

Automation and Artificial Intelligence: should machines do all of our jobs?

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1. Introduction

As machines get more intelligent, they are able to perform more and more tasks for which traditionally human intelligence was necessary. In different industries, they are made to take over tasks in certain jobs, to enable businesses to be more efficient and earn more money: the machines work more efficiently than humans, making human labor less valuable (Acemoglu & Restrepo, 2017). Over the last few years, the use of robots and intelligent machines has increased in sectors such as finance, transportation, aviation and telecommunications, as the average costs of robots has fallen (West, 2015). Ultimately, using these machines can supposedly help us humans to improve our productivity by supplementing our own skills by artificially intelligent machines. However, many blogpost and news articles tell us that while this sounds promising, people believe that there might be a large downside to all of this: when machines do all of the tasks, what will we humans be doing? Will there be any jobs left for us?

Some people believe that work being done by machines means that humans will simply get some more time to do the things they want to do or like to do, and do not see this as a problem (Thompson, 2015). Others say that, looking at history, humans have always invented new jobs and have ultimately gotten busier as automation increased: therefore they do not believe that a problem of a lack of jobs will arise (Autor, 2015). It is however to be expected that at least a lot of the jobs that exist today will cease to exist as tasks are automated. It is unclear what new jobs will be created because of automation, and there are indications that more jobs will be lost than created (Borland & Coelli, 2017). Also, it is difficult to predict if the new work created will cover the complete range of jobs, from cognitive to manual labor, or if it will just be in a very specific area of skills. Not all types of work are easily automated, and current predictions say that there are specific categories of jobs that are most likely to be automated (Autor, 2015).

In current society, it is already the case that in areas with large unemployment, depression, spousal abuse and suicide becomes more prevalent (Thompson, 2015). This is at least partly caused by a decreased sense of achievement. Also, people might believe that robots are better than them, and that they're not good for anything: they lose their purpose in life. In general, people who lose their job are more likely to suffer from mental and physical ailments, and it has been shown that it is harder to recover from long periods of unemployment than from a severe injury or the loss of a loved one (Thompson, 2015). Another consequence might be a loss of autonomy and control for humans. If many tasks are automated, who is in charge of important jobs or life in general? Who determines what are the right decisions? The machines or the humans? The level of control that humans have over their lives and society in general might decrease.

Two main problems have been associated with a possible future in which there is very little or no work at all:

1. A wealth problem: how do we make sure that people have access to basic needs such as food and shelter if they cannot work anymore? What are the impacts on the economy?
2. An achievement problem: what do people actually do when they cannot work anymore? To what extent do they need to have a purpose in life that is related to working?

Both are relevant problems, and much of the literature looking into automation and the loss of jobs explores the first problem (Arntz, Gregory, & Zierahn, 2017; Hughes, 2014). Exactly for that reason, this essay will assume that we as humans will be able to come up with new wealth distribution systems to solve the first problem. I will evaluate the second problem within the context of policy that interacts with technological development: how might we develop or encourage development in new

technology in order to make sure that people view their lives as meaningful? In the following sections I will evaluate more closely what 'work' and 'a job' actually means. I will relate this to what makes us as humans feel happy and achieved, ultimately posing and evaluating different solutions for coping with the problem.

2. Analysis of the Problem: what is work, and how important is it?

2.1 What does work mean to us?

For a long time in history, not having to work has been seen as a luxury: it used to be the case that the nobility had the wealth to not have to work, a situation that 'regular' people would be envious of. However, since the industrial revolution, there has been a glorification of labor. Hannah Arendt, in one of her most well-known books *'The human condition'*, describes that in this period of time, society has changed into a 'society of laborers and jobholders', where all human activity now revolves around this one activity that is necessary to sustain life (Arendt, 1958). In this, she distinguishes between the word 'work' and 'labor', and argues that this important distinction has disappeared. She describes the difference between them as follows.

- **Labor** is that which is necessary to sustain life; it produces nothing but life itself and leaves no traces. Someone who labors is like a slave or animal who uses its body only to sustain life.

- **Work** produces everything that constitutes the human artifice. These are the objects for use that bring value. Someone who works is more like the craftsman.

The two differ mostly on what the activity produces, as well as the objectives of laboring or working. Arendt poses that this distinction is more important than any other distinction that has been made between kinds of work, such as for example the categorization of jobs into manual and intellectual work that is often used. 'Labor' and 'work' are relevant terms when we are looking at the automation problem as well: we might decide to allow machines to do all of our 'labor', whereas we might want to let humans do 'work'. When categorizing existing jobs, however, it is difficult to decide in which category they should be placed. We might wonder what actually is necessary to sustain human life, and if for example social activity and arts are part of that. Similarly, while most people have the necessity for a job in order to buy food, doing this job might have objectives to produce objects or value in another way as well. In order to decide what actually can be considered 'work' that we would like humans to keep doing, a clear definition of the term must be created, mostly in relation to the works that we consider to be 'crafts' and that we do with objectives other than merely to sustain life. At the same time, we might wonder to what extent 'labor' cannot bring life satisfaction, even if its main objective is to sustain life. The natural distinction between labor and work where labor is not desirable and work is, is currently not clear enough when attempting to decide how to deal with autonomous machines taking over our jobs.

2.2 Self-determination: working to produce happiness

While many people have a job to be able to eat, there are already many people who consider most of their job 'work' and not 'labor', when going by the previously mentioned definitions. Many people would not completely stop working even if they would have the financial means to not work. How do we determine which jobs are labor and which are work, as well as what the value of labor and work is in terms of life satisfaction?

A lot of the above has to do with the intrinsic motivation that people have for the things they do. Self-determination theory explains that there are three aspects which are relevant for achieving and maintaining intrinsic motivation for an activity: *autonomy*, *relatedness* and *competence* (Gagné & Deci, 2005). Intrinsic motivation and satisfaction can be ensured if the basic needs of relatedness (being able to socially interact with others) and competence (being skilled) are fulfilled, while autonomy (being in control of the activities you do) defines the extent to which motivation is truly integrated to the largest possible extent. In the context of automation, the three mentioned basic needs can help to set requirements for the types of 'work' or 'labor' that humans should be able to do, and thus for how and the extent to which automation should be implemented.

Looking at relatedness, for example, we can say that people should be enabled to have meaningful relationships with other (likeminded) people in the types of work that remain for people, or outside of work. Since large parts of social life actually exist outside of jobs, this should be possible. For the needs for competence and autonomy, it might be more difficult. If people do not need to have a job anymore, how do they become competent in anything, and why would they even need to be competent in anything? Relating this to the definition of 'work' described by Arendt, we might say that it is important to define work tasks that enable people to learn and increase their skills. The idea that a worker is a craftsman helps, as craftsmen are per se very skilled and competent in their craft.

Autonomy in relation to automation is difficult, as we might at some point arrive in a situation where automation dictates the activities that humans are still able or allowed to do. Especially if intelligent machines are significantly better at all of the available tasks than humans, there is no point in letting humans still perform those tasks. This rids people of the autonomy to choose their activities. An argument can however be made for the other side as well: if people no longer have to perform labor to sustain their lives, they have greater autonomy to choose how to spend their time. Which side counts more, depends on the interaction with the other needs. The requirement that we can formulate, in any case, is that even if machines do all of our jobs, it is important that people are able to choose which activity they do and become competent in.

2.3 Do we need to feel 'useful'?

Self-determination theory does not describe what the kind of activities are within which we should have relatedness, competence and autonomy: this suggests that it is irrelevant. It suggests therefore that it would be enough to be very competent in a completely useless task, if the person doing the task has the autonomy to choose to engage in it voluntarily. However, the impact that the activities we perform have might influence motivation as well. Impact or usefulness can be described as a form of extrinsic motivation, but it seems to be very relevant for the way in which we value the activities that we do. Looking back at the difference between work and labor, it seems that 'labor' inherently is more directly useful: it lets us directly work towards our evolutionary purpose of staying alive and reproducing ourselves.

Articles online suggest that already in our current society, many of the jobs that people do are actually 'bullshit jobs': jobs about which the people performing them themselves say that their job is superfluous or just unnecessary (Bregman, 2015). If all 'labor' jobs, jobs that enable us to sustain life such as producing food or houses, are automated, essentially all 'work' left can be seen as unnecessary. When young people are asked what they want to do with their lives they often mention that they want to have 'real impact', but this might not at all be possible in a fully automated future. The difficulty in this is that there are many ways to define when an activity is useful or has impact, and

that a judgment can be very subjective. However we define usefulness though, it can be stated that in a future where we need to deal with automation, it is relevant to make sure that people feel like they can make real impact.

2.4 The Road to Virtue: what is the purpose of life if there is no struggle?

Related to the 'impact' or 'usefulness' of the tasks that we perform, is the purpose of life in general. Part of what gives our lives purpose is the fact that we have to work hard to stay alive. According to Socrates' virtue ethics, encountering difficult situations and having to figure out the best way to cope with such situations helps us to become virtuous people who are ultimately satisfied with life (Emmons, 2003). If all of the necessities for life are being prepared by machines, it is debatable whether there is enough life struggle to enable people to become virtuous humans, and ultimately to achieve happiness as well. If machines do all of the work, people will not encounter many challenges in life, as they will be free to do whatever they please without any purpose. In any future with automation, it will be important to ensure that people are still challenged in life, to enable them to develop virtuous behavior, as this will help them to feel achieved and happy in life.

3. Possible Solutions at Different Ends of the Spectrum

Using the above theories and problem analyses, we can take a closer look at the viability of different ways of dealing with automation in such a way that people are still able to feel satisfied at life, to avoid the risk of a population without a purpose. I will present three possible solutions: (1) embracing the technology, (2) severely controlling technological development and (3) emphasizing human-machine collaboration. I will argue that the latter is the best solution that we currently have, a solution that enables us to use the benefit of automation while keeping in touch with human values. I will use some examples from Isaac Asimov's Robot book series, in which people living on different planets use different levels of automation, to illustrate what kind of societies the different solutions propagate.

3.1 Embracing the technology

Even with the possible problems posed at the beginning of this essay, it is possible to argue that fully embracing automation is the best way to deal with the problem. If we were to do this, it would open up the space for humans to rethink what they should be doing with their lives other than working or laboring. This solution entails that we accept that machines are better at performing all the tasks and that people no longer work or labor. Along the lines of Arendt we can argue that any useful job is labor, an enslavement for sustaining life, and any other jobs that exist are simply unnecessary.

Within this solution, it is of course important to define how people can still feel autonomous, competent and satisfied in their lives, as well as how they are enabled to be virtuous humans. Existing essays and articles have proposed that people can either contribute to the community by for example engaging in care activities or focus on creativity and self-expression (Thompson, 2015; West, 2015). This would allow them to feel competent in the sense that they can get better at the activities they do, in such activities contact with other people is very relevant and thus it fulfills the basic need of relatedness as well. In terms of autonomy, people are completely free to do whichever activity they like, so there is a large freedom of choice.

Even with those activities, however, we might wonder to which extent they can actually be performed by humans and provide life satisfaction. Care activities can also be automated, meaning that only self-expression and creativity is left as an activity. However, when there is no struggle for staying alive and no real purpose to these activities, what is the meaning of self-expression? The lack of true impact and usefulness might ultimately not be enough to shield people from depression and other mental illnesses.

An example of such a situation can be found in the book *'The Naked Sun'* by Asimov (Asimov, 1957). The story in this book is set on Solaria, a planet on which there are thousands of robots for every human, basically performing every necessary activity to make the lives of the Solarians as easy and pleasant as possible. One of the main characters, Gladia Delmarre, lives on Solaria. She, like most other Solarians, passes her time by video calling with other people and creating some kind of light art. While on the surface she is happy with that, at some point in the story she is struck by the uselessness and meaninglessness of her life, realizing that her light art hobby serves no purpose at all. The story clearly shows that she has many mental struggles because of this, teaching us that this is not a future that we should be striving for.

3.2 Severely controlling technological development

If fully embracing the technology does not provide us with a viable solution for dealing with automation, we could say that we should overall stop automating tasks from now on, and limit technological developments in this area from now on. Assuming this is possible, this would leave us with the automation situation that is currently in place; some very repetitive tasks have already been automated, and that is fine, but all work and/or labor that currently exists helps us to feel useful and competent.

The problem with such a solution, of course, is that automating tasks provides us with advantages as well, since machines might actually be better at certain tasks than humans. It will be hard to justify the loss of these advantages. Furthermore, it leaves us with all the tasks that we currently consider 'labor': there are actually many people who do not enjoy their job at all and only work for money. These people do not currently have the chance to fulfill their basic needs of relatedness, competence and especially autonomy, as they do not feel they have the choice to do an activity that lets them develop themselves and feel competent and achieved. It feels unethical to let them do such and keep those people enslaved by having to fight for staying alive when there is an alternative.

In the world created by Asimov in *'The Caves of Steel'* (Asimov, 1953), the planet that comes closest to such a scenario is Earth. While even they use robots to do their farming, the population of Earth does not get in contact with these machines as the people are confined to the cities, while the robots do their work outside of them. Inside of the cities, a large population of people has to work extremely hard to maintain their social status, while people at other planets enjoy leisure time because of automation. It feels like there is a lack of progress, while the Earthmen are prohibited from feeling any of the benefits of automation. It is clear that controlling technological development to this extent will not be a realistic future.

3.3 A quest for human value and human-machine collaboration

The two extreme solutions presented before indicate that a middle ground solution is probably what we should be striving for. What it does not yet describe, however, is what such a middle ground should

look like, and how we ensure that it is maintained. I propose that the right solution is based on human-machine collaboration. This should create a situation in which we accept that machines are better than us at certain tasks, but not all, and we go out on a quest to discover what we humans are good at and how we can best collaborate with machines. It is a solution in which we do not simply assume that enough new jobs will be created for us humans to replace the automated ones, but in which we consciously and continuously define what the specific human tasks are, tasks which fit within the 'weaknesses' of the machines.

In such a solution, the distinction between work and labor will be very important, and the definitions of the two might even be rewritten to fit a society of human-machine collaboration, where:

- **Labor** consists of the basis tasks necessary to keep the human race alive, including repetitive, boring and heavy manual tasks;

- **Work** consists of the tasks around that which are necessary to manage the machines as well as the tasks that we consider to be core to human activity. This includes activities that require inventiveness, creativity, and other properties that we consider to be uniquely human.

Labor and work should also be defined to be complementary. Within this solution, there are two clear remaining questions: what are properties that we consider to be uniquely human, and how do we ascertain that this quest will be followed and the 'human' properties are not automated as well? It relies on trusting that humans are flexible enough to constantly redefine what it means to be human, and what humans should therefore be doing.

Making human-machine collaboration the core focus of technological development in automation will help to focus on integrating skills of humans and machines. This should be done in parallel to helping individual people to define what labor and work means for them as a person, as the kind of tasks that people enjoy doing is different for every individual. This very strongly relates to the need for autonomy, as it will enable people to decide for themselves what tasks they would rather leave up to a machine and what tasks they are good at or want to become competent in. The process of continuously critically redefining human-machine relations also provides us with a general struggle for making sure our lives remain meaningful, enabling us to search for the right middle ground in every human-machine collaborative situation and thus to become virtuous, happy humans.

The books by Asimov do not directly pose this solution in which the skills of humans and machines are combined, but there are several instances in the story which show that it might indeed be very beneficial to look at it in such a way. Throughout the four books that are situated on Earth, Solaria and Aurora (Asimov, 1953, 1957, 1983, 1985), the main character (Elijah Bailey) is sent on quests together with a robot (R. Daneel Olivaw). For all of the problems they encounter, the robot is usually unable to provide complete solutions. Elijah's ability to think outside of the box and understand irrationality enables him to figure out the solution to the large problems. However, without the help and insights provided by R. Daneel, he would have gotten in much more trouble and might not even have come up with the solutions. This suggests that the skills of humans and machine could indeed be made to be complementary, to ultimately achieve better results than either of them could alone.

4. Analysis of the Middle Ground Solution

Looking at the middle ground solution of creating integrated collaborations between humans and machines, it remains debatable how feasible this solution is. Making sure that we will not move to a situation where everything is automated again, but letting the humans take part in useful activities, will be an ongoing quest as the world changes. However, looking at history, we possibly have already been following this quest since the beginning of human existence, although not very consciously. The current promises of automation require us to be more conscious about the new types of tasks that we humans will be doing in relation to our machines. The question is how we make sure that we are more conscious about it.

Simply investing in a specific type of research does not guarantee results, and also does not prohibit others from developing technology in a different direction. How do we make sure that the values that are embedded in the human-machine collaboration solution are maintained and stuck to? How should such research and innovation focused solutions be combined with more clear cut rules? Ultimately, it will be necessary to initiate global efforts and agreements on these kinds of values to ensure that we will collaboratively work towards maintaining meaning in human life, even with the presence of automation. It will require technological development to be more intertwined with policy making, and a realization among engineers that the development of technology is impossible to be without any political implication.

Apart from ensuring that everyone will work towards the described situation, a remaining question is also who should benefit from the resulting human-machine partnerships. Is it necessary to make sure that everyone can work in a job where they collaborate with a machine, or is it enough to say that a large part of society can? It might be difficult to define tasks and jobs for all types of people and skills. I believe that it should be a goal to provide everyone with a relevant, useful and satisfying task, but that it should depend mostly on what every individual desires to respect the need for autonomy. There might be some people who are satisfied with performing so-called 'useless' jobs, and in a world where the basis of our life is ensured by machines, that should possibly be accepted.

Looking at existing articles and essays that have dealt with the risk of automation eradicating all of our jobs, most work is on how we can deal with the economic effects of that, as I mentioned in the beginning of this essay. Some articles attempt to describe activities that we can do when there are no jobs anymore, assuming that the situation will be as described in the first solution I posed, where the technology is simply embraced. There is one quite recent essay that deals with the problem in a similar way as I did (Danaher, 2017). Using different theories than the ones presented in my essay, the author comes to the conclusion that an integrationist approach is the best way to deal with automation. He describes that we should merge ourselves with machines, and possibly become cyborgs. While this is not completely the solution that I describe, I agree with the author that we should look at how we can use the joint capabilities of humans and machines, rather than focusing on merely expanding the capabilities of the machines. It can be concluded that integrating human and machine capabilities is a situation that we should aim for, where I (at least in the near future) prefer a collaborative integration that respects the human as a useful being on its own. In the far future such collaborations might become more and more integrated, eventually indeed moving to a cyborg future. Whether that is then desirable over a more collaborative future, remains to be researched.

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