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FATE 05899
Prof Motahhare Eslami
09/30/22

<div align="center">Homework 3</div>

a) Suggested Wikipedia Page

Technological fix

Contemporary context [edit]

In the contemporary context, technological fix is sometimes used to refer to the idea of using data and intelligent algorithms to supplement and improve human decision making in hope that this would result in ameliorating the bigger problem. One critic, Evgeny Morozov defines this as "Recasting all complex social situations either as neat problems with definite, computable solutions or as transparent and self-evident processes that can be easily optimized – if only the right algorithms are in place."[4] While some criticizes this approach to the issues of today as detrimental to efforts to truly solve these problems, opponents finds merits in such approach to technological improvement of our society as complements to existing activists and policy efforts.[5]

An example of the criticism is how policy makers may be tempted to think that installing smart energy monitors would help people conserve energy better, thus improving global warming, rather than focusing on the arduous process of passing laws to tax carbon, etc. Another example is thinking of obesity as a lifestyle choice of eating high caloric foods and not exercising enough, rather than viewing obesity as more of a social and class problem where individuals are predisposed to eat certain kind of foods (due to the lack of affordable health-supporting food in urban food deserts), to lack optimally evidence-based health behaviors, and lack of proper health care to mitigate behavioral outcomes.[6][7]

Externalities [edit]

Externalities refer to the **unforeseen** or **unintended** consequences of technology. It is evident that everything new and innovative can potentially have negative effects, especially if it is a new area of development. Although technologies are invented and developed to solve certain perceived problems, they often create other problems in the process.

DDT [edit]

DDT was initially use by the Military in World War II to control a range of different illnesses, varying from Malaria to the bubonic plague and body lice.[17] Due to the efficiency of DDT, it was soon adopted as a farm pesticide to help maximise crop yields to consequently cope with the rising populations food demands post WWII. This pesticide proved to be extremely effective in killing bugs and animals on crops, and was often referred as the "wonder-chemical."[18] However, despite being banned for over forty years, we are still facing the externalities of this technology.[18] It was found that DDT had major health impacts on both humans and animals. It was found that DDT accumulated within the fatty cells of both humans and animals and therefore highlights that technological fixes have their negatives as well as positives.[18]

Humans [edit]

DDT being sprayed (1958, The United States' National Malaria Eradication Program)

- Breast & other cancers[18]
- Male infertility[18]
- Miscarriages & low birth weight[18]
- Developmental delay[18]
- Nervous system & liver damage[18][19]

Animals [edit]

- DDT is toxic to birds when eaten.[20]
- Decreases the reproductive rate of birds by causing eggshell thinning and embryo deaths.[19]
- Highly toxic to aquatic animals. DDT affects various systems in aquatic animals including the heart and brain.[19]
- DDT moderately toxic to amphibians like frogs, toads, and salamanders. Immature amphibians are more sensitive to the effects of DDT than adults.[19]

Global warming [edit]

See also: Climate engineering

Global warming can be a natural phenomenon that occurs in long (geologic) cycles. However, it has been found that the release of greenhouse gases through industry and traffic causes the earth to warm. This is causing externalities on the environment, such as melting icecaps, shifting biomes, and extinction of many aquatic species through ocean acidification and changing ocean temperatures.[21]

Automobiles [edit]

Automobile

Automobiles with internal combustion engines have revolutionised civilisation and technology.[22] However, whilst the technology was new and innovative, helping to connect places through the ability of transport, it was not recognised at the time that burning fossil fuels, such as coal and oil, inside the engines would release pollutants. This is an explicit example of an externality caused by a technological fix, as the problems caused from the development of the technology was not recognised at the time.

b) Proposed changes

Content already on the page

Currently, the [Technological fix](#) Wikipedia page includes examples of engineering or technology solutions to problems, such as climate change and food famine. The section "Contemporary context" briefly describes algorithms as an example of a technological fix among other examples using modern technologies. Another section, "Externalities," describes unintended negative consequences of technology, but does not include information about algorithms.

I am proposing adding an "algorithms" section to the "Contemporary context" section, describing in more detail the use of algorithms as technological fixes, supported by different examples. I would also like to add an "algorithms" section to "Externalities", expanding upon the criticisms of algorithms as a technological fix and describing a few examples of algorithms that have unintentionally caused harm (bias, discrimination, privacy, etc.).

Content proposal changes/additions

Contemporary context

Algorithms

The definition of algorithms according to the Oxford Languages dictionary is "a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer." Algorithms are increasingly used as technological fixes in modern society to replace tasks or decision-making by humans, often to reduce labor costs, increase efficiency, or reduce bias. These solutions serve as a "quick and flawless way to solve complex real world problems… but technology isn't magic," [1].

An example of algorithms as a technological fix to increase public safety is facial recognition software, used by the San Diego County police department and the Pittsburgh police department. Facial recognition is an example of algorithmic technology that has many benefits for its users, often used as a solution to verifying one's identity in security systems. This system uses biometrics to quantify and map out distinguishing facial features. However, facial

recognition as a technological fix for safety and security concerns comes with issues of privacy and discrimination.

Algorithms are used as a technological fix to decision making in cases such as Oregon's Child Welfare Risk Tool and the Pittsburgh Allegheny County Family Screening Tool (AFST).

Externalities

Algorithms

Evgeny Morozov, writer and researcher on social implications of technology, has said, "A new problem-solving infrastructure is new; new types of solutions become possible that weren't possible 15 years ago," [1]. The issue with the use of algorithms as technological fixes is that they shouldn't be applied as a one-size-fits-all solution because each problem comes with its own context and implications. While algorithms can offer solutions, it can also amplify discriminatory harms, especially to already marginalized groups. Externalities include racial bias, gender bias, and disability discrimination.

Oftentimes algorithms are implemented into systems without a clear understanding of whether or not it is an appropriate solution to a problem. In *Understanding perception of algorithmic decisions: Fairness, trust, and emotion in response to algorithmic management,* Min Kyung Lee writes, "...the problem is that industries often incorporate technology whose performance and effectiveness are not yet proven, without careful validation and reflection." Algorithms may offer immediate relief to problems or an optimistic outlook to the issues at hand, but they can also create more problems that require even more complex solutions. Sometimes, the use of algorithms as a technological fix leaves us asking, "Did anyone ask for this?" and wondering whether the benefits outweigh the harms. These tradeoffs should be rigorously assessed in order to determine if an algorithm is truly the most appropriate solution.

[1] Techno solutionism–very few things actually need to be an app.
[2] The Folly of Technological Solutionism: An Interview with Evgeny Morozov

c) Revisions of two other proposed changes for two other articles

Age of Discrimination addition to Algorithmic Bias page

Tim Lee

- In your "Age Discrimination" section, you can elaborate on some statistics from the WHO global report to give a better idea of the negative impacts of ageism in technology and who is being negatively impacted.
- What are the specific effects of ageism on health and well-being?
- What is the motivation for ageism in algorithms? Which stakeholders benefit?
- Perhaps you can add more detail to each example about the motivations and outcomes of ageism in algorithms.
- Are there any examples of how ageism is being combatted? Public movements, organizational actions, etc.

Motahhare Eslami page

Anthony Pan

- Can you include any examples of industry work that Prof. Eslami was a part of? What was her role at these organizations (Max Planck Institute for Software Systems, Adobe Research, and Facebook (now Meta)?
- Has Prof. Eslami been active in spreading awareness about FATE issues outside of academia?
- Can you summarize some of her significant contributions?
- What are different courses that she has taught (FATE-related or unrelated)?
- Where did she notice "the lack of education about what could go wrong with the digital systems she was working with"? Are there specific examples of noticing this in industry or her personal life?
- I remember that at our first class Prof. Eslami had talked a bit about her own personal experiences with algorithmic biases. If she is comfortable sharing her experiences, that would be a great addition!
- What does she hope to teach her students or inspire them to do? Does she have any past students who are now pursuing FATE issues?
- What are her hopes for the future of technology, regarding reducing biases and algorithmic harms?

d) Final revised version of Wikipedia article

Content already on the page

Currently, the [Technological fix](#) Wikipedia page includes examples of engineering or technology solutions to problems, such as climate change and food famine. The solutions described, however, focus on ways to fix symptoms of the problems, rather than the root cause of the problems. Changes to this final version of my article include what some of the fundamental issues of problems are and how algorithms do not actually solve them and instead further perpetuate the problems and create new ones.

Algorithms are briefly described in the section "Contemporary context" as a technological fix to improving human decision-making. The section also mentions that algorithms as a technological fix may not be the most appropriate approach to solving today's problems. My addition of an "algorithms" section to the "Contemporary context" section will describe in more detail examples of how algorithms have been used as technological fixes to contemporary problems.

Another section, "Externalities," describes unintended negative consequences of technology, but does not include any information about algorithms. Therefor, I would like to add an "algorithms" section to "Externalities", expanding upon the criticisms of algorithms as a technological fix and describing a few examples of algorithms that have unintentionally caused harm (bias, discrimination, privacy, etc.).

Many of these "fixes" would no longer be needed if the solutions were more preventative. Neither of these sections describe root causes of algorithmic bias, which is one aspect that my addition aims to include.

Content proposal changes/additions

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One example of algorithms as a technological fix for increasing public safety is face recognition software, which has been used by the San Diego County police department [9] and the Pittsburgh police department [10], among other government security organizations. Face recognition is an example of algorithmic technology that is viewed as potentially having many benefits for its users, such as verifying one's identity in security systems. This system uses biometrics to quantify and map out distinguishing facial features [11]. However, face recognition as a technological fix for safety and security concerns comes with issues of privacy and discrimination. In the case of face recognition technology being used by the San Diego County police department, Black men were being falsely accused of crimes due to being mistakenly identified by the software [12]. Additionally, San Diego police used the face recognition software on American Americans up to twice as often than on other people [13]. The cases of discrimination perpetuated by the face recognition tool led to a three-year ban on its use starting in 2019. Instead of addressing systemic and historically embedded issues of inequalities among racial groups, the face recognition technology was used to perpetuate discrimination and support police in doing their jobs unfairly and inaccurately.

Another example of algorithms being used as a technological fix is tools to automate decision-making, such as in the cases of Oregon's Child Welfare Risk Tool [14] and the Pittsburgh Allegheny County Family Screening Tool (AFST) [15]. In these cases, algorithms replacing humans as decision makers have been used to fix the underlying issues of the cost of employees to make child welfare case decisions and to eliminate human biases in the decision-making process. However, researchers at Carnegie Mellon University found that the tool discriminates against Black families, who are statistically underserved and have historically lived in lower-income areas [16]. This historical data caused by systemic disparities causes the algorithm to flag a greater percentage of children of Black families as high risk than children of White families. By using data based on historical biases, the automated decisions further fuel racial disparities, and actually accomplish the opposite of the intended outcomes.

Externalities [edit]

Externalities refer to the **unforeseen** or **unintended** consequences of technology. It is evident that everything new and innovative can potentially have negative effects, especially if it is a new area of development. Although technologies are invented and developed to solve certain perceived problems, they often create other problems in the process.

Algorithms [edit]

Evgeny Morozov, writer and researcher on social implications of technology, has said, "A new problem-solving infrastructure is new; new types of solutions become possible that weren't possible 15 years ago," [26]. The issue with the use of algorithms as technological fixes is that they shouldn't be applied as a one-size-fits-all solution because each problem comes with its own context and implications. While algorithms can offer solutions, it can also amplify discriminatory harms, especially to already marginalized groups. These externalities include racial bias, gender bias, and disability discrimination.

Oftentimes, algorithms are implemented into systems without a clear understanding of whether or not it is an appropriate solution to a problem. In Understanding perception of algorithmic decisions: Fairness, trust, and emotion in response to algorithmic management, Min Kyung Lee writes, "...the problem is that industries often incorporate technology whose performance and effectiveness are not yet proven, without careful validation and reflection." Algorithms may offer immediate relief to problems or an optimistic outlook to the current issues at hand, but they can also create more problems that require even more complex solutions. Sometimes, the use of algorithms as a technological fix leaves us asking, "Did anyone ask for this?" and wondering whether the benefits outweigh the harms. These tradeoffs should be rigorously assessed in order to determine if an algorithm is truly the most appropriate solution.

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DDT being sprayed (1958, The United States' National Malaria Eradication Program)

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See also: Climate engineering

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Another example of algorithms being used as a technological fix is tools to automate decision-making, such as in the cases of Oregon's Child Welfare Risk Tool [5] and the Pittsburgh Allegheny County Family Screening Tool (AFST) [6]. In these cases, algorithms replacing humans as decision makers have been used to fix the underlying issues of the cost of

employees to make child welfare case decisions and to eliminate human biases in the decision-making process. However, researchers at Carnegie Mellon University found that the tool discriminates against Black families, who are statistically underserved and have historically lived in lower-income areas [6]. This historical data caused by systemic disparities causes the algorithm to flag a greater percentage of children of Black families as high risk than children of White families. By using data based on historical biases, the automated decisions further fuel racial disparities, and actually accomplish the opposite of the intended outcomes.

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[1] Techno solutionism–very few things actually need to be an app.
[2] With State Ban Set to Expire, Local Police Could Bring Back Facial Rec
[3] Pittsburgh City Council introduces police facial recognition, predictive policing ban

[4] Understanding Facial recognition Algorithms

[5] Oregon is dropping an artificial intelligence tool used in child welfare system

[6] How an algorithm that screens for child neglect could harden racial disparities