

Evan Charles  
ECE 390  
14 March 2019

### Big Data Collection and Artificial Intelligence

The enhancements of artificial intelligence and the exponential rate at which the world's big data is stored has pushed technological growth. Artificial intelligence is used in most applications in today's society and can provide information to anyone in an instant, or calculate many different possibilities in milliseconds. Big data allows for the storage of all the world's knowledge and collection of information into a giant global memory bank to help push humanity through technological advancements. As these inventions continue to expand, the engineers are in charge of following the IEEE Code of Ethics, since these applications will be the forefront of many smart systems in the near future and even now. The ethicality of both of these advancements is questionable with the possibility of putting human privacy and life in danger. At the same rate, however, it can make many lives easier and increase the overall quality of life. That is why as technology continues to advance, it is important to refer to the code. Hiring is starting to become more and more automated due to artificial intelligence. Artificial intelligence, big data, and the ethical theories involved are a constant influence in today's society.

Every year, the amount of data the world creates increases. This data contains valuable information about each individual such as what they like or do not like. It can also be applied to the growth of industry. In the article "Big Data for Cyber Physical Systems in Industry 4.0: A Survey," it states: "From the manufacturers' perspective, it only requires marginal human inventions, because computer can automatically reconfigure facilities to meet the production plan" (Xu Duan 1). As the economy continues to grow and advance, industry must invent new ways of maximizing efficiency and profit. The beginning of the Industrial Revolution marked Industry 1.0 and in order to reach the 4.0 mark, the use of these big data computers will be vital.

## Charles 2

While that is a possible benefit to the use of big data, it can also collect a vast number of information about any individual. This issue has raised many concerns in terms of personal privacy. The rate at which data can be handled and sorted is swift and becoming faster with time. For example, when a user logs onto a shopping website and searches specific items, the data is collected and a more “directed” search is initiated which would tempt the consumer into purchases. Since this is becoming more widespread, and technology becomes more prevalent in the daily lives of millions, most, if not all, governments are lacking in producing an effective way of regulating the big data collection. “Existing regulatory requirements and privacy practices in common use are not sufficient to address the risks associated with long-term, large-scale data activities...There is a growing recognition that privacy policies often do not adequately inform individuals about how their data will be used” (O’Brien Wood Gasser 1). Data can be stored for as long as the company allows it which means that it can effectively be used years in advance without the individual’s knowledge. This arises the question of the ethicality of big data usage and its content. Having someone’s personal information can be a danger. For instance, this type of information can be used for blackmail. On the other hand, however, it can be used in assistance of hiring of new candidates. This will help increase the speed of finding good matches to the job position and save money as well. From a Utilitarian standpoint, the cost of collecting that data results in a more personalized internet like refined searches and faster shopping times. This in turn makes the “quality of life” increase. Whether it is morally right, is a controversial argument. A Deontologist, however, would be in a grey area between right and wrong depending on the scenario. The moral relevance would be that if this technology can cause individual harm, then in a deontologist’ eyes this would not be ethically right. However, if the technology is not used for bad purposes and is solely focused on increasing the consumer’s

### Charles 3

convenience then they would be in favor of using it. Ethically, it can be a two-sided argument, with big data increasing the quality of life to be ethically good and at the same time, less privacy which would work against the favor of the technology.

Artificial intelligence is one of the most prominent technological enhancements of this age with more forms of complex computing becoming available. This remarkable ingenuity has provided the economy with unforeseen growth and incredible industrial production rates. “At the forefront are the rapidly advancing techniques of artificial intelligence like natural-language processing, pattern recognition, and machine learning” (Lohr 2). These factors are placed in most technology today with natural-language processing being in every smart phone and machine learning being in the most advanced autonomous vehicles. Both have tremendous benefits such as being able to search something on a smartphone by just speaking into it and allowing a car to essentially do most of the driving for the user. As there are a plethora of other benefits these engineering marvels offer, one must consider the disadvantages of developing them as well. For example, as artificial intelligence continues to grow, an increasing amount of automobile manufacturers are starting to involve them in autonomous applications. The problem is the analysis done by the computer in certain scenarios such as to avoid hitting another car filled with people and instead colliding with a car containing only one individual. “However, when trying to cope with every phenomenon in the real world, there is an infinite number of possibilities that we have to anticipate, so the extraction time becomes infinite due to overloading of the database” (Lu, Li, Chen, Kim, Serikawa 2). The ethicality of this kind of scenario is what is “limiting” the development of the autonomous A.I. because it is the choice of whether you statistically hit one person to save potentially four lives or hit the four and avoid bringing an innocent into harm’s way. This, in turn, causes the two ethical theories to clash. The Deontologist standpoint would be

against the option of bringing in an innocent to avoid the full car since they stand for morality despite the unfortunate event of either outcome. A utilitarian, however, would find that saving four lives over one would be the most positive outcome and so the A.I. should avoid that at all cost. “In the other hand, utilitarian ethics state that a course of action should be taken by considering the most positive outcome” (Guzman 1).

Both artificial intelligence and big data, however, are important to each other in creating a complex web of interconnected systems. Artificial intelligence benefits big data by being able to store and manage the entirety of the world’s data production at an incredible speed. Since the amount of data that the globe fabricates is increasing exponentially, human-based sorting has become obsolete due to the sheer amount that needs to be done. In order to alleviate the stress and effectiveness, algorithms were written to allow for it. Big data allows for the collection of many sorts of information input, but there is nothing to organize and make use out of that data. That was the case until artificial intelligence was implemented with it. “Using data from multiple sources, AI can build a store of knowledge that will ultimately enable accurate predictions about you as a consumer that are based not just on what you buy, but on how much time you spend in a particular part of a site or store, what you look at while you’re there, what you do buy compared with what you don’t- and a host of other bits of data that AI can synthesize and add to, ultimately getting to know you and what you want very, very well,” ( Maryville University 1). The topic of artificial intelligence and big data and how much we should develop the technology is a prominent argument in today’s society. The Institute of Electrical and Electronics Engineers Code of Ethics mentions in code number 9: “to avoid injuring others, their property, reputation, or employment by false or malicious action.” This, included with the other codes, needs to be involved with the AI and big data topic because of the amount of applications this technology

can be used for. This is the case especially for autonomous vehicles when determining the best course of action if an accident is occurring or the collection of personal data of every individual in the world. If the engineers responsible for the progress of these innovations fails to fulfill these ethics, then it could be dangerous for the entire society.

As these two tools continue to be developed, many generations of people will refer to artificial intelligence in hiring of new candidates. Since society is able to store and sort mass amounts of data in a fraction of time, industries will be looking to cut financial costs of menial tasks. While the employment of a new potential candidate is not a very small task, it is time consuming. "Recruiting is a high-touch activity that involves stakeholders across the organization. AI startups are significantly reducing the operational burden by automating low level tasks and providing better information for decision makers" (Seseri 1). Artificial intelligence still has a long time to go before it could potentially fully take on the role of hiring, but it has already advanced in the way of crowdsourcing to the point where it has the potential of doing so. "Although the system may decide to hire another worker for a task, the execution on a task may stochastically terminate because the system may run out of workers to hire or it may run out of time" (Kamar Hacker Horvitz 4). When it comes to automating a process that requires, to an extent, human interaction, it is very hard to say whether or not this tool would be effective or worse. Some candidates may not be as good as other in terms of work experience or grade point average, but they could have much better presentation and communication skills. If the artificial intelligence and big data only look at the "paper" form of the individual, he or she may be out taken out of the list of potential hires. That could potentially raise red flags as not being ethically right because artificial intelligence can be altered based on the designer's input. The Utilitarian viewpoint would say that it is fine because the best hire as far as resumes go would be

the best performing one for the task. The deontologist viewpoint would question it further, whether or not it is a truly unbiased system and if it takes into account other factors like communication. Depending on the scenario, would alter how it applies to the IEEE Code of Ethics, however, it should still be addressed due to the fact that it can interfere with an individual's ability to get a career.

Artificial intelligence can be a huge help to the majority of people all around the world with the instant access of knowledge of many subjects as well as many items to be bought. This increases economic growth and encourages businesses. At the same rate, many people's information is being slowly "collected" over time with most users are unaware of it. This raises the ethical issues between the utilitarian's and deontologists between what is "right" and "wrong." Big data, at the same time, allows artificial intelligence to access all of the world's data and sort it to create an "effective user experience." Both technologies are a vital aspect of many of today's systems, but regulation from the engineering standpoint also must be taken into account. Artificial intelligence and big data will only become a larger aspect of an already advanced society.

References:

“IEEE Code of Ethics.” *IEEE*, [www.ieee.org/about/corporate/governance/p7-8.html](http://www.ieee.org/about/corporate/governance/p7-8.html).

“How Is Big Data Working with AI.” *Maryville Online*, 21 July 2017,  
[online.maryville.edu/blog/big-data-is-too-big-without-ai/](http://online.maryville.edu/blog/big-data-is-too-big-without-ai/).

Guzman, Carla. “PSY 833: Ethics and Leadership (Buban).” *PSY 833 Ethics and Leadership Buban*, 5 Feb. 2016, [sites.psu.edu/psy533buban/2016/02/05/103-deontology-vs-utilitarianism-the-eternal-battle/](http://sites.psu.edu/psy533buban/2016/02/05/103-deontology-vs-utilitarianism-the-eternal-battle/).

Helbing, Dirk, et al. “Will Democracy Survive Big Data and Artificial Intelligence?” *SpringerLink*, Springer, Cham, 1 Jan. 1970,  
[link.springer.com/chapter/10.1007/978-3-319-90869-4\\_7](http://link.springer.com/chapter/10.1007/978-3-319-90869-4_7).

Kamar, Ece, et al. “Combining Human and Machine Intelligence in Large-Scale Crowdsourcing.” *ACM Digital Library*, International Foundation for Autonomous Agents and Multiagent Systems, 8 June 2012, [dl.acm.org/citation.cfm?id=2343643](http://dl.acm.org/citation.cfm?id=2343643).

Lohr, Steve. “The Age of Big Data.” *The New York Times*, The New York Times, 11 Feb. 2012,  
[www.nytimes.com/2012/02/12/sunday-review/big-datas-impact-in-the-world.html](http://www.nytimes.com/2012/02/12/sunday-review/big-datas-impact-in-the-world.html).

Lu, Huimin, et al. “Brain Intelligence: Go beyond Artificial Intelligence.” *SpringerLink*, Springer US, 21 Sept. 2017, [link.springer.com/article/10.1007/s11036-017-0932-8](http://link.springer.com/article/10.1007/s11036-017-0932-8).

Seseri, Rudina. "How AI Is Changing The Game For Recruiting." *Forbes*, Forbes Magazine, 29 Jan. 2018, [www.forbes.com/sites/valleyvoices/2018/01/29/how-ai-is-changing-the-game-for-recruiting/#705d81521aa2](http://www.forbes.com/sites/valleyvoices/2018/01/29/how-ai-is-changing-the-game-for-recruiting/#705d81521aa2).

Wood, Alexandra, et al. "Practical Approaches to Big Data Privacy Over Time." *Berkman Klein Center*, 2018, [cyber.harvard.edu/publications/2018/03/BigDataPrivacy](http://cyber.harvard.edu/publications/2018/03/BigDataPrivacy).

Xu, Li Da, and Lian Duan. "Big Data for Cyber Physical Systems in Industry 4.0: a Survey." *Taylor & Francis*, 1 Mar. 2018, [www.tandfonline.com/doi/full/10.1080/17517575.2018.1442934?scroll=top&needAccess=true](http://www.tandfonline.com/doi/full/10.1080/17517575.2018.1442934?scroll=top&needAccess=true).