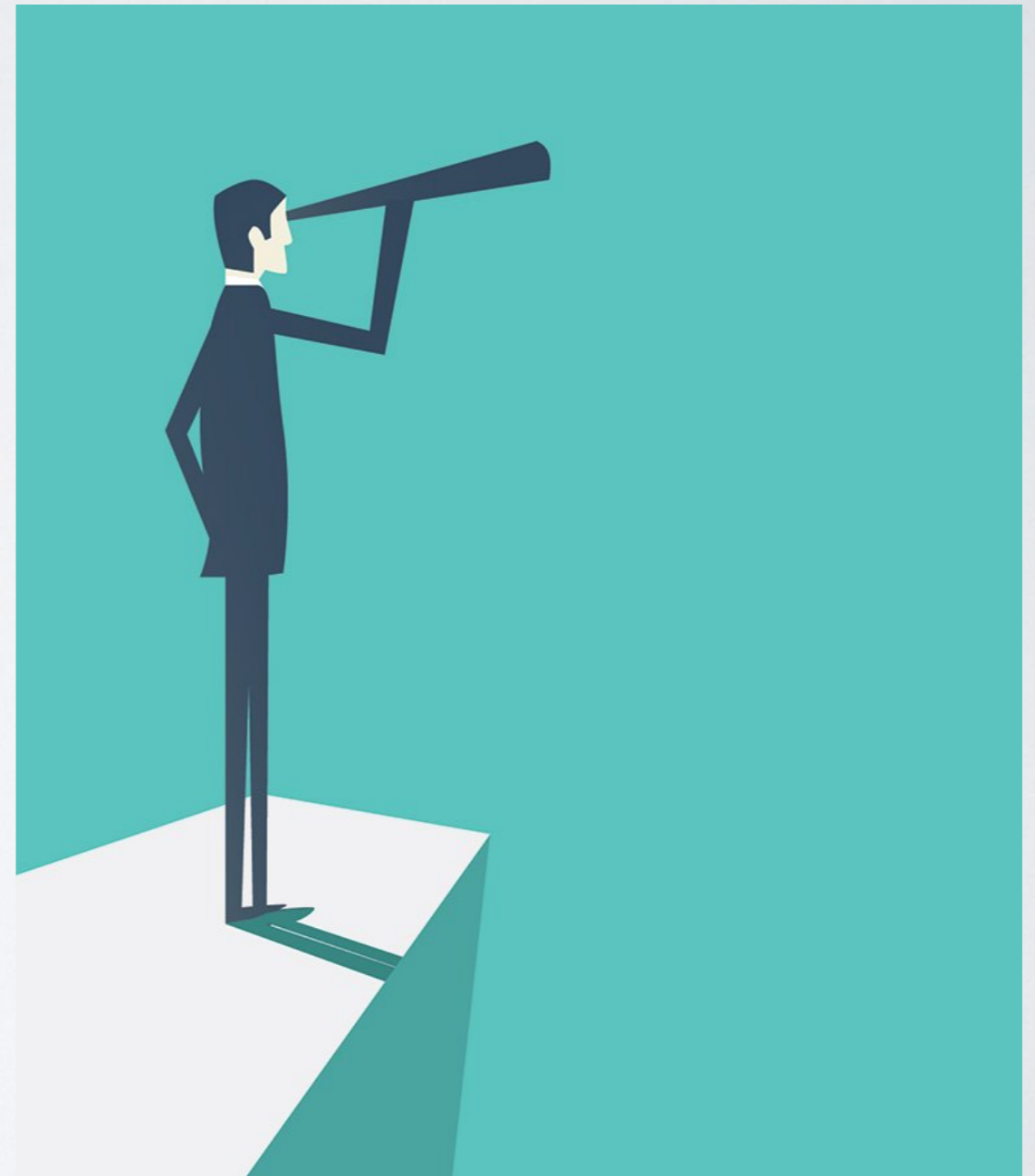


USE CASES FOR ARTIFICIAL INTELLIGENCE IN THE LEGAL INDUSTRY

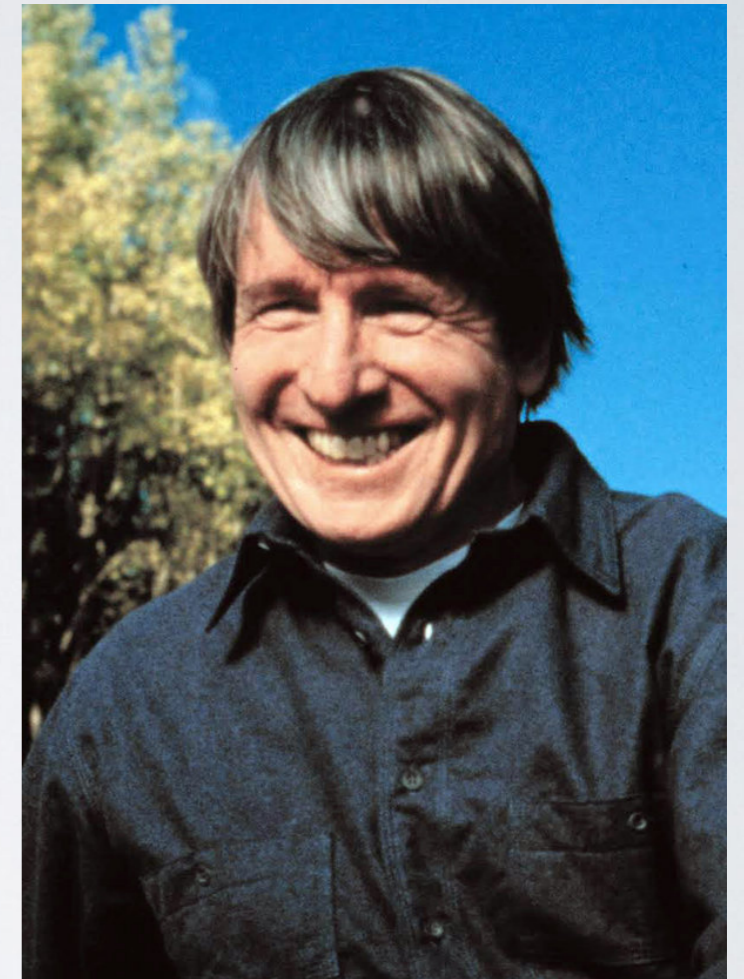
Ronald L. Chichester, Esq.
Houston NLP'ers
Houston, Texas
June 29, 2019

OVERVIEW

- Who am I?
- Why are we here?
- The Legal Profession
- Use Cases
- Things to Consider



HOW I GOT MY START IN AI



Genetic Algorithms



RON'S PERSONAL EXPERIENCE





US007991886B1

(12) **United States Patent**
Wu

(10) **Patent No.:** **US 7,991,886 B1**
(45) **Date of Patent:** **Aug. 2, 2011**

(54) **METHOD AND APPARATUS FOR
INDIVIDUAL-CENTRIC USE OF THE
INTERNET**

(75) Inventor: **Guangdian Gordon Wu**, Houston, TX
(US)

(73) Assignee: **Base Base Corporation**, Houston, TX
(US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 886 days.

(21) Appl. No.: **09/822,097**

(22) Filed: **Mar. 30, 2001**

(51) **Int. Cl.**
G06F 15/173 (2006.01)

(52) **U.S. Cl.** **709/225; 709/203; 709/217; 709/223;**
709/224

(58) **Field of Classification Search** **709/200,**
709/202, 203, 218, 205, 217, 223, 246, 224,
709/225; 705/26; 707/6, 9, 100, 203
See application file for complete search history.

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Primary Examiner — Ramy M Osman

(74) *Attorney, Agent, or Firm* — Baker Botts, L.L.P.

(57) **ABSTRACT**

An individual-centric Internet is provided with a personal base process on a computer system. The computer system is equipped with multiple nodes that are interconnected to facilitate the communication between the nodes. The personal base service includes a personal base instance that is typically in software on at least one of the nodes of the computer system, such as a network. The personal base instance is designed to communicate with a user by any digital or analog device, such as a telephone, personal computer, personal digital assistant, or the like. A personal base server is instantiated on at least one of the nodes on the computer system and is in operative communication with the personal base instance. The personal base server is used to communicate with other personal bases or other nodes on the computer system or network in order to insulate the user from

Mortgage Discrimination: What to Do If It Happens to You



HAL M. BUNDRICK, CFP

Feb. 10, 2016

Home Search, Mortgages



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- [How Much House Can I Afford](#)


```
1 from feedparser import parse
2 from html.parser import HTMLParser
3 import lexnlp.extract.en.acts
4 import lexnlp.extract.en.citations
5 from bs4 import BeautifulSoup
6 import re # Regular Expression
7 import requests # This is to get documents on the web (like opinions)...
8
9 #----- CONSTANTS -----
10
11 CLPrefix = 'https://www.courtlistener.com'
12 alphabets= "[A-Za-z]"
13 prefixes = "(Mr|St|Mrs|Ms|Dr)[.]"
14 suffixes = "(Inc|Ltd|Jr|Sr|Co)"
15 starters = "(Mr|Mrs|Ms|Dr|He\s|She\s|It\s|They\s|Their\s|Our\s|We\s|But\s|However\s|That\s|This\s|Wherever)"
16 acronyms = "[A-Z][.][A-Z][.](?:[A-Z][.])?"
17 websites = "[.](com|net|org|io|gov)"
18
19 #----- CONFIGURATION PARAMETERS -----
20
21 # The list of rss feeds for the various courts is contained within a
22 # local configuration file (one feed per line).
23 courts = open('court_feeds.txt', 'r').readlines()
24
25 #----- METHODS -----
26
27 def remove_hyphens(S=''):
28     # This method removes a hyphen at the end of a line...
29     return S.replace('-\n', '')
30
31
32 class MLStripper(HTMLParser):
33     def __init__(self):
34         self.reset()
35         self.strict = False
36         self.convert_charrefs= True
37         self.fed = []
```


WHY ARE WE HERE?

AUTOMATION

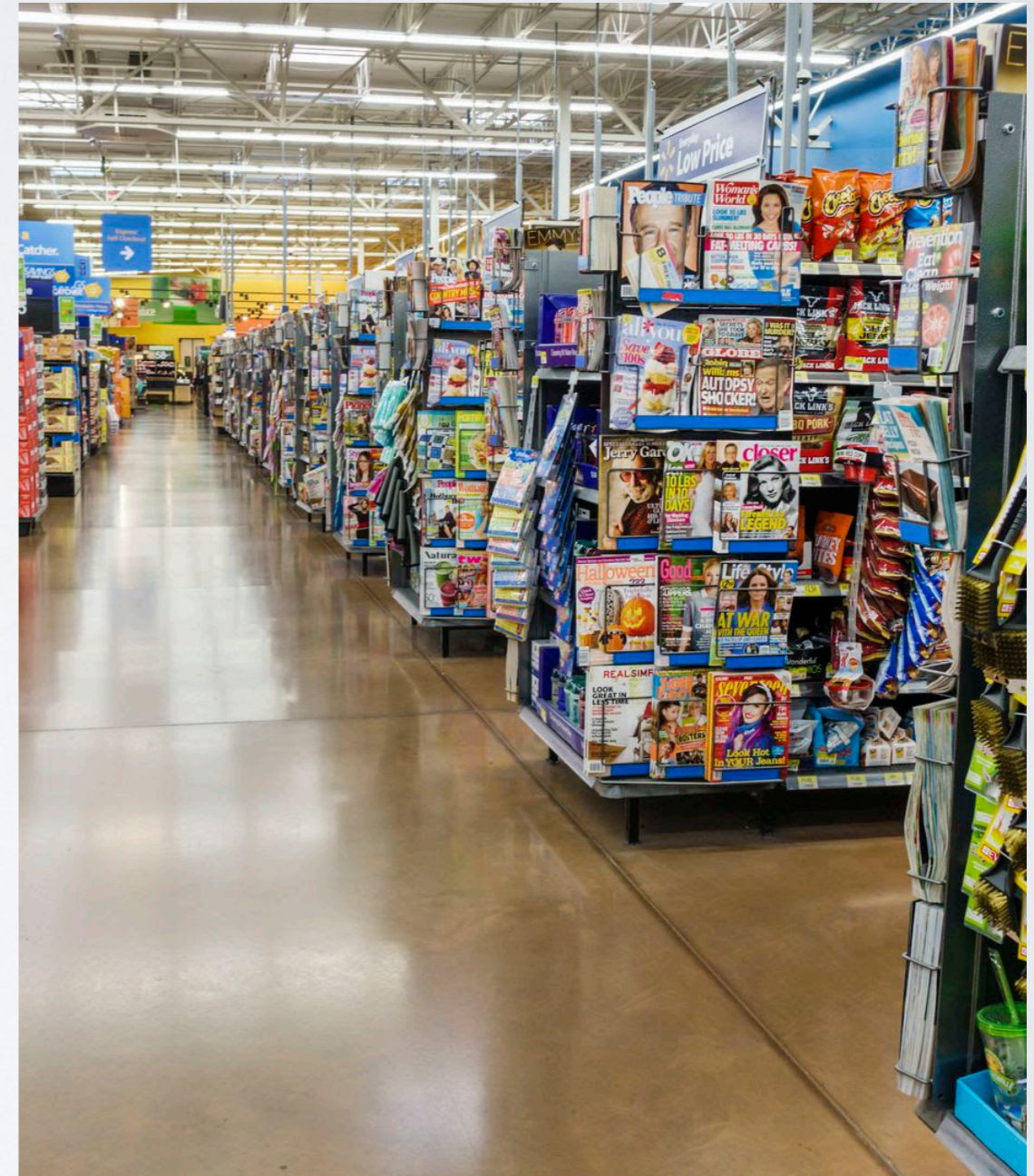
FIRST WAVE OF AUTOMATION

- Gave us *standardized* processes for human laborers
- the Production Line
- Steps in the overall process:
 - Measured
 - Optimized
 - Standardized
- Achieved great efficiencies
- Example: Ford Motor Co.



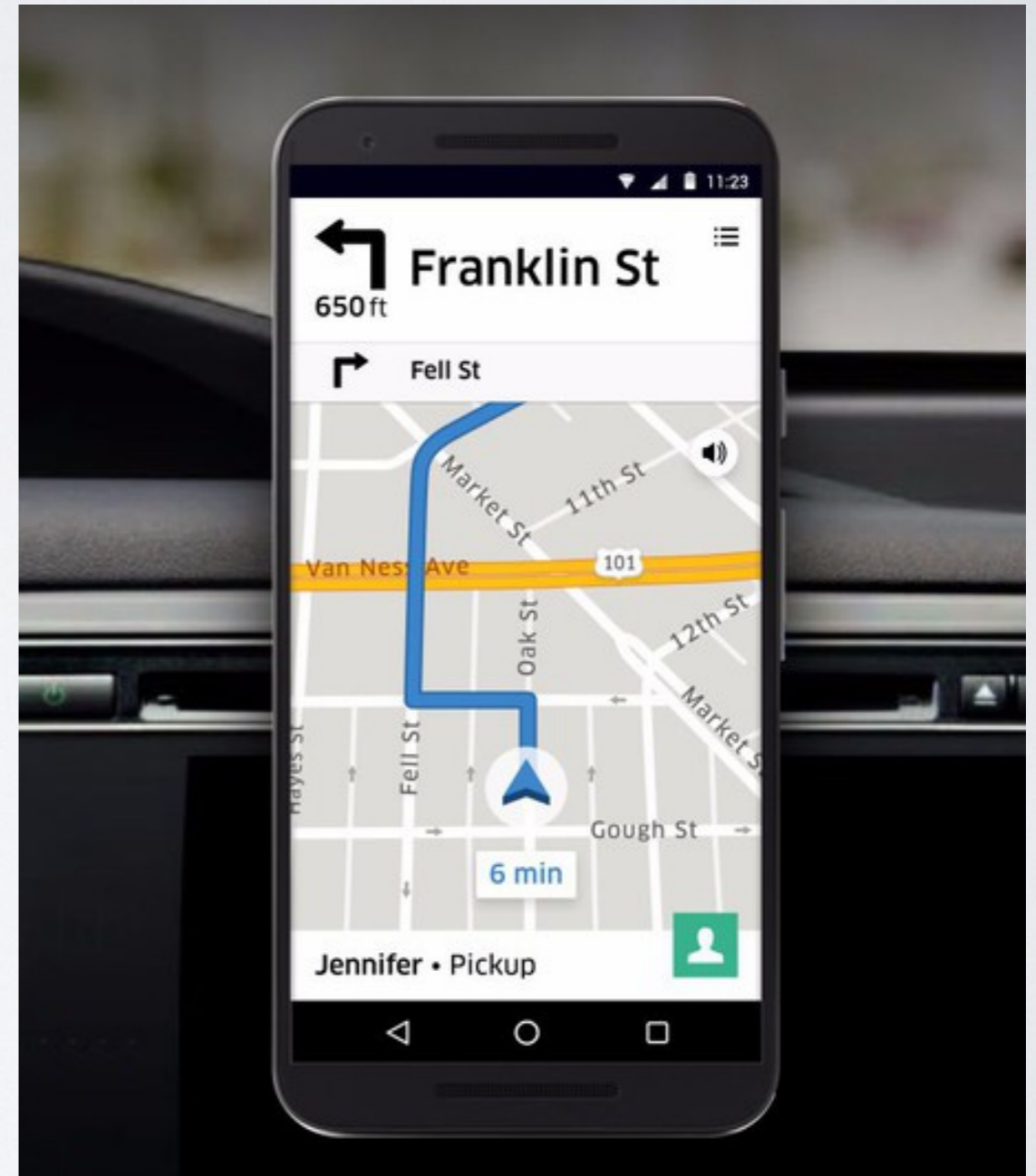
SECOND WAVE OF AUTOMATION

- Gave us *automated* processes for machines
- IT enabled automation of back-office tasks
- Emerged in the 1970's and peaked in the 1990's
- “Business Process Reengineering” (BPR) initiative
- Example: WalMart



THIRD WAVE OF AUTOMATION

- Gave us *adaptive* processes that require humans & machines
- Built upon the first two waves
- Driven by real-time data, available through a network
- **Not** standardized or routine
- Processes are constantly changing
- Example: Uber driver using Google Maps

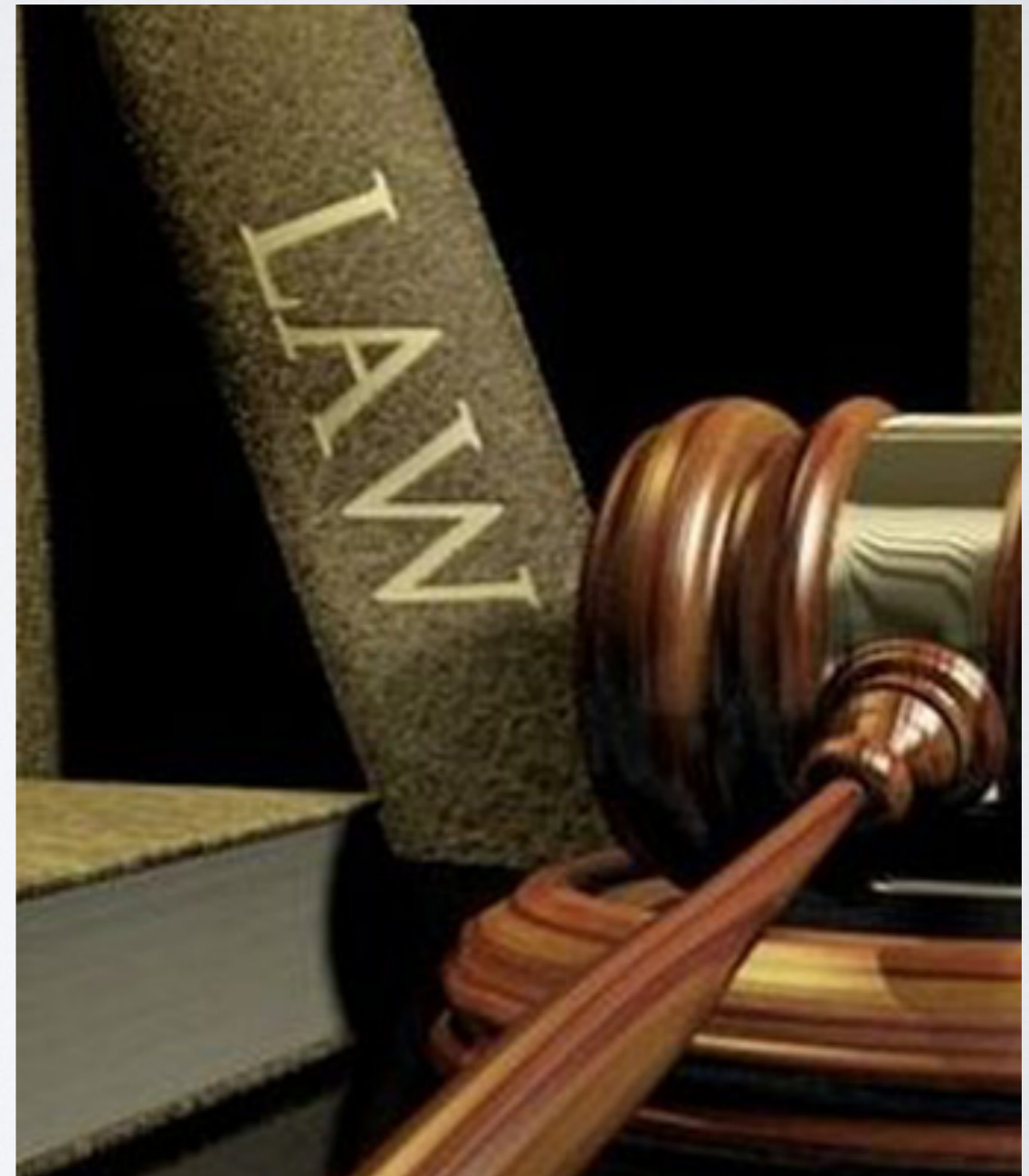


THIRD WAVE MAKES USE OF
ARTIFICIAL INTELLIGENCE

AUTOMATION
OF THE
LEGAL PROFESSION

THE *LEGAL PROFESSION*

- Why have a profession?
 - Particularized knowledge
 - Requires extensive training
 - Requires lots of special data
- Does this sound like AI?



NATURAL FOR AI TO HELP
AUTOMATE THE
LEGAL PROFESSION

THINGS TO KNOW

- Common Law v. Civil Law
- A lawyer may need to know...
 - **Any** law
 - and **Any** judicial opinion
 - in **Any** jurisdiction
- Then discern the right legal advice for that particular client



ONE COUNTRY

- ...with 50 States
 - ...having 3,142 Counties
 - ...with 19,429 Cities
- 100,000+ Laws, Statutes, Rules, Ordinances...
- 3,500,000+ Court Opinions



Liability Trademark
Mining Media Military Funds
Immigration Mergers Statutory Equity
Timber Space Ecclesiastical Security Medical Canon
Advertising Computer International Public Estate
Estates Securities Obscenity Trusts Zoning
Communications Firearm Banking Employee Aviation
Defamation Railway Drug Alcohol Private Art Gaming
Venture Oil Business Agency American Elder
Customs Corporate Rights Native
Class Common Nationality Construction
Services Animal Sports Civil Consumer Insurance
Labor Real Gas Litigation Human Cyber Land
Resolution Water safety Competition Disability Utilities
Interest Capital FDA Product Appellate Hedge
Energy Tort Regulation Cryptography Dispute
Technology Property Contract Administrative
Marital Mutual Control Antitrust
Constitutional Family Markets Commercial
Privacy

Ronald Chichester

A lawyer and legal engineer based in Magnolia, Texas.



[Blockchains](#)

Blockchains for business and commerce, smart contracts, distributed autonomous organizations (digital corporations), business governance. Smart legal contracts, automated business processes, as well as regulatory and antitrust issues related thereto.



[Cybersecurity & Privacy](#)

Matters involving computer/network security such as cybersecurity measures, privacy policies, privacy regulations, security breach and notification requirements, incident response, privacy issues, privacy policies, information technology system audits, corporate espionage, identity theft, and computer crimes.



[Intellectual Property](#)

Patents, Trademarks, Copyrights, Trade Secrets and related Antitrust matters.



[Electronic Discovery](#)

Computer forensics, identification, preservation, acquisition, processing, review, analysis, production, presentation of data for litigation.



[Artificial Intelligence](#)

Development and implementation of systems involving artificial intelligence and machine learning, particularly for workflow automation. Ownership of artificial intelligence and the regulation of artificial intelligence. Litigation involving devices that incorporate machine learning and artificial agents.



[Workflow Automation](#)

Automation of human/software workflow, software development to integrate disparate software systems, document assembly, automated document review, document retention policies.



[Electronic Commerce](#)

Software licensing (both closed source and open source software), contracts, service agreements, end-user license agreements, service level agreements.



[Data Science](#)

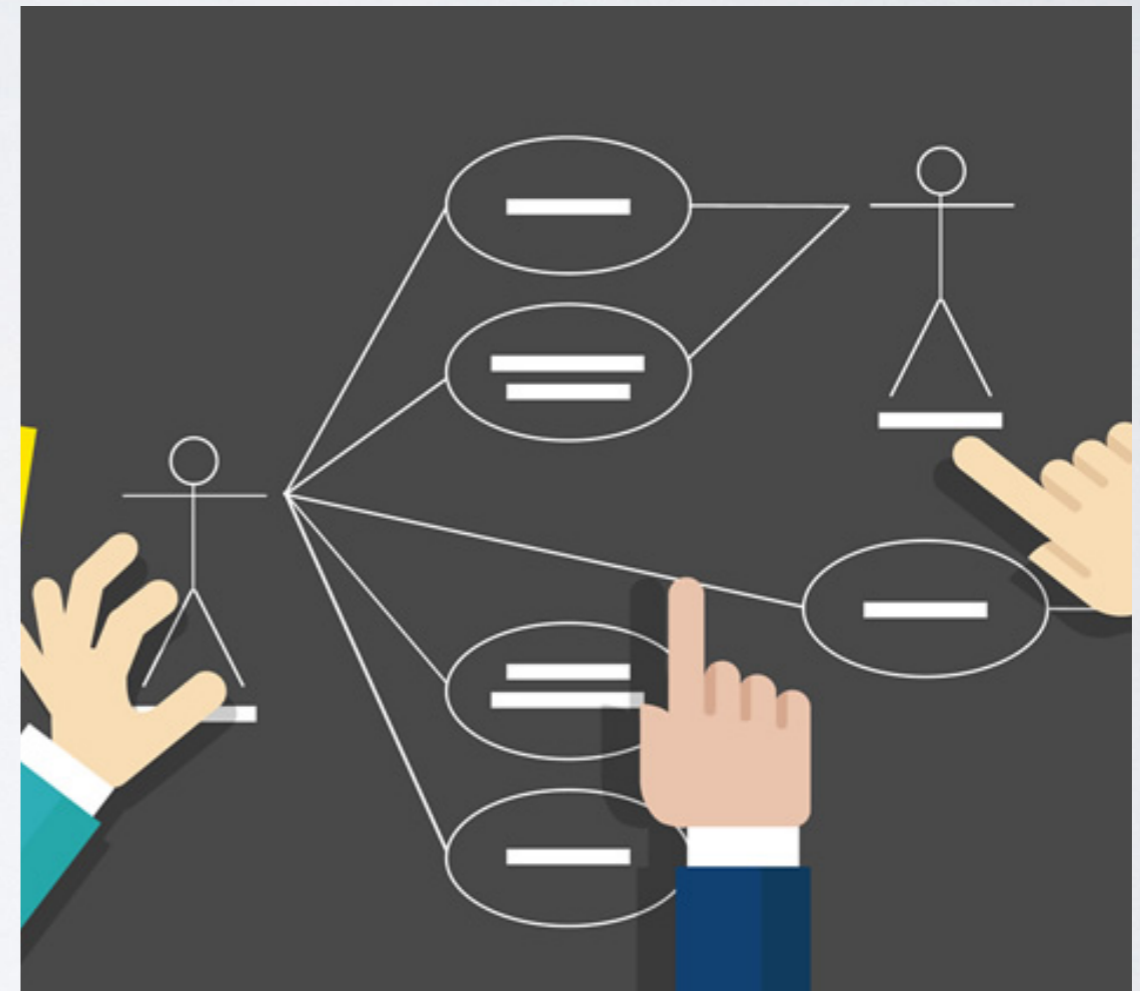
Gathering, formatting and analyzing data in support of litigation as an expert witness. Data mining for law firms and corporations.

The Good News...

- Lots of data
- Lots to automate

USE CASE CATEGORIES

- Due Diligence
- Prediction Technology
- Legal Analytics
- Document Automation
- Intellectual Property
- Client Interactions



<examples>

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[In Re Caremark Intern. Inc. Deriv. Lit., 698 A.2d 959 \(Del. Ch. 1996\)](#)

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☆ Jack L. Marchand II v. John W. Barnhill, Jr. (Blue Bell Creameries USA, Inc.), CA 2017-0586-JRS (Del. Ch. 2018)

Court of Chancery of Delaware

Filed: September 27th, 2018

Precedential Status: Precedential

Citations: None known

Docket Number: CA 2017-0586-JRS

Judges: Slight V.C.

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IN THE COURT OF CHANCERY OF THE STATE OF DELAWARE

JACK L. MARCHAND II,

Plaintiff,

v.

JOHN W. BARNHILL, JR., GREG BRIDGES,
RICHARD DICKSON, PAUL A. EHLERT,
JIM E. KRUSE, PAUL W. KRUSE,
W.J. RANKIN, HOWARD W. KRUSE,
PATRICIA I. RYAN, and DOROTHY
MCLEOD MACINERNEY,

Defendants,

C.A. No. 2017-0586-JRS

Authorities (8)

This opinion cites:

[Rales v. Blasband, 634 A.2d 927 \(Del. 1993\)](#)

[In Re Caremark Intern. Inc. Deriv. Lit., 698 A.2d 959 \(Del. Ch. 1996\)](#)

[Beam Ex Rel. M. Stewart Living v. Stewart, 845 A.2d ...](#)

[Guttman v. Huang, 823 A.2d 492 \(Del. Ch. 2003\)](#)

[Stone v. Ritter, 911 A.2d 362 \(Del. 2006\)](#)

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☆ **Marchand v. Barnhill, 533, 2018 (Del. 2019)**

Supreme Court of Delaware

Filed: June 19th, 2019

Precedential Status: Precedential

Citations: None known

Docket Number: 533, 2018

Author: Leo E. Strine

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IN THE SUPREME COURT OF THE STATE OF DELAWARE

JACK L. MARCHAND II,	§	
	§	No. 533, 2018
Plaintiff Below,	§	
Appellant,	§	Court Below: Court of Chancery
	§	of the State of Delaware
v.	§	
	§	C.A. No. 2017-0586-JRS
JOHN W. BARNHILL, JR., GREG	§	
BRIDGES, RICHARD DICKSON,	§	
PAUL A. EHLERT, JIM E. KRUSE,	§	
PAUL W. KRUSE, W.J. RANKIN,	§	
HOWARD W. KRUSE, PATRICIA	§	
I. RYAN, DOROTHY MCLEOD	§	
MACINERNEY and BLUE BELL	§	
CREAMERIES USA, INC.,	§	
	§	
Defendants Below,	§	
Appellee.	§	

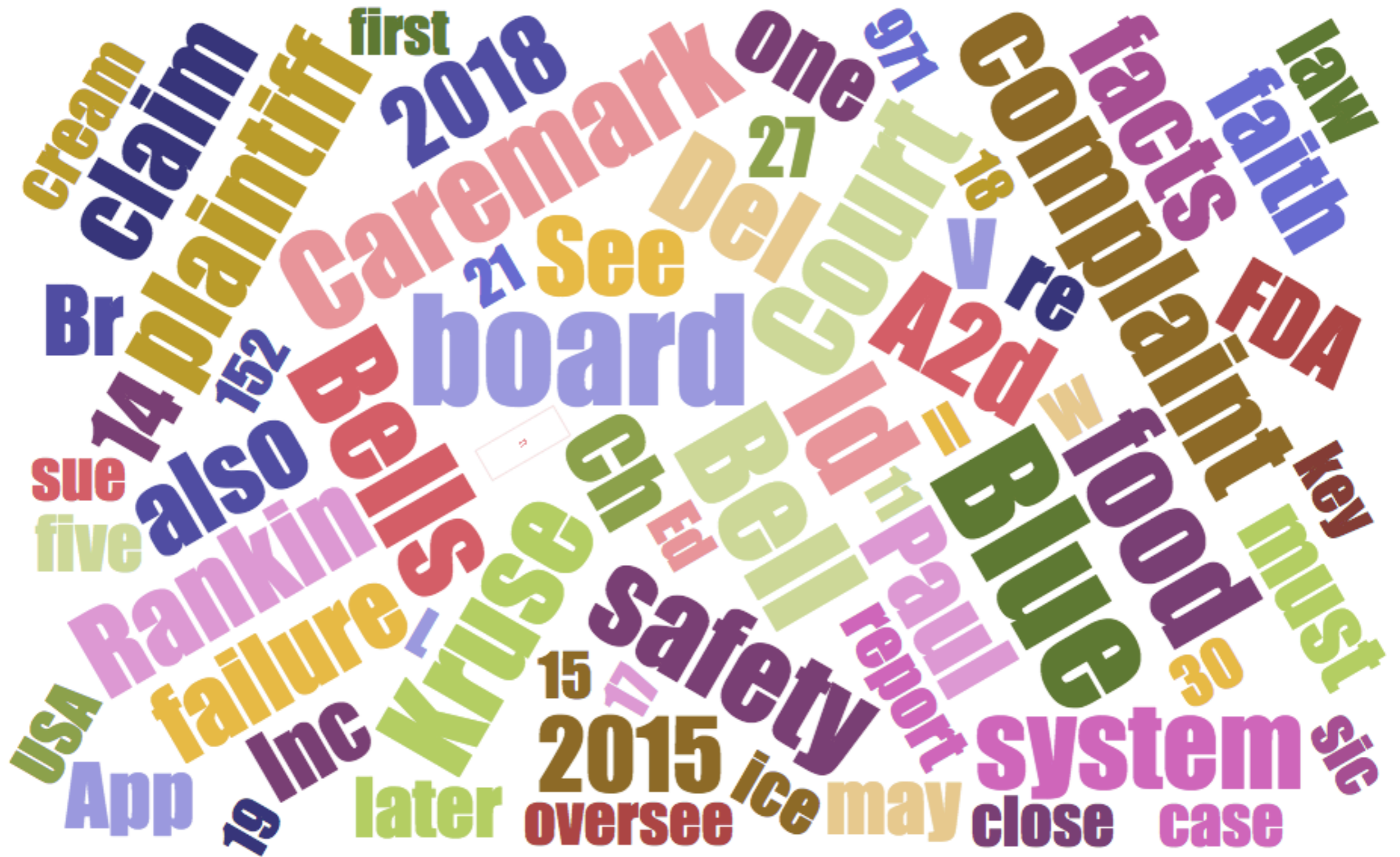
Submitted: April 24, 2019

Decided: June 18, 2019

Corrected: June 19, 2019

Before STRINE, Chief Justice; VALIHURA, VAUGHN, SEITZ, and TRAYNOR, Justices, constituting the Court en Banc.

Upon appeal from the Court of Chancery. REVERSED and REMANDED.



Marchand v. Barnhill, 533, 2018 (Del. 2019)

LOW HANGING (AI) FRUIT

- Back office operations
 - e.g., computer security
 - e.g., estimating profit of case
 - e.g., business intelligence
- Client intake
- Marketing
- NLP tailored to specific niches



AI Chatbots for Client Intake

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Lana: - Please write your question or choose one of the options below:

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[Legal information](#)

[Book an appointment](#)

visitor: [What is D&G Attorneys specialized in?](#)


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Chat With Us

visitor: [What is D&G Attorneys specialized in?](#)

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 [Inheritance](#)

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Chat With Us

[Book an appointment](#)

visitor: [I want to book an appointment for Wednesday](#)

Lana: Here are the available slots for appointment on Wednesday, April 24 th . Please choose preferred hour to continue:

[10:00](#) [11:00](#) [14:00](#) [16:00](#)

[17:30](#)

visitor: [11:00](#)

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	nonprofittechy Update README.md	Latest commit 0c53bb7 on Jun 14, 2018
build	Remove non-functional help button	10 months ago
public	new build	10 months ago
src	Merge changes - refactored search/replace code and added support to r...	10 months ago
.babelrc	polyfill for promise in es5	10 months ago
.gitignore	Fixed local ssl instructions, modified local manifest with unique ID	10 months ago



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ARTIFICIAL INTELLIGENCE

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Hello, Collaboration! How the Future of A.I. Lies With Brand Cross-Pollination

ARTIFICIAL INTELLIGENCE

This AI Predicts Online Trolling Before It Happens

ARTIFICIAL INTELLIGENCE

How Algorithms Can Predict Our Intentions Faster Than We Can

ARTIFICIAL INTELLIGENCE

AI Opportunities Abound, If You Know the Unexpected Places to Look

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Motion analytics ⓘ

Motion type

Motion outcome

Motion type

Motion outcome

Granted

Motions

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Overview Dockets Outcomes **Motions** Expert challenges Appeals References (9,323)

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- Party +
- Attorney +
- Law firm +
- Court +
- Order date +

Motion analytics ⓘ

Motion type Case type Filing role Motion outcome Year

Outcome Time to rule

Motion type	Avg. Time to Rule (Days)	Details
Motion to Dismiss	54 days avg.	Details
Motion for Summary Judgment	77 days avg.	Details
Motion in Limine	28 days avg.	Details
Motion to Compel Discovery	21 days avg.	Details
Motion to Remand	38 days avg.	Details
Motion for Default Judgment	30 days avg.	Details

Number of days

<https://legal.thomsonreuters.com/en/products/westlaw/edge>

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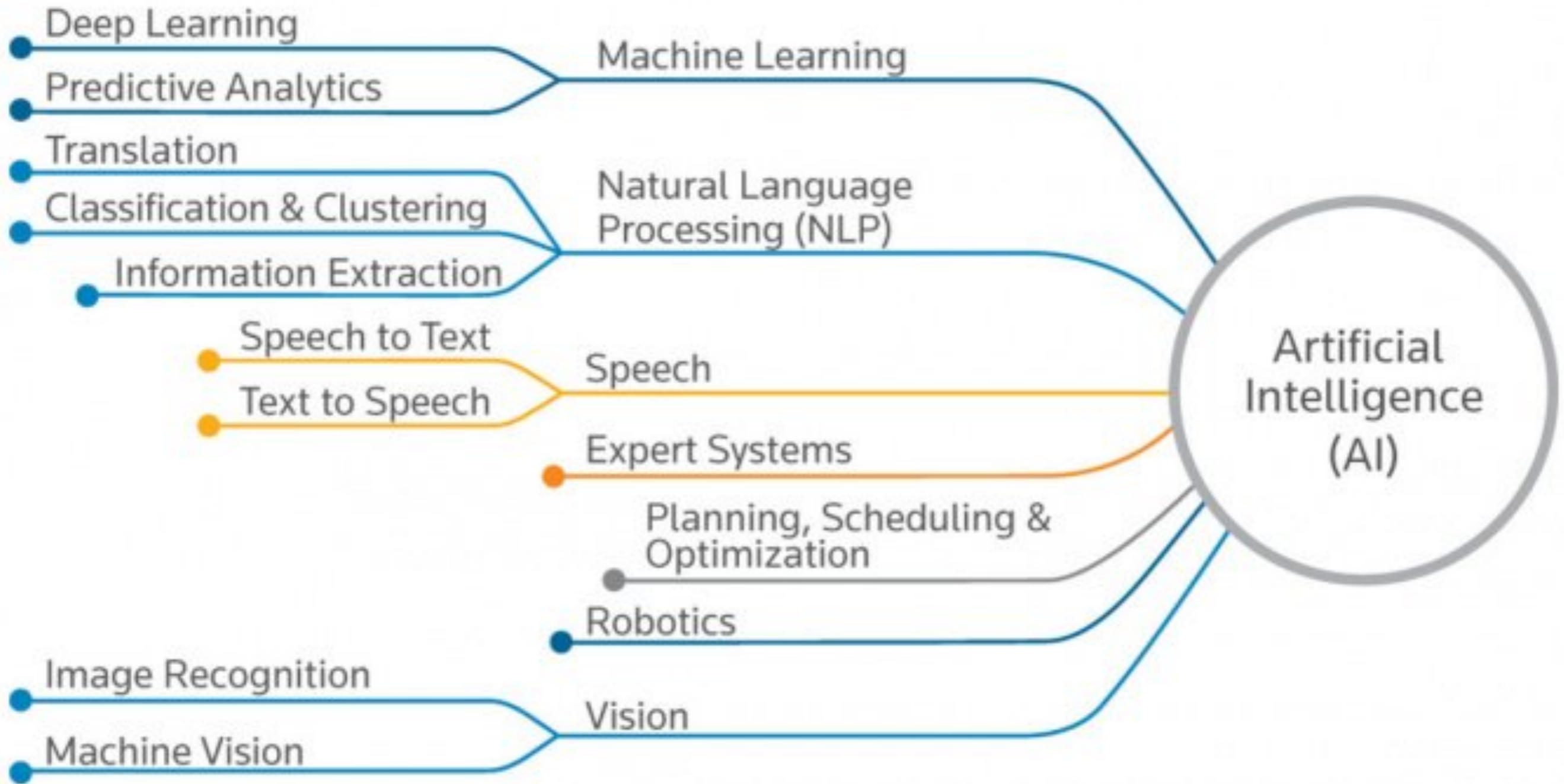
- How likely is a judge to grant or deny a specific motion?
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- How likely is a judge to find infringement of a patent, fair use of a trademark, or a Securities Act violation?

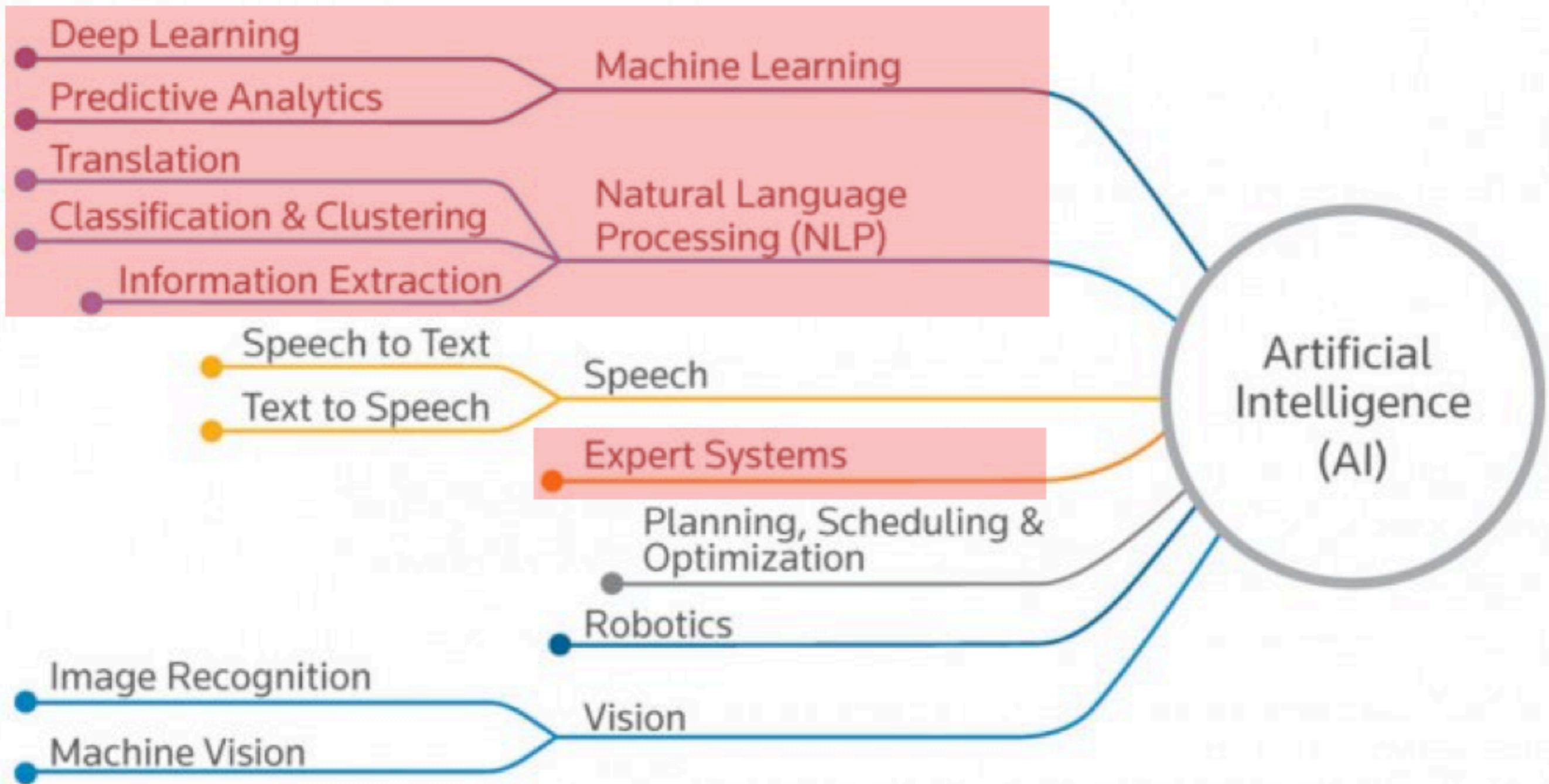


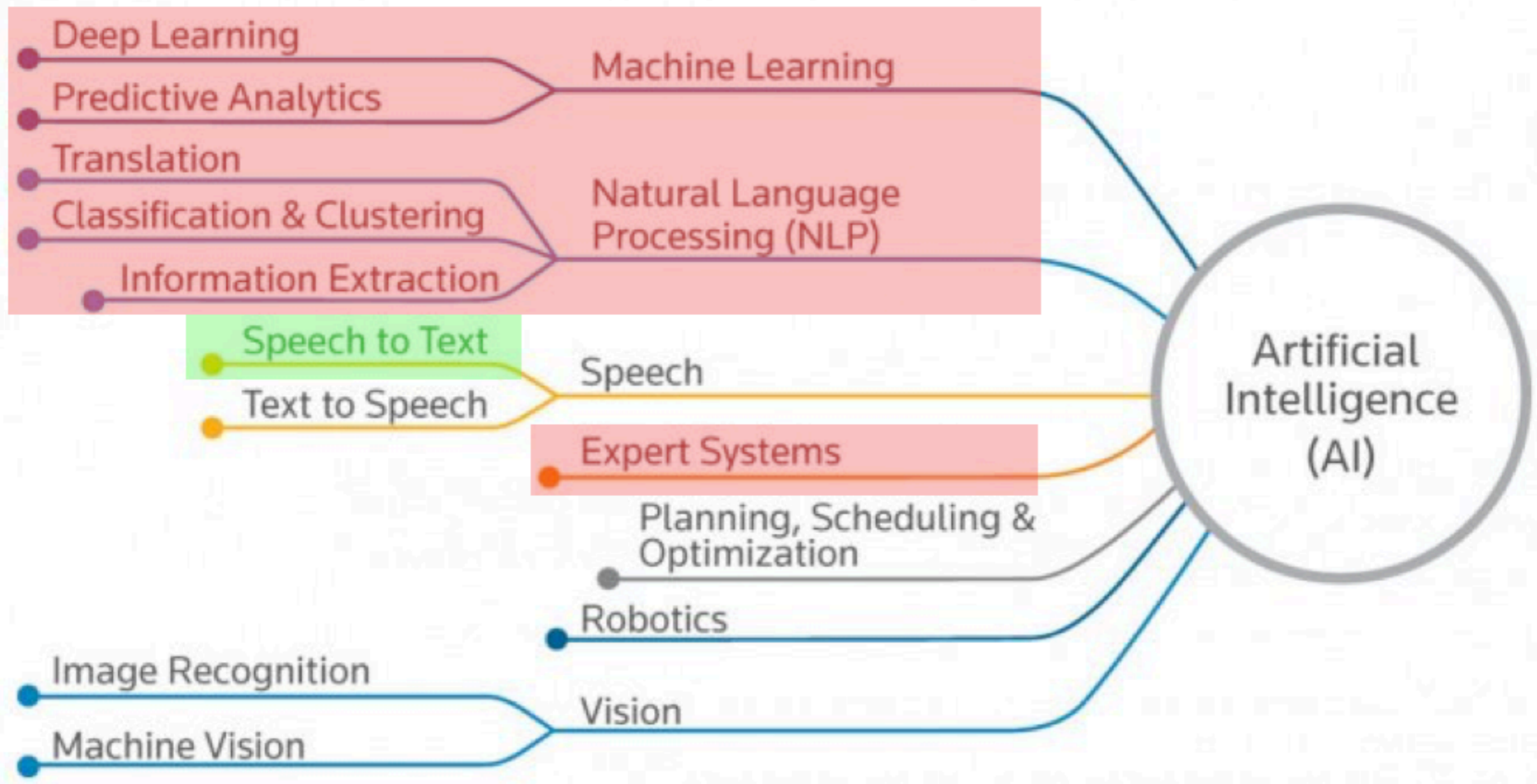
Cases and PTAB Trials

<https://lexmachina.com/legal-analytics/>

THINGS TO KNOW



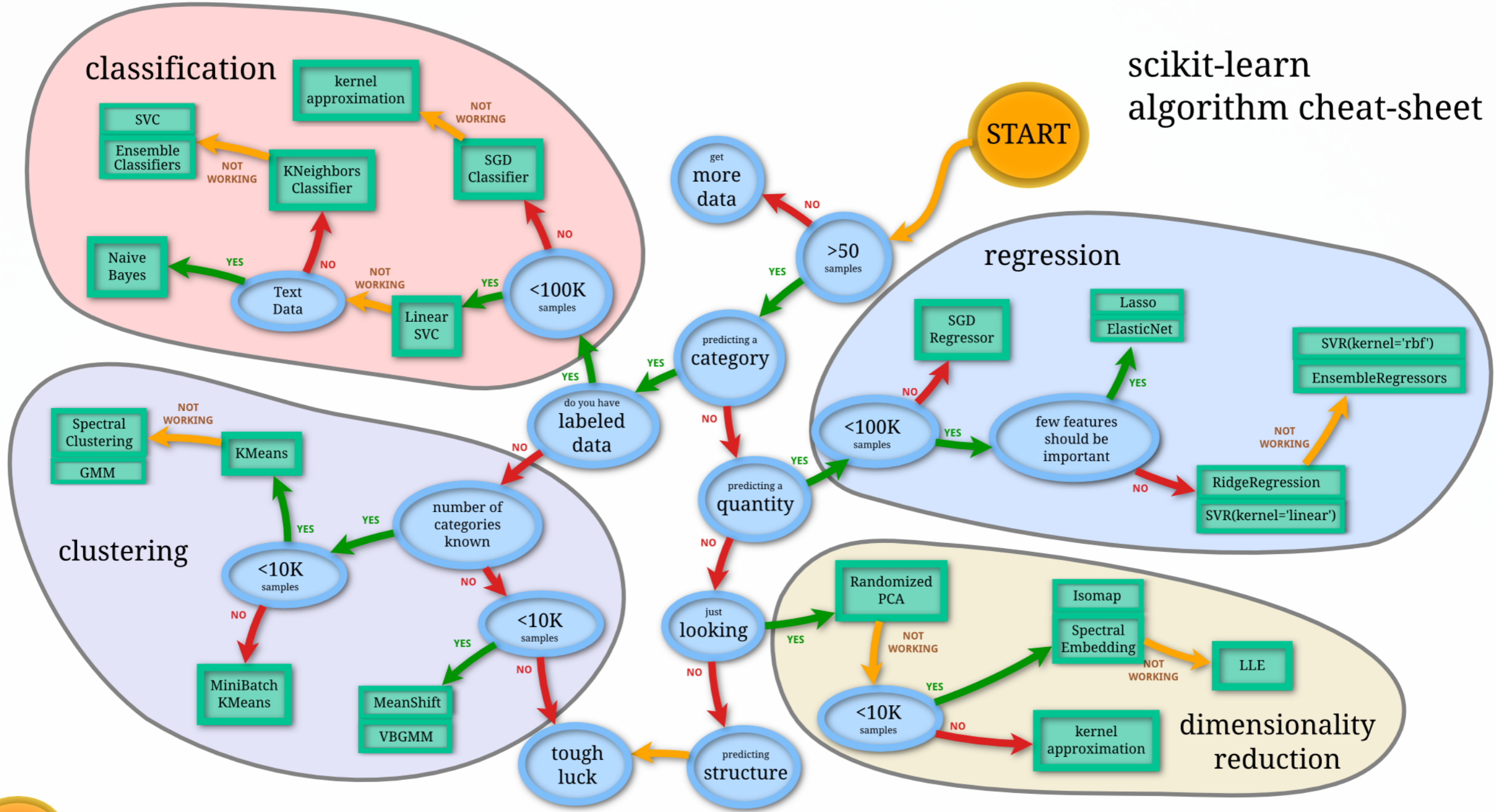




AI is hard (for now)

(But not *nearly* as hard as it *used* to be)

scikit-learn algorithm cheat-sheet



But learning AI yields great benefits

<another example>

NAIVE BAYES

- The problem: Hundreds of court opinions are published each work day. We want to classify them so that we can narrow down what to review
- The solution: Use Naive Bayes to classify the cases into major categories to avoid the uninteresting

NAIVE BAYES

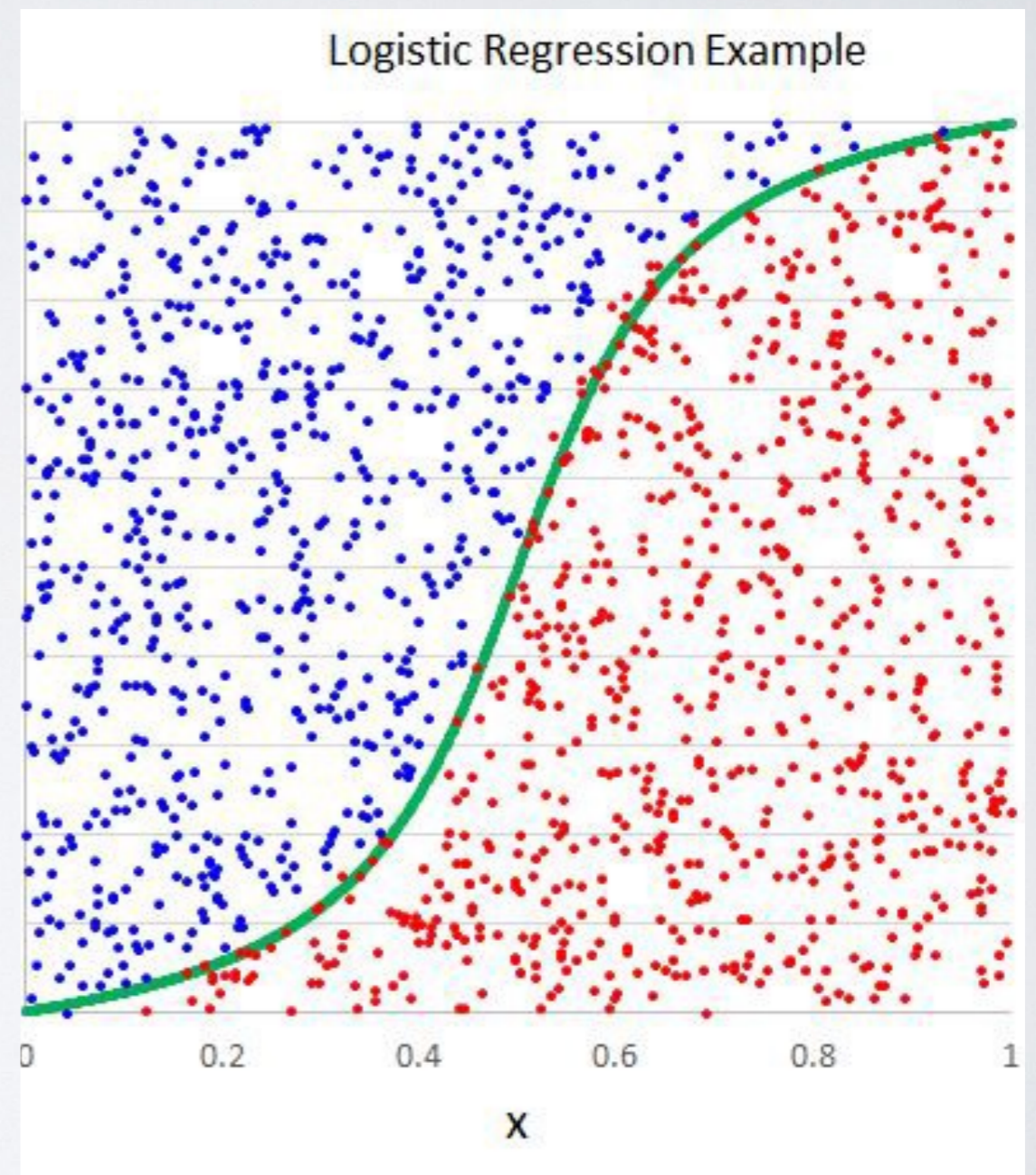
- But Naive Bayes requires training
- How do we get the ML trained?
- Three methods (all require humans)
 - Have user-base classify (continually)
 - Review blogs/papers to identify the interesting
 - Find cites and use that to correlate the practice area

NAIVE BAYES

- Best to make a Bayes filter for **each** area of law
 - Get a percentage for each filter run
 - This accommodates those cases that cover more than one area of the law
 - Once trained, provides good performance (in parallel)
 - Can be used as a pre-filter before specialized processing







DISCRIMINATIVE LEARNING

- Linear or Logistic Regression
- Often not a good fit for legal opinions because the method is too simplistic



TOP PREDICTION ALGORITHMS



	<u>TYPE</u>	<u>NAME</u>	<u>DESCRIPTION</u>	<u>ADVANTAGES</u>	<u>DISADVANTAGES</u>
Linear		Linear regression	The "best fit" line through all data points. Predictions are numerical.	Easy to understand -- you clearly see what the biggest drivers of the model are.	<ul style="list-style-type: none"> X Sometimes too simple to capture complex relationships between variables. X Does poorly with correlated features.
		Logistic regression	The adaptation of linear regression to problems of classification (e.g., yes/no questions, groups, etc.)	Also easy to understand.	<ul style="list-style-type: none"> X Sometimes too simple to capture complex relationships between variables. X Does poorly with correlated features.
Tree-based		Decision tree	A series of yes/no rules based on the features, forming a tree, to match all possible outcomes of a decision.	Easy to understand.	<ul style="list-style-type: none"> X Not often used on its own for prediction because it's also often too simple and not powerful enough for complex data.
		Random Forest	Takes advantage of many decision trees, with rules created from subsamples of features. Each tree is weaker than a full decision tree, but by combining them we get better overall performance.	A sort of "wisdom of the crowd". Tends to result in very high quality models. Fast to train.	<ul style="list-style-type: none"> X Models can get very large. X Not easy to understand predictions.
		Gradient Boosting	Uses even weaker decision trees, that are increasingly focused on "hard" examples.	High-performing.	<ul style="list-style-type: none"> X A small change in the feature set or training set can create radical changes in the model. X Not easy to understand predictions.
Neural networks		Neural networks	Interconnected «neurons» that pass messages to each other. Deep learning uses several layers of neural networks stacked on top of one another.	Can handle extremely complex tasks - no other algorithm comes close in image recognition.	<ul style="list-style-type: none"> X Very slow to train, because they often have a very complex architecture. X Almost impossible to understand predictions.

- Utilizing the law's own search mechanism will yield much better results (95+%) without much effort
- **PLUS!** Use this technique to train the AI and then let the AI identify discrepancies in lawyer's/judge's classification

<things to consider>



TECHNOLOGY IS A TWO-
EDGED SWORD...

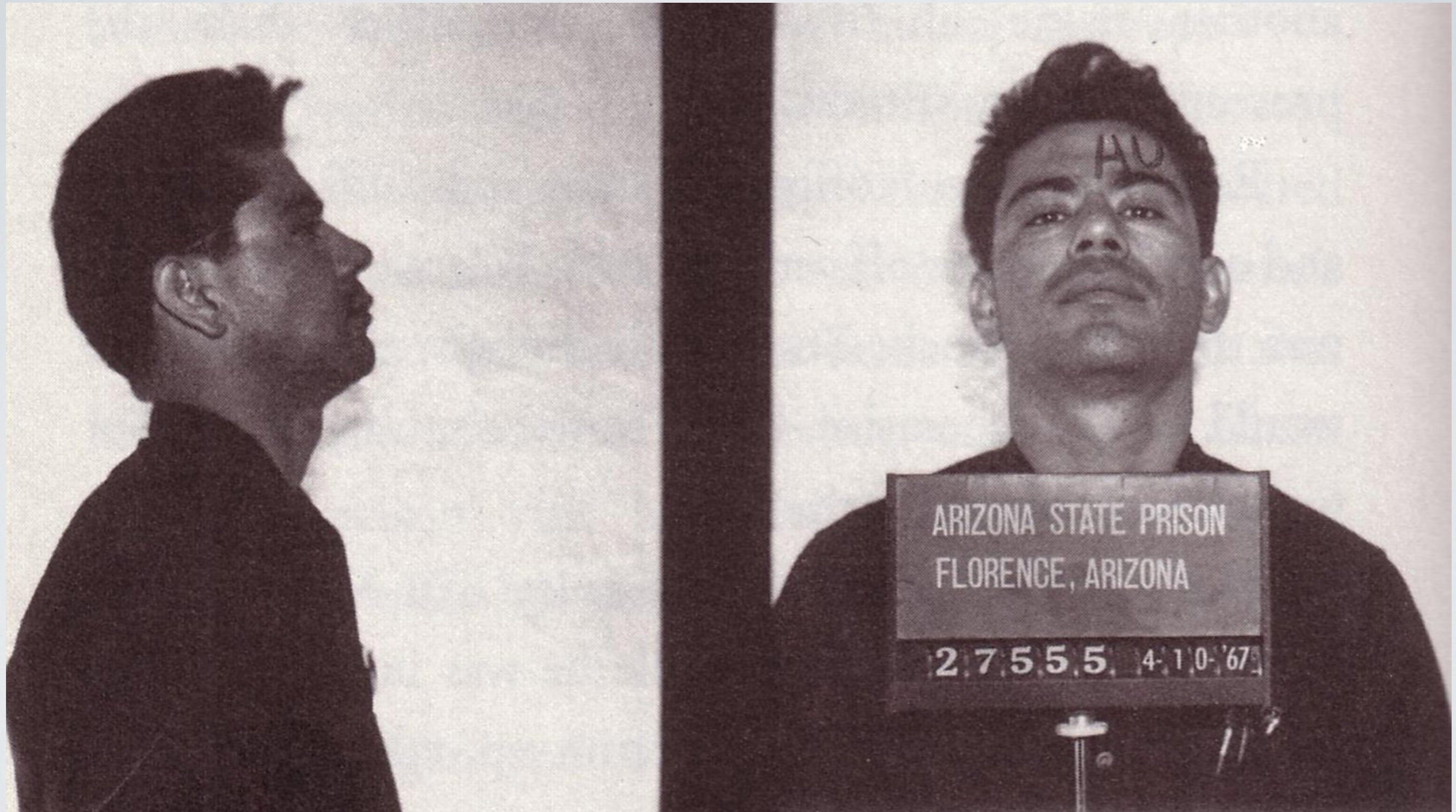
... if you don't own or control it.

WHO OWNS YOUR PRACTICE?

- You *can* develop your own AI
 - You will own it (exclusively)
 - You can tailor it as needed
 - Competitive advantage
- If you don't own the AI, need to know:
 - If permissions will be needed?
 - Who will own the training that you will do to the AI?
 - If others will use your work?



Miranda v. Arizona, 384 U.S. 436 (1966)



MIRANDIZE YOUR AI CONTRACT

- Do I have a right to my work? Will anything that I say or do be learned by the AI? Will what the AI learns from me be used against me in a court of law? Will I be remunerated for training your AI? If I cannot afford the AI in the future, will it be used by my clients?

The practice of law is (becoming) *very*
technology-driven



Find in document



Cass v. 1410088 Ontario Inc., 2018 ONSC 6959 (CanLII)

Document History (1) Cited Documents (9) Cited by (1) CanLII Connects (0)



Date: 2018-11-22
File number: 51145/09
Citation: Cass v. 1410088 Ontario Inc., 2018 ONSC 6959 (CanLII), <<http://canlii.ca/t/hw728>>, retrieved on 2019-06-10



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COURT FILE NO.: 51145/09
DATE: 2018-11-22

ONTARIO SUPERIOR COURT OF JUSTICE

BETWEEN:

Kristen Cass)
Rosemary Book, Counsel for the Plaintiff)

Plaintiff)

- and -)

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Drummond v. The Cadillac Fairview Corp. Ltd., 2018 ONSC 5350 (CanLII)

Document

History (2)

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Date: 2018-09-13

File number: CV-16-560673

Citation: Drummond v. The Cadillac Fairview Corp. Ltd., 2018 ONSC 5350 (CanLII), <<http://canlii.ca/t/hv321>>, retrieved on 2019-06-10



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CITATION: Drummond v. The Cadillac Fairview Corp. Ltd., 2018 ONSC 5350

COURT FILE NO.: CV-16-560673

DATE: 2018/09/13

ONTARIO SUPERIOR COURT OF JUSTICE

BETWEEN:

Stephen Drummond

Plaintiff

– and –

**The Cadillac Fairview Corporation
Limited**

Defendant

)
)
) *Shane H. Katz* for the Plaintiff
)

)
)
)
) *Stuart Woody* for the Defendant
)

) **HEARD:** In writing

Most of this stuff is **free**



Most of this stuff is **free**



NLTK

Scikit-Learn

polyglot



gensim

RasaNLU

spaCy

Python NLP Libraries

Some NLP is already tailored for Law

LexNLP Features

(<https://contrasuite.com/lexnlp-features/>)

Information Extraction

Legal Terms

Extract Legal Terms

Tools for real-world data

Do stuff with text.

- Find dates like effective dates, termination dates, or delivery dates
- Find parties like persons and organizations
- Find durations like terms, notice periods, or assignment delays
- Find references to citations or regulations like “26 U.S.C. 501,” “26 CFR 31.3121,” or “655 F.3d 1013”
- Find references to courts or regulators
- Find controlling law and jurisdictions
- Find copyrights and trademarks
- Find definitions like “Default shall mean...”

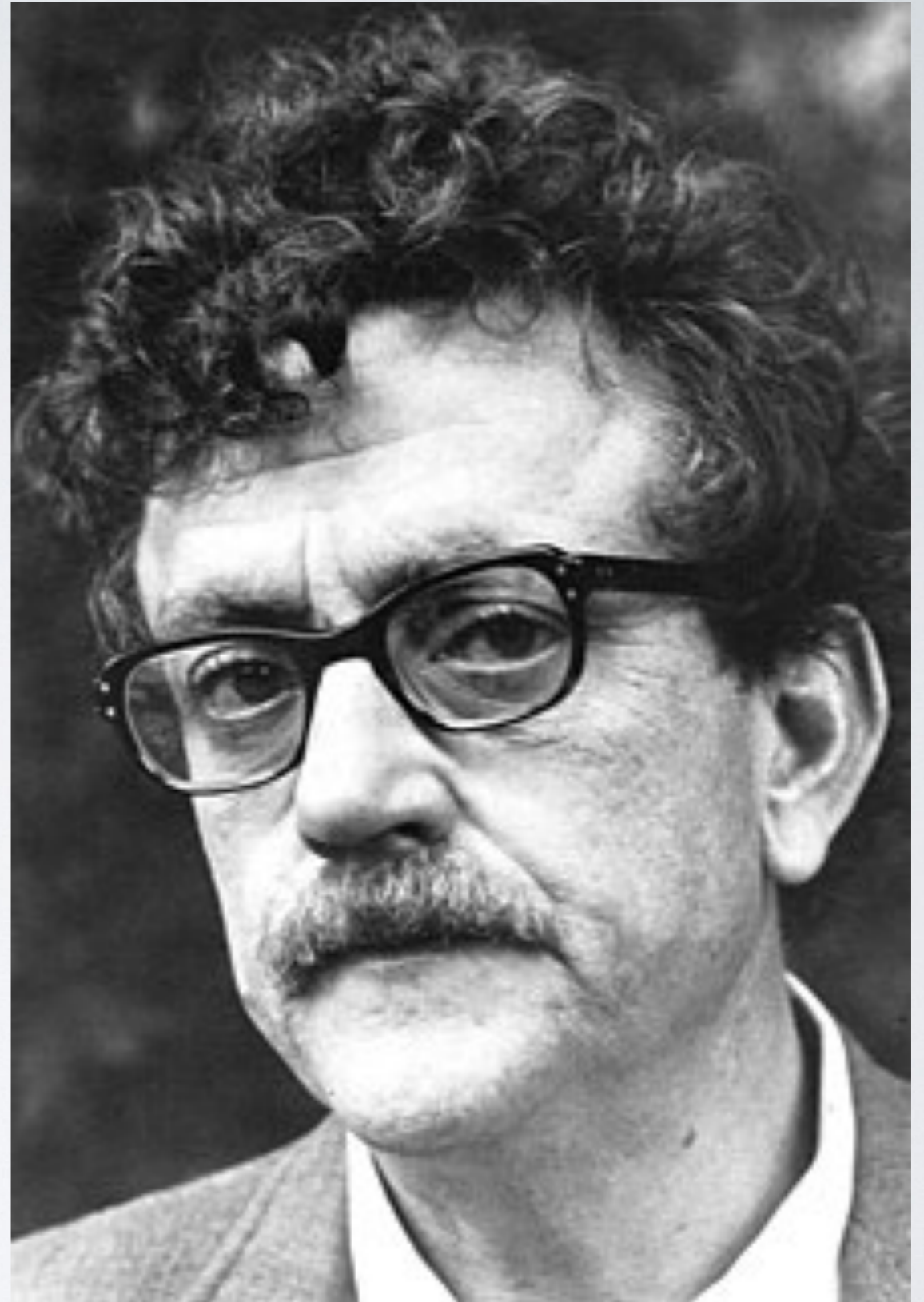
```
>>> import lexnlp.extract.en.durations
>>> text = "This Agreement shall terminate in nine (9) months."
>>> print(list(lexnlp.extract.en.durations.get_durations(text)))
[('month', 9.0, 270.0)]
```


QUESTIONS?

Kurt Vonnegut

If you compete
with a slave...
...you are a slave.

Kurt Vonnegut, *Player Piano* (1952)



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