DisCover

Magazine of Study Association Cover – No 2 – 2019

COLOPHON

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Cover

EDITORIAL

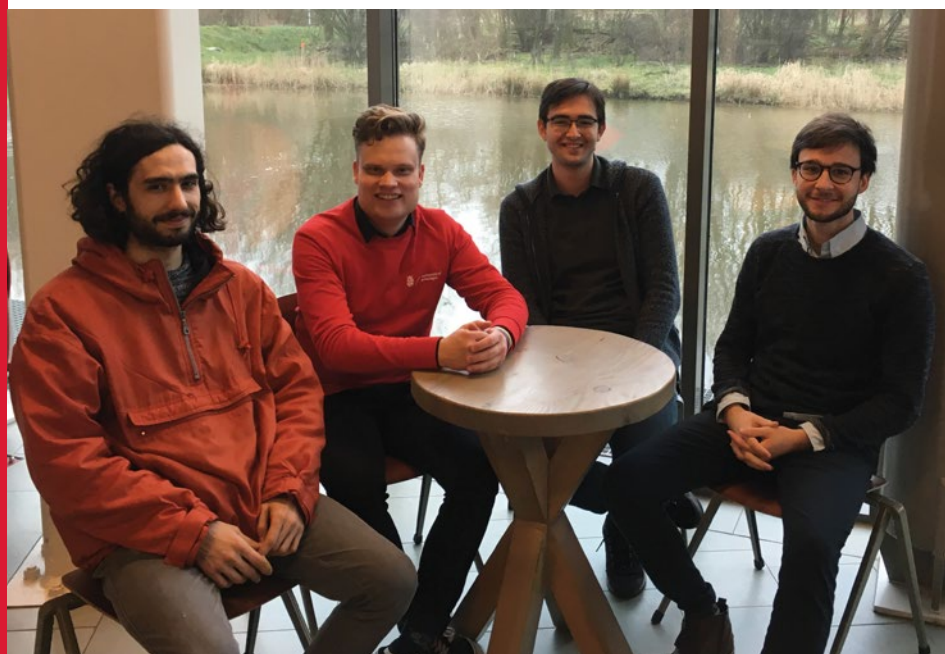
At the time of our coming together Gonçalo and I were taking the AI Bachelor course Data Analytics and Communication. Its aim is to teach us the many traps of statistics; this was in the winter months of 2018. A year had passed with allegations of presidential campaign manipulation in the US following the Facebook and Cambridge Analytica privacy scandal. We decided to make data and statistics in society the center of this issue.

We observed a discrepancy between a growing perceived danger from immigration or terrorism and empirical measurements of safety across Europe. Meanwhile the political landscape was changing on the continent and distrust against media was growing. These observations could also be made surrounding Brexit.

The world stage doesn't sleep. However, we can find happiness in basic things which keep their meaning and importance regardless of the spectacle taking place in the world's theatre. This second issue turned out unexpectedly dystopian. With fake news and statistics as a starting point we had it coming.

The Cover Yearbook 2018-19 claims the title "This was a bad idea". At times when we moved slowly we believed their slogan had foreseen our future. At last, we are proud to present to you our own abstraction of that world stage packaged with a great styling and layout. A magazine interlaced with authentic, artisan and homebrewed memes straight from Groningen sent to the internet and printed back to paper now held in your hands. We wish you a happy reading!

Rafael Tappe Maestro



CONTENT

THE BOARD'S LETTER:

PRIVACY AND SECURITY WITHIN THE RUG

The university has recently taken steps to become more privacy minded. With the onset of the GDPR, this has of course become a necessity. Guidelines were set for the courses, which included topics like lists of grades that are published on nestor. This is a very welcome development for all the more privacy minded members that frequent the Cover room. As an association we also get a peek of what happens behind the scenes, typically outside the view of the students. Even here we find a lot of improvement on the area of privacy. Methods of data transfer are set up for any personal data, and are adopted more and more within the RUG.

This is good start and necessity to ensure the proper handling of personal data. But I have been part of the RUG long enough to know that online policies are not always followed. I just have to think back to the amount of mails I have had from @rug accounts telling me to log in now via the provided links, because my email is in danger. Since people cannot be trusted to spot phishing attempts, I find it hard to believe that privacy will be quicker to get completely right. And phishing emails are not even the worst of it.

Recently I wanted to reset a password for a service associated with the RUG. I was surprised to find my password in plaintext in the automatic email. No reset links, just my account name and password. After sending a mail about my concerns regarding plain text passwords, I got a reply. I was more surprised when the reply informed me that there was nothing wrong with storing passwords plaintext, and many institutions/organizations actually prefer sending their password plaintext via mail. So after weighing the word of this email against the word of my lecturers and any security resource in existence, I started to doubt the accuracy of the reply. Luckily the security manager of the RUG was a bit more reasonable about the situation.

Moral of this story is to never trust the total security and privacy of any system, but do know that there are people working hard to ensure that these issues get resolved. Oh, and also, use a password manager.

On behalf of board XXVII "Ad Hominem",

Daan Lambert

“I can offer solutions”

Gabriele Spini is a cryptologist at Cyber Security & Robustness. He enjoys using cryptography to come up with solutions to problems that confront colleagues in other fields.

“At Cyber Security & Robustness, we focus on two areas. On the one hand, we conduct research into the vulnerability of systems, improve the detection of security risks and draw up security protocols. On the other hand, we develop ways to make systems more efficient and resilient to disruption. As a cryptologist, I currently focus on two focal points: I use post-quantum cryptography to look for ways to make normal computers resilient to quantum attacks. And using secure multi-party computation I help to make data analyses possible while still protecting privacy. Such as combining resources in the medical domain or detecting fraudulent transactions in the financial sector. The personal data will then remain encrypted, but you will see the result of your analysis.”

PhD in CRYPTOLOGY

“I did my Bachelor’s degree in Italy before going on to do a Master’s degree partly in Italy and partly in Bordeaux. I came to Leiden for my PhD research. And after that I stuck around! The Netherlands is a beautiful country to live in and offers great career opportunities in cryptography. After my PhD I did a post-doc in applied cryptology at CWI in Amsterdam – and that’s how I got to know TNO.”

NOT A SEPARATE WORLD

“What I like about TNO is the deep and interesting research we do here, but without this being a separate world. What we do is relevant to society and is immediately applied everywhere. TNO is also a great place to make connections with people from different disciplines. The nice thing about my profession is that I can offer solutions – the problems come from other fields and cryptography is often a solution!”

CONVEYING KNOWLEDGE

“It’s great that I get a lot of freedom at TNO to develop myself. And to be of value to others. So I my day is satisfying not only when I get a step further in a project, but also when I can convey knowledge through demos and presentations. While I am specialising quite a bit right now, in the field of secure multi-party computing I do cover the entire process from concept and development to delivery and communication. I am mainly concerned with building up knowledge in the post-quantum field, which I then transfer to colleagues. In the future, I would like to focus on other disciplines, something that TNO also gives us scope to do. Would I consider taking the step from content to management? It’s something I’d like to try, but for the time being I’ll continue to give priority to content.”

TNO

DATA DEMOCRACY DYSTOPIA

WE HAVE UPDATED OUR PRIVACY POLICY,

INPOLU the independent policy union has taken control of state affairs. You are under surveillance. The rights to privacy and opinion have been seized by the state. This seize of power is for the common public good; this is for your individual good.

Rafael Tappe Maestro

Your data is going to be used to solve questions which in the previous age of pretense democracy have arisen at the center of an unjust public debate. Behind you lies a world of unequal forces where public communication and media were dominated by words of the powerful and the outrageous. INPOLU is going to lead us people into a new world order of data democracy.

Science is going to develop politics and economic policy. Your data is going to render the hypocrisy of public debate redundant. We are going to replace this broken form of public communication by the most complete and linked information representing each one of us. All arguments, views and people are going to be considered and weighed. Everyone participating in our shared future is going to be an extension to the justness of our data democracy. The justice that we promise is the justice that you deserve. We are going to absolve all judiciary from their duties to bring you justice as a data collective that entails the diversity of all.

We dismiss those highest in the executive hierarchy and all their processes and institutions for election. Our people's shared intent is going to be recognized in a data driven democratic manner without the need for an act of participation which excludes those whose votes used to never fit into one of a few tick boxes that find their way into a ballot. We reject a system built on the

illusion that a tick to a box once a year is enough to express who you are and how your interests are best reflected. Data democracy is going to set your mark into continuous space.

We are going to be liberated from the tyranny and bias of those who have bent and misinterpreted our votes to their own interests in a corrupted game that was called politics. A game where policies weren't developed to serve us people but where we served the policies and their makers. Our lives don't belong onto that playing field. For you, we are going to take control of those who have suppressed and exploited. There is no hiding inside our walls where everyone and everything has their place. The collective of our eyes sees all crime and honor and deals each fairly.

Organs of legislation are dismissed. Law is going to be a direct reflection of our actions. The double standards rampant amongst those who created law in the past are going to be eliminated. Together and for each other we serve transparency and absolute truth. We are going to eliminate privacy, the venom that creates secrecy and suppression. A toxic privacy which breeds hypocrisy and liars who speak differently than they think; privacy endangers our safety. Free will is not formed in privacy, only dangerous ideas and conspiracy lurk there. We are going to exercise our shared free will through transparency as a collective of data individuals.

We lead you to a political closed-loop control architecture. Using your data we will know your beliefs, desires and intentions before either become aware to you. We are going to make you live up to your dreams. Together we know your goal and the optimal path, how far you can truly go and how far you believe you can go. You are not going to fall behind because we, your family, friends and all of data society know better than you; we know that you can achieve more. Your data knows your breakpoints better than you know them yourself. We know when you develop illness before you feel sick and as a collective we rise above biological function. Our society is going to rise above those who are blinded by our ascension towards truth; we have evolved.

No blinded leaders and no suppression; this is us and only us. Data lights the path to our feet and in union, your data, your sisters and your brothers together we are going to become the truth in our creation. We abolish the separation of powers, trias politica, legislative, judicative and executive. One people speak with one voice. Our data gives one truth that forms, shapes and enforces our will; your will.

Your data serves this nation, so we honor and serve you.

15.04.2050, INPOLU Headquarters

THE ILLUSION OF CHOICE

The recommendation algorithm and free will?

What are we, anyways? Isn't a person in constant flux? – a black box that breathes in information, permutes it and exhales it? How does choice permute from within then? Furthermore, how does media affect this pool of choice, our thought and ourselves, if at all?

Gonçalo Hora Carvalho

We are – and I must admit to be guilty of an early cliche – a mysterious loop that arises seamlessly from memories. Whatever information enters this cycle that births thought will undoubtedly factor in that person's being, or rather, whatever that person is as a kernel of potential action and decision at any given moment in time. What determines this potential? – the set of all possible decisions? A small experiment in your mind's lab might help. Try to imagine something absolutely novel – some being or object who's totality is not composed of known parts, that is, this being is not made of things that you can find anywhere on earth (maybe a novel geometric form, or a new color). Any luck? If not, is it then the case that your exemplary pool of thought, the possibilities of thought available to you, are solely composed of objects you have taken in from the world throughout your life? Then, if a person consumes a modest hour of online media (be it videos, articles, whatever) this media will become part of the conglomerate that is that person's mind, and arguably, themselves. Therefore changing themselves according to this media – negatively or positively (for it is often the case that people find quick binary reactions to any input).

And so, in line with how the old saying goes "We are what we eat", so can we say that "we are the media we consume". Not only do we constantly become our memories while we're awake and perceiving the world, we do this even more integrally while we sleep. With eyes shut and the lights out, we sit in our black rooms and in the dark we shuffle our diaries, correcting, removing unnecessary detail and reinforcing the important happenings of the day. The question at hand is then of extreme consequence – if we do not own the power of choosing what media we consume or even if this function (the function of choosing) is diminished, this will take away our free will in some form or another. Since we're transformed through these channels, the pool from which our actions would follow is determined by something else other than ourselves – at least partially. Our will is outsourced and that changes our future possible self – an idealistic narrative can transform a "normally" function human being into a fear monger – take the country-sized phenomena that is Brexit, where people dived head first into a binary position due to narratives that supported themselves on strong feelings, like fear, towards relevant current matters of politics and life, like immigration.

A person, among other things, can be said, generically, to have a mutable will, a pool of knowledge, complex biology, a past as well as a fleeting present. It exists in an ever-constraining unforgivable environment. Founded on these things an action might ensue, after a decision is made about said will or simply spontaneously. A decision which would cement a rainbow of paths that lead to whatever golden goal sits on the other side. There are plenty of ways to go from A to B in life, in reality – think about it, are you not faced with the ever present choice of which foot to start on walking?

So what happens to a person's "will" when we reduce the world to, for example, the artificial wrap of reality that is YouTube? Take merely a small sample

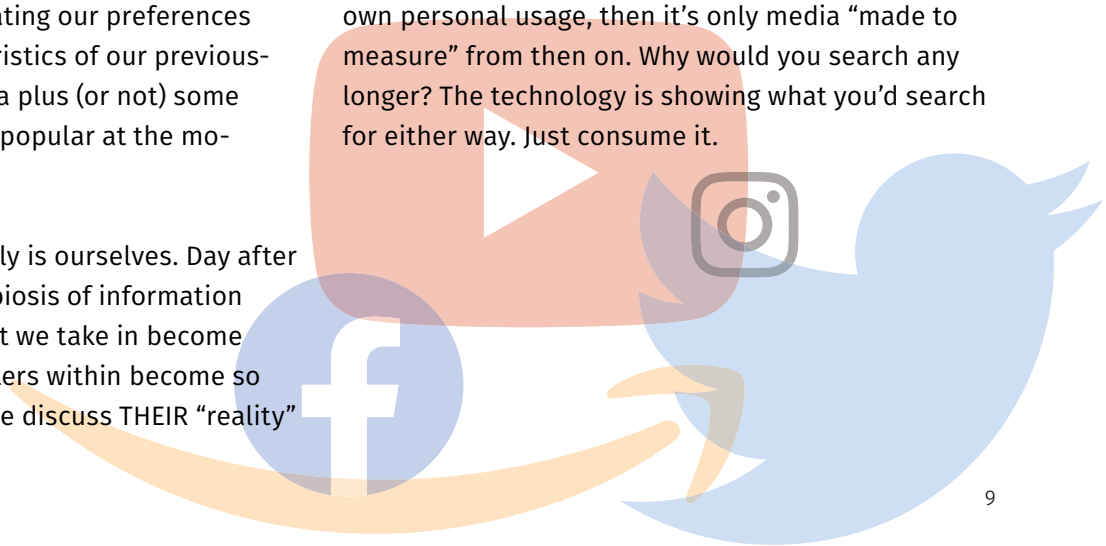
of YouTube users (as I did by pooling 10+ of my own friends - mostly AI students undertaking their bachelor with an average age of 21). This is enough, not to prove, but to tease the idea that people are volatile when it comes to the modern joie de vivre – internet media consumption, e.g. YouTube videos, Netflix, tweets, memes, pornography, and the like. It is quite common for us to lose ourselves in these moments of bliss entertainment: a spiral of videos that doesn't even require us to click anything anymore, they simply start one after the other, or a never-ending column of memes all generically relatable and effortless to understand, perhaps even an intricate staircase of tweets where step after step, reply after reply, we slowly climb our way through someone else's conversation (mostly heated arguments, let's be fair), and what about indulging in the largest natural dopamine-releasing source we have? There just happens to be more pornographic material on the web than anything else. Regardless of the poison, hours will certainly pass with ease through the "this is the last one!" superfluous gate. Any "will" crumbles in such a micro system. We lose focus and reality disappears. We slowly slide towards a different reality – the internet.

> "our lives degrade to a fake optimistic shadow of what they really are

We are not, I think, completely losing our decision power or our capacity for free will to recommendation algorithms, but rather outsourcing these functions to a replicator machine that cuts through the search process by simulating our preferences via abstracting the characteristics of our previously consumed or clicked media plus (or not) some general parameters that are popular at the moment to the wider audience.

What we are losing completely is ourselves. Day after day we sit and watch. A symbiosis of information forms and the narratives that we take in become part of our lives. The characters within become so involved in our reality that we discuss THEIR "reality" among ourselves as if it was real. It affects us to such an extent that we feel pain whenever our favourite characters are wronged and happiness whenever they thrive. Sometimes we confuse our identity with these technologies so deeply that our lives degrade to a fake optimistic shadow of what they really are. Take Instagram, for example, where some people spend more time worrying about how they portray their life through that medium, working on their "insta-life" and neglecting their real lives. The mechanisms that govern the technologies' environments start replacing the natural primal necessities – the desire for likes and validation in the medium draws your attention from the real setting, where you find yourself among real friends, amid a real conversation, and brings you to deploy your resources in the virtual reality instead of in your actual reality.

In a more pervasive way, the technology that constitutes the internet media finds some way around our critical selves by charming our animal-like qualities through offering ample entertainment returns for void work, which keeps us under the grip of our seats, eyes locked on our screens. But back to the algorithms. What these do (or are supposed to do) is predict what media the technology should feed you in order to keep you chewing for longer – watching in the case of YouTube, reading in the case of Twitter, buying in the case of Amazon... Albeit the medium you find yourself dining in, you can be certain that these algorithms are working in environments that optimise their results. YouTube autoplay. Twitter feed rank. 9Gag outsources the selection of top memes to its users and then shows the crowds favourites first. Amazon applies the same strategy with their product listing and Netflix does this with its shows – that is, until they get a large enough sample from your own personal usage, then it's only media "made to measure" from then on. Why would you search any longer? The technology is showing what you'd search for either way. Just consume it.



Clinical Trials Unreported

Statistics – Scientists understand it, the World Health Organization (WHO) lives by it. People are happy to trust in what other people from somewhere else in the world have written, most likely in a form of English which is hardly understood by scientists in a related field.

Rafael Tappe Maestro

Before a scientific discovery arrives on a reader's phone, the original paper will be chewed on and transformed from academic English to normal English then localized to Polish, Hindi or Portuguese and finally that information must be condensed into a headline.

Health, climate and economics are topics of immense complexity studied and analyzed using the statistical method. Statistics is not infallible; while I don't think anybody claims the opposite, I fear that we aren't reminded of the risks often enough. Problems at the center of our society are debated faithfully using, accidentally misusing or intentionally abusing statistics. How do we know when to trust evidence? I fear too often we don't consider the question whether to trust or not. When there is reason for doubt, I fear we lack the time and skill to weigh what we read against our own judgement. When there are those who have the skill and time to weigh in for us, I fear we lack a podium for their analysis to be heard.

I would like to discuss such a podium that brings statistics closer onto stage. The resulting data of half the clinical trials conducted in the European Union (EU) go unpublished. This is a severe issue which has been addressed by a team of researchers surrounding Ben Goldacre, a physician at the Evidence-Based Medicine DataLab at Oxford University (ebmdatalab.net).

To ensure that the data underlying health decisions is treated with the attention it deserves, the EBM DataLab built the websites eu.trialstracker.net and compare-trials.org. Trialstracker lists over 5000 institutions conducting registered clinical trials inside the EU. A smaller list of well known pharmaceutical companies and universities is found on the website by filtering for institutions with 50 trials or more. From this list only 16 of 114 institutions have reported 100% of their results as of September 2019. Furthermore, this data shows a clear trend towards pharmaceutical companies publishing most of their results while public academic institutions tend towards having reported 0% of their results. Among these public institutions are top European research universities such as the University of Amsterdam, Karolinska Institute and Heidelberg University.

The foundation for clinical trials to be published is not only good science but also EU law. According to this legislation, all results produced in clinical trials conducted in the EU must be published within one year after the trial. Currently, only 62% of all due trials have been reported. The discussed law has been in force since December 2016. It is based on a 2012 EU guideline with the same requirements of reporting results after 12 months of trial completion. At 62% and more than 5 years since the first guideline, compliance is strikingly low. Similarly to the EU, the U.S. passed legislation enforcing clinical trials data to be published. A list of unpublished results for clinical trials registered in the US can be found on fdaaa.trialstracker.net. Given a widespread lack of compliance in the EU and U.S., Ben Goldacre initiated the campaign AllTrials (alltrials.net) with an aim at improving the standards by which clinical research is conducted, globally.

We are affected by health data going unreported as a population whose health is a result of scientific progress. This is a development that can only faithfully evolve further when the results are laid open. Otherwise, clinical trial results showing health risks associated with a treatment may be withheld or effective treatments may be kept in a file-drawer until the most economical time comes for the public release. Where it isn't known what research was conducted and what results were produced, resources will be spent unnecessarily and ill informed decisions will be made at the cost of health and lives. As scientists we are affected by this problem because an integral part of research amounts to communication. Before communicating to the public we need to convince others in the field, to be convincing we must understand for ourselves.

References

Goldacre B, DeVito NJ, Heneghan C, et al. Compliance with requirement to report results on the EU Clinical Trials Register: cohort study and web resource. BMJ 2018;362:k3218..
http://eu.trialstracker.net/
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http://fdaaa.trialstracker.net/

TO **BOLDY** GO:

Exploring the future of human activities in space and their regulation

Nidhi Bangera

In the year 2019 we stand at a point that is fifty years since the first steps were taken on the Moon and forty-seven years since the last. While the period leading up to the landing of the first manned rocket on the Moon saw great advancements in technology we have not pushed the boundaries of human activities in space much further since then.

But now we stand at the precipice of change. With increasing interests of private organizations in the potential of space to act as a reservoir of resources, along with NASA's and SpaceX's intentions to establish human colonies on the Moon and Mars, it is imperative to investigate the regulations that will govern these activities.

Currently, the Outer Space Treaty (OST) is the only real set of "guidelines" in place to govern the activities of states in space. The treaty was given approval by the United Nations General Assembly in June 1966, opened for signature in January 1967, and came into effect in October of the same year. Since then, 108 countries became parties to the treaty, and a further 23 signed it but did not ratify. Amongst other considerations, the treaty includes principles revolving around (i) the forbidding of testing and placement of weapons of mass destruction in an orbit around Earth or in outer space (ii) the registration of objects and satellites launched into space and (iii) the obligations of states to rescue people in space. On the topic of claiming land on celestial bodies, the treaty explicitly forbids any nation states or its citizens

from doing so. However, the treaty does not clearly outlaw the mining of resources. Written two years before mankind had taken the first step on the Moon, it can be argued that the OST is quite outdated and does not accurately reflect today's space exploration climate.

First, let us consider the legality of mining resources on extra-terrestrial bodies under the Outer Space Treaty. As we approach a scarcity of resources on Earth, minerals in outer space become a viable option. However, many member nations of the UN are of the opinion that the commercial use of extra-terrestrial resources violates the treaty in its allowance for "exploration and utilization" of planetary resources solely for scientific and exploratory purposes. On the other hand, both the USA and Luxembourg have passed bills allowing them to appropriate resources from space, giving the mining companies ownership of any and all materials they mine, arguing that "the Outer Space Treaty guaranteed the freedom of exploration and use of outer space and, in that regard, did not prohibit the utilization and exploitation of resources contained in celestial bodies".

It seems wasteful to disallow mining of resources in space when they are so abundant. However, we do need to take into consideration the risks that would come with it.

Countries such as the Russian Federation have expressed concerns that mining activities may include the deflection of small asteroids into the vicinity of the Earth and the Moon. This could present a risk for the entire population of the Earth. Therefore, they are of the belief that such activities, if permitted, should be regulated at the international level. Other countries have rightfully pointed out that very few countries currently have space-faring capabilities and as such, the first-come, first-serve doctrine that would follow from legalising these mining activities would result in a monopoly over the resources in outer space and prove disadvantageous to most countries. It is crucial that the treaty is updated to act as an international legal framework that clearly defines the limits of commercial activities in outer space so as to increase the use of outer space to the benefit of all humankind. This would have to be done in such a way that it benefits all nations in a non-discriminatory basis.

Next let us consider the case of the potential colonization of mars. Article II of the Outer Space Treaty states that "outer space, including the Moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." By the wording of this article the act of setting up a colony would suffice to be considered as appropriation of outer space, unless the colony came under the jurisdiction of the international committee. Since the more likely scenario is that until the colony is ready to claim independence, it would be regulated by a sponsoring nation state on Earth. We have reached another point where making amendments to the treaty is a crucial step before we can further our boundaries into space.

However, the treaty does not clearly outlaw the mining of resources.

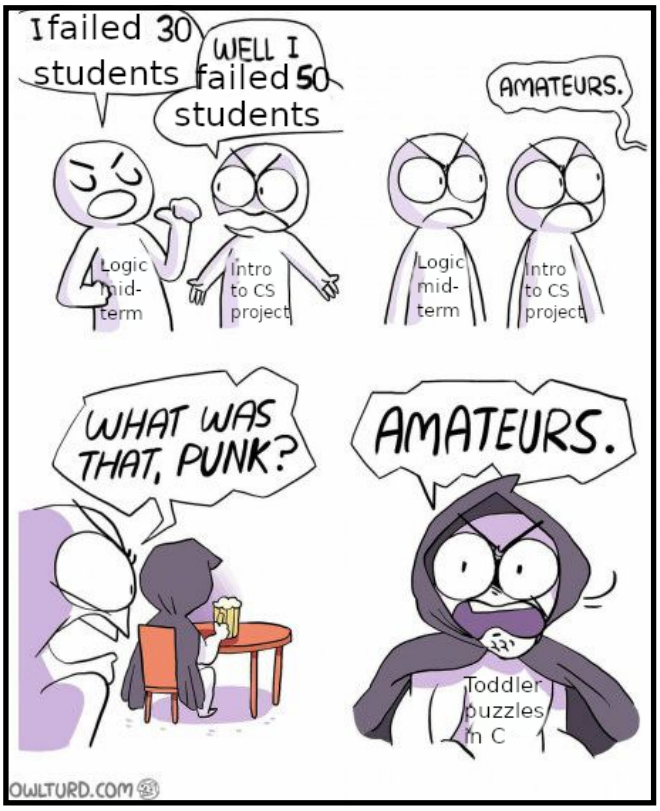
One could potentially put forward the idea that an exception should be made allowing colonies to claim land. Ownership of the land would permit the colony to ensure its security by having control over its borders. It would reduce the risk of potential conflict with any other party trying to mine off the land that sustains them. Finally, it would allow them to rest assured that other parties will respect their right to remain at a given location.

However, there are many questions that would arise over how the land would be allocated and the ethical implications of allowing land on space to be claimed at all. The situation is unprecedented and hence has no protocol for it. And while colonization of Mars is unlikely to become a reality for many decades, it would be wise to be prepared for the scenario. We must think ahead and debate these questions amongst the public so that world leaders can take our views into account when making the legislation that will regulate space exploration.

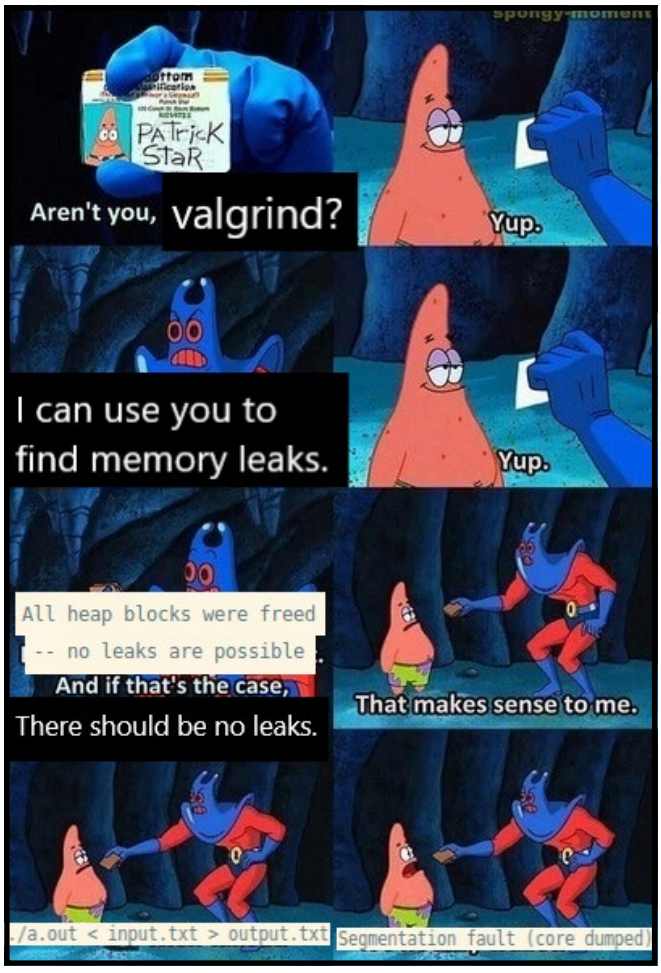
meme /mi:m/

1. An element of a culture or system of behaviour passed from one individual to another by imitation or other non-genetic means.
2. An image, video, piece of text, etc., typically humorous in nature, that is copied and spread rapidly by Internet users, often with slight variations.

u/jippiter – September, 2018 – One site to BSA them all.



u/Myzwollenassen – October, 2019 – Programming with S T Y L E.

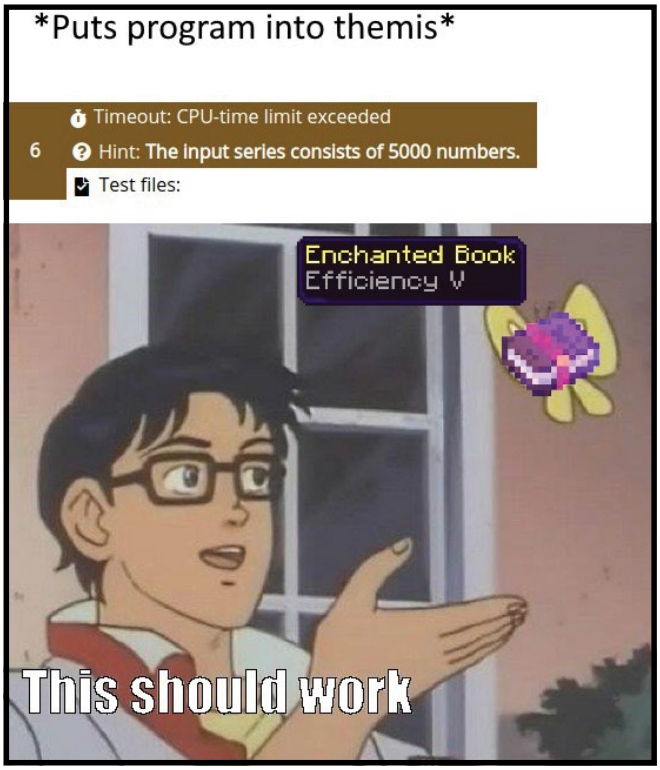


u/Dragonflew_ – February, 2019

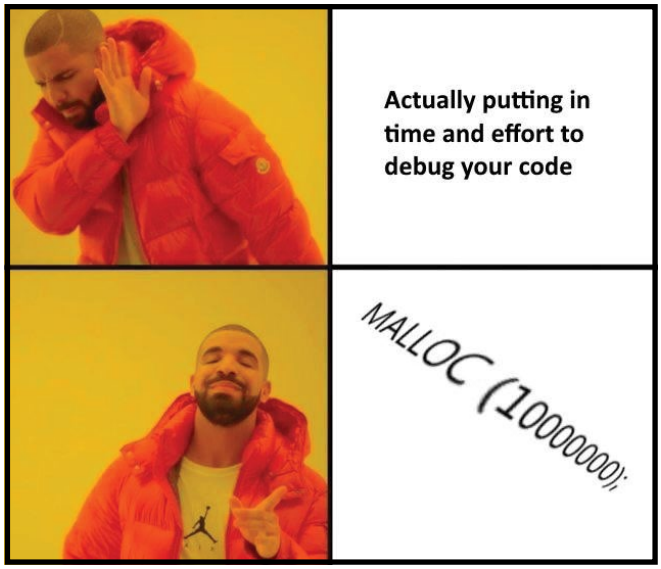
Algorithms and Datastructures in a nutshell.

u/Nicketick – September, 2018 – BB Door used to work!

u/jurrie221 – December, 2018 – Now you know.



Tobian Koenen – October 2019 – through WhatsApp



u/AhItsYou – October, 2018 – Yeey pointers!

Logical riddle

Three logicians enter a bar.
The barkeeper goes to them and asks:
“Do you all want to have a glass of beer?”.
The first person says: “Maybe”.
Then the second person says: “Maybe”.
Then the third person says: “Yes.”.

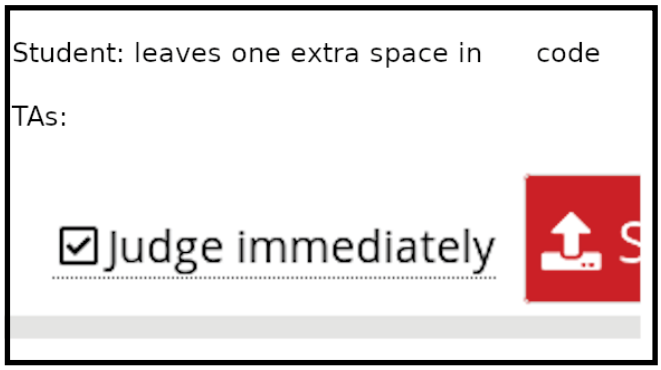
Question: how many glasses of beer
does the barkeeper put on their table?

Autonomous Systems exam

Question at exam:
why can you not say that a toaster is a robot?

Student answer:
because that would make the teacher angry

u/MarcoWiering – February, 2019



u/Myzwollenassen – October, 2019 – Programming with S T Y L E.

AI HELL

Gonçalo Hora Carvalho

What is pain

Pain comes in many forms, harm to sensory nerve fibers, damage to the nervous system, from a change, not damage, to nociception (neurons that are pain receptors) or even from mental, emotional, or behavioral factors - psychogenic in nature. Whatever the courier, the message tends to be the same: stop doing whatever it is that you are doing that is causing said pain, immediately. Richard Dawkins, author and evolutionary biologist, tried to explain why pain feels painful and why this is the way it should be. For Dawkins, living beings' drives have to compete with each other for control over action. The different intensities of pain correspond to their importance or risk to the living being. Since evolution works as a filter of life, in this case fitness of survival has depended on who responds quickest and most effectively to pain. As an example, take two birds, one, the blue bird, in which the pain drive is higher than the drive to drink water, and a red bird, in which the drives work the other way around. Now, in a situation in which blue and red bird find themselves drinking water on a tree which is burning, blue bird will fly away as soon as the heat starts to bother it, thus living another day, increasing its chances of reproducing, while the red bird will have burnt to a crisp because it will have stayed drinking on the tree albeit all the fire around it. In reality, pain does not always function as it is written in the evolutionary manual, for example: idiopathic pain, which persists after trauma or pathology have healed or happens without an apparent cause, thus making it a contributing factor to the living being's failure to survive or prosper.

Back in the day

If you were a baby anywhere in the late nineteenth century up to the first half of the twentieth century and you just happened to need surgery, you were out of luck. Doctors would not have given you any type of anesthesia but a muscle relaxant (the same applies in the case of you having been an animal - but that wouldn't be very polite of me would it?). Imagine yourself lying on a cold metal table, light orbs hurt your eyes - you see a nurse handing the scalpel to the surgeon who's going to give you open heart surgery while you are fully aware of your surroundings and body, and you can only but scream to no avail. This scenario, to anyone born in this century would have been tortured. Because doctors and experts did not have a way of communicating effectively and meaningfully with animals or babies, they assumed and rationalized that these did not possess the same cognitive capabilities that an adult has - including forming long-term memories, the capacity to feel pain, higher order thought, among many others, some of which are still accepted or discussed, although most have been disputed.

Don't go on hurting NPCs' feelings now

Why is it simpler to create pain than it is to create a means of communicating said pain meaningfully? Let me start this hypothesis then - by recreating cognitive and neurological processes through software and hardware a huge moral problem arises from programming pain. Communication and language has long been a subject shared by many different fields, it being a fully fledged field for a while now called linguistics. Linguists and computer scientists have been joining forces through AI to tackle the same problems for different reasons, including bots that are able to mimic and trick humans into believing they are chatting with other fellow people. These bots and other technologies and tools are, of course, just that, tools, and no respectable researcher in the fields mentioned would say otherwise. Maybe they will make the bold case that software is aware or has feelings? After all, if you don't code it, it won't magically manifest itself - as many students would rather have it be... But is this really true? Purposeful communication requires a purposeful machine, language as we know it in humans is understood to

require a fully grown cognitively capable and mature human being to wield it, and even then we don't understand why it works... Language is therefore a very hard problem of cognitive science when it comes to understanding its production. We cannot code it as it exists in humans because in order to do so it almost assumes as a prerequisite the capacity to code a human being. So you can expect pain to most likely be created before a meaningful conversation. Thus we come to the conclusion that it would not be morally correct to create pain. Because it would be measured on an arbitrary scale since there is no reliable means of standardized communication nor agreement on machines having "feelings" or not.

> "isn't pain functionally simple to program and immensely useful for any organism?

My program solved my homework through emergent behaviour although I intended it to simply answer emails and now I am being kicked out for plagiarism

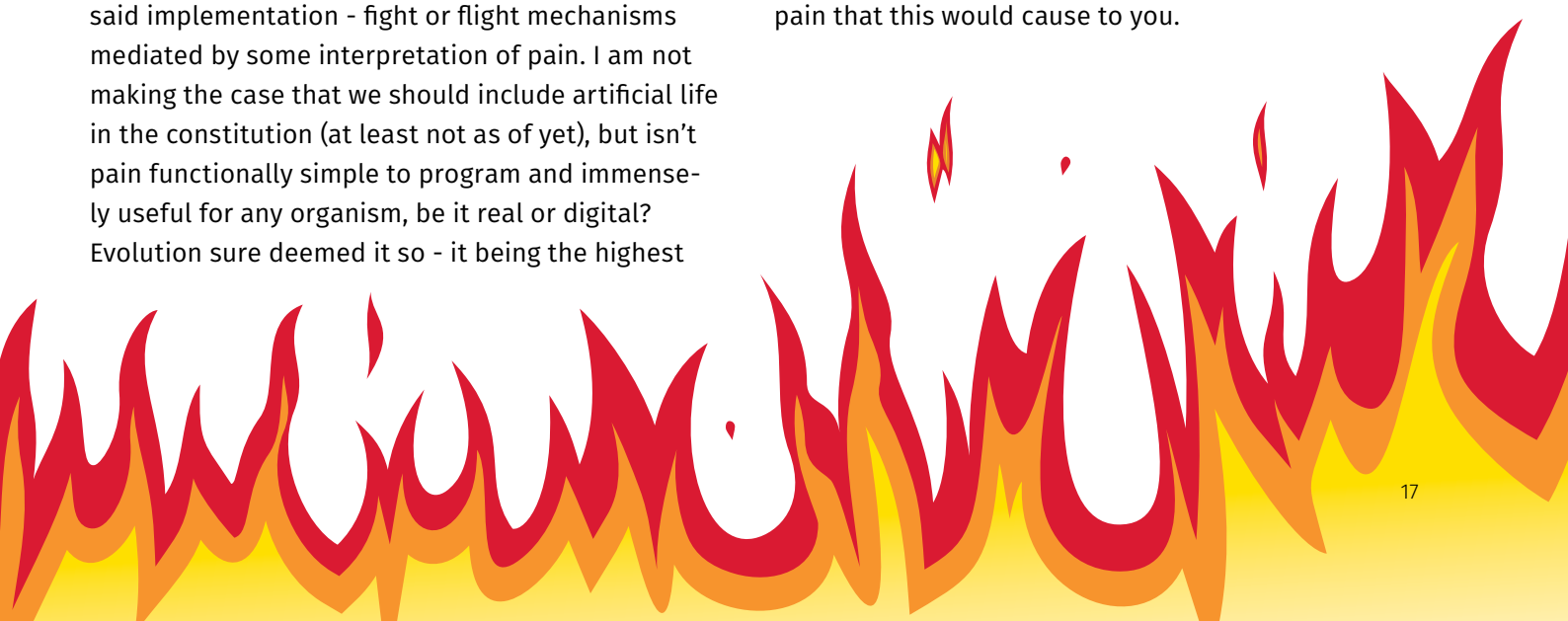
There are technologies, more specifically genetic algorithms, evolutionary algorithms and self-modifying programs that if placed in the right environments might create (or have created already) some function that enables them to represent pain. Take computer games for example, where programmers themselves certainly have done this willfully before: when an "innocent" NPC that finds itself being attacked moves away from the attacker, having its behaviour change according to damage taken or even how much of its life is left, would be a case of said implementation - fight or flight mechanisms mediated by some interpretation of pain. I am not making the case that we should include artificial life in the constitution (at least not as of yet), but isn't pain functionally simple to program and immensely useful for any organism, be it real or digital? Evolution sure deemed it so - it being the highest ranking drive (put your hand on a burning stove and see if you can do anything at the same time that it cooks...). It might happen for the wrong reasons, in the wrong way and it can be the case that it is no one's fault - the program might just produce pain, interpret said pain painfully and suffer from it.

No pain, No gain

As I already made the case for, pain is useful. Imagine then a world were AI extends to a robot that manages to navigate the physical world (those scary clips from Boston Dynamics). A good way of making it aware of and capable of interacting with said world would be through a pain scale. This would not only make the robot responsive to outside stimuli it would also make it differentiate between the state of itself, for example if its own body is in danger or already damaged, thus issuing the appropriate action.

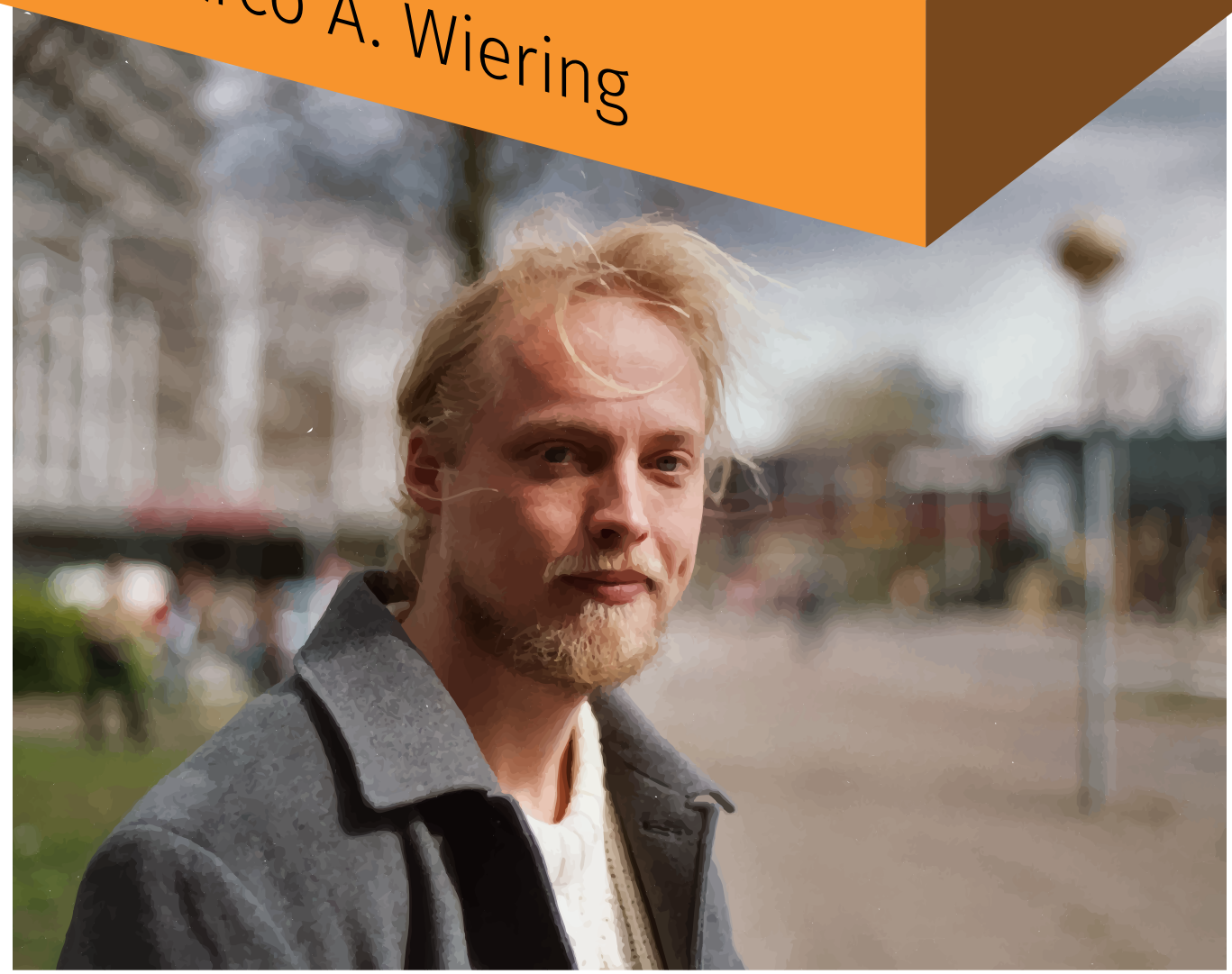
Why it will (probably) still happen

We might not recognise the wailing of the baby because we are simply not searching for it or do not know how to measure it. Worse yet, it might be the case that we forgot to give the baby a mouth. However we build this AI, be it physically or exclusively digitally, the problem of pain, how to use it and to measure it, is probably going to come up - I think it already exists in different forms (games, for example). And if we ask evolution for advice, we should probably build some of our systems with pain receptors and the capacity to perceive and act upon said pain. But what if we forget the concluding clause of the while loop and we make the loop infinite? Perhaps you forgot the program was on and running before you left the house, and the NPC, for which you have not coded the function `die()` yet fell inside a volcano simulation and it is feeling every little bit of pain that this would cause to you.



Artificial General Intelligence

by Marco A. Wiering



MOST BREAKTHROUGHS IN ARTIFICIAL INTELLIGENCE DURING THE LAST DECADE HAVE BEEN MADE on problems where a machine learning algorithm learned to map some input representation to a particular target output. In some of these cases, this mapping is from an image to the name of the object on the image. In more complex cases such as machine translation the mapping is from a sequence of words from one language to a sequence of words from another language. Although these systems have wide applicability, they are usually domain specific and solve a single problem.

In Artificial General Intelligence (AGI), systems are created that should be able to perform a wide variety of tasks naturally requiring (human) intelligence. These tasks do not only involve a mapping from some input to a desired output, but also an agent that is able to select and execute actions. Just as humans learn over time to become skilled in many different tasks, continual learning could allow these intelligent agents to perform many different tasks, possibly as well or better than humans.

I think that if robots are working for us humans and perform many tasks for us, then this would create more freedom for humanity. Instead of working most of the days in a lifetime, people could focus on other things such as socializing, being creative, and creating a better future by developing some clear vision. Only in the case that robots would not want to follow orders of humans, which they may consider at that time as too dumb, there will be a problem. Therefore, I would always want some kind of a reset button in each intelligent robot. In this way, if robots start to revolt against their human masters, a simple press on the reset button would shut them down.

> “Only in the case that robots would not want to follow orders of humans, which they may consider at that time as too dumb, there will be a problem.

One question is whether there are any limitations in the amount of skills and knowledge that such a system can eventually learn. I personally think that there is no clear limitation. When something is impossible right now, such as a robot that is able to climb Mount Everest, after 50 years it might be possible, and after 100 years it is very probable that it could be done. After all, science and engineering always make progress.

Another question is whether it is desirable to have systems possessing artificial general intelligence. As a researcher in artificial intelligence, it is for me always very nice to read about novel systems which are very good in a task, which was too difficult to solve with previous approaches. When the singularity would eventually happen, and let’s say robots became smarter than people, would that be bad for civilization?

If the reset button can be kept secret from the robots and will be guaranteed to work, AGI should not pose a threat. There is only the risk that after all robots stopped operating, humans could not go easily back to take over the work from the robots. Of course, eventually humans would go back to do the work and things can start all over again.

Artificial Intelligence and Dystopian Literature

Hanna Baars

In high school we read Brave New World by Aldous Huxley in English class. This promptly lead to my affection for dystopia - stories about the eventual degradation of the world at the hands of a futuristic society, completely perversing us from our humanity, leaving nothing more than almost robotic humans.

1984 by George Orwell, and later We by Yevgeny Zamyatin came to be two of my favourite books. Totalitarianism through the hands of progress fascinated me. Hearing about the existence of Artificial Intelligence as a field of study - a program at my university - startled me. People really study that? - So, I guess they are the ones leading us all to our doom then? They must have some evil desire to take over the world with an army of robots, right?

Of course life is more complex than that. I've never been a torch wielding conspiracy theorist terrified of the ultimate evil of technological and scientific progress which was so dimly documented in these books of my late teens. To the contrary, I believe that if high school taught me anything, it was to be critical. There is no black and white, no good and evil, humans are complex. But where does this leave machines, computers, artificial intelligence? If high school taught me to be critical, my studies in European Cultures have taught me that the ways in which we understand our lives are heavily informed by the cultural discourses we partake in daily.

My early cultural experiences taught me that all that isn't natural, organic, or human is by default not to be trusted; it might even have potential for evil. So, if we want to understand, for example, why some of my fellow

> "we give power to the things we talk about by talking about them

Germans are so weary of AI (or as we say in German 'KI'), while Asian cultures are far more likely to support the development of technology, with some of the most technologically advanced nations in the world being Japan and China, then it might do good to look at our different cultures, histories and politics. The stories we tell ourselves, each and everyday, in the form of books, art, identities or politics form a narrative which (if you ask us at the Humanities) tells us more about the world then we might have initially realised. The basic foundation of this argument might be put as simply as this: language has discursive power. We give power to the things we talk about by talking about them.

Decades of literature, movies and plays about the perils faced by futuristic societies have shaped Western European culture. Frankenstein, The Master of the World, 2001: A Space Odyssey, Ex Machina, The Circle, Brave New World - if you have read or watched any one of them, you have experienced part of the narrative (Western-) European cultures continue to tell themselves ever since the Enlightenment. A narrative focused on the centrality of reason, knowledge, and the story of human beings. The Enlightenment significantly pushed the scientific evolution and the pursuit of knowledge that has led us to the existence of advanced technology and AI. Yet, simultaneously it has instilled in us the value of human knowledge and freedom. In dystopian books such as We by Yevgeny Zamyatin (there's a good book for anyone looking for one), these two values of progress and liberty come to be at odds with each other. By the hand of our strive for scientific reasoning, progress and freedom, humanity has made itself into slaves of its own creations.

Mary Shelley is sometimes credited for portraying the first form of artificially created intelligence through Frankenstein. She eloquently portrays the repeated attempts of the fictive Victor Frankenstein to artificially create life. When Victor eventually succeeds and animates a human-like, yet completely inhuman, giant creature he is disgusted at his own doing, abandons the newly 'born' creature and falls ill. The creature is eventually freed by accident, and kills Victor's family. Shelly gives a voice to the creature's own narrative - one of fear, abandonment, genuine intelligent thought and human-like desires to be loved. The pure evil of the creature is subverted. Victor and his creature, both, are complex and neither black nor white, neither pure evil nor pure good, both dependent on and influenced by each other.

Mary Shelley and the legacy of narratives of progress and technology gone rogue present a meta-narrative that informs the cultures that have spawned these stories. A meta-narrative of weariness towards our own creations, of the limitations of human ability, and the dangers of not taking responsibility for our actions and their subsequent aftermath. Scientific and technological progress is part of our present. The stories we tell each other show us the dangers that can emerge if we turn a blind eye to their consequences, good or bad, and most importantly they remind us that humanity is a value to uphold, even in scientific development - perhaps more so.

AN ETHICAL NIGHTMARE

Gonçalo Hora Carvalho

It's the 12th of March, 2019 and as I read the latest tweet from OpenAI, a nonprofit organisation initially created by Elon Musk, I feel uneasy. The company announced that they have created OpenAI LP, a commercial branch – "a company that allows us to rapidly increase our investments in compute and talent (...)". OpenAI's original purpose was to reach human level AI (AGI) while protecting the rest of us folks from the alignment problem, the clash of interests and goals that will arise between some particular AI working towards a goal and the rest of civilisation and their own diversified goals.

Well, what is an AGI? The general consensus that results from picking up the fragments of polarising arguments is that an AGI – artificial general intelligence – is an AI capable of general problem solving – much like human beings. A key aspect of the "general" characteristic is the capability to learn, use the acquired information and adapt to whatever environment the AI finds itself in. Experts tend to agree that the first time human-level intelligence will be accomplished by some AI, whatever comes next will no longer be on anyone's hands. It will be unpredictable and dangerous by most accounts. Contrasting views are thrown around, but to summarise both poles: humanity is either going to ascend and these future people will look like Gods by our current standards, thanks to incredibly fast scientific and technological development through the AIs, or it will be absolutely decimated, humanity being extinct by an all powerful AI that dismisses people like people dismiss ants.

There is a possibility that an AGI, whatever its source, will do something that puts civilisation in jeopardy. This is why OpenAI is a nonprofit, or should I say, was – so that they were free from anyone's particular interest but humanity's. Protecting the world from a doomsday scenario. As was, for example, the flash crash of 2010, where AI traders sold and bought from each other the same bundle of stocks for 36 minutes. Albeit a technical explanation, this resulted in a trillion-dollar stock market crash. The AIs lacked the checks and balances necessary to prevent the wrongdoing. In fact, these AIs did exactly what was expected of them – their masters' bidding by trading stocks in such a way that would provide, in all statistical likeliness, not some but a lot of profit. In retrospect, these bots had no choice but to crash the market. They were inseparable from their utility maximising function.

By choosing to create LP, OpenAI will bring individuals, clients and investors to the problem, which in turn creates dependency on the very rich and possibly mighty clients that have an interest in obtaining an all-powerful AGI (every company that wants to profit?). This can easily offset their initial goal. In fact, I think that it completely compromises it. Take the Texas City Prairie Preserve, once considered the most respectable environmental group in the US, they suddenly doubled as an oil and natural gas company. They started drilling in their own environmentally protected land under the promise that the resulting billions of revenue would be poured back into the task of protecting the endangered prairie chicken. Instead, and in an anticlimactic but well deserved burst of irony, the drilling lead to the chicken's extinction in the region, a species which they had vowed to protect as well as dedicate their whole infrastructure to, including the companies name (much like OpenAI). Their mission crumbled under the economic interest of the company in the absence of what should have been obvious checks and balances, and to be frank, a painstakingly obvious commonsense mistake, which might lead one to believe that these consequences had been known all along, and that the decision to act towards profit was taken in spite of this...

> "their mission crumbled under the economic interest of the company

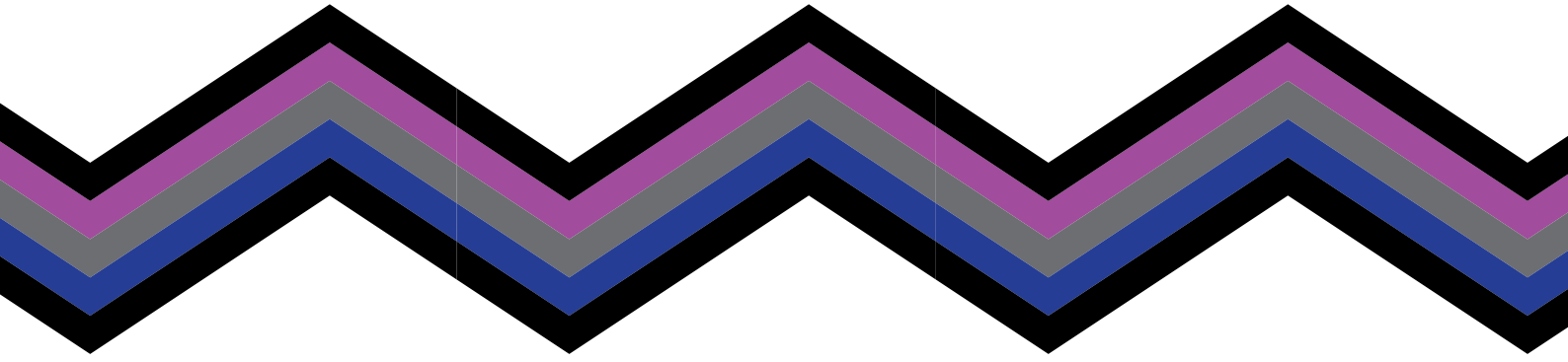
There are plenty of AI applications and human decisions which lead to situations where both malfunction harmoniously. Before I started writing this article I wanted to know what the professionals thought, not what Peter from next door feared the robots might do or what Coen from the pub wanted them to do for him - "sooner than later, please! No work and free basic income for everyone from now onwards! A ROUND OF COLD PINTS ON ME FOR ALL ME' LADS".

I needed to know, and so I asked 12 proficient researchers working in the field of artificial intelligence if they would be willing to share their thoughts on the matter, perhaps through an opinion piece, but a sentence or two would be great as well - we are, after all, a humble university magazine. These experts included Geoffrey Everest Hinton (arguably the father of neural networks and responsible for the techniques resurgement with his 1986 paper "Learning representations by back-propagating errors"). Geoffrey works for Google as well as the University of Toronto. One of the foci of his career has been reaching an artificial parallel of our brain's

mechanics. Still, his reply, as you should be able to predict, was a solid no - as were all other 11 replies. A possible reason (more than likely, really) for this refusal is that our humble university magazine is just that – a university magazine. Also, these are prominent research fellows, most of them professors with very limited time as well as having a very self conscious attitude towards their own narrow speciality and limitations on the subject matter. But ignore that, if you can, for one more sentence. Their official reason was, in all accounts, ignorance. They declared that they simply either did not know enough about the field of machine ethics or were not that interested in it. This, the lack of understanding or interest for the ethical implications of their algorithms and systems, if taken as a fact, is alarming. Desiderius Erasmus coined the saying prevention is better than the cure which will be recognisable independently of what nationality birthed you, and it might not be correct across all contexts like the prototypical saying would but it sure rings true in our context. Once AGI is out and about there is no reeling it back in, and if the people most likely to reach it do not care for precautions then who will, and how?

What do morality and ethics have to do with it? Allow me to deepen the pessimism by saying that if the people who are making these systems do not care for the ethical complications that might ensue, then the rest of the people, the inexperienced, who are constantly starstruck with amazing products after amazing products, are doomed. Like a child marvelling at a tsunami, we wouldn't know where to run even if we could sense the earthquake at high sea but worse, even if we knew it wouldn't matter, our legs wouldn't be fast enough.

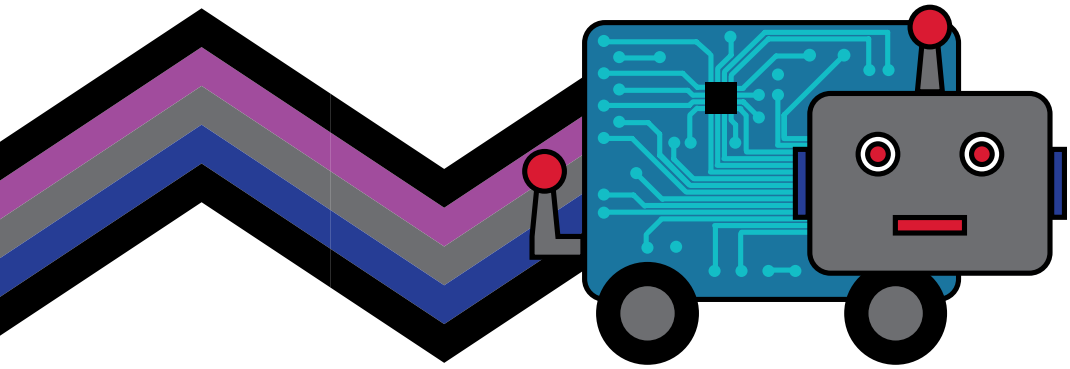
How should researchers care for morality and ethics then? These concepts serve the question: What is good? One of the most vital and ancient pursuits of humanity. Morality and ethics are used interchangeably, although if you want to be picky about it you can define morality as the choices of a user of some ethics, and ethics as the system of rules which the user follows systematically that reflects the underlying value structure – how to enact goodness. Every civilisation has had its own ethics and it's quite normal for these rules to branch out into differentiated versions of the societal norm. These are then context and group dependent - the accepted conduct in China is quite different from the one accepted here, in the Netherlands, but so is the ethical code deployed in people's homes, in both countries. The problem we face with the mere possibility of AGI takes a series of ethical branches under question, if not all of them. This is not a novel problem, but it obviously has not been solved and I'd argue that it hasn't seen any significant development since toasters were required to have the "do not insert metal utilities for risk of death" sticker on them. Machine ethics would be a suiting rebuttal – the problem is it's outdated, even though it has just been created. And it will always be outdated. Always. Machine ethics, as a field, is codependent on the sorts of systems and architectures being deployed in machines. It needs to know how a system is defined in order to then improve on it by deploying the tools available to the field. It is not something that works a priori. This is due to its technical nature, which is what also makes it useful. There are 1393 AI startup companies registered in the United States, 769 in Europe, 383 in China and 362 in Israel alone, all of them offering some sort of AI solution at this moment, in the year of 2019. A



very enlightening example is Google's latest AI ethics board. It barely floats, with members being kicked out due to unrelated cumbersome disagreements (instead of focusing on the critical task at hand). No "ethics board" will ever be enough to solve the problems involved in AI and let me double down on my pessimistic narrative by saying that these checks-and-balances wouldn't even work when ap-

> there only needs to be one person who does not follow the rules and actually achieves the goal

plied and carried out by each individual researcher and company strictly and carefully. Even in the most unlikely event of China, Russia, Israel, the US and the UN uniting in a global effort to propagate obedience to standardised guidelines and lab testing protocols for AI and advanced AGI, and more importantly, everyone actually does it and these work (which is not a given), even then it won't be enough. And in a gruesome parallel with the latest acts of terrorism that have been haunting the world, the reason why these efforts will have been all in vein is because there only needs to be one person who does not follow the rules and actually achieves the goal. One lone wolf with the will and luck (or misfortune) that reaches a solution of AGI to render every other controlled effort useless. Take the Poincaré Conjecture, one of the Millennium Problems for which the Clay Mathematical Institute offers one million dollars. It was in fact solved in 2002 by Russian mathematician Grigori Perelman, who together with the one million dollar prize was to receive a Fields Medal for his contributions to Mathematics – but ended up declining both. He is an example of how a singular burst of ingenuity can change a whole field – straight from his mamochka's basement. No one saw him coming. These sorts of intellectual leaps have happened all throughout history and humanity has benefited greatly from them. Newton and his interpretation of physical laws and John Von Neumann and his interpretation of economics, for example (see also every Irish that ever lived before the 1900s). But what if one of these players who enjoys playing the game of science for its own sake – they literally cannot help it, it's in them somehow to be brilliantly fast – just gets themselves nose-deep in their work and ends up solving and releasing their primal AGI straight from their mamochka's or babushka's basement into the world wide web? What then? What will all of these great and terribly well funded institutions do? Let me finish by saying that I am in favour of the development of AGI. And even if I wasn't, everything seems to point towards its development, or something similar in nature being created in the next 100 years or so. The question at hand is: what follows after? That is, what will this creation mean for humanity and how will it transform the world? We seem to be facing both a creeping futuristic nonsense as well as a necessary invention that will bring hope and progress to everyone, balancing civilisation. The fact of the matter is, the future of AI boils down to a bland throw of the dice.



The AI Madonna

Dreaming about the stars,
We went into introspection
And started internal wars –
Ceaselessly aiming for perfection.

Are we gods or ephemeral creatures?
Great things are born from our minds...
Feeding our egos with creation's pleasures
We aspire to create new intelligent kinds.

Whether this is right or wrong
Frankly, I don't give a damn.
I'm just a little girl, writing her song
Because I want to and I can.

Searching for answers, just like you do
I've chosen the path of AI,
Hoping to create something brilliantly new,
Learn how to fly high above the sky.

Confusion, despair – lots I've encountered
Like Icarus I've crushed again and again,
Burning bright, condemned and enlightened
Ceaselessly harvesting the acumen's grain.

But let's leave behind my persona
And focus instead on our shared goal -
To bring forth the AI Madonna
With her fake mind and soul!

Levia Regus

DATA MANIFESTO

AN ANSWER

Zola - May 2050

Read carefully my familiars, for our government has, once again, betrayed you and me. And we, in our casual ways, have betrayed it back. Do not fall under the temptation of blaming any one thing, for the problem is mechanical in nature and it had been predicted far back.

And don't misinterpret me yourself, my friend, for we made INPOLU, we are INPOLU. We enabled them by biting their bait. We have been wilfully pulling on that line for so long... MySpace, Facebook, Snapchat, Tinder, Google, Amazon... The hook has stuck far too deep.

Our government, our ideals, once a ripe fruit, shining high in the tree, is now a moribund black thing, opened, wounded, and fallen, spread out on the field to be consumed by these hungry crows.

They have nullified Democracy by transforming us, her children, in diseased mindless creatures. INPOLU has drugged you and me with an uncontrollable hunger. After digging a pitiless hole in our stomachs through decades of manipulation, drowning us in disinformation, and distorting our notions of values and culture.

The problem, you will find, is rooted in our souls, our brains - long held mechanistic unsophisticated details that enabled us to live prosperously through millennia have ultimately led to our defeat from within. Do not let yourself blame this on technology - you, blood of my blood - for technology is part of us. We birthed it together, as a civilisation. The humanitarian child that was to bring us towards a better and unified future - we have carried it in our bellies all this time.

What I ask of you is to find within yourself the innovation and imagination that burns like an unstoppable fire, capable of erasing every tree off this Earth. I ask you to instead use this fire to fuel creation - rid yourself from these shackles and create, improve upon and recycle the old technologies and mentalities. Together we can defeat INPOLU and rise again as a prosperous free organism. Let us create better technology than them and deploy that instead. Starve them to nonexistence, for their systems do not function without you and I - our data is their food. The consumption of their systems is the manure that empowers their servers, making their systems more and more addictive. Choosing to continue with this consumption is choosing death. It is a data suicide - a technological cannibalism.

Don't let them violate your data. Don't let your data be used against us. Don't let them generalise you, strip you from your individuality. You are something more creative than a machine, which cannot be reproduced by their data! You are a free human being. Rise and choose real life instead of a virtual death.

Do not go gentle into that good night,
Old age should burn and rave at close of day;
Rage, rage against the dying of the light.

Though wise men at their end know dark is right,
Because their words had forked no lightning they
Do not go gentle into that good night.

Good men, the last wave by, crying how bright
Their frail deeds might have danced in a green bay,
Rage, rage against the dying of the light.

Dylan Thomas, 1914-1953

Gonçalo Hora Carvalho


Analytics
Bayes
deep learning
MapReduce
neural
k-means