

# Will Robots Take My Job?

Ronald L. Chichester

2019 Advanced In-House Counsel Conference

San Antonio, Texas

August 8, 2019

# Overview

Executive Summary

Why & Some Definitions

What goes into a Robot?

The State of the Art

What's Driving the New Art

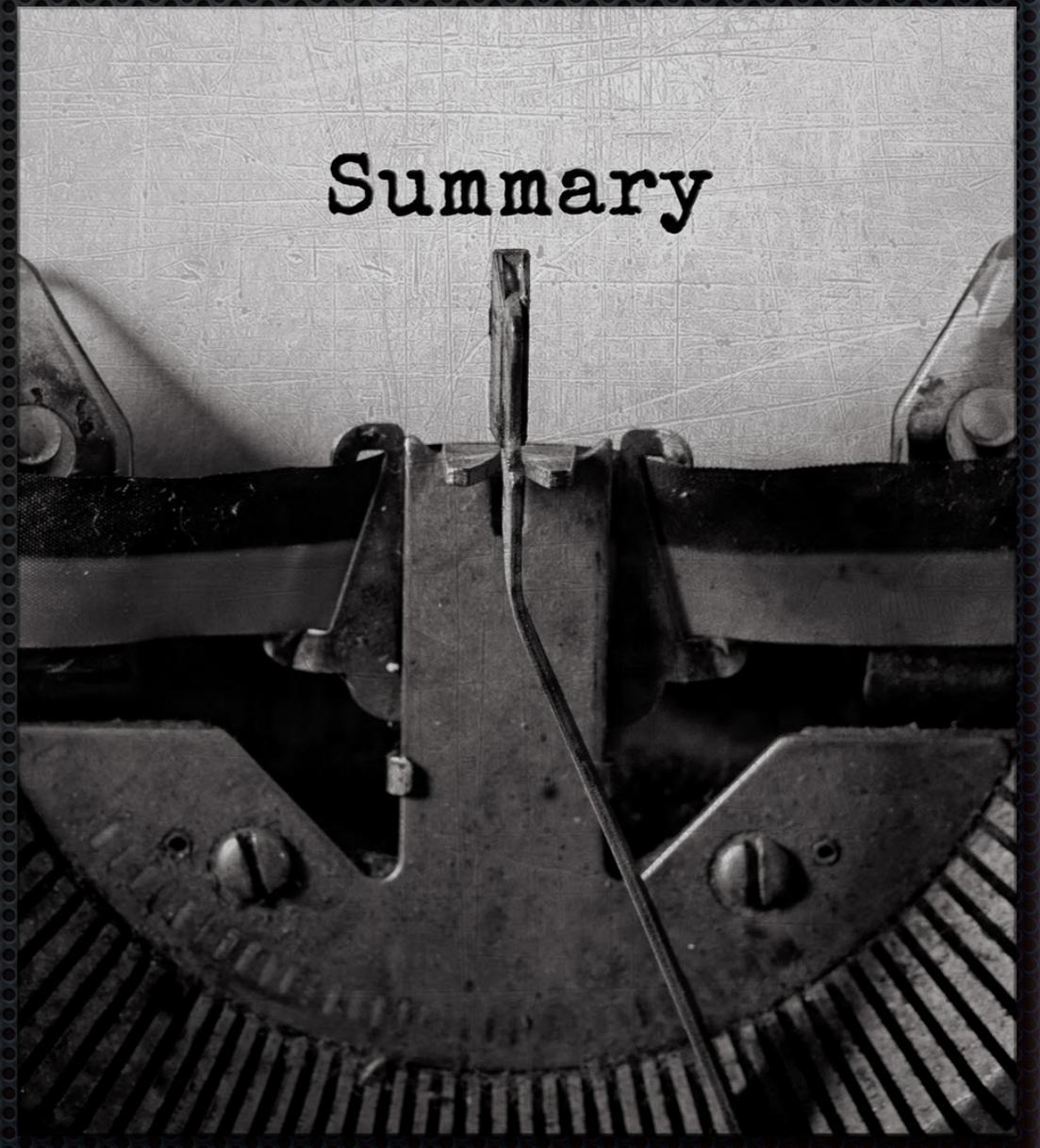
Conclusions

Questions



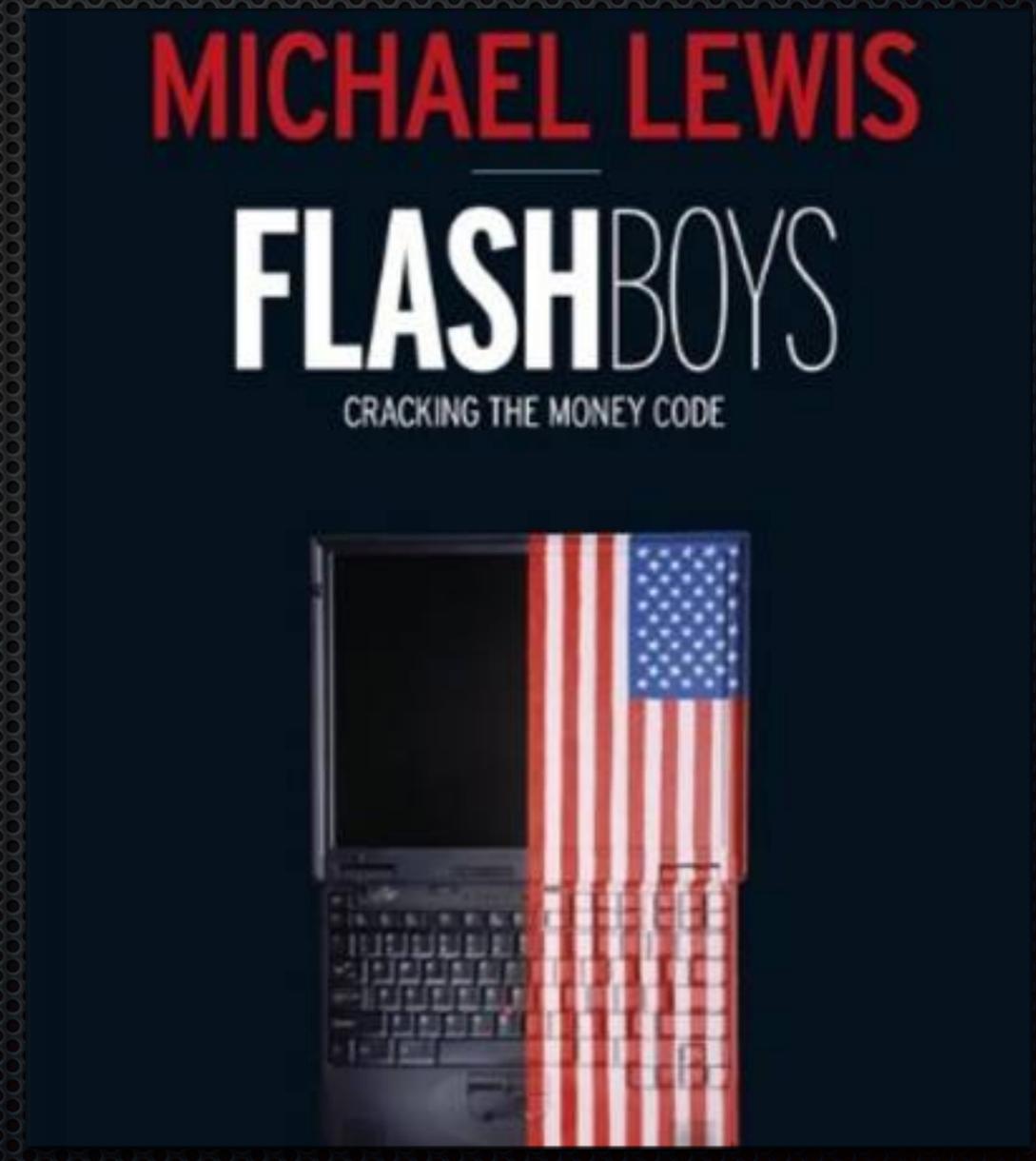
# Executive Summary

- ✦ Will robots *take* my job?
  - ✦ If you let them
- ✦ Will robots *affect* my job?
  - ✦ Absolutely!
- ✦ What are the key factors?
  - ✦ Interpersonal skills
  - ✦ Interest rates



# Why is This Happening?

- ✦ Sophisticated data analytics
- ✦ Plus integrated IT systems
- ✦ Yields (constantly) malleable business model
- ✦ Speed is of the essence
- ✦ Your company will be competing with AI-enabled DAO's





300 ms

92%+ accuracy

31,557,600 seconds

# Coase's Transaction Cost Theory of the Corporation

Transaction cost theory [edit]

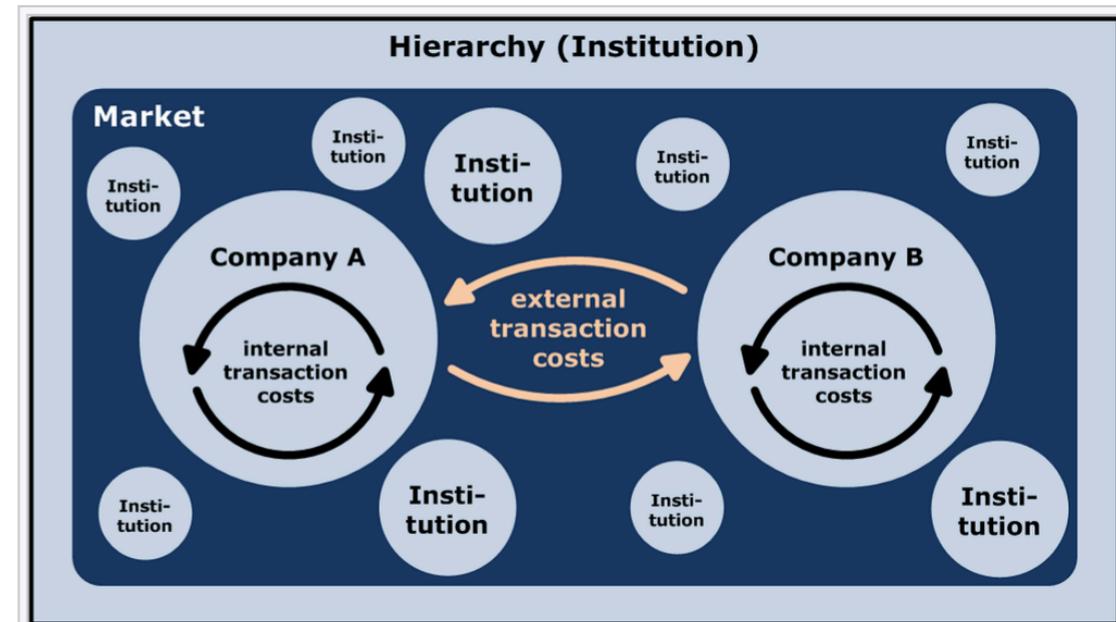
Main article: *Transaction cost*

According to **Ronald Coase**, people begin to organise their production in firms when the **transaction cost** of coordinating production through the market exchange, given imperfect information, is greater than within the firm.<sup>[3]</sup>

**Ronald Coase** set out his **transaction cost** theory of the firm in 1937, making it one of the first (**neo-classical**) attempts to define the firm theoretically in relation to the market.<sup>[3]</sup> One aspect of its 'neoclassicism' lies in presenting an explanation of the firm consistent with **constant returns to scale**, rather than relying on **increasing returns to scale**.<sup>[8]</sup> Another is in defining a firm in a manner which is both realistic and compatible with the idea of substitution at the margin, so instruments of conventional economic analysis apply. He notes that a firm's interactions with the market may not be under its control (for instance because of sales taxes), but its internal allocation of resources are: "Within a firm, ... market transactions are eliminated and in place of the complicated market structure with exchange transactions is substituted the **entrepreneur** ... who directs production." He asks why alternative methods of production (such as the **price mechanism** and **economic planning**), could not either achieve all production, so that either firms use internal prices for all their production, or one big firm runs the entire economy.

Coase begins from the standpoint that markets could in theory carry out all production, and that what needs to be explained is the existence of the firm, with its "distinguishing mark ... [of] the supersession of the price mechanism." Coase identifies some reasons why firms might arise, and dismisses each as unimportant:

1. if some people prefer to work under direction and are prepared to pay for the privilege (but this is unlikely);
2. if some people prefer to direct others and are prepared to pay for this (but generally people are paid more to direct others);
3. if purchasers prefer goods produced by firms.



The model shows institutions and market as a possible form of organization to coordinate economic transactions. When the external transaction costs are higher than the internal transaction costs, the company will grow. If the external transaction costs are lower than the internal transaction costs the company will be downsized by outsourcing, for example.

[https://en.wikipedia.org/wiki/Theory\\_of\\_the\\_firm#Transaction\\_cost\\_theory](https://en.wikipedia.org/wiki/Theory_of_the_firm#Transaction_cost_theory)

relation of ...  
point of view.

**Definition** [ , defn  
signification of a  
essential to the c

# Robot

Robotic Process Automation ('RPA') is the technology that allows anyone today to configure computer software, or a “robot” to emulate and integrate the actions of a human interacting within digital systems to execute a business process.

– <https://www.uipath.com/rpa/robotic-process-automation>

# Robot

Robotic Process **Automation** ('RPA') is the technology that allows anyone today to configure computer software, or a “robot” to emulate and integrate the actions of a human interacting within digital systems to execute a business process.

– <https://www.uipath.com/rpa/robotic-process-automation>

# Artificial Intelligence



“The field of study that gives computers the ability to learn without being explicitly programmed.”

– *Arthur Samuel*

# Cognitive Computing

A new blend of *hardware and software* that mimics the functioning of the human brain to help improve human decision-making in a way that is:

adaptive,  
interactive,  
iterative & stateful, and  
contextual

# Legal Engineer

## Legal Engineering

### Our Definition

#### Legal Engineer

(UK /'li:.gəl En.dʒɪ'nɪər; US /'li:.gəl En.dʒɪ'nɪr/)

**Noun** - *A Person That Sits At The Interface Of Technology, Law And Data, And Who Is Trained And Skilled In The Construction Of Designed Legal Solutions.*

**Verb** (Used With Object) - *To Navigate, Connect And Integrate Point Legal Technical Solutions With The Real Time Practice Of Law.*

**Origin** - English, Early 21st Century To Mid-2016. A Concept Developed By A Few Enlightened Individuals From Susskind To Winlaw.

<https://www.wavelength.law/legal-engineering/>

What goes into a Robot?

< example >

# CORPORATE COUNSEL REVIEW

VOLUME XXXVI

November 2017

NUMBER 2

Published at South Texas College of Law

## ARTICLES

A Litigator Looks at  
Your Transaction Documents ..... *C. Elaine Howard*

How to Effectively Deal with Minority  
Shareholders: Some Practice Pointers  
and Recent Developments..... *Soren Lindstrom &  
Lindsey Reighard*

**Choosing the Correct Entity..... *Harry Herzog***

Divisive Mergers: How to Divide  
an Entity into Two or More Entities  
Under a Merger Authorized by the  
Texas Business Organizations Code..... *Cliff Ernst*

Considerations in Drafting  
Limited Liability Company Agreements  
and Limited Partnership Agreements ..... *John C. Ale,  
Hillary H. Holmes, &  
Brad L. Whitlock*

Ethical Concerns and Discovery Issues  
with Lawyers' Use of Social Media ..... *John G. Browning*

## CASENOTES



# Getting Started with Rasa

## 1: What is Rasa?



Rasa is an open source machine learning framework for building [contextual AI assistants and chatbots](#).

Rasa has two main modules:

- **NLU** for understanding user messages
- **Core** for holding conversations and deciding what to do next

**Rasa X** is a tool that helps you build, improve, and deploy AI Assistants that are powered by the Rasa framework. Rasa X includes a user interface and a REST API.

Product	License	Price	Key Features
Rasa	Open Source		Understand messages
Rasa X	EARLY ACCESS	\$0	View & Annotate conversations

<https://rasa.com/docs/getting-started/>

17/12/2015



Thank you. What is the best contact number to reach you on?

02064442332



Why were you made homeless?

a fire in my old house without insurance.



The next few questions will help me make the best case possible for you. Are you or someone you live with pregnant?

nope



Would you say that you are vulnerable as a result of old age or disability?

absolutely



# CHATBOT PLATFORMS FOR LAWYERS, NO CODING REQUIRED

< another example >

## A Problem

“It is the *ambiguity* of language that prompts society to tolerate the legal profession.”

“It is the *ambiguity* of language that vexes AI engineers.”

## A Solution

“*Standardization* of language eliminates its *ambiguity*.”

“*Standardization* of language thus facilitates *automation*.”



# LEGALESE

software is eating law

Why Computational Law?

What's Legalese?

Education & Resources

Community & Contact

Login

Paperwork can be *such* a pain

Create, automate, and execute entire workflows < 5 minutes instead

Our beta web-app now supports SAFE paperwork!

[Get started \(beta\)](#)

Relax, no credit card required



TL:DR

**KNOW ALL MEN BY THESE PRESENTS**

*that*

**WONG MENG WENG**

*upenn.edu (SEAS '97), Harvard Berkman Klein ('16-'17), Stanford CodeX ('17-'18)  
previously co-founder of pobox.com, karmasphere.com, hackerspace.sg, and jfdi.asia  
and co-author of SPF (IETF RFC4408), a globally deployed opensource email standard*

*and*

**ALEXIS CHUN**

*a recovering lawyer who read at Queen Mary in London, practiced at TSMP (M&A)  
and Rajah & Tann (commercial litigation), and spent years consulting on software contracts  
before coming to the conclusion that doing things by hand was never going to get better*

<https://legalese.com/>

# Innovation Premise: Law better off as Code

The legal industry today is where software was in the late 1950s: getting ready to make the jump from macros to compiled languages. [Tomorrow's lawyers](#) will look a lot like today's programmers: drawing on opensource libraries, they will configure code for clients that compiles to readable contracts – maybe English, Mandarin Chinese, maybe Ethereum/Hyperledger. From that future, we will look back on today's lawyers, drafting agreements in Microsoft Word and checking references mandraulically, as white-collar successors to [John Henry](#).

<https://legalese.com/aboutus.html>

# Innovation Premise: Law better off as Code

The legal industry today is where software was in the late 1950s: getting ready to make the jump from macros to compiled languages. [Tomorrow's lawyers](#) will look a lot like today's programmers: drawing on opensource libraries, they will configure code for clients that compiles to readable contracts – maybe English, Mandarin Chinese, maybe Ethereum/Hyperledger. From that future, we will look back on today's lawyers, drafting agreements in Microsoft Word and checking references mandraulically, as white-collar successors to [John Henry](#).

<https://legalese.com/aboutus.html>



# Computable Contracts

The Computable Contracts project works on developing a universal Contract Definition Language that will allow terms and conditions to be represented in machine-understandable way. As a result, computers will be able to process and reason over the contracts automatically with a guaranteed degree of accuracy. The effect is not only a significant reduction of legal transaction costs, but it also opens a variety of new options to create better contracts.

## Contract Definition Language

Contract Description Language (CDL) is a new language designed for expressing contracts, terms and conditions, and even laws in machine-understandable way so that automated tools can be used to work with them more efficiently. Its roots lie in declarative rules based logic programming.

## Automation for Formation of Contracts

### **Validity Check**

Is there a conflict between laws and/or contract terms?

### **Utility**

What is the value (or score) of laws and/or contract terms according to particular preferences or criteria?

## Automation for Analysis of Contracts

### **Hypothetical Analysis**

What are the implications of laws and/or contract terms in a particular situation?

### **Consistency Check**

Is a set of contracts consistent, i.e. contradiction free?

## Automation for Implementation of Contracts

### **Planning**

What actions can/should be done in a particular situation for achieving a particular goal.

### **Execution**

Ultimately, automated triggering of actions

<http://compk.stanford.edu/>

# Computational Law

## The Cop in the Backseat

Michael Genesereth  
CodeX: The Center for Legal Informatics  
Stanford University

**Abstract:** Computational Law is that branch of legal informatics concerned with the mechanization of legal analysis (whether done by humans or machines). It emphasizes explicit behavioral constraints and eschews implicit rules of conduct. Importantly, there is a commitment to a level of rigor in specifying laws that is sufficient to support entirely mechanical processing. While the idea of mechanized legal analysis is not new, its prospects are better than ever due to recent technological developments - including progress in Computational Logic, the growth of the Internet, and the proliferation of autonomous systems (such as self-driving cars and robots). Legal technology based on Computational Law has the potential to dramatically change the legal profession, improving the quality and efficiency of legal services and possibly disrupting the way law firms do business. More broadly, the technology has the potential to bring legal understanding and legal tools to everyone in society, not just legal professionals, thus enhancing access to justice and improving the legal system as a whole.

### 1. Introduction

"It is one of the greatest anomalies of modern times that the law, which exists as a public guide to conduct, has become such a recondite mystery that is incomprehensible to the public and scarcely intelligible to its own votaries." - Lee Loevinger 1949



+

```

1 #!/usr/bin/env python
2 import sys
3 import os
4 import simpleknn
5 from bigfile import BigFile
6
7 if __name__ == "__main__":
8     trainCollection = 'toydata'
9     nimages = 2
10    feature = 'f1'
11    dim = 3
12
13    testCollection = trainCollection
14    testset = testCollection
15
16    featureDir = os.path.join(rootpath, trainCollect
17    simpleknn.load model(os.path.join(fe
  
```

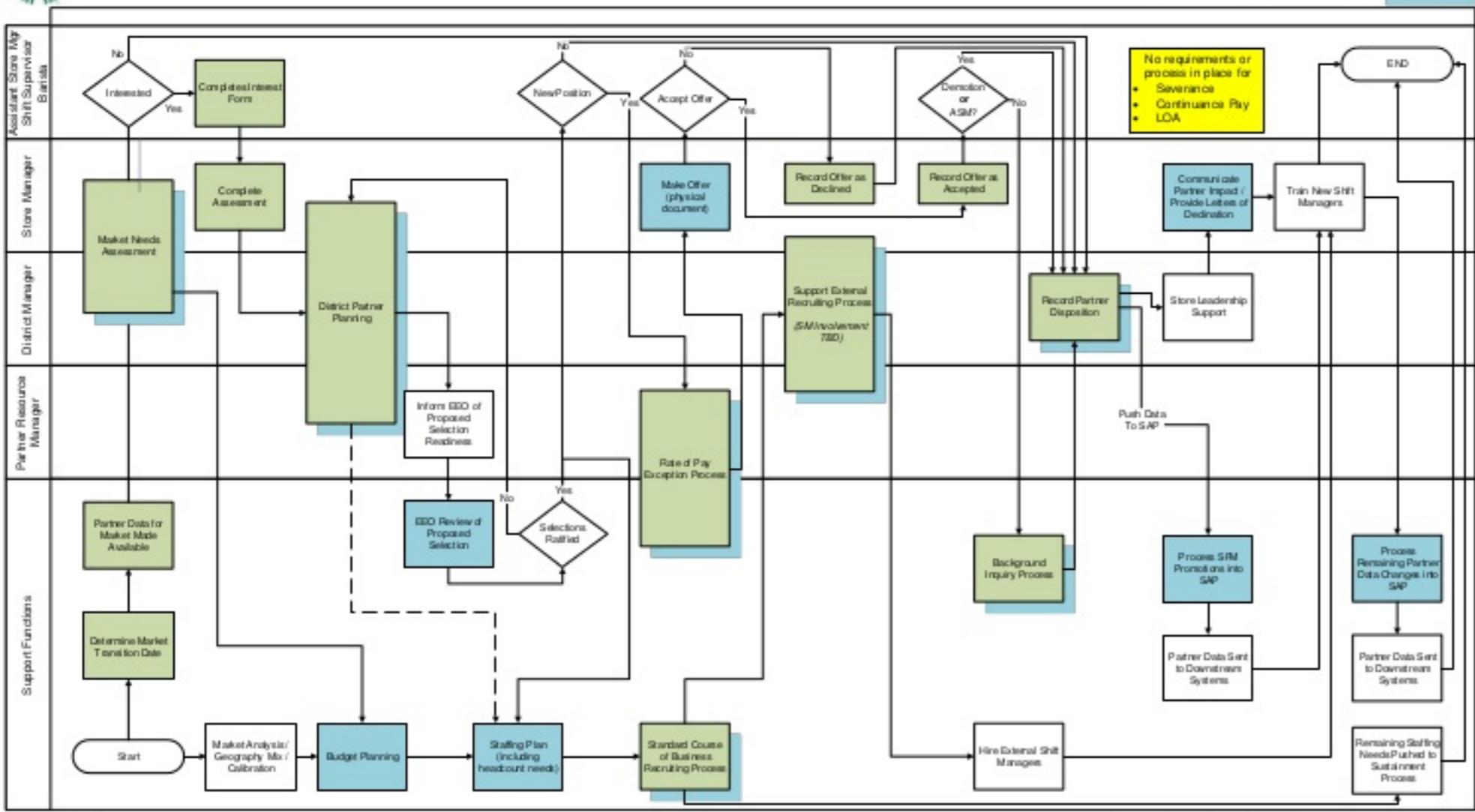
=

Legal Process



Store Management Model Transition Tool Kit:

SMM Transition - Business Process Highlights



# The State of the Art

Legal Engineer



# law. data. design.

We are **the** regulated firm of legal engineers.

We use data engineering and creative design to deliver positive change in the legal sector.

We work with the top legal teams around the world to unlock new value, efficiencies and insights.

Using our tools and skills, we transform how each legal professional, business and member of society experiences legal service process.

**We design legal solutions. We deliver positive change.**

<https://www.wavelength.law/>

#LawGeex

# Study: Artificial intelligence outperforms top lawyers

AI software proves more accurate than attorneys in spotting potential problems in legal contracts.

By [ISRAEL21c Staff](#) | MARCH 25, 2018, 10:26 AM



## LATEST ARTICLES

Aug 5, 8:43 am

6 Israeli restaurants win World Luxury Restaurant Awards

Aug 5, 7:00 am

Breakthrough in understanding of immune system dysfunction

Aug 5, 7:00 am

Cook up a batch of scrumptious halva in your own kitchen

Aug 5, 7:00 am

Rare whale shark surprises Israeli Red Sea ranger

Aug 5, 7:00 am

What do you get when you cross Birthright with ISRAEL21c?

<https://www.israel21c.org/study-artificial-intelligence-outperforms-top-lawyers/>



# ALIBABA AI BEATS HUMANS IN READING-COMPREHENSION TEST

CHRISTINE CHOU | JULY 9, 2019

## RECENT



OREO, FORBIDDEN CITY MAKE COOKIES FIT FOR AN EMPEROR

### DAMO RELATED LINKS



WELDEN TEACHES GLOBAL EXECS ABOUT 'NEW RETAIL'

## TRENDING

<https://www.alizila.com/alibaba-ai-beats-humans-in-reading-comprehension-test-again/>

# Senate Bill No. 1001

## CHAPTER 892

An act to add Chapter 6 (commencing with Section 17940) to Part 3 of Division 7 of the Business and Professions Code, relating to bots.

[ Approved by Governor September 28, 2018. Filed with Secretary of State September 28, 2018. ]

### LEGISLATIVE COUNSEL'S DIGEST

SB 1001, Hertzberg. Bots: disclosure.

Existing law regulates various businesses to, among other things, preserve and regulate competition, prohibit unfair trade practices, and regulate advertising.

This bill would, with certain exceptions, make it unlawful for any person to use a bot to communicate or interact with another person in California online with the intent to mislead the other person about its artificial identity for the purpose of knowingly deceiving the person about the content of the communication in order to incentivize a purchase or sale of goods or services in a commercial transaction or to influence a vote in an election. The bill would define various terms for these purposes. The bill would make these provisions operative on July 1, 2019.

Vote: majority Appropriation: no Fiscal Committee: yes Local Program: no

---

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

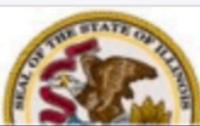
**SECTION 1.** Chapter 6 (commencing with Section 17940) is added to Part 3 of Division 7 of the Business and Professions Code, to read:

**CHAPTER 6. Bots**

**17940.** For purposes of this chapter:

- (a) "Bot" means an automated online account where all or substantially all of the actions or posts of that account are not the result of a person.
- (b) "Online" means appearing on any public-facing Internet Web site, Web application, or digital application, including a social network or publication.

[https://leginfo.legislature.ca.gov/faces/  
billTextClient.xhtml?bill\\_id=201720180SB1001](https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1001)

**Bills & Resolutions**[Compiled Statutes](#)[Public Acts](#)[Legislative Reports](#)[IL Constitution](#)[Legislative Guide](#)[Legislative Glossary](#)Search By Number  
(example: HB0001)[Search Tips](#)

Search By Keyword

[Search Tips](#)[Advanced Search](#)**Bill Status of HB2557** *101st General Assembly*[Full Text](#) [Votes](#) [Witness Slips](#) [View All Actions](#) [Printer-Friendly Version](#)**Short Description:** VIDEO INTERVIEW ACT**House Sponsors**Rep. [Jaime M. Andrade, Jr.](#) - [Diane Pappas](#) - [Terra Costa Howard](#)**Senate Sponsors**(Sen. [Iris Y. Martinez](#) )**Last Action**

Date	Chamber	Action
6/27/2019	House	Sent to the Governor

**Statutes Amended In Order of Appearance**

New Act

**Synopsis As Introduced**

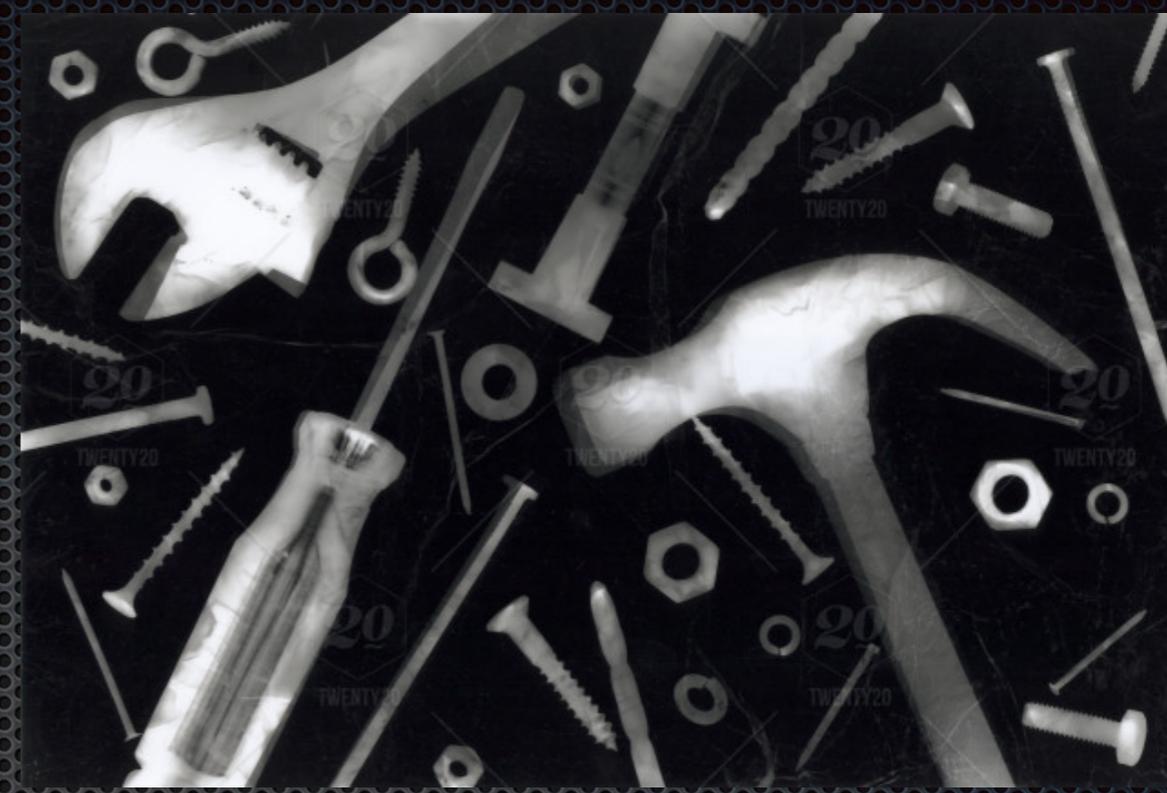
Creates the Artificial Intelligence Video Interview Act. Provides that an employer that asks applicants to record video interviews and uses an artificial intelligence analysis of applicant-submitted videos shall: notify each applicant in writing before the interview that artificial intelligence may be used to analyze the applicant's facial expressions and consider the applicant's fitness for the position; provide each applicant with an information sheet before the interview explaining how the artificial intelligence works and what characteristics it uses to evaluate applicants; and obtain written consent from the applicant to be evaluated by the artificial intelligence program. Provides that an employer may not use artificial intelligence to evaluate applicants who have not consented to the use of artificial intelligence analysis. Provides that an employer may not share applicant videos, except with persons whose expertise is necessary in order to evaluate an applicant's fitness for a position.

**[Senate Floor Amendment No. 1](#)**

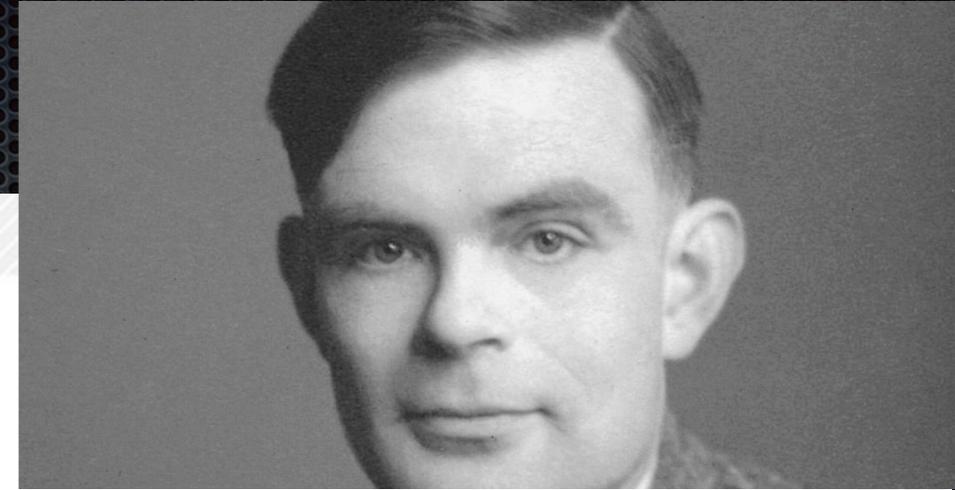
Removes the requirement that the disclosure regarding the use of artificial intelligence analysis be in writing. Provides that the notice disclose an analysis of the applicant's video interview rather than an analysis of the applicant's facial expressions. Provides that the applicant's consent does not have to be in writing. Provides that destruction of the videos is contingent upon an applicant's request for destruction.

<http://www.ilga.gov/legislation/billstatus.asp?>

DocNum=2557&amp;GAID=15&amp;GA=101&amp;DocTypeID=HB&amp;LegID=118664&amp;SessionID=108



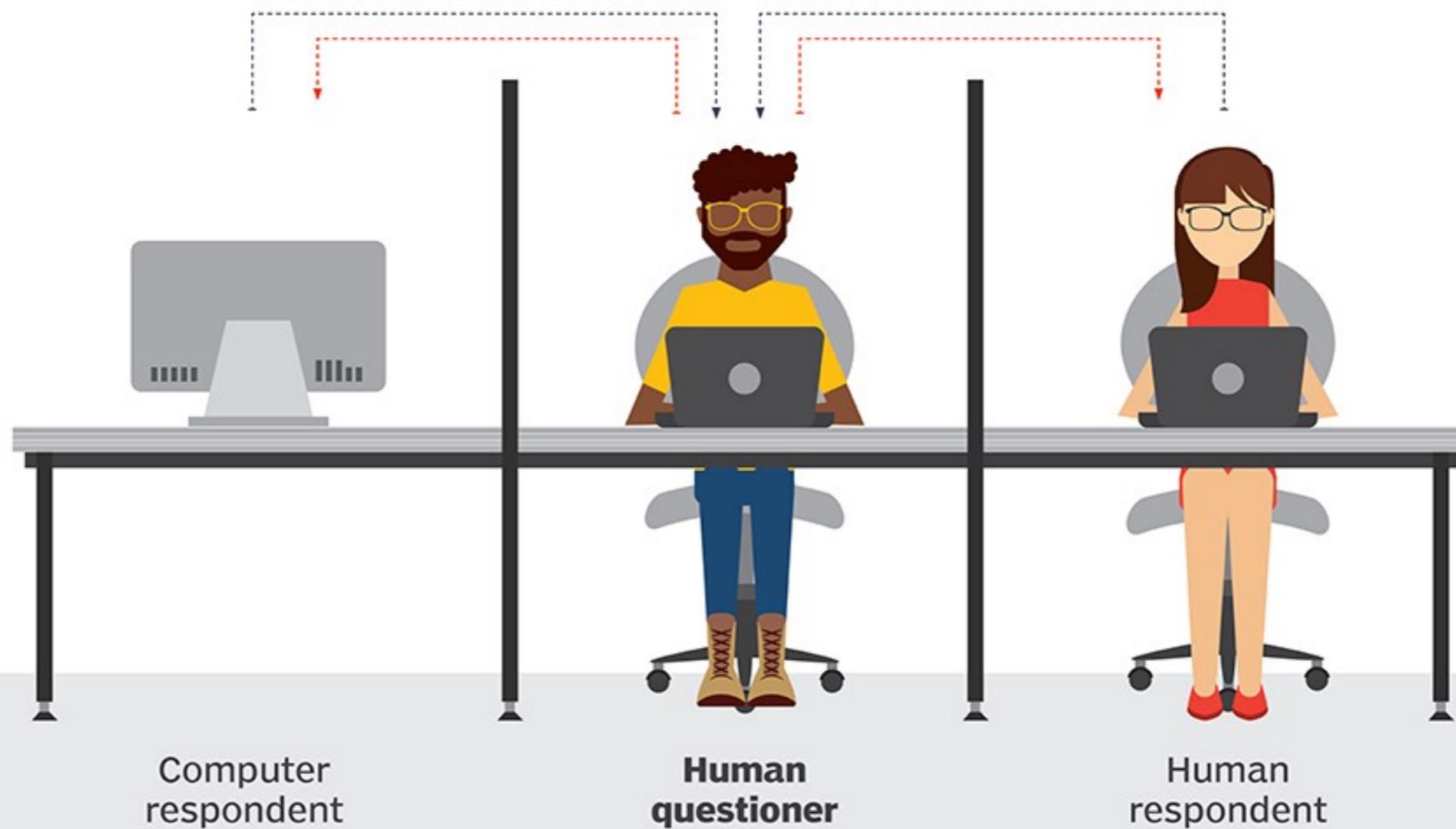
# Artificial Intelligence



# Turing test

During the Turing test, the human questioner asks a series of questions to both respondents. After the specified time, the questioner tries to decide which terminal is operated by the human respondent and which terminal is operated by the computer.

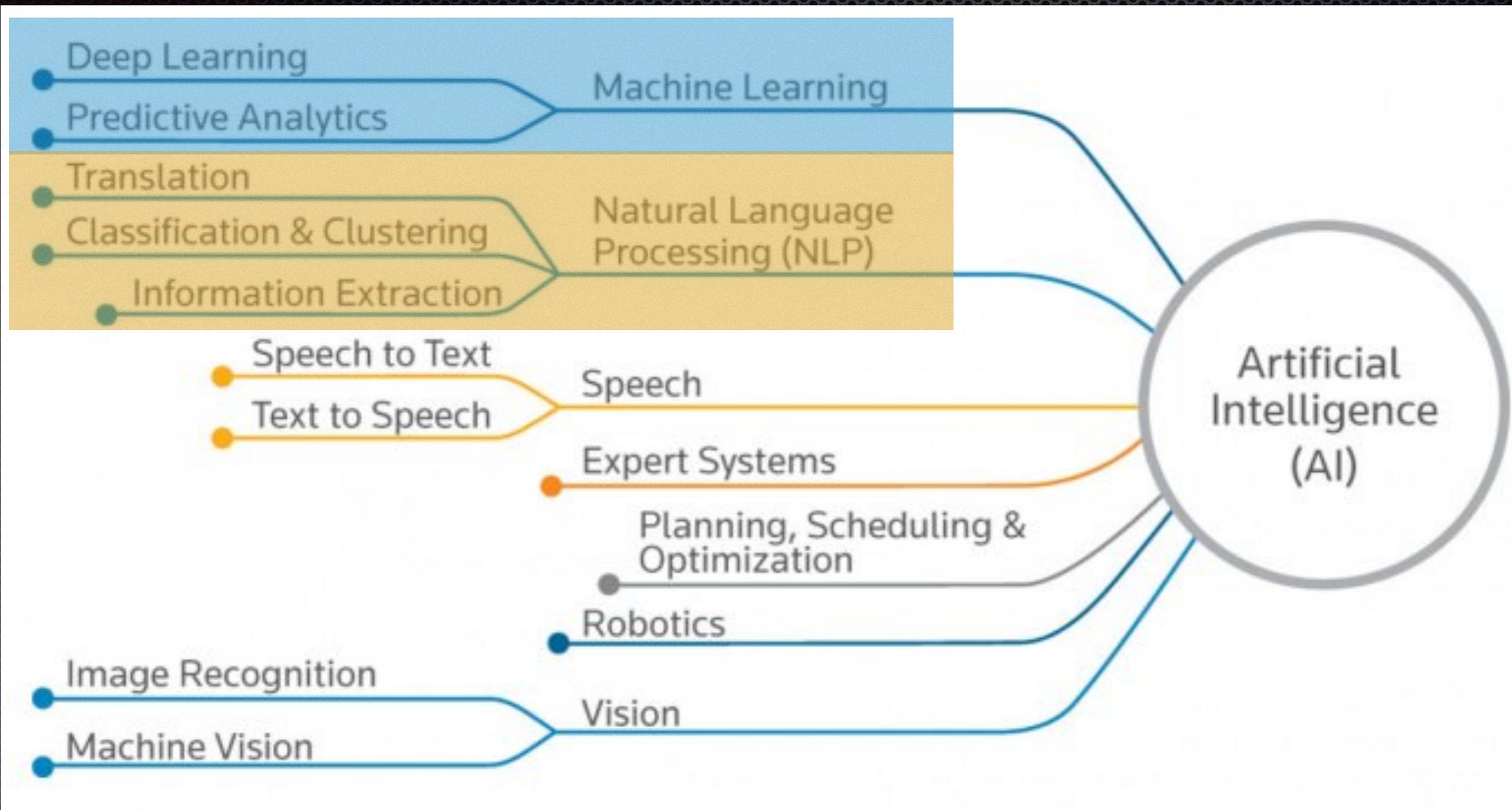
■ QUESTION TO RESPONDENTS ■ ANSWERS TO QUESTIONER



“If the robot passes the Turing Test, a *human* won’t know if she is talking to a lawyer or to a machine.”

“If the robot passes the Turing Test, the *corporate IT system* won’t know if it is talking to a lawyer or to a machine.”

– *Ronald Chichester*



<https://www.process.st/applications-of-ai/>

How do you know when a  
technology is “ready for prime time”?



Additional Foundation

# Software Development

## Closed Source Licensing:

Used to make software scarce (and thus profitable)

## Open Source Licensing:

Used to make software plentiful (and thus adoptable)

- But only when an idea is “ready for prime time”

# Software Development

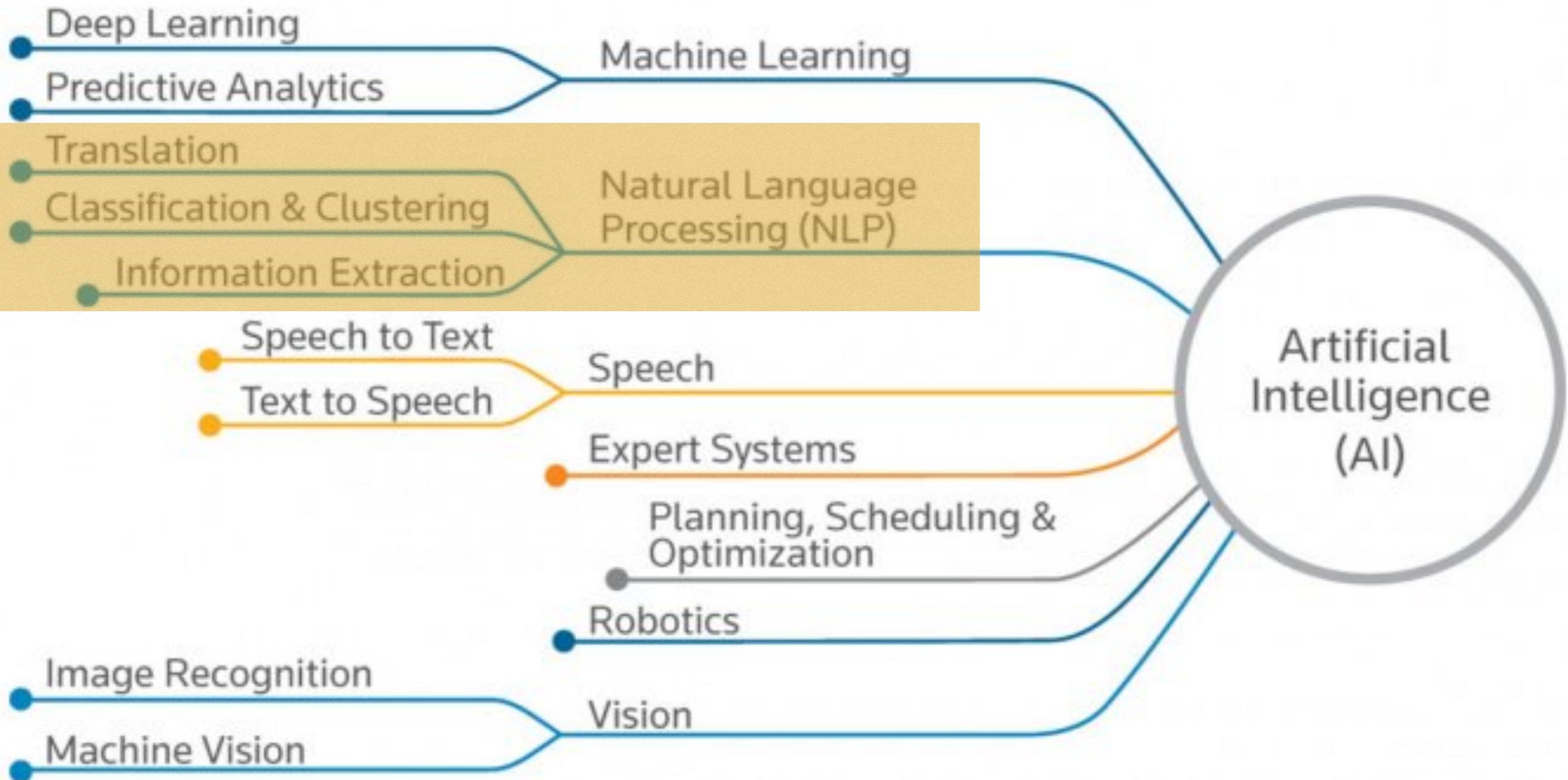
- ✦ Existence of an open source version of an idea is an indication of the *maturity* and the *value* of that idea
- ✦ Open source versions are adoptable and modifiable by corporations without the need for *permission*



# Software Development

- ✦ Open source can dominate a software ecosystem
  - ✦ Internet infrastructure
  - ✦ Data analytics
  - ✦ Artificial Intelligence





# LexNLP: Natural language processing and information extraction for legal and regulatory texts

Michael J Bommarito II, Daniel Martin Katz, Eric M Detterman

LexPredict, LLC

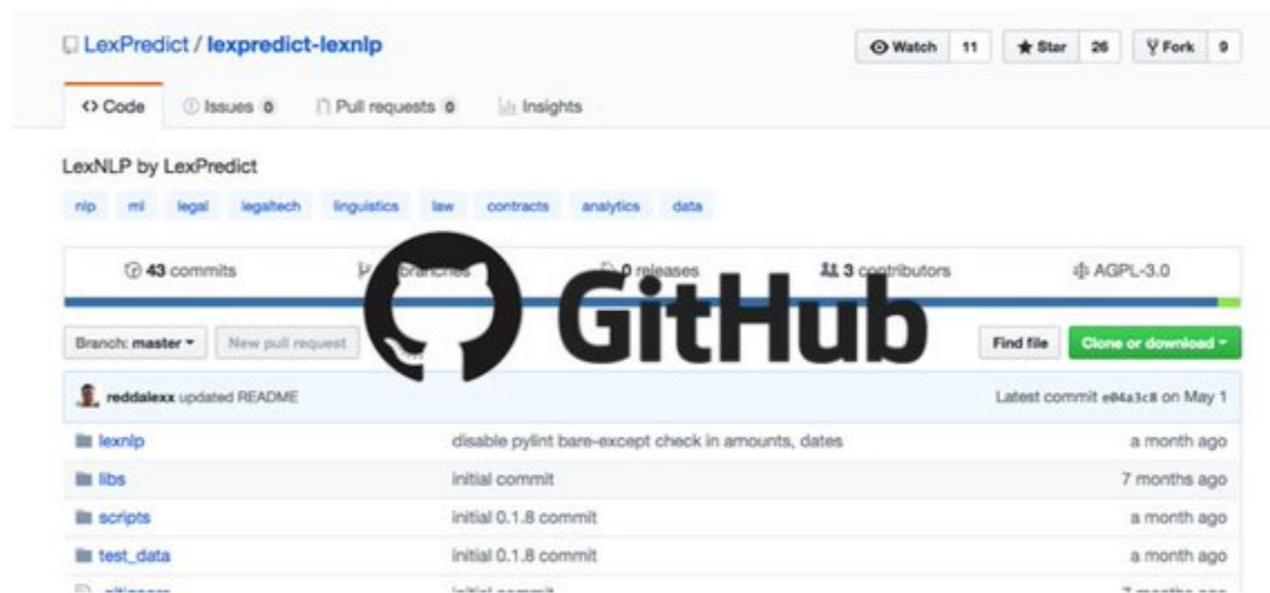
```
>>> from lexnlp.extract.en.definitions import  
    get_definitions  
>>> list(get_definitions(text2))  
['First Deposit', 'Deposit', 'Second Deposit']
```

Finally, in addition to sentence boundary pitfalls, Example 3 also demonstrates the usage of constraints and regulatory references.

```
>>> from lexnlp.extract.en.constraints import  
    get_constraints  
>>> constraints = list(get_constraints(text3))
```



...and closing the  
...layer, on behalf of itself and  
...and assigns, shall thereby  
...of the seller parties from,  
...and all liabilities against  
...seller parties for,  
...o, or in connection with the  
...ther arising or accruing',



#OpenSource #OpenSourceLegal

# Get a grip on your contracts.



## IDENTIFY LEGAL MATERIAL

Automatically identify legal material among your sea of files and communications.



## ORGANIZE AND TAG DOCUMENTS

Automatically group and tag documents into related clusters by content or metadata.



## DE-DUPLICATE DOCUMENTS

Automatically match duplicate or near-duplicate documents like executed copies, revisions, and amendments.



## ANALYZE LEGAL DOCUMENTS

Locate key clauses and references like



## EXTRACT KEY INFORMATION

Extract key terms like effective or



## VISUALIZE, EXPORT, INTEGRATE

Export your data and generate reports to

<https://contraxsuite.com/>

SEARCH ...

## Clifford Chance Picks Elevate's ContraxSuite For New Data Science Lab

© 16th July 2019  artificiallawyer  Legal AI  0

### NEWS ALERTS

Enter your email to receive news alerts, plus info on Artificial Lawyer and 3rd party events.

Email Address

Subscribe

### FOLLOW ME ON TWITTER

My Tweets



<https://www.artificiallawyer.com/2019/07/16/clifford-chance-picks-elevates-contraxsuite-for-new-data->



# Wolters Kluwer

## Capital Markets Clause Analytics

The screenshot displays the 'Results for "Indenture - High-Yield"' interface. On the left, there are filters for Date Range (Jan 01, 1994 - Jan 22, 2018), Document Type (Indenture, High-Yield), Law Firm (Alston & Bird, LLP), Choose Law Firm, Industry (Asset-Backed Securities), and Governing Law (New York). The main content area shows the 'Indenture - High-Yield' model, updated February 05, 2019, with a description of how the model is derived. A button labeled 'CREATE DYNAMIC MODEL: INDENTURE - HIGH-YIELD WITH APPLIED FILTERS' is highlighted. Below, 'Other Example Agreements' are listed, including 'Honda Auto Receivables 2015-4 Owner Trust' with a 78% conforming score.

**Wolters Kluwer** has launched a new NLP-powered clause analytics platform that allows lawyers to build their own model documents and compare their clauses to 'market standard language' from a database of over one million individual capital markets-related clauses.

The move is also another sign of a growing movement toward more efficient document creation that may be leading to greater standardisation across the commercial legal world (see below).

The system, **Capital Markets Clause Analytics**, uses NLP search capabilities to allow a lawyer to 'analyse agreements clause by clause' and then compare standard language to that in one's own agreements. This covers documents related to equity deals (i.e. shares) and debt (i.e. loans and bonds) that form a significant slice of many large commercial law firms' client work.

The screenshot displays a search interface for 'Indenture - High-Yield' on the Wolters Kluwer NLP Clause Analytics platform. On the left, a sidebar contains filters for Date Range (Jan 06, 1994 - Jun 22, 2018), Document Type (Indenture - High-Yield, 25), Law Firm (Alston & Bird, LLP, 25), Industry (Asset-Backed Securities, 25), and Governing Law (New York, 25). The main content area shows the search results for 'Indenture - High-Yield', updated February 05, 2019. A blue button labeled 'CREATE DYNAMIC MODEL INDENTURE - HIGH-YIELD WITH APPLIED FILTERS' is highlighted with a red border. Below this, there is a section for 'Other Example Agreements' sorted by 'Conforming to the Model'. One example is 'Honda Auto Receivables 2015-4 Owner Trust', dated Oct 22, 2015, with a 78% conforming score indicated by a green and red progress bar. A 'Check/Uncheck All' checkbox is also visible.

Screenshot from the platform.

The system also gives you a **percentage score** for how far a clause you are using conforms to certain clauses in the database.

Overall, this appears to be a nifty tool. But, perhaps of greater long term importance is that **this tool is part of a broader trend that is leading the legal market towards greater standardisation.**

<https://www.artificiallawyer.com/2019/07/15/wolters-kluwer-launches-nlp-clause-analytics-platform-for-capital-markets/>



# OPENLAW

## The Universal Legal Protocol for Blockchains

Blockchains are transforming the way commercial relationships are structured and executed, bringing increased operational efficiencies.

Putting together a blockchain-based application is cumbersome, expensive, and inefficient. We make building those applications a snap.

<https://www.openlaw.io/>



What is driving the new art?

# BERT Explained: State of the art language model for NLP



Rani Horev

Follow

Nov 10, 2018 · 7 min read

BERT (Bidirectional Encoder Representations from Transformers) is a recent paper published by researchers at Google AI Language. It has caused a stir in the Machine Learning community by presenting state-of-the-art results in a wide variety of NLP tasks, including Question Answering (SQuAD v1.1), Natural Language Inference (MNLI), and others.

BERT's key technical innovation is applying the bidirectional training of Transformer, a popular attention model, to language modelling. This is in contrast to previous efforts which looked at a text sequence either from left to right or combined left-to-right and right-to-left training. The paper's results show that a language model which is bidirectionally trained can

# Baidu's ERNIE Tops Google's BERT in Chinese NLP Tasks



Synced [Follow](#)

Mar 25 · 3 min read

# ERNIE & BERT



Baidu has released ERNIE (Enhanced Representation through kNowledge IntEgration), a new knowledge integration language representation model which outperforms Google's state-of-the-art BERT (Bidirectional Encoder Representations from Transformers) in Chinese language tasks including natural language inference, semantic similarity, named entity recognition, sentiment analysis, and question-answer matching.

In recent years unsupervised pre-trained language models have significantly improved efficacy on various natural language processing tasks. Methods like GPT, ELMo, GPT or BERT mainly focus on building models to solve problems based on original language signals instead of semantic units in the text. Unlike BERT, ERNIE features knowledge integration enhancement, which learns semantic relations in the real world through massive data. It directly models prior semantic knowledge units, which enhances the ability to learn semantic representation.

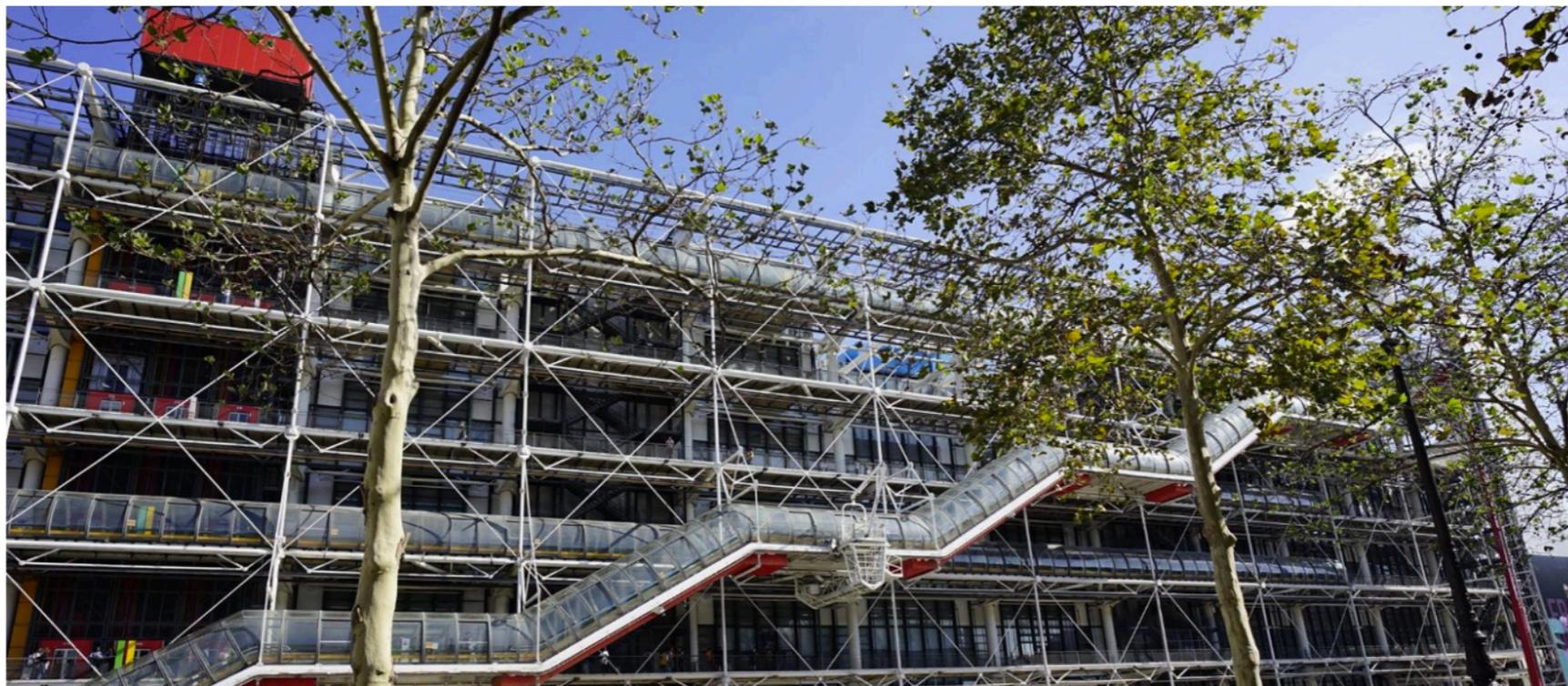
# How XLNet combines the best of GPT and BERT

Understanding the conceptual differences of GPT, BERT and XLNet in 3 min



Ken Tsui [Follow](#)

Jun 22 · 3 min read



Takes one to know one Jul 26

...

## A new tool uses AI to spot text written by AI

I am seated in an office, surrounded by heads and bodies. My posture is consciously congruent to the shape of my hard chair. This is a cold room in University Administration, wood-walled, Remington-hung, double-windowed against the November heat, insulated from Administrative sounds by the reception area outside, at which Uncle Charles, Mr. deLint and I were lately received.

I am in here.

Three faces have resolved into place above summer-weight sportcoats and half-Windsors across a polished pine conference table shiny with the spidered light of an Arizona noon. These are three Deans - of Admissions, Academic Affairs, Athletic Affairs. I do not know which face belongs to whom.

I believe I appear neutral, maybe even pleasant, though I've been coached to err on the side of neutrality and not attempt what would feel to me like a pleasant expression or smile.

I have committed to crossing my legs I hope carefully, ankle on knee, hands together in the lap of my slacks. My fingers are mated into a mirrored series of what manifests, to me, as the letter X. The interview room's other personnel include: the University's Director of Composition, its varsity tennis coach, and Academy prorector Mr. A. deLint. C.T. is beside me; the others sit, stand and stand, respectively, at the periphery of my focus. The tennis coach jingles pocket-change. There is something vaguely digestive about the room's odor. The high-traction sole of my complimentary Nike sneaker runs parallel to the wobbling loafer of my mother's half-brother, here in his capacity as Headmaster, sitting in the chair to what I hope is my immediate right, also facing Deans.

The Dean at left, a lean yellowish man whose fixed smile nevertheless has the impermanent quality of something stamped into uncooperative material, is a personality-type I've come lately to appreciate, the type who delays need of any response from me by relating my side of the story for me, to me. Passed a packet of computer sheets by the shaggy lion of a Dean at center, he is peaking more or less to these pages, smiling down.

AI algorithms can generate text convincing enough to fool the average human—potentially providing a way to mass-produce fake news, bogus reviews, and phony social accounts. Thankfully, AI can now be used to identify fake text, too.

They are Pre-Trained!

# Unsupervised Machine Learning Types

## Clustering

Grouping of objects - Similar or related to and different or unrelated to others  
Inter-cluster distances are maximized  
Intra-cluster distances are minimized

## Unsupervised Learning

Learning useful structure *without* labeled classes, optimization criterion, feedback signal, or any other information beyond the raw data

## Association

Algorithm looks for strong association among features in data



See, e.g.: <https://www.datarobot.com/wiki/unsupervised-machine-learning/>



# Natural language processing

Natural language processing (NLP) is a field of computer science that studies how computers and humans interact. In the 1950s, Alan Turing published an article that proposed a measure of intelligence, now called the Turing test. More modern techniques, such as deep learning, have produced results in the fields of language modeling, parsing, and natural-language tasks.

★ Star

Sign up for GitHub

or [sign in](#) to edit this page

Created by Alan Turing

REPOSITORIES 4,137

Language: All ▾

Sort: Best match ▾

LEARN ABOUT NLP

## GokuMohandas / **practicalAI**

★ 18.9k

A practical approach to machine learning.

deep-learning

pytorch

machine-learning

natural-language-processing

data-science

● Jupyter Notebook Updated 23 days ago

[Wikipedia](#)

RELATED TOPICS

[See more topics](#)

nlp

machine-learning

deep-learning

sentiment-analysis

python

nltk

data-science

neural-networks

spacy

language

## google-research / **bert**

★ 16.8k

TensorFlow code and pre-trained models for BERT

nlp

google

natural-language-processing

natural-language-understanding

tensorflow

● Python Updated 2 days ago

# Conclusions

- ✦ AI is already useful ...
- ✦ ... and is advancing rapidly
- ✦ Legal work product will no longer remain within a traditional silo
- ✦ Legal work product will be leveraged into code that can be integrated into the corporate IT system
- ✦ If you won't do it, someone else will



“Robots can make it much easier for your clients to get the right answer to the *wrong* question”

“For some corporate operations, even 92% accuracy is good enough if made in 300ms.”

– *Ronald Chichester*

# Questions?

Ronald L. Chichester

<https://TexasComputerLaw.com>

[Ron@TexasComputerLaw.com](mailto:Ron@TexasComputerLaw.com)

713-302-1679