

## **The ethics and law of data –driven research**

Big Data has been frequently characterized as “the new oil” This comparison is inevitably meant to be positive and encouraging, extolling the audience to fully embrace the new technology and the opportunities that it brings. Toonder’s characterization can stand in for many others that made claims along similar lines:

“Data in 21st Century is like Oil in the 18th Century: an immensely, untapped valuable asset. Like oil, for those who see Data’s fundamental value and learn to extract and use it there will be huge rewards. [...]Without it, progress would halt.”

The imagery that these statements try to evoke is of rich but underexploited potential for improved products, services and profits, potential for wealth generation and a better future for everybody. Just as oil was the energy source of the 19<sup>th</sup> and 20<sup>th</sup> century, the power behind the current industrial revolution is data; the combustion engine is replaced by the silicon chip.

However, even a cursory glance at the history of oil exploitation and the fossil fuel economy triggers a gestaltswitch. Big data may well be the new oil, but that means we should better be prepared for substantial environmental damage caused by massive spills; long lasting environmental degradation due to the premature use of untested and unsafe extraction technology; forced dislocation or destruction of small, indigenous communities; threats to the democratic system due to a combination of money and economic power held by a small number of large monopolies ; and political dependency on foreign states with questionable human right records.

To control the dangers that arise from a data driven economy, and the use of big data by governments and administrations, society has responded in a variety of ways. In some cases, hard laws have tried to established “lines that must not be crossed”. Examples are the Data Protection Act that implemented in UK law the EU Data Protection Directive, or, controversially, in the US the Data Quality Act that requires safeguards before studies are turned into policies. In other cases, self-regulation by industry resulted in “soft norms” such as ISO standards and best practice guides. Finally, markets, both in ideas (politics) and money (commercial) can punish companies, developers or individuals for violations of communal (ethical, legal etc) standards. To manage the ensuing risks, a range of tools was developed, both to operationalize legal requirements and to anticipate possibly damaging social, ethical, legal or political violations and problems, a range of tools have been developed that play an increasingly important role for computer scientists in their professional lives, in academia, commercial or governmental work.

The aim of this week is to familiarise you with some of the most frequently used tools, and to understand better the legal environment that generated them. Below, you will find 2 case studies, one from the public sector and one from the private sector. We will use the risk assessment tools described briefly below to analyse them for their privacy and other legal dangers. What will however also discuss their limitations. What do they cover, what (or who?) is left out? Can complex ethical and legal issues be reduced to “tick boxes”? What are the inherent risks of using risk management tools? For preparation, you should look at one of the two case studies, chose one of the tools listed below, and ask yourself what issues you can discover using these methodologies.

We start with “Privacy Impact Assessments” a frequently mandatory process to anticipate privacy risks of new products and procedures.

A template with explanations can be found here:

<https://www.nottingham.ac.uk/emahsn/documents/stroke-edocument-data-sharing-privacy-impact-assessment.pdf>

The law that prescribes PIAs and generally regulates a considerable part of data processing and analysis is the Data Protection Act

<http://www.legislation.gov.uk/ukpga/1998/29/contents>

Incorporating aspects of PIAs, but going in some significant ways beyond them is the recently published Data Ethics Framework by the UK Cabinet Office, which will be required for all non-policing and non-military data uses by government agencies:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/524298/Data\\_science\\_ethics\\_framework\\_v1.0\\_for\\_publication\\_\\_1\\_.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/524298/Data_science_ethics_framework_v1.0_for_publication__1_.pdf)

In addition to the “state driven” methodologies, there is a plethora of analytical tools developed to assess the ethical, legal and other societal risks of a data project.

Deciding whether to invest into research for a new technology, or whether to adopt a technology for a business, is a highly complex task fraught with difficulties. Legal, ethical and more generally societal and reputation risks are amongst the many risks and opportunities a decision maker has to consider – if you are responsible for awarding millions of euro in research funding on behalf of the EU, you probably do not want the press reporting that you spend taxpayer’s money on building tools for the sex industry. If you invest money into a startup company that uses a new, technology enabled business model, you want to be certain that they are not closed down the day they start trading for violations of local laws. Lawyers are often asked to advise in these situations, and this week we will explore the issue of the law of autonomous agents in such a “business strategy” environment.

One of the oldest and most widely used methods is a SWOT (strengths, weaknesses, opportunities and threats) analysis.

[http://en.wikipedia.org/wiki/SWOT\\_analysis](http://en.wikipedia.org/wiki/SWOT_analysis)

Lawyers are often involved when it comes to threats – the threat of litigation, the threat of not being able to get money owed, or the threat of crime.

Methodologies for breaking up the “threat” category in a SWOT analysis have multiplied in recent years:

PEST ("Political, Economic, Social and Technological analysis")

SLEPT(Social, Legal, Economic Political and Technological)

PESTEL or PESTLE, ('Political, Economic, Social , Technological, Legal, Environmental)

STEEPLE and STEEPLD, (add Ethics and Demographic factors)

STEER (Socio-cultural, Technological, Economic, Ecological, and Regulatory factors)

An overview is here:

<https://www.boundless.com/management/textbooks/boundless-management-textbook/strategic-management-12/the-planning-process-91/overview-of-types-of-plans-and-tools-for-planning-441-8316/>

(boundless com has generally good resources for self-study)

and templates can be found here:

<http://pestleanalysis.com/what-is-pestle-analysis/>

For high tech research in particular, there is also the ELSI framework, displayed herein exemplary form for nanotechnology:

[http://www.nano.gov/sites/default/files/pub\\_resource/riskmanagementandelsi.pdf](http://www.nano.gov/sites/default/files/pub_resource/riskmanagementandelsi.pdf)

Finally, there is a very good visualisation method for Pestle Analysis

<http://users.ox.ac.uk/~kell0956/docs/PESTLEWeb.pdf>

## Case studies

### 1) Public sector: sentencing support tool

Risk assessments have existed in various forms for a century, but over the past two decades they have spread through the American justice system. The tools try to predict recidivism using statistical probabilities based on factors such as

age, employment history and prior criminal record. They are now used at some stage of the criminal justice process in nearly every state. Many court systems use the tools to guide decisions about which prisoners to release on parole, for example, and risk assessments are becoming increasingly popular as a way to help set bail for inmates awaiting trial.

Pennsylvania is about to use these risk assessments in sentencing itself. A state commission is finishing a plan that, if implemented as expected, could allow some offenders considered low risk to get shorter prison sentences than they would otherwise or avoid incarceration entirely. Final recommendations won't be ready until the beginning of 2016 at the earliest, a series of reports lay out what the tool should look like and how the information will be presented to judges.

Those deemed high risk could spend more time behind bars. Pennsylvania is struggling with an unwieldy and expensive corrections system. It has roughly 50,000 people in state custody, 2,000 more than it has permanent beds for. Thousands more are in local jails, and hundreds of thousands are on probation or parole. The state spends \$2 billion a year on its corrections system (more than 7 percent of the total state budget). Yet recidivism rates remain high: 1 in 3 inmates is arrested again or reincarcerated within a year of being released.

Last August, then Attorney General Eric Holder said risk assessment tools can be useful in directing offenders toward rehabilitative programs, allowing them to shorten their prison sentences. But he criticized the use of such tools at the sentencing phase. "By basing sentencing decisions on static factors and immutable characteristics – like the defendant's education level, socioeconomic background, or neighborhood – they may exacerbate unwarranted and unjust disparities that are already far too common in our criminal justice system and in our society,"

Sonja Starr (University of Washington) : "These instruments aren't about getting judges to individually analyze life circumstances of a defendant and their particular risk," she said. "It's entirely based on statistical generalizations."

Jennifer Skeem, a University of California, Berkeley, psychologist who has written extensively on risk assessment, said there simply isn't enough data available to say with certainty whether it reduces racial disparities in the justice system. The core questions around risk assessment aren't about data. They are about what the goals of criminal justice reforms should be. Some supporters see reducing incarceration as the primary goal; others want to focus on reducing recidivism; still others want to eliminate racial disparities. Risk assessments have drawn widespread support in part because, as long as they remain in the realm of the theoretical, they can accomplish all those goals. But once they enter the real world, there are usually tradeoffs.

Judging on the wrong data

Interest has grown in the ability to measure the risk of offender recidivism for public safety and better interventions. The Level of Service Inventory-Revised (LSIR) test is widely used in the US to measure risk of offender recidivism but it is a male-specific assessment instrument with more and more evidence showing that it is a weak predictor of criminal behavior in women.

Recidivism predictors and other justice-related predictive analytics are starting to look at other metrics into account like home address and educational attainment. More than 60 risk assessment tools are in use across the U.S. These statistical tools have entered the criminal justice system in places where legal protections for fairness are relatively lax, such as setting bail, determining the intensity of parole supervision, or moving inmates among different categories of confinement within a prison. An overwhelming majority of corrections agencies nationwide routinely utilize assessment tools to some degree.

Proponents of risk assessment tools in probation and parole argue that data-driven systems can help counter the subjective, subconscious biases present in judges or parole officers. But discussions of accuracy and transparency too often skip past questions of fairness. Considering an offender's geography in setting sentence length is a recipe for punishing black and brown offenders more heavily when they commit the same crimes, relative to whites.

## **Case study 2:**

### **Private Sector: Cloudteam**

This case study is based on experience with a EU project, Cloudteams. The full specifications and more details can be found here: <https://www.cloudteams.eu/downloadables/> We will look however at the 2 use case scenarios that CT asked its ethics advisory board to consider for a very first ethical and legal compliance screening.

## **2. SCENARIO 1: THE ACTIVITY-TRACKING FAN**

Nick is a male, single, 27-year-old developer from Greece, believing that tracking his daily activities can help him self-improve. In that direction, Nick has already installed in his Android phone different applications to track what he eats on Noom Coach, he has bought various fitness bracelets to end up using

FitBit he runs also with Runkeeper to meet his goals and he is a constant

Twitter user. He has also a Facebook account mainly to contact with his friends

through Messenger. While browsing Flipboard application for tech blogs, he finds out an interesting application about tracking his daily activities, finding interesting new and innovative applications, participating in market analysis and redeeming in free software applications. The service is called CloudTeams. He goes through the article and finds out that he can easily synchronize his existing accounts, mashup his activities from other platforms in one, choose what types of activities can be visible by software companies that develop such applications in a privacy-aware way, and then follow interesting projects or get invitation by software companies -called "teams"- that want him to test applications based on his interests, and participate in the development (i.e. by voting and rating) in return of redeemable points in their products. He decides to learn more, thus he bookmarks the article and later that night he enters [www.cloudteams.eu](http://www.cloudteams.eu) to find out more.

Nick goes through the website and sees more details for the concept as well as an introductory video. In detail, by reading the testimonials, the description and watching the video, he gets that he will be able to:

track his daily activities

synchronize his existing accounts and mashup his activities in other platforms

decide what kind of his activities, that is anonymized, shall be visible in

CloudTeams to participating software companies

find and follow interesting new software development projects

interact with software development teams

participate in the software reviewing process

participate in market analysis

be invited to by software development teams to test software prototypes,

based on his user interest profile and his ranking in reputation

rate and vote software,

collect points benefit by redeeming in free software applications or services

He wants to give it a try, thus he wants to signup. Still he is a bit concern about the data he is going to give and how they will be used by the project itself and the software teams. Thus, he goes through the Terms of Use of the platform; he reads the complete text but he can see the highlighted text, where it summarizes that (a) his personal user data is protected; no softwareteam has direct access on them. (b) he is represented in the platform as an avatar; when software developer teams look for candidates they get a pseudonymous of him, with only relative information exposed, i.e. his age group, his gender, his country and his main interests. (c) He can delete his registration on the CloudTeams at any time. (d) He can reject an invitation to a software

development project. (e) He can leave unsubscribe from a enrolled software development project.

Nick is okay with the terms of use. He can register easily by giving his email or alternatively with Facebook or Twitter login. He chooses to login with Facebook, he gives the simple profile info permissions needed and access to his list of friends, and then he is prompted to fill in a short wizard; CloudTeams would like to learn what are his main interests. He can skip that step, but a message says that he can be higher in ranking if he has a complete user profile. Nick completes his interest profile wizard; he adds that he likes running, backpacking, coding, playing football and watching movies, and a pop-up message informs him that he just won his first 100 points. In the meantime, he has also gotten an email in his inbox, where he is welcomed to CloudTeams. After completing his profile he enters the CloudTeams Portal that shows his latest activities, as well as trending projects and recommended projects based on his profile data. CloudTeams also provides him a preview of his user profile, so that he is aware how he is represented in CloudTeams and visible to others.

Nick goes through the projects and finds out an interesting application that will help him learn to play music. He can follow the project just to get notified about the project in his news feed, or ask to enroll the project and participate actively. He decided to follow the interesting project, but he also sees that he can ask to enroll this project, apart from following; some other software developers teams require to send an enroll request that can be accepted or refused. He goes over the FAQ and sees that when sending a enrolling request the teams can decide based on the public profile of the user, his ranking in the leaderboard, and their needs. No further data are visible to them. He sends a relative enroll request, but a message pops up with a system notice that during the interaction, teams may ask to have further access on some categories of activities; this is a notification on the first message, and he clicks to hide it and never show again. He is ok and sends the request.

An hour later a message is sent in the notification mechanism and via email, informing him about his acceptance by the software team, Nick gets 100 more points. He finds this project in the list of his projects; this list gives always an overview of the projects he participates, the ones he has sent an enrolling request to with a pending response, as well as the rejected requests with an explanation by the teams. He likes that process, thus he additionally follows some other related projects he has found just to be aware of their progress and he gets some extra points too.

On the top of the screen, he sees that his profile is incomplete, and that he has only 20% of his profile ready, for running the wizard and participating the programme. He clicks there and he sees that he has to run some tasks to complete his profile, like adding his first activities, sync with other services, invite friends etc. and goes to the second milestone. He has an option of var-

ious services he can sync, in order to mashup all his preferred services. He would like to see Runkeeper and Fitbit together, thus he synchronizes these services with this CloudTeams profile. He goes over the calendar, where he can change time period, and goes over the analytics. Nick can see how much time he has gone running, how much time he sleeps daily and what steps he does. It is the first time he can see everything together. He decides also to sync his Google Calendar, and now he has a complete view of his daily schedule. Nick likes the service and sends an invitation to his sister, Maria.

In the meantime, Nick has enrolled 5 projects, but lately he has no so much free time, and he can only visit the platform during weekends; he has to travel for some hackathons around the Europe. Thus, he would like a mobile application to keep in contact with the CloudTeams process and not lose any available points. He searches the Play store and finds an Android application. He installs it and launches it, he logins with his Facebook account again, and here he is. He can see all his data there, with less but also interesting graphs there. Nick is prompted to enable the activity tracker notifications, a feature that reminds him to update what he is currently doing. He fears that it might be a bit annoying, but he knows he can turn it off later. He feels excited that he may put more information. Two hours later, while on bus going to the airport, Nick gets a notification to state his activity. He can skip or compose an activity. He selects a drop down list with activities, the application fills in some contextual information, and there he is. As long as he opened the application, he decides to navigate through the popular projects, and he decides to follow some more. In his older notifications he can find some requests to fill in some questionnaires, one from the project he participates in and two others from some new projects that have found his avatar and think that there is a match. While bored on the bus, Nick goes through the process and gets some extra points (i.e. both redeem and star points); he gets into the top 20 ranking of the more active and influential users (i.e. star points, aka points that improve ranking in hall-of-fame of users), with great feedback by teams where he participated in, thus Nick has more chances to be selected when applying or get a direct invitation on another project without even revealing any of his activities to the software teams. Nick has not decided how he would redeem the points he has collected, but he enjoys collecting star points and putting his name in the leaderboard. He know also knows that his opinion and comments will be followed by a "top 20" label that will increase the importance in his comments and feedback, even if he is anonymous for software teams.

After arriving the airport, Nick chooses to update his activity on CloudTeams, and he would like to inform his friends, thus he chooses to share it also on Twitter. Nick is excited with the new service he is using, and he will definitely give a recommendation in the hackathon about the capability of local teams to participate in this market research project as software teams.

## **SCENARIO 2: THE CONTENT CONSUMER**



Maria, Nick's sister, a married woman, 38 year-old mother of two children and a Marketing Director, gets an invitation through email from a new service, called CloudTeams. She knows that Nick is a tech savvy guy, thus she is a bit afraid that what he has suggested is too complicated. After some days, Maria starts seeing in her Facebook profile that some friends have participated in the CloudTeams project and now follow a project. Some weeks later, she sees some other posts about people redeeming points and saying how nice was the new application they found in CloudTeams, over Twitter. Now Maria is really curious about CloudTeams and what this service is all about. She googles and finds a blog post in TechCrunch describing the service. Now Maria is even more curious, thus she is navigated to [www.cloudteams.eu](http://www.cloudteams.eu) and reads the description and user policies of the service she can enroll.

Maria is not interested tracking her activities, she was always against that trend, but she goes through the projects and finds some interesting details about a software that can mashup content from various, creative-common resources, and generate new unique content. She registers thus the platform in order to follow this project, with any new material. She skips all the syncing and user profile steps and just follows this project, and some others that look interesting to her too.

Maria does not use CloudTeams after she registered, she found no interesting projects during the 5' minutes she spent into the platform. Nevertheless she gets a weekly newsletter with news about the projects she follows, and she also reads in TNW about a new service that kicked off in CloudTeams and was really successful. Even if Maria doesn't have much time to enroll, she would like to really try an early project. After 2 months of receiving the project news, she gets a video, released by the project publicly, which she likes it a lot and decides to enroll the program in order to try it out, as she would like such a tool for her work. Maria is bored of filling forms, she has also no multiple services and she doesn't want to share her Facebook credentials. Thus she just syncs her calendar, and she chooses to filter out her private activities and keep only her business appointment. After 2 days she gets an email and starts viewing more information about the project. She gets an invitation for a Hangout call in two days where the software will be presented, and she is asked to fill in a questionnaire to identify her needs. Maria fills in the questionnaire, gets 100 points and puts the invitation in her calendar. After two days, she connects with her Google account and watches a demo of the product, then she is prompted to answer a form, rate it and leave feedback. Maria kind liked the product, but would like some more features. When she fills it in, she gets 200 points.

After a week she gets a notice from CloudTeams with a link to test the application; Maria goes through, completes another feedback form for 300 points, and she really likes the new version. She decides to preorder the software, and she can cash out the collected points with free months

subscription to the service, for 1000 points each month. Maria likes that she can access software that would never be aware of otherwise. She also likes that the content of CloudTeams and the features continuously improve and keep here interested, she has found a service that lets her be informed about projects and be engaged in some interesting ones.