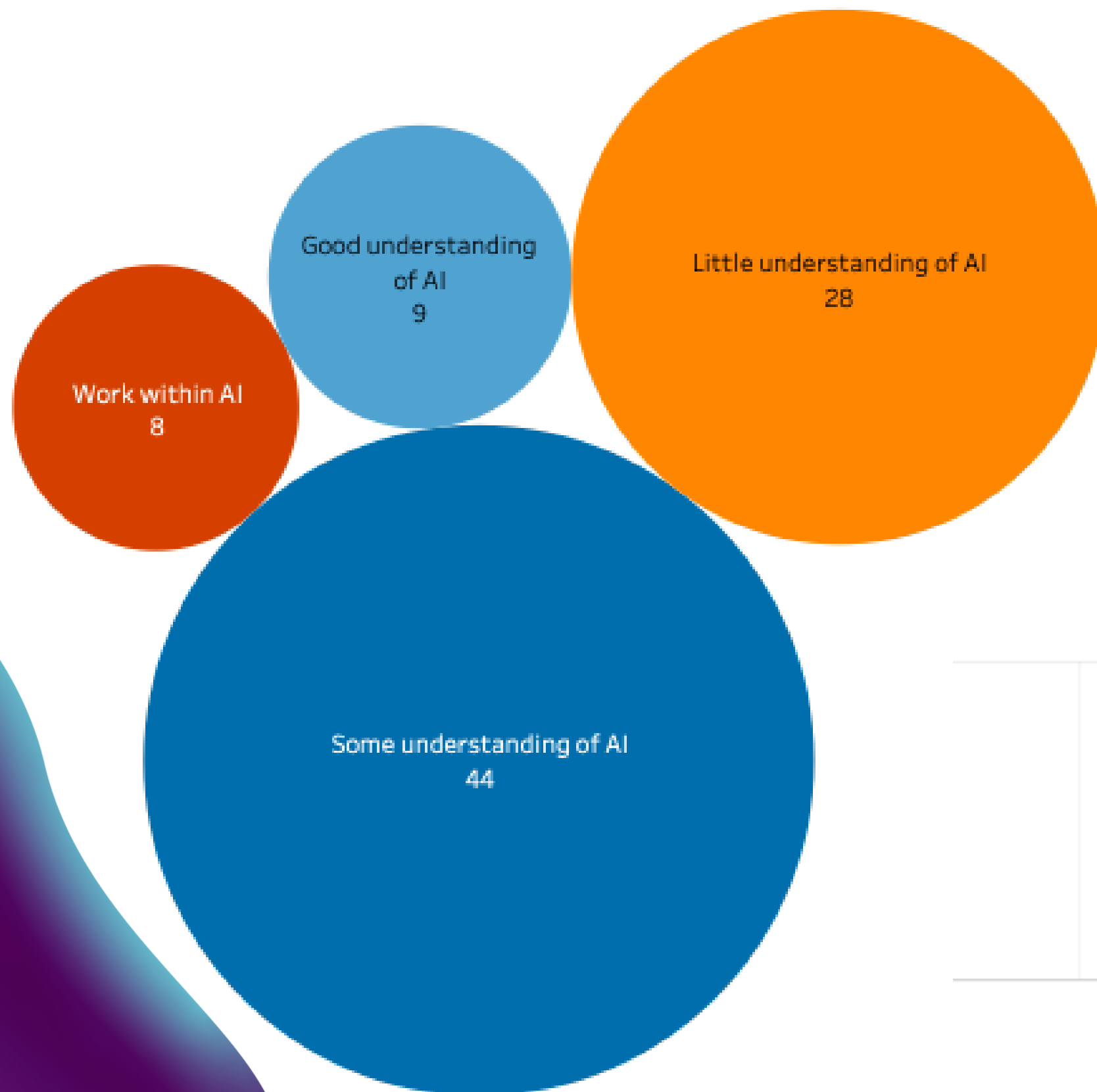
- In 2018, Amazon discovered that its algorithm for hiring was based on job performance data within the company
  - As **white men** had the highest performance ratings historically, the algorithm therefore gave higher scores to white male applicants
  - Amazon subsequently stopped using the system as there was no simple remediation for this algorithm (Cappelli et al., 2019).
- Microsoft developed 'Tay' in 2016, an **AI chat-bot** which was released via Twitter
  - Tay learned from other Twitter users and was influenced by **White Supremacists**, causing it to Tweet offensively
  - This led Microsoft to shut down Tay just 16 hours after its launch (The Guardian, 2016).

The background is a solid dark purple color. On the left side, there is a large, organic, light purple shape that resembles a splash or a drop. In the upper center, there is a smaller, elongated, light purple shape. In the lower center, there is a circular, light purple shape. The text "What did the survey find?" is centered horizontally and vertically in a white, bold, sans-serif font.

**What did the survey find?**

# Survey Participant Demographics

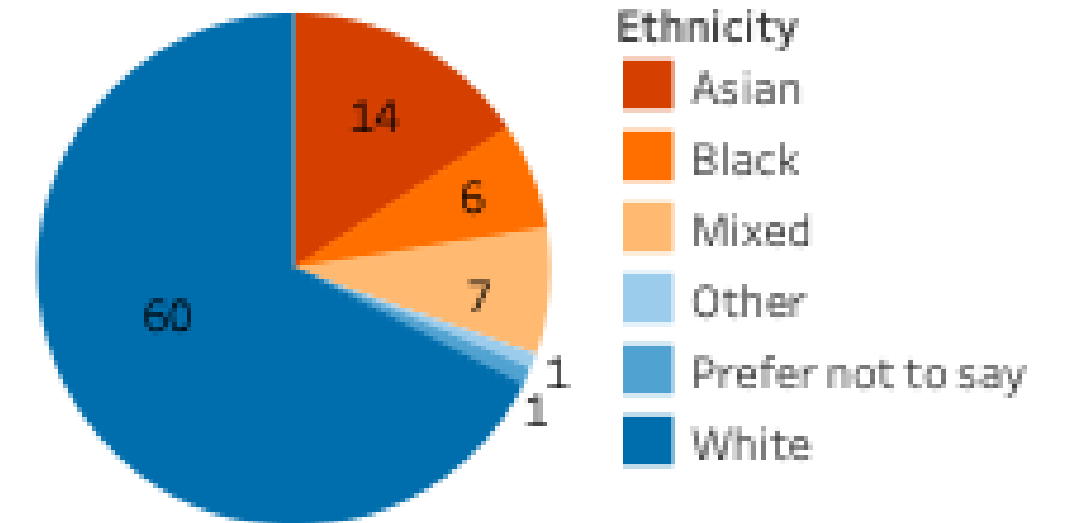
Self-reported level of AI Knowledge



Level of AI Knowledge

- Good understanding of AI
- Little understanding of AI
- Some understanding of AI
- Work within AI

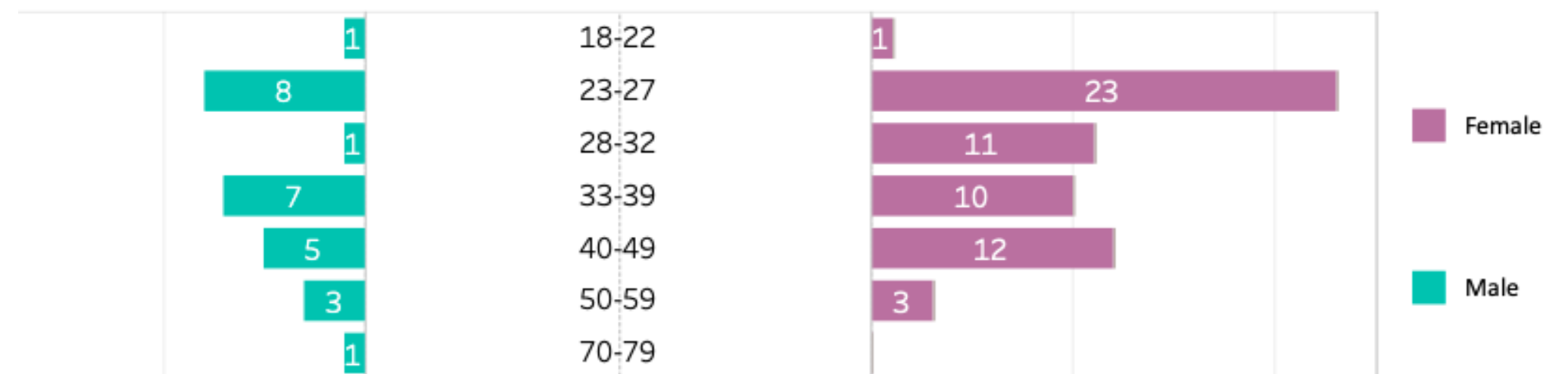
Ethnicity



Ethnicity

- Asian
- Black
- Mixed
- Other
- Prefer not to say
- White

Gender and Age (excl. Gender Variant + Unanswered)



# Survey Findings

Overall, the survey results suggested largely **positive views** towards AI, both generally within society and more specifically within the workplace and work-related factors.

## Views about AI's impact on Society:

- Largely **positive views** towards AI's impact on society
- 79.8% (71) responded positively to the statement about AI being important for the **development of society**
- 71.9% (64) responded positively to the statement that AI has a role to play in **solving issues** relating to **discrimination**.

## Reducing Gender Inequality:

- Over half (51, 57.3%) of the respondents responded positively to the statement about AI having the potential to **reduce gender inequality**
- However, compared to the other questions on Society, this question had the largest proportion (24, 27%) of 'Neither Agree nor Disagree' responses, indicating **uncertainty** around this statement.

# Survey Findings

## Occupations:

- Largely in line with responses to the society statements, participants responded positively towards statements relating to AI's role within the **workplace**, which involved factors relating to pay gaps
- However, there was a greater proportion of 'neither agree nor disagree' responses, suggesting that participants felt more **unsure** about AI's impact on workplace related factors which may contribute to pay gaps.

## HR Processes:

- Almost 85% (75, 84.3%) of participants responded positively about **AI providing solutions** to reducing biases with HR processes
- Participants also mostly responded positively (73, 82%) when asked about AI's ability to **shortlist more diverse candidates** in a fair and objective way
- Almost 4/5 (70, 78.7%) participants responded positively when presented with a statement about **AI reducing bias occurring with names on CVs**, further demonstrating the positive view towards the potential of AI in relation to improving HR outcomes.

# Interview Findings

# Theme #1 - Power of AI

Most participants explained that AI is **strong at detecting and identifying patterns** in data, including large and complex datasets, and therefore may be used to **identify issues or potential issues** pertaining to gender and ethnicity pay gaps.

*“One of the potential **opportunities** posed by AI is its ability to **blend together different datasets** to **identify patterns** better to unearth trends and to **highlight points of weakness** in the current system. So, I think this is probably something that AI is well geared to do that is kind of **beyond the ability of a human eye**”*

- Interview Participant (AI professional/AI ethicist)

# Theme #2 - Exacerbating pay gaps

Most participants expressed **concern** about AI having **detrimental impacts** to the pay gaps, or **struggled to see** the role AI would/could play.

This **contrasts** with **survey** findings, which demonstrated **largely positive** views towards the role of AI in **reducing issues** which may exacerbate pay gaps, including **diversity** and disproportionate impacts on women and ethnic minorities.



# Lack of Diversity

In terms of **AI as an industry**, most participants expressed concern about the **lack of diversity** within those designing, developing and implementing AI.

*"I think the **tools** are kind of **fundamentally flawed** if the people building the tools are **not representative** of the workforce and society that they're serving"*

- Interview Participant (AI professional/AI ethicist)

# Impact of Automation

While AI will create new jobs, automation will have **disproportionate impacts on certain demographic groups**, such as **women** and **ethnic minorities** who may be more likely to work in certain professions and therefore experience job loss at a higher rate.

*“Most of those [automatable] jobs are being done by **women** rather than men. So, it means that, proportionally, there would be **more women losing their jobs**”*

- Interview Participant (AI professional/AI ethicist)

# Bias

Bias was raised frequently during the interviews, which was largely grouped into three main areas: **biased datasets, human bias, and societal bias.**

*“If you only use the **historical data** without, you know, treating them or trying to get **rid of that bias**, then whatever you are going to predict is **going to be biased** because **your future is no longer a representation of your past**”*

- Interview Participant (AI professional/AI ethicist)

*“You can **reproduce, reinforce and amplify** the patterns of **marginalisation, inequality, and discrimination** that already exist in those societies or like **structural injustices**”*

- Interview Participant (AI professional/AI ethicist)

# Theme #3 - Opportunities of AI

Discussions also included a focus on the opportunities of AI in relation to pay gaps.

The main areas emerging from this were:

1. Inclusion & Accessibility
2. Education

*"We need **AI literacy programmes** and coding programmes particularly in the Global South, particularly for **communities of colour**, particularly for communities that have been **marginalised**, particularly for **vulnerable communities**. So, they can have **access** to this technology, not only to use the technology, but to use the technology to **impact change**. That is what is critical. And in those ways, you can see those [pay] gaps being closed"*

- Interview Participant (AI professional/AI ethicist)

# Interview Findings

## Large consensus on AI's power

This can be used for extreme bad or harnessed for extreme good. As such, considering ethics within AI is fundamental.

## Concern about its impacts

There are many real-life cases where AI has had life-threatening impacts. AI can exacerbate the pay gaps and hinder progress towards closing them.

## Importance of D&I

AI is a male-dominated field, accessible mainly to those in Western countries. This contributes to biased algorithms and AI ethics failures. D&I is fundamental to improving the field. This can have an indirect, positive effect on narrowing ethnicity and gender pay gaps.



## Recommendations

1. Harness the power of **AI for good**, and develop mechanisms to prevent harm
2. Enhance **inclusion** and diversity within AI and Technology
3. Include AI and Technology into core **education** for children, globally
4. Consider and seek to mitigate **disproportionate** impacts of AI on already marginalised groups
5. Question new technology, **always**.

"Harness the power of **AI for good**.  
Enhancing inclusion and diversity in the  
field is a way to reduce biased  
outcomes of AI."

- Maya Welford