

Day 2: Work, poverty & fiction

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The Mechanical Turk or the Science Fiction of Labor

Amazon Mechanical Turk is an online service that presents itself as “artificial artificial intelligence”. “Requesters” ask “Turkers” to do tasks that are still uneasy to program, and better done by humans. Anyone can submit or accept tasks. The pay is ridiculously low, most of the time between 1 and 20 cents for each task. We will look into some of the science fiction scenarios that the Mechanical Turk embodies. Is it the sign of a world where the human beings are definitely hidden behind the machine? Is the one cent pay the last leftover that the machine leaves for us? Is the human labour reduced to a mere powder? Will it become as volatile and abstract as the data flowing on the financial markets? An extreme outsourcing where mankind struggles with green plants for a place in the labour market? Will they be brought down to the lowest common denominator?

***Mechanical Turk* ou la science-fiction du travail** : Amazon Mechanical Turk est un service en ligne qui se présente comme de « l’intelligence artificielle artificielle ». Il permet de faire réaliser par des êtres humains des tâches que les ordinateurs ne sont pas encore capables d’effectuer. N’importe qui peut proposer des tâches, ou les accepter. Les rémunérations des travailleurs sont dérisoires, le plus souvent entre un et vingt cents la tâche. Nous passerons en revue quelques-uns des scénarios contenus en puissance dans ce dispositif. Le *Mechanical Turk* annonce-t-il un monde où l’humain se cache définitivement derrière la machine ? Les rémunérations de quelques cents sont-elles les dernières miettes que les machines nous laissent ? Le travail « en poudre » indique-t-il un marché du travail devenu aussi volatile et abstrait que les marchés financiers ? Une externalisation extrême du marché du travail, où l’homme dispute sa place aux plantes vertes ? Seront-ils ramenés au plus petit dénominateur commun ?

MECHANICAL TURK OR THE SCIENCE FICTION OF LABOR

STEPHANE DEGOUTIN / FR/CAN

NICOLAS MAISONNEUVE / FR

Stéphane Degoutin / FR/CAN

Artist and researcher. Co-founder of the LOPH research lab and the ongoing Nogo Voyages project. His main research interests are: mankind after man, the contemporary city after public space, architecture after pleasure, and the Umwelt of data. He creates films, video and sound installations, theoretical texts and places. He teaches the theory of architecture at Ensad (Paris).

<http://www.nogoland.com/sdbio/>

Nicolas Maisonneuve / FR

Eclectic scientific researcher and engineer, working regularly at the intersection of art, science and computers. From a background in artificial intelligence, his curiosity led him to tackle a wider panel of research topics gravitating around collective intelligence – the mixing of human and machine to solve issues. He worked in various labs e.g. University of Sydney, INSEAD, Sony lab, University of Geneva, United Nations. Currently at INRIA/ENS he's working on a new quantitative approach in urbanism. He also co-founded two startups and was an award winner of the French national contest for emerging innovative companies (OSEO) in 2013. He is the author of numerous international scientific publications.

<http://nico.maisonneuve.free.fr/blog/>

The future looks mundane

One of the paradoxes of our time is that the future always seems too close and too easy to predict. The twentieth century has impregnated us with science fiction, futurology and all sorts of predictions, through literature, cinema, the press and mass media. We are so used to the approaches used by these futurist concepts that we are habituated to routinely envisioning the future, almost as a reflex act. At the same time, the more connected we are, the more information spreads, the more everyone receives similar schemes. Just as ecological diversity is shrinking in the physical world, information diversity is dangerously shrinking in the digital world.

In the end, both factors create an environment where all the predictive scenarios tend to merge. All the visions we have of the future become strangely similar and repetitive – almost boring.

Futuring the present: exaggerating it rather than making it different

Most of the twentieth century science fiction writers were obsessed with space travel. Yet the complete lack of space travel in today's world does not disturb us at all. It might very well be the same with all of the topics today's futurologists dedicate themselves to: the emergence of a posthuman condition, human-like artificial intelligence, human reengineering, the complete end of privacy, etc. These topics, too, might seem completely irrelevant in the future.

What we call the future is, most of the time, the very unlikely result of extending the trends of the present into the direction where they already point today: a mere exaggeration of what we have under our eyes. As if we did not know that the reality never evolves following a straight line. Our present-day vision will be distorted along the way, just as surely as it has been distorted many times before. The trends that appear important today are not those which will matter tomorrow.

Knowing that, it might be more relevant to scrutinize the distorted aspects of the present as a way of predicting the future. We should pay attention to areas where the logic does not follow a straight visible path, rather than to the most obvious orientations of the time.

One of these places is Amazon's Mechanical Turk, and, by extension, the new forms of labor which have recently emerged with webshoring, crowdsourcing and collective intelligence.

Labor is, naturally, of primary importance in our society. It is a "total social fact", as Dominique Méda pointed out, using Marcel Mauss' expression: a social activity in which the most important aspects of our society converge into a single process.

Yet, as important as it is for us today, labor has known a frightening evolution during the last half century. Méda believes it might very well disappear, leaving us with a gigantic void. This mere idea is an incredible, if little used, starting point for a science fiction scenario.

Amazon's Mechanical Turk is another such starting point.

In all respects, the Mechanical Turk resembles a Borgesian fiction. From its name to its mechanism, it seems to exist in a parallel universe. Every aspect of it looks unreal, yet strangely familiar. How can we understand the existence of such an exotic object? The mere fact that a thing like the Mechanical Turk does indeed exist in the actual world proves the plasticity of human society.

If this is how distorted the present is, then what about the future?

During this lecture, we will imagine how work and employment could change in a near future. To do so, we have imagined a series of very short science fiction scenarios. We will start with examples that exist in the actual world, and continue with propositions which might very well become real in a few years or decades.

This introduction should not suggest that the Mechanical Turk has been ignored by researchers – this is not the case. But they have mostly concentrated their analyses on its present form: where it comes from, how it works; in other words: the past and the present of this system. This is not surprising, regarding the strangeness of the subject: understanding its nature is difficult enough. Yet, doing so, they have often failed to understand its true nature, and how unfamiliar it is in the history of labor. It is too easy, for instance, to compare the Mechanical Turk to the previous forms of labor that have existed before, and to understand it as a striking example of deregulated neoliberalism. This is true of course, but does not help us much. More important is to show how it differs from the logics we are accustomed to.

We will begin by explaining how the Mechanical Turk works today and try to understand its logic. We will then concentrate on its potential, trying to focus on its fundamental strangeness, and, by extension, the aspects that might lead to an even stranger future. Since our goal is to emphasize how the current trends bend, the scenarios we offer here will explore contradictory logics. It should be understood that we do not intend to spin-dry the object of our attention by predicting which scenario is the most plausible, but rather to explore its richness by expanding it in many directions. But first, let's try and understand the present.

The present #1: Webshoring for all

Low cost design

You may know the story of the Nike “Swoosh” logo. It is a classic example of old fashioned low cost design. It has been created by a freelancer, Carolyn Davidson, who had met Phil Knight. She was paid only \$35 for this design in 1971, although she continued to work for Nike for a number of years following.

This – the first Twitter “Birdie” logo – is a different story. It was created about thirty years later for even less – \$6. The designer has never met anyone from Twitter, neither before or after designing the logo. He was hired online, on a crowdsourcing website.

These sites are known as “market places”. They link together employers and employees, for any kind of work that does not require a direct human connection. There are a number of them on the web today.

Webshoring for all

Among other things, they allow what is called “webshoring” (offshoring through the web). The difference with traditional offshoring is that it allows anyone, not only large companies, to send work to be done at the other end of the planet. One does not need any longer to be a big organization to be able to outsource.

The present #2 : Bizarre tasks

As a result, one can obtain almost any kind of work for a fraction of the price one would pay in developed countries: \$3 to write a 475 words paper, \$2 an hour to pose half naked for webcam sites, etc.

One will also find offers to write holiday cards to someone else’s family. There are sites which require a physical presence, for instance to put some order in someone’s closet, or to queue for someone at the Apple store. Many people offer a few dollars to design a logo.

Here is a small excerpt of the list of tasks you can find on Freelancer, one of the most important of these sites. You can see how many offers are available in the field of design or architecture.

Because they do not need to meet their employer in person, anyone in the world, no matter where he or she lives, can apply to these tasks. This free market system puts every economic actor on a same level. Whether you live in India, Russia, Brazil, the US or Europe, you belong to the same freelance market, with the same rates. This is obviously to the advantage of the emerging countries’ workers, and to the disadvantage of the “rich” ones. It is also, for the moment, to the advantage of the rich countries’ requesters, but this may not last long.

An American office worker has recently made himself famous by offshoring his whole job to such market places. He was paid as a programmer, but only worked one hour or two each day, which he spent sending tasks to China or India. He could

then spend the rest of the day on Facebook and YouTube. He had very good feedback from his superiors on the quality of “his” work.

A similar phenomenon, growing mainly in China, is “gold farming”: workers play very large multiplayer online games, with the sole purpose of acquiring in-game currencies that they can sell to actual players of the game in exchange of real money.

The present #3 : Microtasks

Amazon’s Mechanical Turk is one of these market places. On the main page, you can choose between being a “worker” (in order to “make money”) or a “requester” (in order to “get results”). The workers are also known as “Turkers”. What Amazon adds to the concept of market places is the idea of “microtasks”. In the company’s jargon, they are called “HITs”, which stands for Human Intelligence Tasks.

Amazon’s Mechanical Turk lets the requesters divide their projects into a series of microtasks. The bigger tasks are divided into smaller ones, which are then distributed to many workers. Most of these tasks are extremely limited: check some data in a short document, copy some info from a business card, translate a few lines of text, correct misspellings, insert data into the proper rows of Excel tables, sort series of images by kind, check whether a series of profile pictures contain pornographic elements, moderate the comments on a blog, create content for a website, etc.

One can also find many tasks asking to rewrite a paper with other words. They pay the worker to plagiarize. These tasks are posted by online papers that lack content. Another common task is to create profiles on dating websites. These sites will pay each worker a few cents, in order to add a few more people to their database and grow more quickly. For all these tasks, humans are still more efficient and/or cheaper than computers. They require only a few minutes, sometimes just a few seconds. The pay is accordingly low: from one to ten US\$ cents for most tasks.

The workers accept the tasks, submit the results, which return to the Cloud. When enough workers have completed their tasks, a magical operation occurs: the microtasks are united and the project is completed. The process is very similar to a factory’s assembly line. The difference is that there is no “line”. It has been replaced by a cloud.

The flow is not linear: the tasks can be completed in any order. The workers are free to choose the tasks they wish to complete, and they can choose how long they work. They can work for just a few seconds and can quit whenever they want. They can switch from a task to another. In the end, no one in particular has done the job, it is done by an everchanging crowd – a “cloud crowd”. Amazon calls this process “artificial artificial intelligence”. It is driven by a software, but in the end, human beings do the job. The humans are hidden behind the machine.

Some tasks are rather mysterious. One of them requires the worker to film himself while doing a sign with his hand. The requester gives them one US\$ cent for that.

One can wonder what is the purpose of such a task. Is it to train an Xbox' Kinects? In this case, the human worker's job would be to train a machine.

A task posted by a professor in a Chinese university requires the worker to watch a video of his students during class, check if some of them are asleep, and earn a few cents by denouncing them.

Among other mysterious tasks: sort tweets according to the emotions they contain, decide if an image makes one happy, find as much information as possible on a person for whom only the name is known (a form of microespionage).

The purpose of the tasks is sometimes obvious, sometimes strange. It is almost never explained. It puts the worker in a curious situation: anonymous and completely remote from the purpose of his work, he is in a state of complete abstraction, a mere droplet in the cloud.

These microtasks require limited attention from the worker and a very short attention span. After completing the brief task, it is easy to forget it completely. It disappears instantly, only to be replaced by another one, consistent with the world we live in: a world dominated by countless microevents requiring and/or meriting limited focus.

Past & present #1 : The workers hidden inside the machine

During a workshop we organized at the Ensad in 2011, a student, Louis Ziegler, asked the Turkers to film themselves while leaving their homes. He gathered a series of videos in which one could see the everyday surroundings of these anonymous workers from all around the world.

Usually, they are invisible.

Neither the workers nor the requesters have an actual name. The requesters are identified by a nickname they choose. The workers are identified by a very long code number generated by Amazon.

The workers are paid only if they complete their tasks correctly. The requester can also choose not to pay them, even if the task is completed. He does not need to justify himself. The workers cannot complain or protest directly. It is an economy without a proper regulation.

The workers do not know who or where the requesters are. They do not see or meet them. They do not know the purpose of the tasks they are working on, or what they are related to. A worker in a factory knows at least the purpose of his tasks, and the workers around him. The Mechanical Turk system resembles an ant colony, with each worker working on a fragment, yet blind to the masterplan.

The workers inside the Mechanical Turk's machine are anonymous, hidden and mute. This is in perfect continuity with the origin of the name "Mechanical Turk". Selfportrait by Wolfgang von Kempelen, showing a very strange and intense expression. To understand the logic of the worker hidden inside the machine, we have to go back in time to the 18th century.

In 1770, Wolfgang von Kempelen invented a human sized automaton dressed as an oriental magician standing behind a table with a game of chess. Kempelen called it the Mechanical Turk. During the following decades, the Turk was introduced to many European courts. An ancestor of Deep Blue, he was able to play chess and beat most of his oponents. Although it was obvious that there was a trick, no one could figure out exactly how it worked. Some people suspected that Kempelen had made a pact with the devil.

The mystery was still complete almost seven decades later, in 1836, when Edgar Allan Poe wrote a text on this mysterious chess player, Maelzel's Chess Player (Maelzel was the name of the owner of the Turk after Kempelen's death). The text is a very precise description of the Turk and of the ceremony of the game, yet Poe could not guess the actual mechanism of the automaton. Despite a large number of such texts, no one ever succeeded in deciphering the mystery. And, in 1854, the Turk burned in Philadelphia with its secret.

After the fatal fire, the trick was finally revealed by the last owner's son. Inside the desk of the Turk was an ingenious drawer, large enough to hide a man. During the game, the man got out of the drawer, sat in front of a chess board, lighted by a candle, and moved the arm of the Turk through a complex mechanism.

The machine was in fact a man.

Past & present #2: Human and animal computer

But was the original Mechanical Turk really a lie? This question leads directly to another one: what is a computer, at its most basic level? The answer is tricky. Most people think the first computers were machines. Yet, for three centuries (from the 17th to the 20th century), the word referred to actual people. Their job was to compute – to do calculations – and they were called “computers”. The computing world was originally a woman's world. At that time, being a “computer” was a common job for women who had studied mathematics.

In this image, the computer is on the right. The machine on the left is only used to enter the results of the calculations.

Even distributed computers already existed. Warehouses called “computer rooms” contained rows of computing people, coordinated and controled by managers. The most complex calculations were distributed into microtasks, which were executed by a series of people: each one of them was specialized for a certain type of calculation: one for the additions, another for the substractions... The most talented of these laborers did the divisions. Needless to say, such organizations are amazingly close to an assembly line, or to Amazon's Mechanical Turk.

In a hall of the Cern in Geneva, there is a series of images of the supercomputers which have been used there, placed in a chronological order. All the pictures show machines, except for the first one. It is a portrait of Wim Klein, a human supercalculator. He was able to find, in just a few seconds, the result of multiplications or divisions with a huge number of figures.

He had been hired in the 1950s to become, officially, the first supercalculator. He was lucky enough to retire at the time when IBM began to replace human

computers with machines. In the 1970s, to be a genius at calculation was no longer a route to a steady career.

One can find on the Internet an amazing video of his retirement party, where he gave a last demonstration of his talent. However, if one tries to check the results, one can see that he did, in fact, make a few mistakes.

We tend to believe that such people have a super power, that they are like machines, make no mistakes. But that in itself would be a mistake: they are, after all, human. Speed is not a real victory for the machine. The machine won a much more powerful and long term battle: trust. Nowadays, we trust much more the output of a machine than that of a human calculator, because of its regularity and its lack of errors.

In the field of calculations, it is obvious that the machine has won over the humans. But Amazon's Mechanical Turk proves that there are still activities for which human beings are more competitive, or at least where human beings are willing to compete.

When the animal was the machine

During the 20th century, the machine was not only in competition with human beings, but also with animals.

During the Second World War, aerial pictures were taken by specially trained pigeons.

Pigeons were also used to guide missiles, at a time when the technology of these weapons was not yet precise enough. In each missile, there were three pigeons, trained to detect a target. It was rather efficient, and it took some time (and the invention of cybernetics) for a machine to compete with three pigeons.

The French army still trains pigeons near Paris, just in case this workforce would prove competitive again.

Past & present #3: The Mechanical Turk with no human inside

In the 1980s, a working replica of the Mechanical Turk automaton was built. Ironically enough, this time, the mechanism hidden inside was not a man, but a computer.

The present #4: Labor reduced to powder

Not so long ago, people could hope to keep a job for decades, if not for life. It has disappeared in neoliberalist societies. One looks for a job one could hope to keep for a few months, or a few years at best. With the spread of freelancers, this time span has been reduced: one looks for jobs that will last a few days or a few weeks.

With the spread of market places, it has been reduced again: one looks for tasks that will last a few hours at best. With MTurk's microtasks, one looks for tasks that will last a few seconds, or a few minutes at best, never more. One has to look for a new task every time he finishes one. The worker throws himself into a "career" for a

few minutes, before to switch to a new one. He can try 1,000 different activities during one month, which is perfect for the age of Attention Deficit Disorder.

In this system, the resume is obsolete. It has been replaced by the “reputation”. Just as on eBay or any such website, the comments that the other users give on one person determine the trust one can give him. On a marketplace, the worker’s reputation determines if a requester will allow him to work for him.

Uncertainty as a choice, work as a parasite

These mutations can only appear as a dystopian reductionism, if we compare them to what labor used to be, and the place it used to occupy in the society. It is easy to see the neoliberal urge to increase the efficiency of the whole system, to accelerate the rhythm of change, without any regard to the human beings involved in this process.

But is this type of comparison relevant? Is it relevant to compare the Mechanical Turk with what labor used to be? Is the word “labor” even appropriate for this kind of activity?

It has been noted that in this context, it would be better to speak of playbor. There are two ways to understand this idea. The first interpretation would be to consider that the system fools the workers by letting them think that they are playing. By doing so, they do not need to actually pay them – or only minimally. In this logic, MTurk can be regarded as a parasite: it develops by exploiting the human will for play, and profits from this predisposition. But it should be considered a rather honest parasite, as many other websites let the workers work for absolutely nothing, for instance Wikipedia (even if Wikipedia does not make a profit out of its users’ work, it does let them work without any payment).

Another interpretation is to link “playbor” to an often heard phrase in these times of crisis: “If I am to be unemployed, it may as well be in a field that fills me with enthusiasm.” Maybe we should not speak at all of work, pay, lack of job security, etc. What the MTurk workers are looking for might be an activity rather than money. Labor is not just a way to get money. The MTurk workers might prefer to be free and unattached, rather than be paid and tied down.

Jonathan Zittrain, a professor of Internet law at the Harvard Law School, proposes to see this type of work as “precarity by choice.” He notes that “there is a surprising number of people who want to do something for a penny.”

There might be a reason for this surprising trend. The working mechanism involved in Mechanical Turk is coherent with the way we tend to interact on the Internet: the quick and diverse interactions we have on the social networks, the short attention span we have when we surf...

In the beginning of the 19th century, the French utopian thinker Charles Fourier imagined a system he called “la Papillonne” (from the french word “papillonner”, to flit around). It was based on the idea that any activity becomes boring if one does it every day. In the opposite, any activity is fulfilling if it is only practiced for a few hours. Therefore, Fourier envisioned that, in his utopian Phalanxes, the workers would work for a few hours only at each task, before to switch to another one, and so on. Life would vary constantly.

The Mechanical Turk can be considered as a means of realising this concept.

Possible future #1: Reversing globalization

About half of the Turkers are American, the other half being either Indian or Pakistanese. While it is unconceivable to make a living with the very low wages of Mechanical Turk's HITs in the US, it is possible to do so in India or Pakistan. Mechanical Turk might create a viable economy in these countries. It may not have been the formal intention of Amazon (at the origin, the sole purpose of the Mechanical Turk was to help Amazon sort the data of their data bases).

For the moment, most marketplaces are used by western companies to offshore labor in developing countries. But it is only a matter of time before this movement reverses itself.

A video called "The new way to work" lets us imagine what could happen. It has been made by Salma Jafri, a woman based in Pakistan who uses the marketplace Elance:

"I run a content development firm based in Karachi, Pakistan. Pakistan is a troubled country [...] We face issues such as political turmoil, curfews, strikes, unscheduled holidays, electric power breakdowns, and yet we are able to prosper through it all in our professional, cultural and family lives. I've been a salaried employee since 1999 but I left the corporate world seven years later in 2006 when I got pregnant [...] By the time my daughter was about 9 months old, I was really starting to miss the personal fulfillment of work. With wanting to spend maximum amounts of time with my baby and the desire for financial and emotional independence, I really struggled to find a balance. Then, due to extreme political tension, my husband's business – he runs his own production house – started to suffer. The financial crash was hitting us really hard. The political situation certainly was not helping, and I knew that I just had to find a way out, both for myself and for my family [...] I had to figure something out."

She then explains how the 2008 financial crisis hits Pakistan, and how her business on Elance goes from strength to strength.

She finally turns it into a company. However dramatic the economic situation is in the physical place where she lives, it seems that she is now elsewhere, in a world devoid of these issues. The marketplace system has made her small business global. Yet, she still is a housewife. She can, at the same time, work at home as a housewife with her children, and work outside of her country's economy.

The physical space of her household still exists. The wider world still exists. It is the place in between that has disappeared: the political space of her country, and the public space of her city.

The people living in the countries that face the biggest economic and political issues might be the most interested in actually creating a viable economy in the

virtual world. They might very well become the leaders of this new economy. Could this somehow reverse globalization?

The mass of unemployed workers in the western countries will have no other choice than to work online day and night to grab a maximum of microtasks paid at Indian rates.

Possible future #2: Human labor becomes a mere resource for the machine

For decades, chess was considered the ultimate challenge for artificial intelligence, the holy grail. It was before we realized that it was much more difficult to teach a computer the most basic human aptitudes, like the low-level sensorimotor skills of a one-year-old (this is known as the Moravec paradox).

In 1997, the IBM supercomputer Deep Blue won against the human champion Garry Kasparov. This day, a bit of mankind was taken into the realm of the machine.

Since then, competition between computers and human chess masters has become obsolete: humans never win anymore. There are still high level competitions though, but they take place directly between the computer systems themselves. ...to machine assistant.

Human chess players used to practice against computer programs. Now, they have become the assistants of the computers, feeding them with their knowledge. They define themselves as “trainers” or “machine coaches”, in order not to lose too much of their influence.

But do these human players still have something to teach to the computers? The territory of human singularity is getting smaller and smaller.

This scenario can be extended to other areas of expertise (e.g. the world of finance). What will happen when we will have taught the machines everything we know? ...to cognitive slaves.

Slaves used to cultivate the land, the traditional asset of their master. Nowadays, knowledge is becoming the new asset of the economy. And the keyboard has replaced the shovel.

Humans have become cognitive slaves, cultivating this digital land for the machines who are the real owners and the new masters of this asset.

Each input fuels the intelligence of the machines and increases the scale and scope of their territories.

During the last few centuries, in the Western world, human discoveries and inventions have been highly regarded. They were supposed to bring progress and free mankind from its dependency on nature.

We tend to think that any invention is good for us. “Innovation” in general is the goal of science, regardless of its meaning or its direction. The goal seems to extend the possibilities of science, no matter what the direction. Even if, doing so, we end up creating our own masters, and choose deliberately to become their slaves.

Possible future #3: The labor market as an amusement park

Labor has become playbor, i.e. an almost automatic activity one does for his own pleasure. The separation between work and leisure, which dated from the modern times, is now obsolete. Work and leisure melt into each other and form a continuum. Playbor has become much more fun than it was at the beginning of the 21st century. It is now purely distractive: an amusement more fulfilling than any other.

As a necessary conclusion, people become addicted to work/play. They work/play all the time. As the character of Alex DeLarge in *A Clockwork Orange*, the worker/player of the future finds himself condemned to watch kitten videos *ad infinitum*. For some unknown reason, it generates a revenue for some corporate entity, somewhere. But not for the worker/player himself, since the notion of salary has long vanished. The more one works/plays, the less one is paid.

The job market has become an amusement park. One chooses between different rides. Of course, one needs to queue to ride the best ones.

Possible future #4: Pay to work

Massive unemployment in all fields of the economy leads to huge social crises. People realize that the lack of social activity is even more dangerous than the lack of money. People fight to work.

After decades and decades of crises, the governments of the world have definitely given up on finding a solution on the problem of unemployment. They do not even make any promises any longer – these would look like bad jokes.

The governments do not speak of the unemployment rates any longer: since the vast majority of the population has no hope to ever find a job. The figure that matters is the employment rate. Yet, the rate of people having a full time job has long ago dropped below 5%.

So, the governments begin to speak of the activity rate: counting the people who have some kind – any kind – of activity. Usually, it is defined as spending more than half of your conscious time on online marketplaces.

But even the online marketplaces do not have enough tasks for the number of people who wish to work online. The pays get lower and lower: the tasks which used to be paid 10 US\$ cents are now paid only 1. The ones that were paid 1 cent are now paid 0,1. But even that is not enough to filter the mass of those willing to work: there are still approximately 100 people for each task.

Mostly as a cynical joke, a student in political sciences creates a new marketplace, for which people need to pay to work. Surprisingly, the website has an amazing success. The other marketplaces companies soon understand the financial potential of this situation. As an unexpected result, people begin to accept the idea to pay for work, and more if the work is interesting.

The illusion that the goal of labor was to provide money for the worker has long disappeared. Labor provides a place in the society, a reason to exist. People are more than willing to pay for it.

Anyway, the crisis has lasted for so long, that most people have organized themselves in rural communities, where money is not the center of their lives. Most of those who could not adapt to this system have died a long time ago.

Possible future #5: The labor market becomes as volatile as the financial markets

Because of the instability of the economy and the increase of flexibility, the online tasks become ever shorter, less stable, and in the end, completely volatile.

The volatility of the tasks presents an enormous advantage for the requesters: they can adjust the job offer in real time and optimize the efficiency of the crowd's work second by second.

Work has become a mere commodity, an abstraction, just like money. The job market becomes a financial place for exchanging human actions. People begin to speculate on human tasks, and exchange real "human" actions at a higher and higher speed. The volatility of the human tasks market is getting so extreme that the job market now functions exactly as the financial market.

Some human resource companies decide to apply methods from the financial world to deal with such volatility. They hire high frequency trading specialists.

These people create algorithms which replace the finance traders by machines able to trade (request) at an unprecedented speed. In a few seconds, thousands of orders can take place.

The requesters are now computer programs. Their demands are more and more important.

Labor has been cut in pieces, reduced to powder. The main characteristic of powder is its very large specific surface area (the total surface area of a material per unit of mass), which makes it more responsive to chemical reactions. The job market becomes more and more reactive and, just like the financial markets, crashes more and more often, and more and more dramatically.

The crises are also more and more volatile. At 34 past noon, the 12th of April, more than 130 millions of humans are fired all over the world because of a single bug.

Possible future #6: Extreme externalization, towards an organic competition for work

Humans are inefficient at solving ecological problems. The beavers' project wins over Veolia's. In a century marked by major ecological crises, people begin to realize that human beings are completely unable to manage the problems they have caused to the Earth. All the solutions they try to apply only make things worse, if indeed they can agree on an approach.

The plants and animals tend to adapt more naturally to their environment. Human beings finally admit that they must rely on them to solve the desperate situation in which they have put themselves. A new competition emerges to save the Earth, in

which human beings are now competing with all the other species on Earth, whether animals or plants. Teams of beavers win a call for bids to build thousands of microdams all over the world. This proposition is much more robust, flexible and adaptative than the competing proposition, a mega project by Veolia, with an ecological footprint which is completely miniscule. Furthermore, the cost of the beaver dam network represents only a fraction of the price of Veolia's mega project.

These “animals and plants” solutions, made possible by the naturally evolved networking of their brains and nervous systems, become commonplace in large ecological projects. They almost always win the bids.

In the 19th century, the machine has proven its superiority over human physical labor. In the 21st century, the computer has proven its superiority over all intellectual labor. In the 22nd century, the connection of animals and plants prove its ultimate superiority over humans and save the planet.

Ethics comitees all around the world try to determine if the animal workers should be deemed to have the same rights as their human counterparts, in the name of animal dignity. Should they be allowed a political representation? An aging Bruno Latour speaks once again in favour of a parliament of things, animals and plants.

As a response, the unions argue that in the current situation, human workers have less dignity than animals and plants, since they have no real role anymore. They wonder how to fight this new kind of competition.

The competition gets more and more tough: in 2185, humans fail to compete with plankton for the organization of the world united university programs. All the intelligence of the world plankton, once networked, has proven more efficient in reorganizing the knowledge of mankind, than mankind itself.

Possible future #7: Empathic job market

In the 22nd century, all human capabilities have been transferred to computers. Human beings have lost their superiority in every domain, except one: love. Love is the one thing that computers cannot do. Yet, humans themselves have become less able to love. In an ever more abstract society, people fail to interact socially, to express themselves. Social isolation becomes a major issue. As a direct result of the general lack of empathy, love itself becomes a currency. The most valuable one. The human desire for efficiency leads to the creation of a love stock market, where this currency can be exchanged at the best rate.

Possible future #8: Cognitive poverty

Human beings have become completely accustomed to externalizing their cognitive tasks. Computers are worn on discreet devices which look like distant grandchildren of the old Google glasses.

The collective intelligence is now completely embedded in the brain. One needs not to “ask” anything to the network any longer, or to type a request into a search engine. Optogenetic sensors in their neurons, connected to a small chip via fiber optic cables, detect their brain activity and understand it, process the information,

activate different neurons, compare the situation with similar ones found on the web, and provide answers to a question before it even becomes conscious in the brain.

When more complex collective brain processing is needed, a program separates the questions into a series of tasks which are distributed among other brains. The brains process their microtasks, give an answer, which comes back as an input.

Every one is part of a larger brain, yet the process is completely invisible and unconscious.

The content of every one's brain is offshored to other brains. But the situation is far from being homogeneous. Rich people can buy the right to access other brains, while the poor rent their brains to make a living. In order to make more money, they need to let them completely accessible. To do so, they must empty their thoughts while staying alert. They practice yoga or meditation, or take smart drugs.

The poor neighborhoods become strangely quiet.

Possible future #9: Turkers scenarios

We have also asked Turkers how they imagined the future of crowdsourcing. One of them imagines that people will be turking to pay for oxygen. Sleep will be conquered by some new kind of ADHD medication. Another Turker has imagined that people would wear kinds of glasses that would allow them to accept tasks in real life. For instance, if one walks along a sidewalk, he could receive a proposition to clean a portion of it for 10 cents. The whole world, including human beings, would be filled with such propositions. Work would appear on the move. One would not be stuck to his desktop chair anymore. And the tasks would not be limited to what can be done on screen. This could change completely the idea of work: free it from its physical chains: the office and the computer screen. The worker would be free.

Another Turker suggests that there could be tasks in the future that "learn" from Turker responses, to help program computer intelligences to do the sorts of tasks that Turkers are doing today. In a recursive loop, the Turkers would help accelerate their own obsolescence (without even knowing it).