

An Algorithm Discriminates

Name:	Nihar Sudhanshu Limaye
Student Number:	18210876
Email Address:	nihar.limaye3@mail.dcu.ie
Programme:	MCM – Research Practice & Ethics
Module Code:	CA640
Date of Submission:	16/11/2018
Word Count:	2340 Excluding assignment declaration & references)

An essay submitted to Dublin City University, School of Computing for module CA640 Professional and Research Practice, 2018/2019.

I understand that the University regards breaches of academic integrity and plagiarism as grave and serious.

I have read and understood the DCU Academic Integrity and Plagiarism Policy. I accept the penalties that may be imposed should I engage in practice or practices that breach this policy.

I have identified and included the source of all facts, ideas, opinions, viewpoints of others in the assignment references. Direct quotations, paraphrasing, discussion of ideas from books, journal articles, internet sources, module text, or any other source whatsoever are acknowledged and the sources cited are identified in the assignment references.

I declare that this material, which I now submit for assessment, is entirely my own work and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work. By signing this form or by submitting this material online I confirm that this assignment, or any part of it, has not been previously submitted by me or any other person for assessment on this or any other course of study.

By signing this form or by submitting material for assessment online I confirm that I have read and understood DCU Academic Integrity and Plagiarism Policy – (available at: <http://www.dcu.ie/registry/examinations/index.shtml>).

Name: Nihar Sudhanshu Limaye

Date: 16/11/2018

AN INTRODUCTION TO THE CASE

I have chosen two case studies which represent how algorithms are designed to discriminate between people.

Case A :

The case study focuses on Joy Buolamwini found out that her face was recognised better by robot when she wore white mask, so she came forward to fix problem. When she was a computer science undergraduate she was working on robotics, these robots use computer vision to detect human face. At that time she discovered that her face is not detected by robots compared to lighter skin people. She left the matter assuming people will fix this issue later.

She encountered same issue during Hong Kong entrepreneur event. She discovered that same code was used here that she encountered earlier. This way she got to know some discrimination algorithm was added knowingly or unknowingly and left the matter for second time assuming people will fix this issue.

Third time the issue occurred when she joined MIT Media Lab about later as a graduate student, and she discovered same problem. Once again she wore white mask that worked better than using her actual face.

“When we look at it now it seems very obvious, but with work in a research lab, I understand you do the down the hall test – you’re putting this together quickly, you have a deadline, I can see why these skews have come about. Collecting data, particularly diverse data, is not an easy thing” – Joy Buolamwini [6]

Case B :

The team of researchers from CMU found out that Google displays very fewer ads for high-paying executive job if you’re a woman [2].

“I think our findings suggest that there are parts of the ad ecosystem where kinds of discrimination are beginning to emerge and there is a lack of transparency,” -Carnegie Mellon professor Annupam Datta [2]

To come to those conclusions, Datta and his colleagues built a tool, called Ad Fisher, that tracks how user behaviour on Google influences the personalized Google ads to each user[2]. So they created fake profiles and did some research but they came with the conclusion that online behaviour was same for all the fake accounts. But their genders are different hence the Google algorithm is discriminating on basis of gender.

The Ad Fisher team found that male Google users likely to get high paying jobs adds rather than female job seekers.

“Advertisers can choose to target the audience they want to reach, and we have policies that guide the type of interest-based ads that are allowed,” Google Spokesperson [2]

The interesting thing about the fake users in the Ad Fisher study, however, is that they had entirely fresh search histories: In fact, the accounts used were more or less identical, except their gender identity. This indicates either advertisers are requesting that high-paying job ads only display to men (and that Google is completing their request) or that some type of bias has been programmed, if inadvertently, into Google’s ad-personalization system.

REVIEW OF THE LITERATURE ON THE SUBJECT

Case A :

A robot face recognition system is a computer application used to automatically identify a person from a digital image or a video frame from a video source. This is achieved through the comparison of selected facial features from the image and a facial database[5]. Typically it is used in security systems and comparable to other biometrics like fingerprint or eye iris recognition systems, facial recognition software is based on the ability to recognize a face by measuring the various features of the face[5].

We don’t often notice, but our faces have distinguishable landmarks. Each person faces has different peaks and valleys that make up our specific facial features. Hence the facial recognition software is now used in many applications.

Case B :

Targeted advertising is a form of advertising where online advertisers uses some methods to target audiences with certain trends basis their search history. These trends are mostly demographic which are focused on race, economic status, sex, age, the level of education, income level and employment or they can be psychographic focused which are based on the consumer's values, personality, attitudes, opinions, lifestyles and interests[7]. Target audience means they behaviour is taken under consideration depending upon their search history, viewing history and personal details and after that similar products are shown to them which connects to their previous search history[7]. This is very demanding now as it helps advertising agency to promote their products wisely.

LIFFICK'S ANALYSIS

MAIN PARTICIPANTS & THEIR ACTIONS

PRIMARY PARTICIPANTS

- Joy Buolamwini
 - The main participant who encountered the facial recognition issue and came forward to create social awareness.
- Annupam Datta
 - The Carnegie Mellon professor responsible to build Ad fisher tool.
- Google Spokesperson
 - He gave the press release regarding gender discrimination on behalf of Google.

SECONDARY PARTICIPANTS

- Software development team for open source facial recognition code
 - They designed the base code which was used by many persons available on the web
- Hong Kong entrepreneur event organizers
 - Responsible for hosting discrimination software applications
- Hong Kong entrepreneur event software developers
 - Built discrimination software's using open source code available on web
- Google Code of Conduct
- Google software development team
 - Implemented targeted advertising policy
- Ad Fisher software team
 - Developed the software ad-fisher to track user behaviour

IMPLIED PARTICIPANTS

- Other Law enforcement teams
 - They will affect if some dark skin criminal needs to be identified
- Human resource team of Job providing companies
 - Created job alerts for persons

- Job seekers
 - Previous job seekers treated unfairly due to algorithm discrimination

REDUCED LIST

My reduced list consists of all the participants who are directly involved with the algorithm discrimination.

PRIMARY PARTICIPANTS

- Joy Buolamwini
 - The main participant who encountered the facial recognition issue.
 - Software developer and designed the software of facial recognition using online open source code.
- Annupam Datta
 - The Carnegie Mellon professor responsible to build Ad fisher tool.
- Google Spokesperson
 - He gave the press release regarding gender discrimination on behalf of Google.

SECONDARY PARTICIPANTS

- Software development team for open source facial recognition code
 - They designed the base code which was used by many persons
- Hong Kong entrepreneur event software developers
 - Built discrimination software's using open source code
- Google software development team
 - Implemented targeted advertising policy
- Ad Fisher software team
 - Developed the software ad fisher to track user behaviour

IMPLIED PARTICIPANTS

- Human resource team of Job providing companies
 - Created job alerts for recruitment.

LEGAL CONSIDERATIONS

The cases I discussed are against the law of discrimination. The law states that

The Employment Equality Acts 1998–2015 and the Equal Status Acts 2000–2015 outlaw discrimination in employment, vocational training, advertising, collective agreements, the provision of goods and services[1]. Under equality legislation discrimination based on any one of the following distinct grounds is unlawful. These grounds are:

- Gender
- Civil status
- Family status
- Sexual orientation
- Religion
- Age (does not apply to a person under 16)
- Disability
- Race
- Membership of the Traveller community[1]

In our both the cases the law is broken. Joe found out the software is discriminating her compare to other light skin person and google posted only large number of adds to male job seekers rather than female job seekers.

POSSIBLE OPTIONS FOR PARTICIPANTS

PRIMARY PARTICIPANTS

- Joy Buolamwini
 - It would have be beneficial for all if she posted the issue at first occurrence.
 - Identified, fixed and re-published the code on the open source website by herself rather than waiting for someone else to fix.
 - Highlighted the issue to base code developers in first occurrence by communicating.
- Annupam Datta
 - Informed Google regarding issue and get it fixed
 - Launched a case against Google for gender discrimination
- Google Spokesperson
 - Investigated further rather than giving public statement justifying the act.

SECONDARY PARTICIPANTS

- Software development team for open source facial recognition code
 - Tested the code on different persons prior release.
- Hong Kong entrepreneur event software developers
 - Tested all possible cases prior code release.
- Google software development team
 - Informed in advance to management regarding targeted advertising policy
- Ad Fisher software team
 - Asked google to stop targeted advertising and provide their insights on the issue before going public.

POSSIBLE JUSTIFICATIONS FOR ACTIONS

PRIMARY PARTICIPANTS

- Joy Buolamwini
 - Created awareness regarding algorithm discrimination.
 - Developed platform to report algorithm discrimination cases to avoid future discrimination.
- Annupam Datta
 - Created software tool to find out targeted advertising and saved many job seekers from algorithm discrimination.
- Google Spokesperson
 - He simply followed management decision.

SECONDARY PARTICIPANTS

- Software development team for open source facial recognition code
 - They did not get any chance to test on variety of cases and simply posted the code on web. This might happened due to time constrain given by their management.
- Hong Kong entrepreneur event software developers
 - This might happened due to time constrain given by their management
- Google Software development team.
 - Followed policies of company that guide about interest-based ads and simply followed management decision.

- Ad Fisher software team
 - They developed an algorithm in good faith to avoid targeted advertising.

IMPLIED PARTICIPANTS

- Human resource team of Job providing companies
 - They might have jobs for specific gender hence instructed google to view adds to specific gender.

KEY STATEMENTS

There are some key statements which are very crucial in the case. They are as given below

CASE A

“When we look at it now it seems very obvious, but with work in a research lab, I understand you do the down the hall test – you’re putting this together quickly, you have a deadline, I can see why these skews have come about. Collecting data, particularly diverse data, is not an easy thing” – Joy Buolamwini [6]

Case B

“I think our findings suggest that there are parts of the ad ecosystem where kinds of discrimination are beginning to emerge and there is a lack of transparency,” -Carnegie Mellon professor Annupam Datta [2]

“Advertisers can choose to target the audience they want to reach, and we have policies that guide the type of interest-based ads that are allowed,” Google Spokeperson [2]

QUESTIONS RAISED

The questions raised are as below

Case A:

What happened if the system was installed with faulty face detection? How many criminals, law breaker were left free due to such systems? If some dark skin criminal is roaming free on streets because of this algorithm discrimination(as software unable to match his face to database) who will take the responsibility? Besides facial recognition what areas have an algorithm problem?

Case B:

What compensation will be given to people who were the victims of this gender discrimination? Some persons had joined the organization due to this search results on less salary but they supposed to get better one. Is this behaviour is only for job seekers or any other things needs to be investigated?

CODE OF ETHICS UTILISED

The code of ethics for above mentioned to cases are as follows:

According to ACM code of Ethics and Professional Conduct.

1.4 Be fair and take action not to discriminate [3].

The values of equality, tolerance, respect for others, and justice govern this principle[3]. Fairness requires that even careful decision processes provide some avenue for redress of grievances. Computing professionals should develop such algorithm or software which doesn't discriminate between people[3]. Fair chance must be given to all individuals.

The above code of conduct is breached in the cases discussed.

2.9 Design and implement systems that are robustly and useably secure [3].

The Software or algorithm must be robust and properly tested before release[3]. It should work for any use case given and try to analyse all possible scenario that might occur in the world and those scenarios must be tested by the algorithm or software.

IEEE Policies, Section 7 - Professional Activities (Part A - IEEE Policies)

Treat fairly all persons and to not engage in acts of discrimination based on race, religion, gender, disability, age, national origin, sexual orientation, gender identity, or gender expression [4].

ALTERNATIVE PROPOSALS

OPTIMISTIC

The algorithms must be tested rigorously before release it on web. It is the responsibility of the developer that he make sure that it works for all cases without differentiating. The algorithm should give fair chance to every gender/race rather than discriminating.

PESSIMISTIC

The developers can't test each every case study before software release. Some aspects might be left without testing due to variety of data present in the world or they didn't get the time to cover entire possible cases due to time constrain.

COMPROMISE

The developer must overcome the faults regarding the algorithm and provide fix. It should be tested against different scenarios to ensure accuracy.

CONCLUSIONS

In my opinion racism and gender discrimination should not happen at all. All the persons have some good capabilities irrespective of their race and gender. All persons must get a fair chance to prove themselves. Equality between women and men is a fundamental principle of Community law. The objectives of equality between women and men are to ensure equality of opportunity and treatment between the sexes on the one hand, and fight all discrimination based on gender.

In above cases both gender discrimination and racism happened. In Joy's case she came out and spoke to all persons and also built a platform for victims of racial discrimination. But I have to look on the other side as well the developers of open source code had no intention to build such discriminated software but they did not get all the test cases to test. Hence they have released the software and same were used by many other developers.

In Google and ad-fisher case the add companies might asked google about target advertising as their job involves some task which are only meant for males rather than females. But they should mention this on the website rather than just giving instructions to google about target adverting.

At last discrimination is bad and I think every person must get fair chance irrespective of their gender or race. If the law is broken then responsible person/s should be penalized.

References

- [1] Retrieved from Citizens information:
http://www.citizensinformation.ie/en/justice/law_and_rights/irish_human_rights_commission.html

- [2] Carpenter, J. (2015, July 7). Retrieved from Independent: <https://www.independent.co.uk/life-style/gadgets-and-tech/news/googles-algorithm-shows-prestigious-job-ads-to-men-but-not-to-women-10372166.html>

- [3] code-of-ethics. (n.d.). Retrieved from Association for computing machinery:
<https://www.acm.org/code-of-ethics>

- [4] IEEE Code of Ethics. (n.d.). Retrieved from
<https://www.ieee.org/about/corporate/governance/p7-8.html>

- [5] Robots and Android. (n.d.). Retrieved from <http://www.robots-and-androids.com/robot-face-recognition.html>

- [6] Tucker, I. (n.d.). Retrieved from The Guardian:
<https://www.theguardian.com/technology/2017/may/28/joy-buolamwini-when-algorithms-are-racist-facial-recognition-bias>

- [7] Wikipedia. (n.d.). Retrieved from https://en.wikipedia.org/wiki/Targeted_advertising