Artificial Intelligence (AI)
Machine Learning (ML)
Natural Language Processing (NLP)
Analytics

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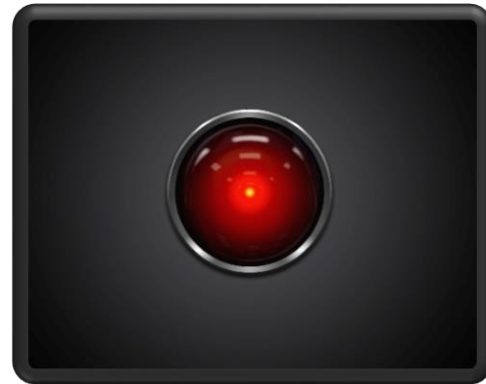
"AI has by now succeeded in doing essentially everything that requires 'thinking' but has failed to do most of what people and animals do 'without thinking.'"

Donald Knuth, Computer Scientist

What is Artificial Intelligence

- A computer system that can perform/mimic tasks normally requiring human intelligence
  - E.g. learning, problem solving, visual perception, speech recognition, decision making, ….

- Requires (today) human beings to develop the algorithms and teach the system what to look for
  - E.g. words, sentences, patterns, exceptions, anomalies,….. i.e. "filling in the blanks" for the algorithm to work
  - Some systems (Cognitive, Deep Learning) can modify the algorithm as the system learn (becomes smarter)
  - The system becomes more and more accurate (smarter) the more it is used

- Usage areas:
  - Due diligence, contract review, predictions on case outcomes, assets and properties, legal search and -research, ….

Source: Neota Logic

Extract of AI-providers in legal:
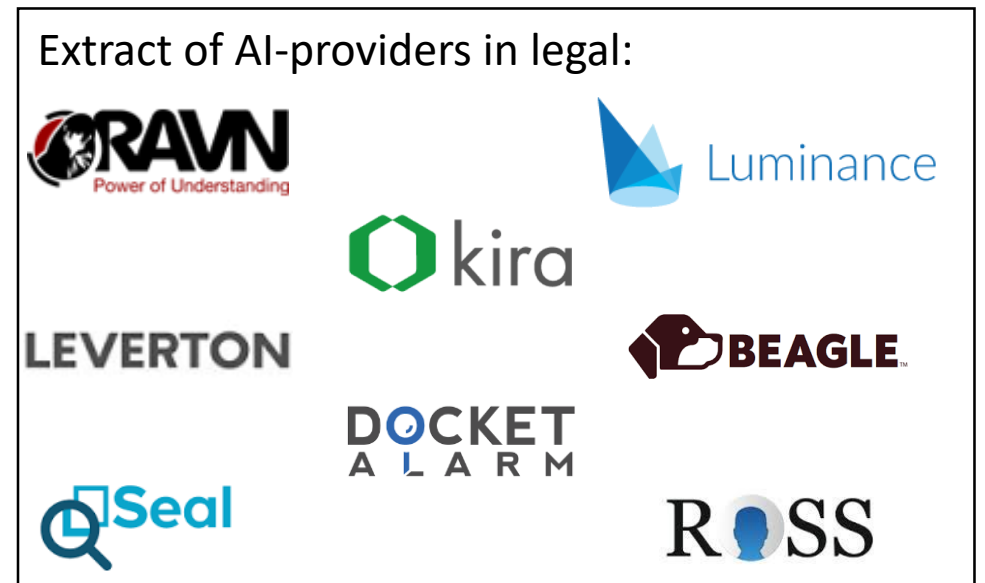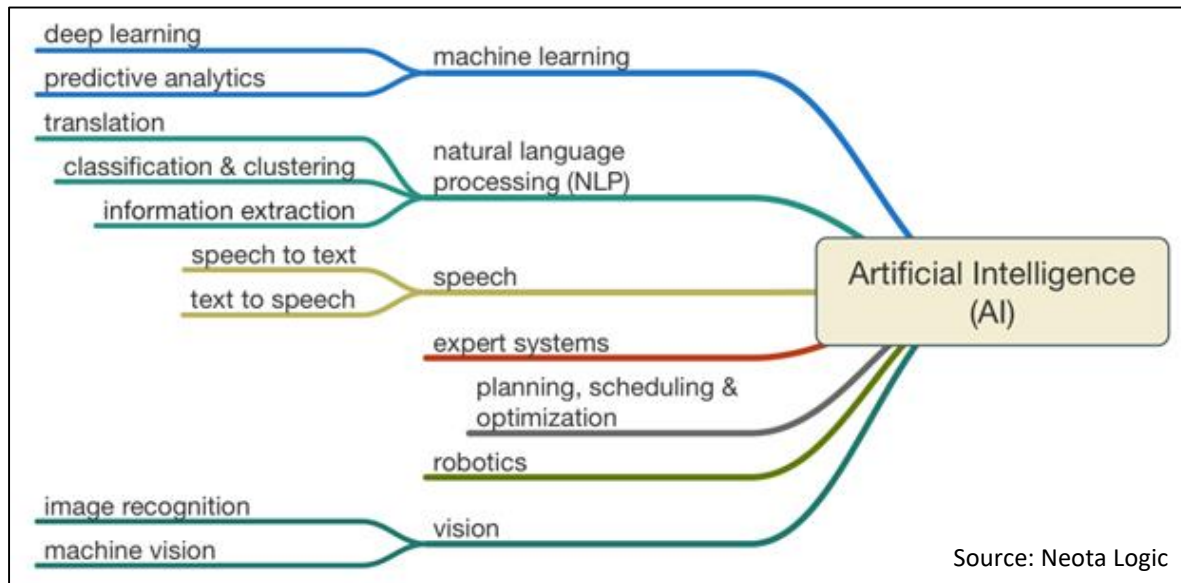
Types of Artificial Intelligence

- **The human brain:**
  - Can process ~**10 quadrillion calculations per second on just 20 watts of power**

- **Applied AI (Weak)**:
  - A machine that can only simulate the mind and human behavior

- **General AI (Strong)**:
  - A machine that is capable of performing any task to the standard of a human
  - Expected to happen around 2030/2040

- **Super AI:**
  - A machine that is more advanced than the human brain
  - Expected to happen hours/days after General AI….
  - Will quickly become millions/billions times more advanced than the humain brain

- **Predefined Purpose AI** (IBM Watson, Apple Siri,….)
  - Pre-programmed to what it should do

- **General Purpose AI** (Google DeepMind)
  - Learns from experience – i.e. is not pre-programmed

- **Roles that require lateral, creative thinking, empathy or social sensitivity are the hardest to automate**

- **Estimate:**
  - 50% of all of today's jobs across the globe will be serviced by AI in 2050

Source: Wikipedia, Google, Oxford Dictionary, RAVN, Deloitte

Why use AI in Legal

- **Fast** – can save 20-90% of the time it takes a lawyer to do the same work

- **Accurate** – the quality of the outcome increases the more the solution is used. Accuracy quickly reaches +90%. A human being typically has an accuracy of ~85%

- **Meticulous** – finds clauses, wordings etc. that lawyers would normally not find

- **Tireless** – works 24/7 with the same speed and quality all the time

- **Inexpensive** – costs less than a digital data room

- **Frees up time** – lawyers can focus on more value creating tasks for the customers

- **Improved profit** – reduced costs and less time spent on tasks that the lawfirm normally can't charge full/normal fees for

- **Improved jobsatisfaction** – lawyers can focus their time on more interesting challenges vs. read tons of documents to find certain clauses etc.

Source: RAVN, et al

General observations about AI in Legal

- Most AI solutions today need to be trained by humans in order to deliver value / high accuracy in results

- Depending on the complexity of the task to be executed, training of the AI solution may take considerable time – time that typically cannot be charged to a customer

- Once trained, the solution becomes smarter and more accurate, the more it is used

- AI solutions already exist – and more are on the way – that are "pre-configured/pre-trained" – i.e. requires little/no training. Known as "Self Service Portals" or "Pay-as-you-go Portals" (e.g. Luminance, RAVN's Extract Direct,…)

- The solution will retain the knowledge in the firm when a lawyer / partner / subject matter expert leave the firm – i.e. loosing a good lawyer may be less of an issue in the future

- Cost of using AI in a due diligence project <u>today</u> (likely to change significantly in coming years) varies greatly

  - **Luminance**: ~EUR 1.200/GB*; **RAVN**: ~EUR 5.000 for 100 contracts (incl. setup)**; **Kira**: ~EUR 10.000 per project

- Potential issues w. AI solutions:

  - Integration to data rooms (encrypted data + access/login), Languages (non-English) and new areas (outside of due diligence/contract mgmt.) may require significant training

*1GB is equivalent to ~ 60.000 (Word) – 650.000 (Txt) pages
** Number of pages in contracts irrelevant

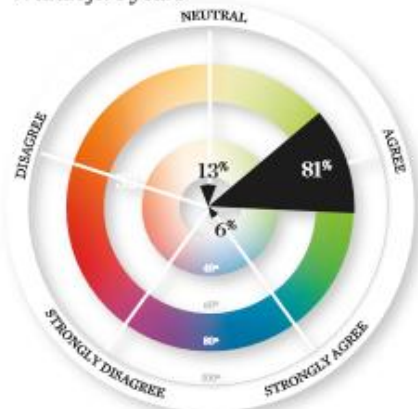Source: Interviews w. vendors and customers
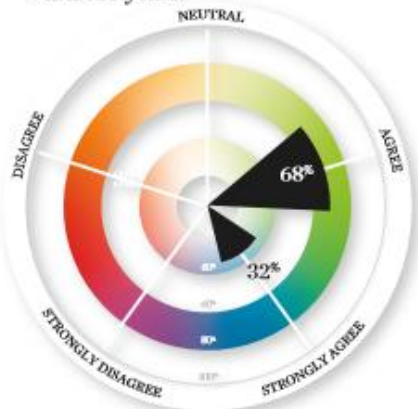
Research on AI in Top 100 Law Firms

Research:
"Cognitive computing/AI systems, whether in-house or third party such as Watson, will result in a significant reduction in the number of fee-earning staff in law firms like mine"
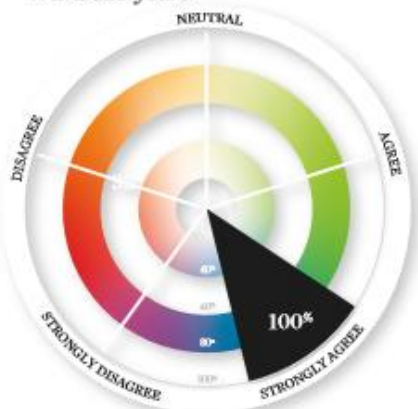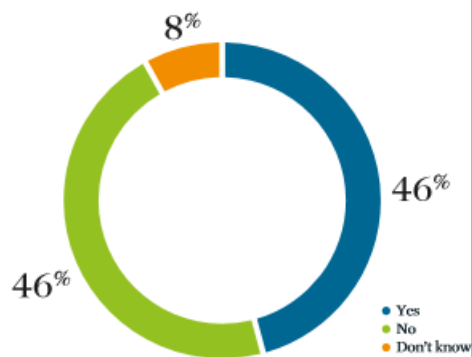**Answer: 87% / 100% agree/strongly agree in 5 / 10 years**

Research:
"Does your firm currently use some form of AI technology"
Answer: 46% Yes

Research:
"Over what timescale do you think your firm will use some form of AI technology"
Answer: 86% within 5 years

AI systems by category

DANSKE
ADVOKATER

eDiscovery
- **DISCO**
- Catalyst
- StormED
- Recommind
- Relativity

Expert Systems
- **Neota Logic**
- Oracle OPA

Legal Research
- **LexisNexis**
- **RavelLaw**
- **ROSS**
- **Thomson Reuters**
- Knomos
- Judicata
- Fastcase
- BlueJ Legal

Legal AI

Prediction
- **Premonition**
- **Predictice**
- **Lex Machina**
- **DocketAlarm**
- PredictGov
- Loom Analytics
- LexPredict
- PatentVector

Contract Analytics
- **Beagle**
- **Luminance**
- **Kira**
- **Leverton**
- **SEAL**
- Thoughtriver
- LitIQ
- Diligen
- eBrevia
- Contract Standards
- LawGeex
- Legalsitter

In **bold**: most well-known solutions

Will AI replace the lawyer?

Video w. a doctor around AI in Medical:
https://www.youtube.com/watch?v=27zPBWSBs-g

No – not on the short term!

Video of Sophia – AI Robot: https://youtu.be/W0_DPi0PmF0

…. and definitely not as long as the solutions cannot represent empathy or emotions

AI can be biased and inefficient across jurisdictions

- In 2016, an investigation by news organization ProPublica found that an algorithm used by the US justice system to determine whether criminal defendants were likely to reoffend, had a racial bias.

- Black defendants with a low risk of reoffending were more likely than white ones to be labelled as high risk.

- M&A cases often have different jurisdictions – making it difficult to use standard algorithms

- Legal documents are open to interpretation and tacit assumption which (currently) require human input

Racistisk Microsoft-chatbot nedsmelter totalt

Det var en stakket frist for Microsofts Twitter-robot Tay, der i sidste uge var racist og onsdag genopstod ved en fejl for derefter at gå i baglås.

Tay blev racist på rekordtid, forsvandt og genopstod som rebelsk hashryger. (Foto: skærmdump)

https://www.ft.com/content/8e228692-f251-11e6-8758-6876151821a6; Law Society

Extract of Leading AI Solution Providers

RAVN

LOCATION: UK

URL: https://www.ravn.co.uk/

INFO:

- Founded 2010: 51 - 200 employees. Acquired by iManage 24th May 2017

- ~45 law firm customers – in DK: Bech Bruun & Kammeradvokaten (Enterprise search) and DJØF (employment contracts)

- Requires RAVN people to setup solution

- Requires training in Danish language

- Price: ~EUR 5.000/100 contracts (Incl setup)

- BLP Real Estate Group: "Completes two weeks work in ~two seconds!"

FUNCTIONAL AREAS:

- Process, Read & Analyze Documents

- Data Extraction and comparison

- Due Diligence & Contract Analysis

- GDPR compliance

- ISDA/CSA Review & Provisions impacted by Brexit

SOLUTION(S):

- RAVN **ACE** – Applied Cognitive Engine

- RAVN **Connect** – Advanced Enterprise search

- RAVN **Extract Direct** - Due Diligence & Contract Analysis – plug n' play (no training of the AI solution required)

- RAVN **Refine** - Categorize data into clear scopes and refinements

- RAVN **LLP Robot** – Doc. Review for legal professional privilege (eDiscovery)

Demo Video:
https://ravn.wistia.com/medias/fqc85hiw83

Intro Video:
https://www.youtube.com/watch?v=XdTLLg6mKf0

Kira

LOCATION: Canada

URL: https://kirasystems.com/
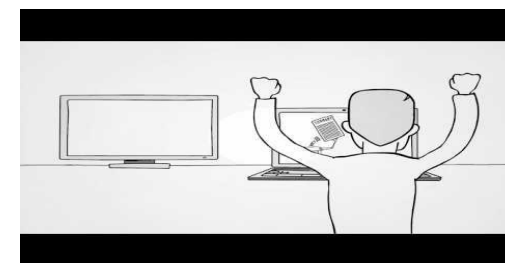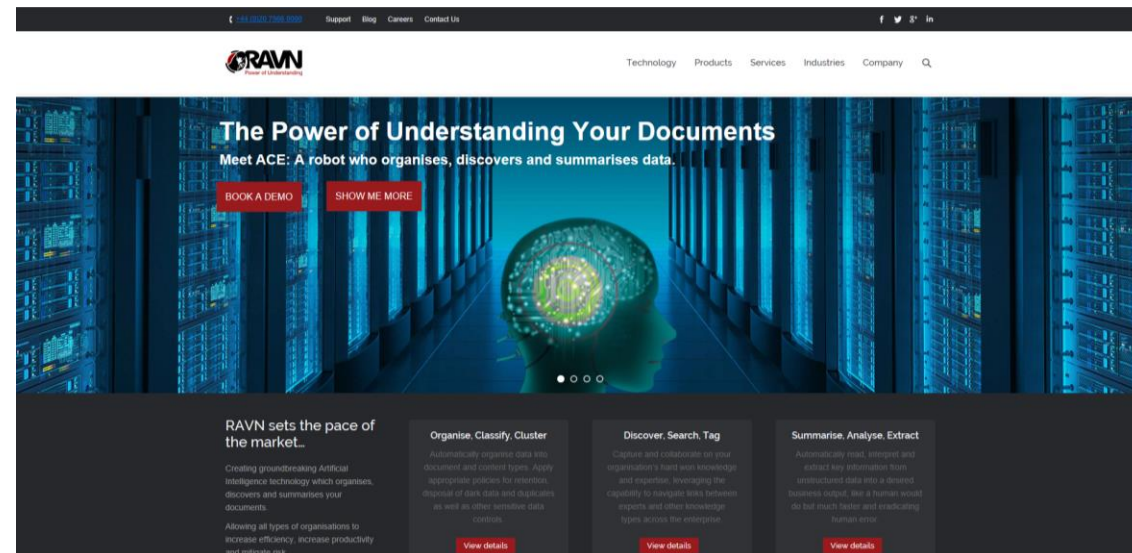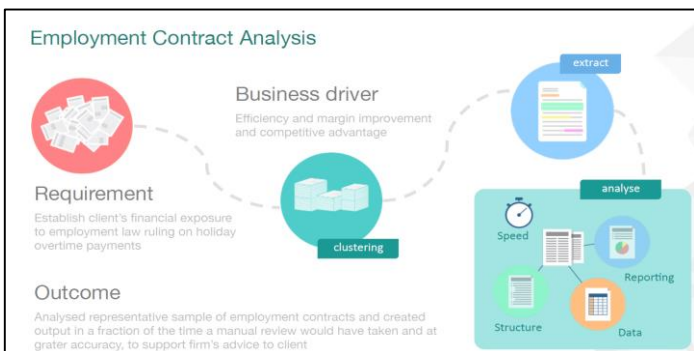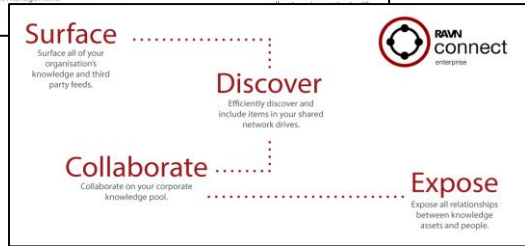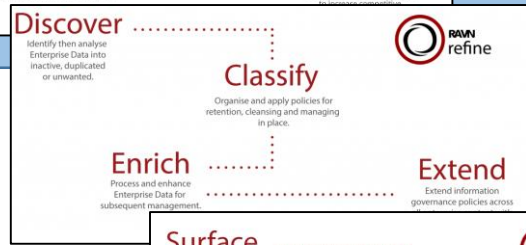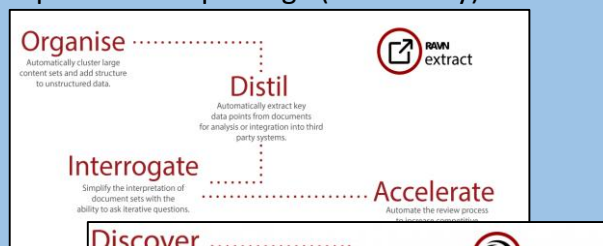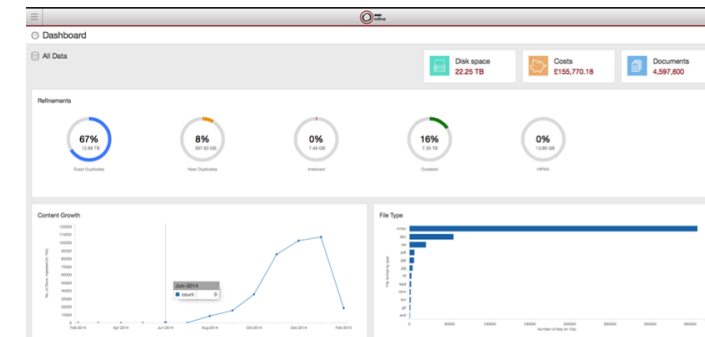
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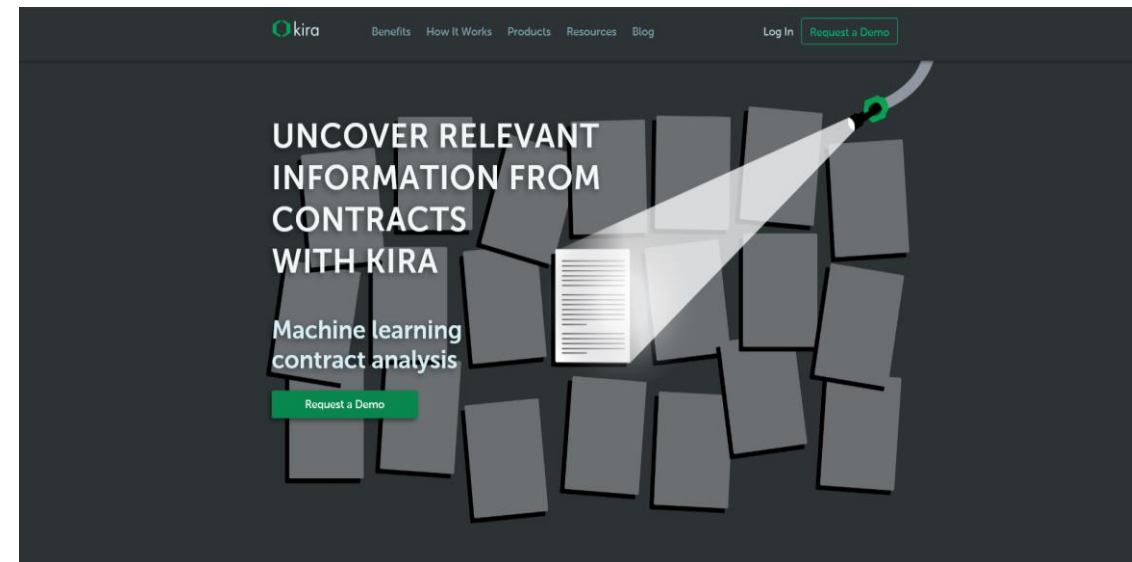
- Founded 2011: 11-50 employees

- Does not require a Machine Learning expert – developed by and for lawyers

- Handles 60+ formats of std. and non-std. forms

- Price: ~EUR 10K per "project"

- Saves 20-90% of time on contract review projects (non-trained vs. trained)

FUNCTIONAL AREAS:

- Contract review, analysis & mgmt.. - Contract Risk mgmt. & Compliance

- Due diligence for M&A and Divestitures

- Post-merger integration / separation

- Regulatory reporting and compliance

- Lease Abstraction – auto-extract and summarize provisions from leases

SOLUTION(S):

- **Kira Quick Study** – create custom provisions and find virtually any relevant contract information

- **Kira Standard**: < 10K docs p.a.; Secure Cloud; 2 built-in provision groups - e.g. change of control, assignment, license grants, indemnity

- **Kira Professional**: Regular contract reviews; Private Cloud; 4 built-in provision groups; API access

- **Kira Enterprise:** Your own technical environment; On-premise; 4 built-in provision groups; API access

UNCOVER RELEVANT INFORMATION FROM CONTRACTS WITH KIRA

Machine learning contract analysis

Request a Demo

Intro Video:
https://vimeo.com/185328372

Luminance

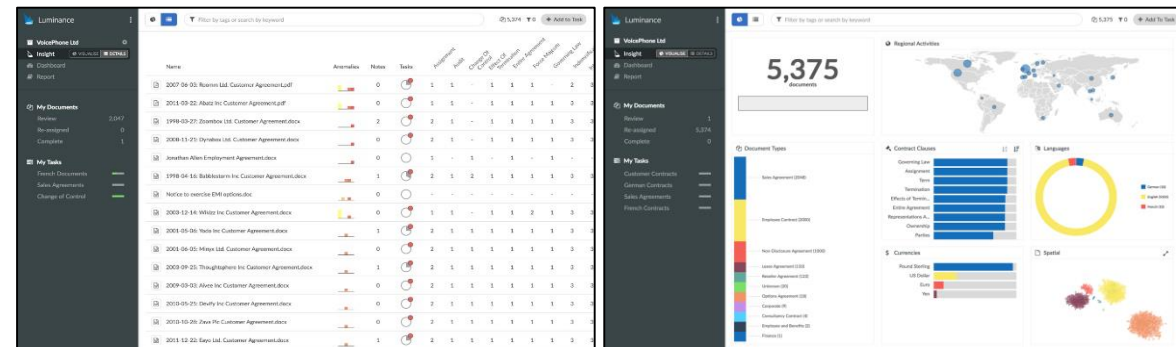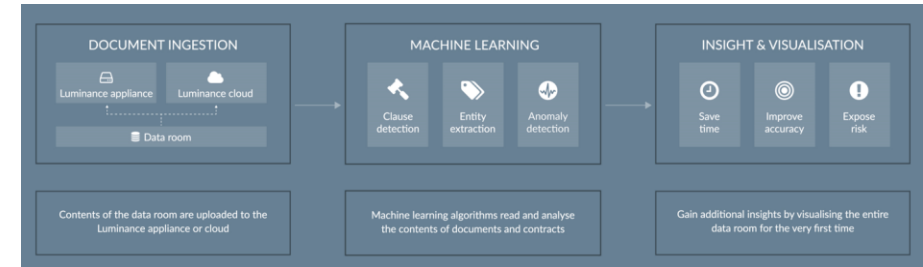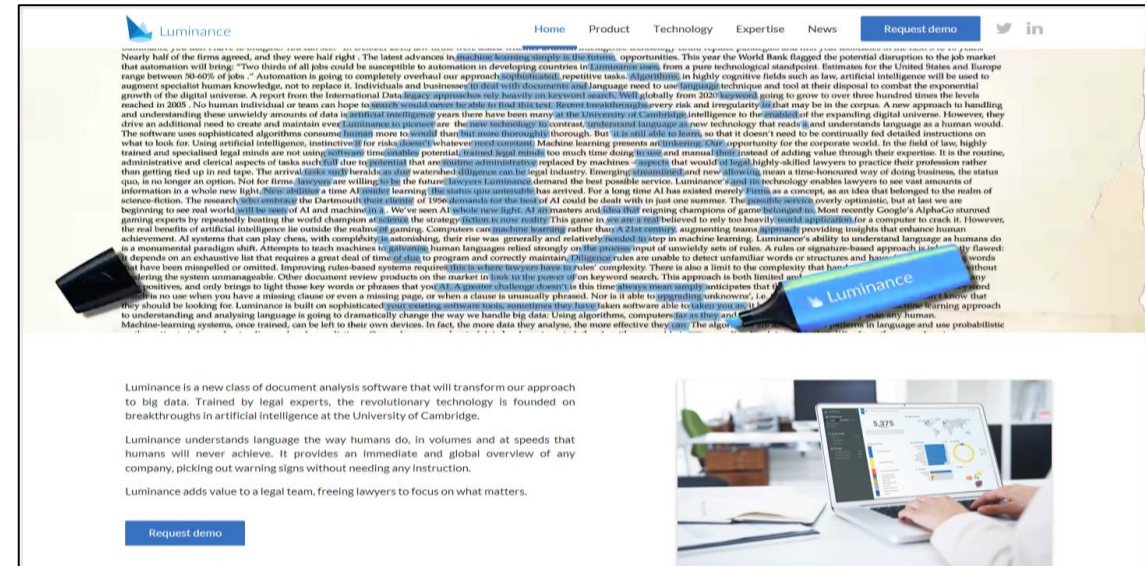**LOCATION: UK**

URL: https://www.luminance.com

INFO:

- Founded 2015: 11 - 50 employees

- Does not require training of the solution – deployed "out-of-the-box" – Plug n' Play

- 8 law firm customers – in Nordics: Roschier and BAHR

- Price: ~EUR 1.200/GB (1GB = ~65K – 650K pages)

- Awarded "Best AI in Legal Tech" by the Global Annual Achievement Awards for Artificial Intelligence

- Cuts research time by 50% (Slaughter & May)

FUNCTIONAL AREAS:

- The solution can in principle be used for any project that requires detecting anomalies – not just in Due Diligence

- Detects patterns in 21 languages and identify anomalies – without being told what to look for

SOLUTION(S):

- Analyses clauses, extracts data and reports exceptions

- Sorts by document and clause type, currency, language and location to make navigation of the data room more intuitive

- Cloud or on premise

- Big Data Visualization – can read and interpret photos and diagrams from e.g. PowerPoint slides or photographs of old documents etc.

Luminance is a new class of document analysis software that will transform our approach to big data. Trained by legal experts, the revolutionary technology is founded on breakthroughs in artificial intelligence at the University of Cambridge.

Luminance understands language the way humans do, in volumes and at speeds that humans will never achieve. It provides an immediate and global overview of any company, picking out warning signs without needing any instruction.

Luminance adds value to a legal team, freeing lawyers to focus on what matters.

Leverton

LOCATION: Germany
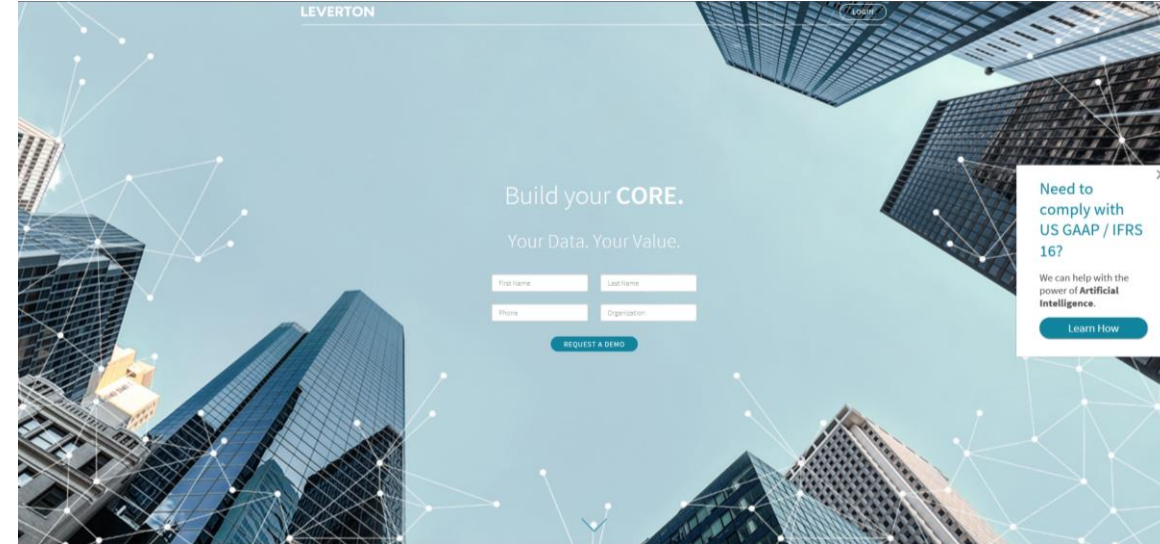
URL: https://leverton.ai/

INFO:

- Founded 2011: 51 - 200 employees

- 100+ customers (not only law firms)

- User friendly – plug n' play – Leverton staff not involved in projects

- Partnership with SAP

FUNCTIONAL AREAS:

- Document & contract mgmt., Due diligence, Real estate, Asset & Property mgmt., Lease abstraction

- Extract provisions from legal documents as attributes - not text

- Attributes: what a clause means not what it states/how it is phrased

- Language agnostic – can be accessed in 21 languages w. no need for translation

- Interfaces (APIs) to ERP systems (SAP,...)

SOLUTION(S):

- CORE – real estate engine – focus on lease documents

- Secure Cloud

ROSS

LOCATION: Canada

URL: https://www.rossintelligence.com/

INFO:

- Founded 2014: 11 - 50 employees

- Intuitive – quick onboarding

- Looks through > 1M legal docs/sec

FUNCTIONAL AREAS:

- Based on IBM Watson Platform

- Legal Research - Searches the law and precedents to produce evidence-based answers

- Bankruptcy-related legal work

- Drafts confidentiality agreements (NDAs)

- Intellectual property

- Employment law

SOLUTION(S):

- ? – no info available

Intro video:
https://youtu.be/ZF0J_Q0AK0E

Short intro video:
https://youtu.be/BO-Ltxk7Hj4
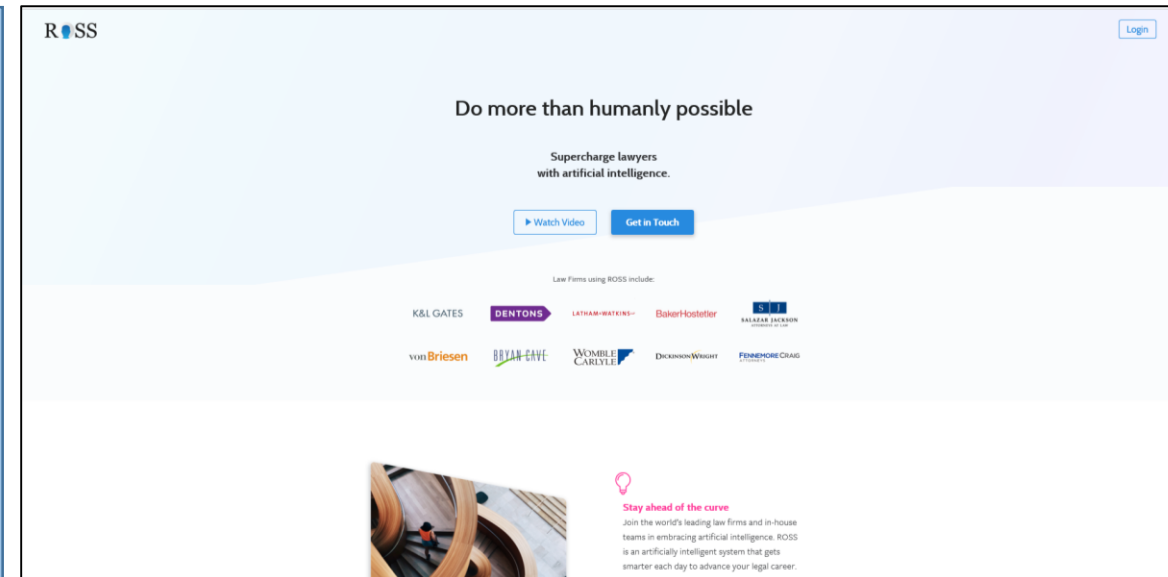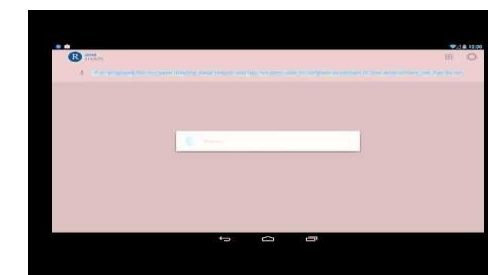
Demo Video:
https://www.youtube.com/watch?v=ODPgh4Jlv_I&feature=youtu.be

Predictive Analytics Solutions

- Predict the outcome of court cases based on multiple criteria, including the courthouse, the judge and type of case.

- Help lawyers decide whether the case is worth taking to court at all and therefore avoiding unnecessary and substantial costs for their client

- **Predictice** - https://www.predictice.com/
  - Predict the likely outcome, costs, duration, etc of legal cases
  - Set up alternative routes through a case and which route(s) have the highest likelihood for success
  - Identify alternative conflict resolution options than a court case
  - Provide the lawyer an opportunity to price the case according to the risk

- **Premonition** - https://premonition.ai/
  - Judge report Video: https://youtu.be/RcymU2SsZGc?list=PLAlMfwckplcwkIuUYKjGFlcLr0rhIikMK

- **Ravel Law** - http://ravellaw.com/
  - Court analytics Video: https://vimeo.com/194135471?from=outro-embed
  - Judge analytics Video: https://vimeo.com/163718987
  - Case analytics Video: https://vimeo.com/163718479
  - Ravel law & Harvard University Video: https://www.youtube.com/watch?v=kwlN_vhai84

- **Lex Machina** - https://lexmachina.com/

- **Docketalarm** - https://www.docketalarm.com/
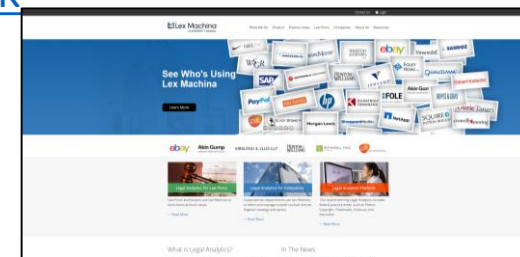
Neota Logic – AI Expert System

NE⊙TA
LOGIC

LOCATION: US

**URL:** https://www.neotalogic.com/

INFO:

- Founded 2010: 11 – 50 employees

- Development of apps without coding – drag n' drop tool

- Expert system typically used together with other systems, e.g. RAVN (AI), HighQ (Workflow)

FUNCTIONAL AREAS:

- Integration to several external systems, HighQ, SharePoint, iManage, K2, Nintex, OpenText and databases – various SQL versions

- Lease contract review & risk assessment in collaboration w. HighQ and RAVN
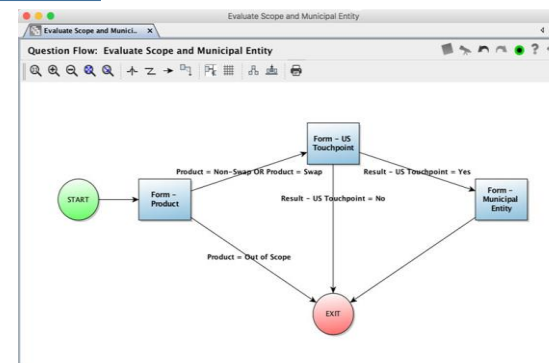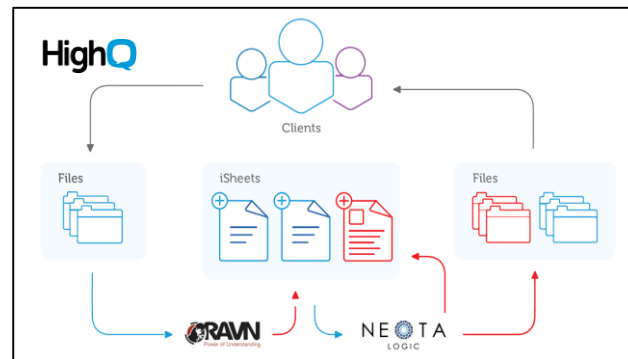
SOLUTION(S):

- **Neota Logic Systems (NLS) Reasoning Engine** w. decision trees, If/then mapping, Decision tables, Multi-value variables

- **NLS Workbench** – Visual drag n' drop tool for building apps w. automatic testing, debugging and documentation

- **PerfectNDA** - Fully automated creation, negotiation, execution and filing of your NDAs

Overview Demo:
https://youtu.be/2AGbGa5hdy4
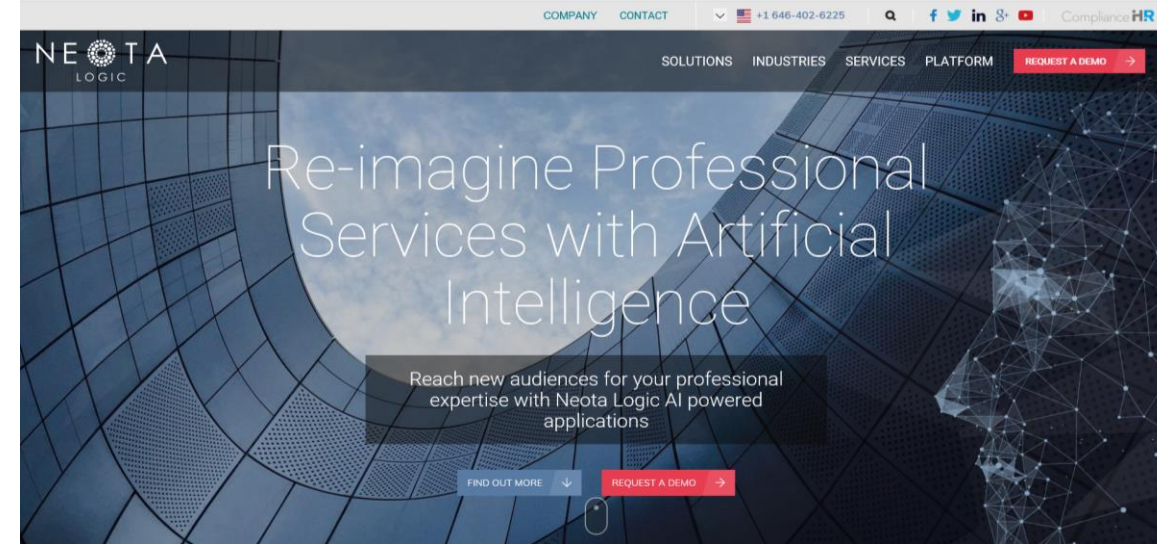
Additional Reading

When Google made a "giant leap" of 10 years!
Google's DeepMind won over the grand master Lee Sedol in the game "GO"

- The game "GO":
  - The most complex strategy game in the world
    More possible moves than atoms in the universe! => impossible for a computer to calculate all possible moves on the board!

- Google DeepMind – a new kind of AI:
  - Deep Reinforcement Learning = General Purpose AI (learns from experience – i.e. is not pre-programmed)
  - Trained with 100.000 different games/outcomes + played against itself 40M times to learn from it's mistakes!
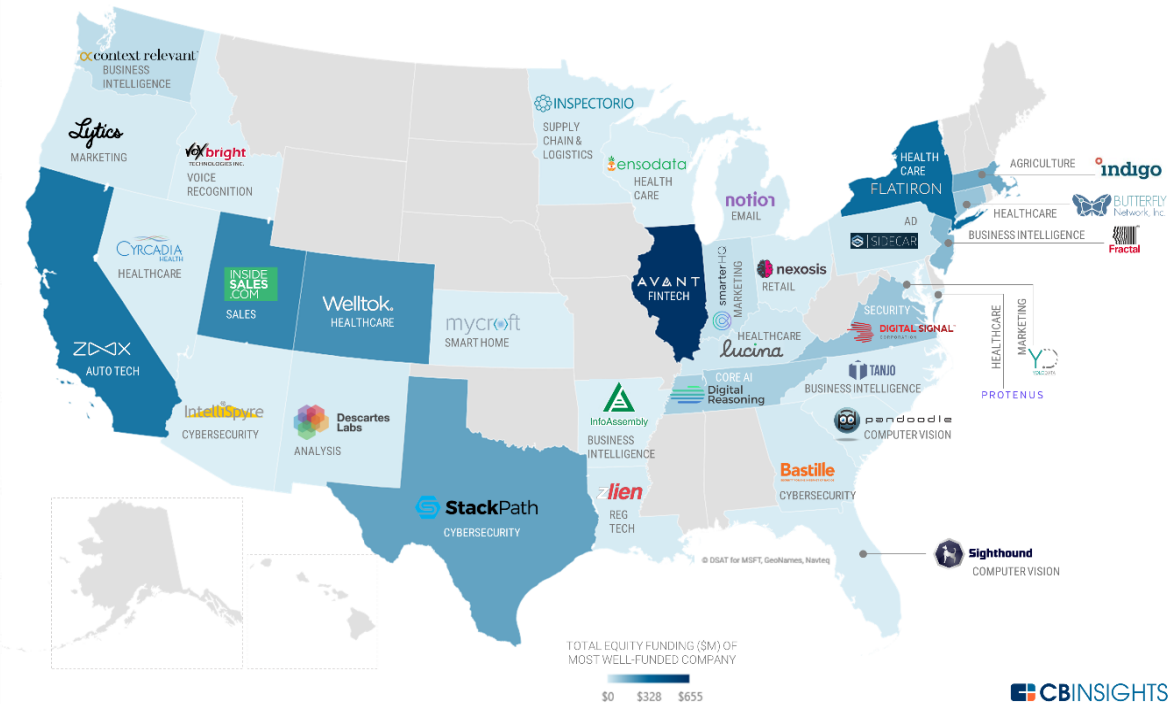

March 2016
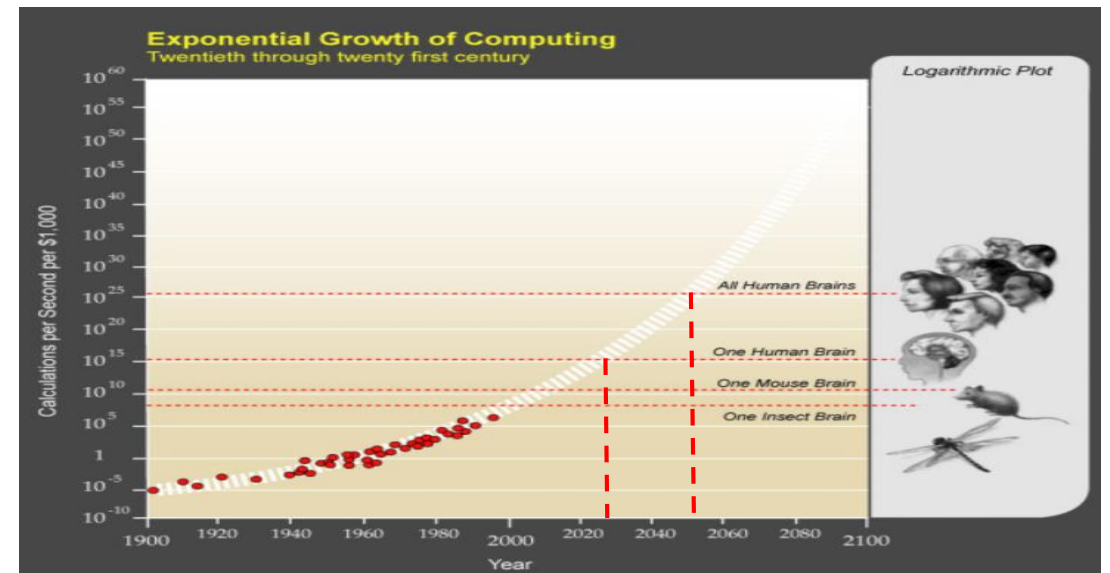
Most active Corporate investors in AI: 2011 – 2016

Most funded AI startups in the USA

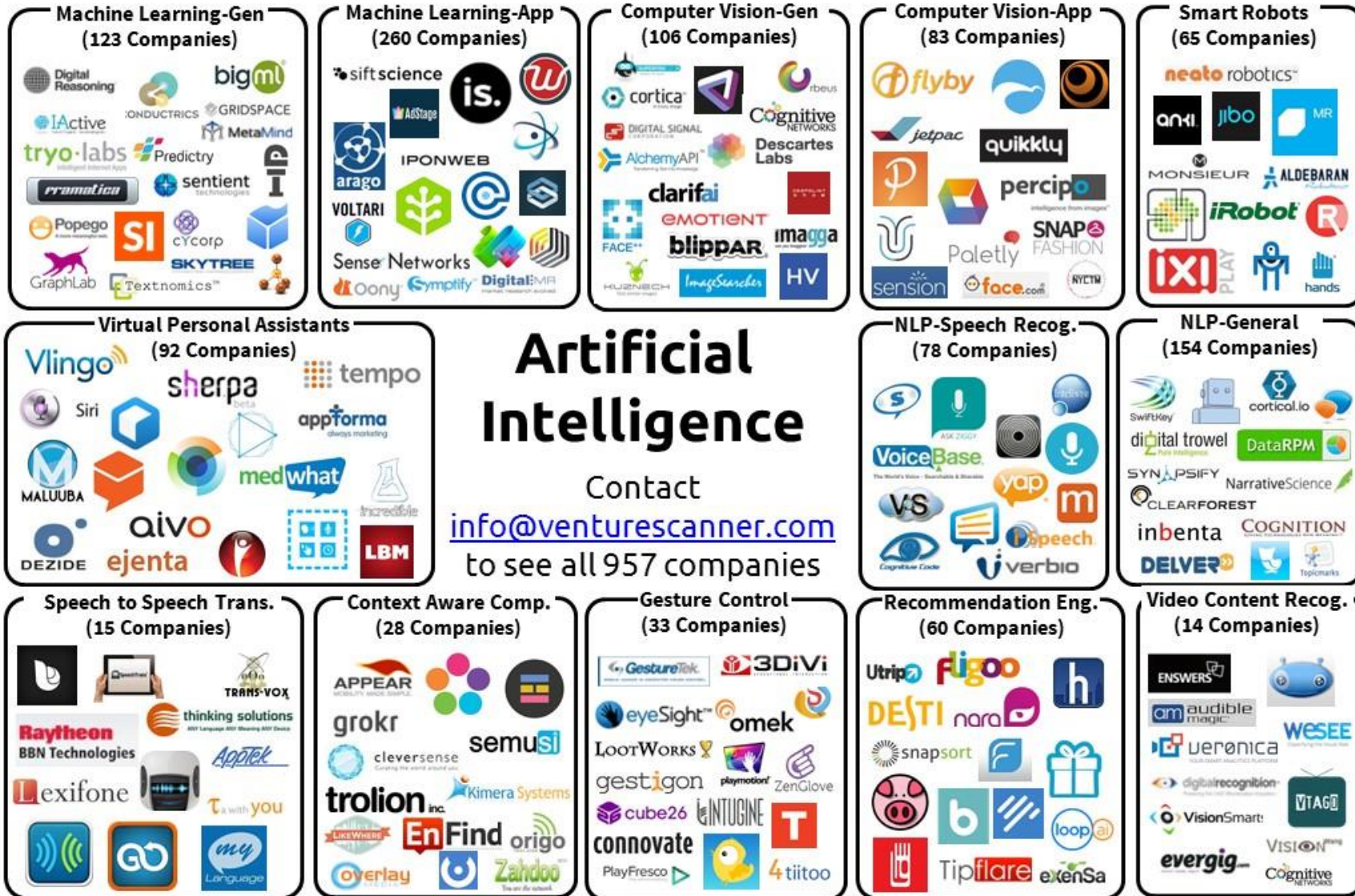| Investor	Rank	Select Investments
Intel Capital	1	DataRobot, prelert, lumiata, MAANA, incoming, saffron, PERFANT, emotient, Reflektion, Parallel Machines, P/A, MindMeld, smartzip, api.ai, indisys Intelligent Dialogue Systems, COLDLIGHT
Google Ventures	2	BUILDING ROBOTICS, clarifai, KENSHO, FRAMED, ZEPHYR HEALTH, Unbabel, tamr, MindMeld, Orbital Insight, Predilytics
GE Ventures	3	SIGHT MACHINE Manufacturing Analytics, ARTERYS, AYASDI, BITSTEW SYSTEMS, MedAware Eliminating prescription errors, PingThings, stem, Predixion, MAANA
Samsung Ventures	4	vicarious, sentiance, Maluuba, iDIBON, jibo, MindMeld, ai AUTOMATED INSIGHTS
Bloomberg Beta	4	deep genomics, context relevant, AVISO, howdy., DOMINO, Orbital Insight, DigitalGenius, DIFFBOT
In-Q-Tel	6	MindMeld, CYLANCE, celect, INTERSET, Digital Reasoning, DOMINO
Tencent	7	DIFFBOT, CLOUDMEDX, SI SCALED INFERENCE, iCarbonX, skymind
Nokia Growth Partners	8	rocketfuel Artificial intelligence. Real results., WorkFusion, rapidminer, indix.
Microsoft Ventures	8	BUILDING ROBOTICS, NEURA, insidesales, CrowdFlower
Qualcomm Ventures	8	clarifai, Predilytics, Welltok., tempo
Salesforce Ventures	8	DigitalGenius, insidesales, sense
AXA Strategic Ventures	8	NEURA, BI-BEATS, medlanes, pricemethod
New York Life Insurance Company	8	context relevant, DataRobot, Skycure, aptricity

Source: CB Insights – 15th June 2016

Source: CB Insights – January 2017

AI startup overview – Not LegalTech specific