

Computer Forensics and cyber crime analysis

Introduction to the Course

Prof. Giuseppe Vaciago

Overview of the Course

- 1. Introduction to the Course*
- 2. Foundations of Digital Forensics*
- 3. Cybercrime Convention*
- 4. Resolution Adopted by the UN General Assembly on 26 May 2021*
- 5. Garlasco case*
- 6. IoT and Digital Forensics*
- 7. Digital Forensics and Territorial Principle*
- 8. Remote Forensics: Hacking Team Case*
- 9. Digital Forensics and Artificial Intelligence*
- 10. The New Frontier of Digital Forensics in the AI Context*
- 11. Case studies and practical applications*

WHO I AM?

Where We Are



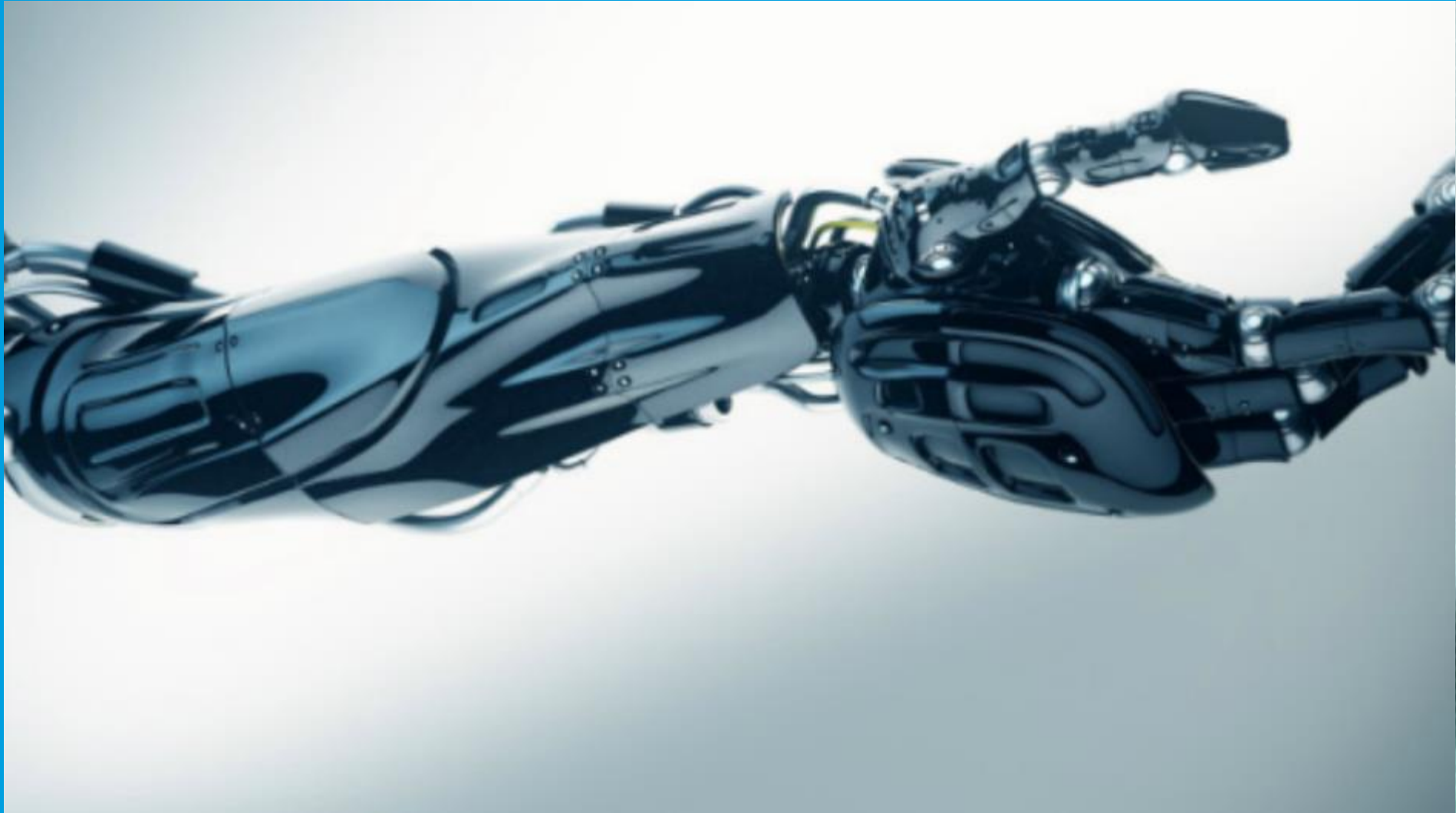
*Technology **Between** Us*



Technology *About Us*



Technology In Us



A math exercise

Three plus Four,
Multiplied per Two

14

$3+4\times 2=$

11

If the difference between 14 and 11 is important, then the natural language is not the best way to solve legal problem.

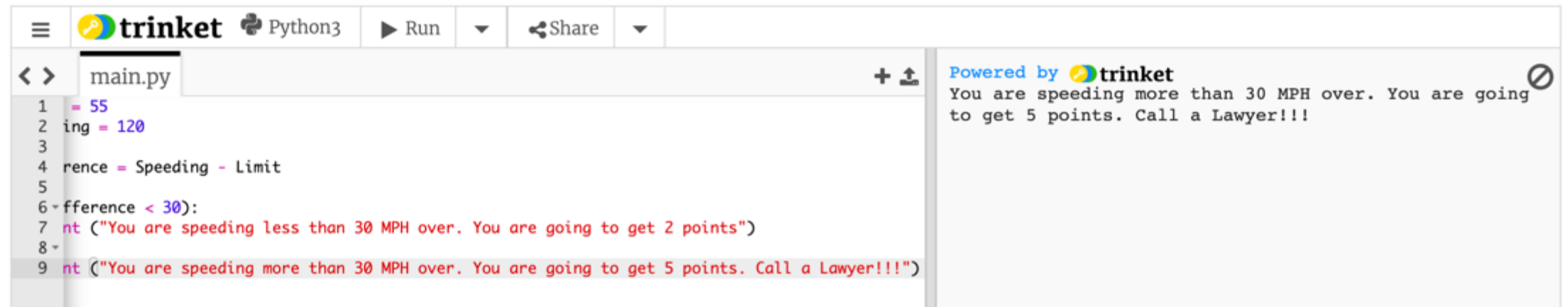
A coding exercise

Coding with Python

1. Create Container
2. Create Value
3. Create Variables
4. Create function

Our Python 3 trinket is here!

This update includes everything in [Python 3.6.6](#) as well as scientific libraries like [Numpy](#) and [SciPy](#) and [matplotlib](#), with more on the way. You can try the examples below or try your own code and then click ► Run. An interactive console option is available too — just select >_ Console from the Run menu.



The screenshot shows the Trinket Python 3 IDE interface. At the top, there's a header with the Trinket logo, 'Python3', and buttons for 'Run' and 'Share'. Below the header, a file named 'main.py' is open. The code in the editor is as follows:

```
1 speed = 55
2 limit = 30
3
4 difference = Speeding - Limit
5
6 if difference < 30):
7     print("You are speeding less than 30 MPH over. You are going to get 2 points")
8
9 else:
10    print("You are speeding more than 30 MPH over. You are going to get 5 points. Call a Lawyer!!!")
```

On the right side of the IDE, there's a console area titled 'Powered by trinket'. It displays the output of the code: 'You are speeding more than 30 MPH over. You are going to get 5 points. Call a Lawyer!!!'.

Suggestion no.1

We don't have to reinvent the wheel

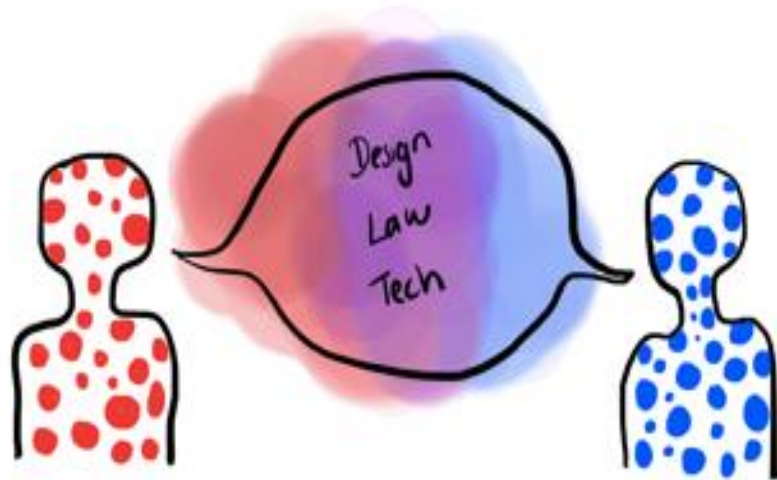


Legal Design

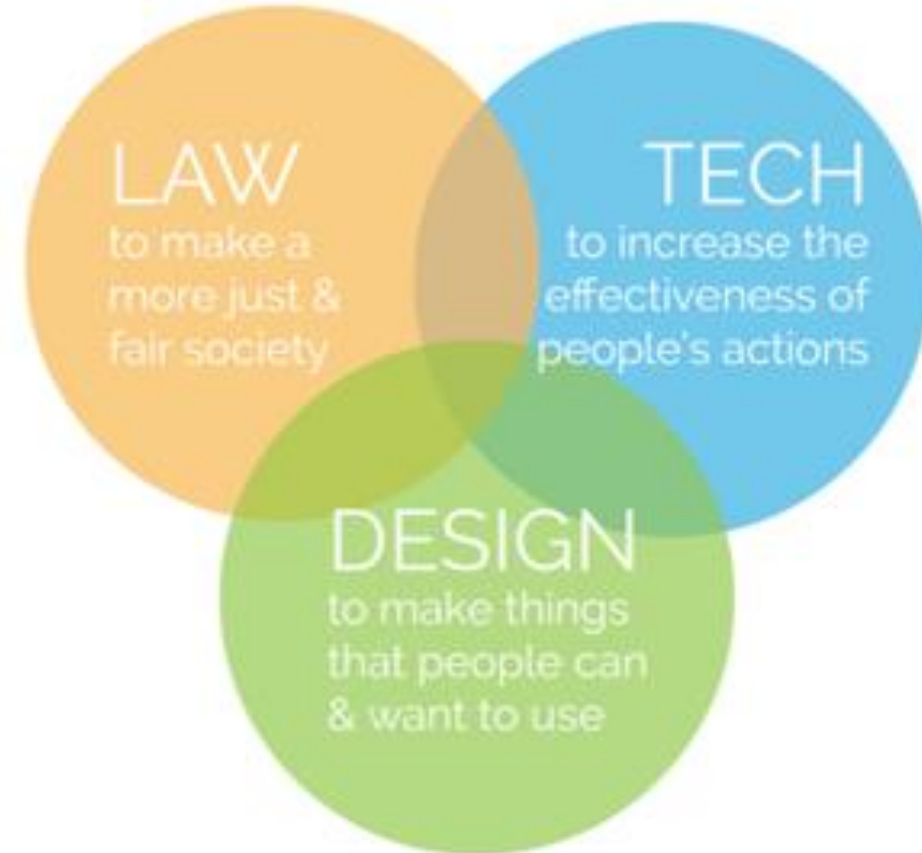


What is
LEGAL
DESIGN?

What is Legal Design?



"We need a common language to talk about tech, design and law." — Rakea Kew



Methodology of Legal Design

Problem 1

Information overload

Discover the status quo



Focus on a person



Make sense and prioritize



Prototype



Testing

Problem 2

Written by lawyers for lawyers

Empathy



Awareness of Unconscious Bias



Respect for Community

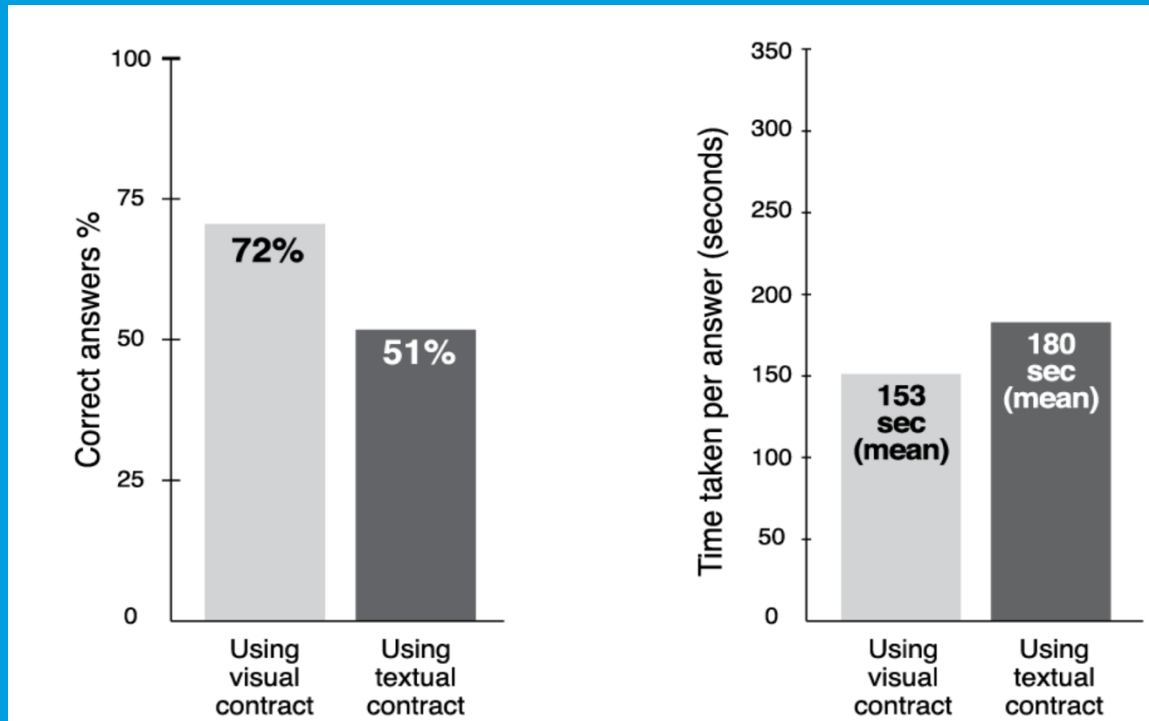


Transparency About Intentions



Commitment and Follow-Through

Legal Design Example



1) **10 % of the Purchase Price, fifty thousand (50 000) euro** as an advance payment when this Agreement has been signed, provided that the advance payment guarantee (as described in clause 6 “Guarantees”) have been delivered to the Purchaser;

2) **20 % of the Purchase Price, hundred thousand (100 000) euro** when complete detail engineering documentation by the Supplier have been delivered and approved by the Purchaser,

3) **60 % of the Purchase Price, three hundred thousand (300 000) euro** when the commissioning of the Equipment and final documentation concerning the Equipment has been completed and accepted by the Purchaser;

4) **10 % of the Purchase Price, fifty thousand (50 000) euro** when the warranty period guarantee and performance guarantee have been delivered to the Purchaser, and the Provisional Acceptance Certificate has been signed according to clause 13 “Provisional Acceptance”.

PRECONDITIONS FOR INVOICING

- Agreement is signed
- Advance payment guarantee delivered to the Purchaser

INVOICE

Within 60 days

PAYMENT 1

10% of the total purchase price
50 000 €

PRECONDITIONS FOR INVOICING

- Detailed engineering delivered to the Purchaser (Final Foundation Drawings and Equipment design)

INVOICE

Within 60 days

PAYMENT 2

20% of the total purchase price
100 000 €

PRECONDITIONS FOR INVOICING

- Commissioning is successfully completed
- Final documentation is accepted by the Purchaser

INVOICE

Within 60 days

PAYMENT 3

60% of the total purchase price
300 000 €

PRECONDITIONS FOR INVOICING

- Warranty period guarantee delivered to the Purchaser
- Performance guarantee delivered to the Purchaser
- Provisional Acceptance Certificate has been signed

INVOICE

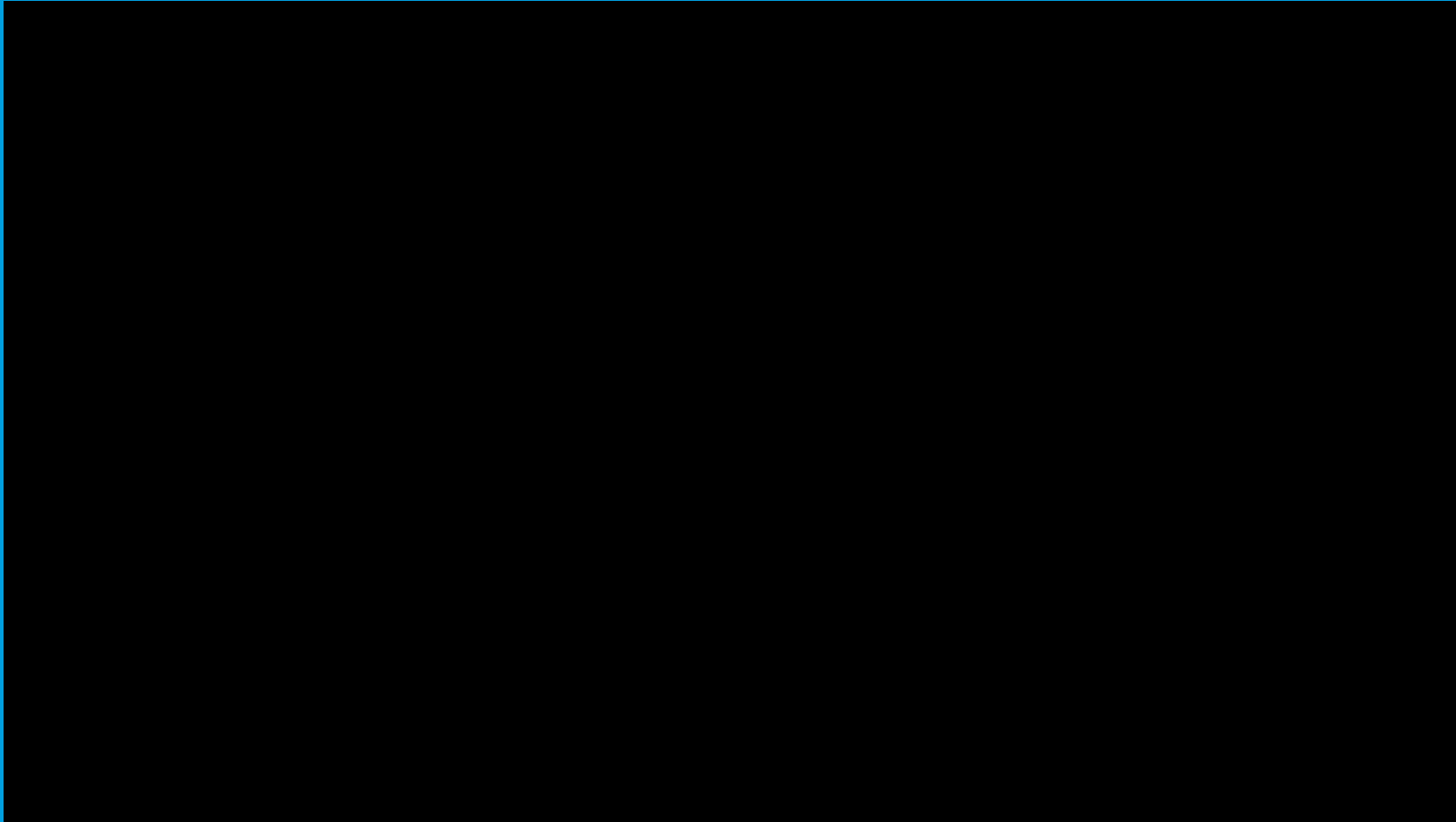
Within 60 days

PAYMENT 4

10% of the total purchase price
50 000 €

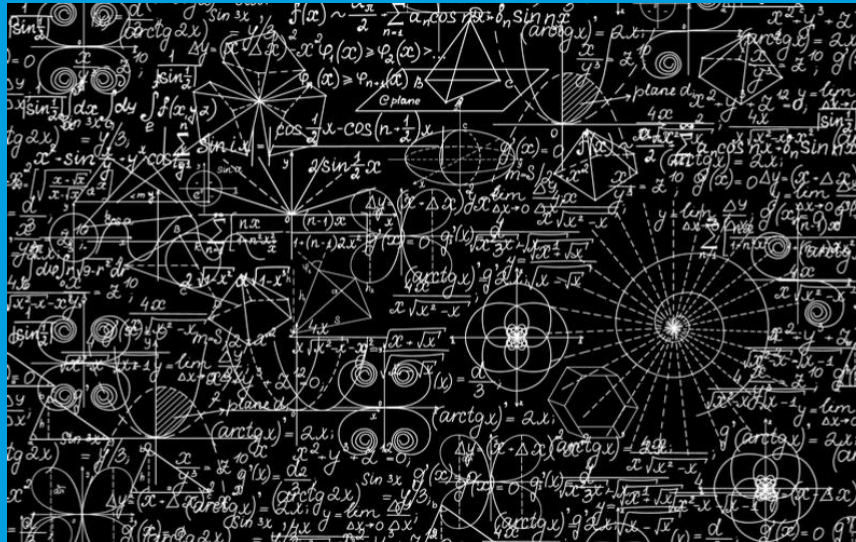
Dark Patterns

A dark pattern is "a user interface that has been carefully crafted to trick users into doing things, such as buying insurance with their purchase or signing up for recurring bills (Harry Brignull)



Suggestion no.2

We must never be too complicated.



*if we want to be, we would be perfect for
working in Amazon Legal Department*

GDPR and Algorithm Bias

Art. 22 of GDPR

1. The data subject shall have the right not to be subject to a decision **based solely on automated processing, including profiling**, which produces legal effects concerning him or her or similarly significantly affects him or her.
2. Paragraph 1 shall not apply if the decision:
 - (a) is necessary for entering into, or performance of, a contract between the data subject and a data controller;
 - (b) is authorised by Union or Member State law to which the controller is subject and which also lays down suitable measures to safeguard the data subject's rights and freedoms and legitimate interests; or
 - (c) is based on the data subject's explicit consent.

Practical Examples

Lex Machina

Legal tasks that are being automated are largely those that used to be performed by new law school graduates and paralegals. The use of AI in areas such as contract review and management is making contracting faster and easier and lets lawyers eliminate time-consuming and repetitive tasks from their daily routines. With Prediction and litigation technology you can enter a judge's name to predict the outcome of any judgement.



The screenshot displays the Lex Machina web application interface. The top navigation bar includes links for Courts & Judges, Counsel, Parties, Cases, Documents, Patents, and Apps. The user is logged in as Brian Howard. The main content area features a news article titled "France Bans Judge Analytics, 5 Years In Prison For Rule Breakers" dated 4th June 2019, attributed to artificiallawyer, with a tag for Litigation Prediction and 37 comments. Below the article is a photograph of a stack of books, with a yellow book on top, secured by a heavy metal chain and padlock. The left sidebar contains filters for Case Status (All, Open: 158,523, Terminated: 340,375), Case Types, and Case Tags, with a RESET button at the bottom.

Practical Examples

Compas

COMPAS system (Correctional Offender Management Profiling for Alternative Sanctions). Nationwide, many jurisdictions use statistical algorithms to assess the likelihood a defendant will fail to appear at trial or commit a future violent crime. Propublica analysis found that white defendants who re-offended within the next two years were mistakenly labeled low risk almost twice as often as black re-offenders (48 percent vs. 28 percent).



Suggestion no.3

Let's remember that a false positive in digital forensics can change people's lives.

defect *failure* *bug*
error

Challenges: Questions?

- How can consent be managed within AI?
- Right of explanation: is it possible to find profiling details within AI algorithms?
- How can biases be found within AI algorithms, and can it be stopped?
- How do you involve humans within AI when the very nature of AI is for machines to act and decide on their own?
- Is it possible to control and to regulate the fairness and the transparency of the algorithm? and if yes, how?
- St. George Hospital developed an algorithm to sort medical school applicants. The algorithm was trained to mimic past admissions decisions made by humans . But past decisions were biased against women and minorities. How to manage the false positive?
- Collective intelligence is enough to avoid false positive?
- Are Law enforcement and Judiciary system able to use these tools?

Last Question: Technology substitute Us ?

Robots Will Help Lawyers, Much Like Autopilot Helps Pilots

During the 1940s many pilots were afraid that they'd lose their jobs due to the rise of autopilot technology. That didn't happen though, as even 80 years later we still have pilots operating the airplanes even while autopilot helps them immensely

Giuseppe Vaciago

g.vaciago@lt42.it

<https://www.linkedin.com/in/vaciago/>