Machine Learning
Tech-enabled Legal Document Portfolio Review

Presentation PwC Legal NL
Introduction
Artificial Intelligence & the legal profession
"You have five years to reinvent the legal profession"

Richard Susskind
2016
Technology disrupts businesses at an increasing pace

The legal market needs to act fast to keep with the current pace.
AI is an umbrella term for “smart” technologies that are **aware of and can learn from their environments** to assist or augment human decision making.

**In practice:**

- Machine learning
- Recommendation engines
- Chatbots
- Image recognition

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**China and North America will see biggest AI gains by 2030**

- **26.1%** China
- **14.5%** North America
- **11.5%** Southern Europe
- **10.4%** Developed Asia
- **9.9%** Northern Europe
- **5.6%** Africa, Oceania, & other Asian markets
- **5.4%** Latin America

Source: PwC Global Artificial Intelligence Study, 2017
Artificial intelligence in the legal profession

Investments in AI and ML software for the legal profession increase rapidly.

The continuous increase in AI related investments indicates the need for optimization of processes within the legal function. For example, AI can be used for electronic discovery, making review processes faster and more accurate.

A whopping 71% of law departments cite the need to increase productivity without increasing headcount as their main driver for AI adoption.

HBR Law Department Survey 2017
Why AI in legal?

The use for AI in the legal profession, especially e-Discovery and document review processes, is endless. But what are the reasons to opt for AI in stead of manual processes?

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<tbody>
<tr>
<td>1</td>
<td>Fast</td>
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<tr>
<td>2</td>
<td>Accurate</td>
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<td>3</td>
<td>Meticulous</td>
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<td>4</td>
<td>Tireless</td>
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<td>5</td>
<td>Inexpensive</td>
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<td>6</td>
<td>Time</td>
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<td>7</td>
<td>Business improvements</td>
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PwC Legal
We are *the* tech-enabled legal partner for complex transformations
Use case: the application of AI in legal questions
Use case: VENTURE CAPITAL INVESTOR

PROJECT: REVIEW OF DOCUMENT PORTFOLIO RELATING TO INVESTMENTS
# Request of the client

## Automated document review

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<tr>
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<th>Problem</th>
<th>Data extraction</th>
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<td>1</td>
<td>The client had <strong>limited insight</strong> in the differences between the legal documents (memorandum of understanding, deed of issuance of shares, SHA, articles of association) pertaining to their investments and the risks connected therewith.</td>
<td>The information was stored in <strong>different locations</strong>, knowing that there are always four <strong>recurring</strong> documents per investment. The recurrence in documentation made the use case eligible for AI document review.</td>
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<td>2</td>
<td>Data extraction</td>
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<table>
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<th>Solution</th>
<th>Result</th>
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<td>3</td>
<td>PwC used <strong>artificial intelligence</strong> (with machine learning component) to go through number of categorized documents. The ML component allowed the software to learn from the SME’s.</td>
<td>The unstructured data in legal documents was made structured. The structured data was used for <strong>data analysis and visualization</strong>. A user-friendly contract dashboard was the final deliverable.</td>
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<td>4</td>
<td>Result</td>
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*Proprietary and confidential. Do not distribute.*
Phased approach
In co-creation with the client

1. Determination of the objective of the automated document review and the scope of the assignment together with the client. We organized a workshop to align all interests and ensure every party was on the same page.

2. We briefly reviewed and identified the 4 document types involved, for this particular project it pertained to several corporate documents of the target companies: the articles of association, deed of issuance for the transfer of shares, memorandum of understanding and shareholders’ agreement.

3. Our SME’s were trained to work with the software and to program the different recipes which will be ultimately used for review of the documents.

4. The recipes were applied to the documents by our SME’s and perfected to reach an as accurate outcome as possible.

5. Reviewing the output of the software (by our SME’s) to determine the accuracy and analyze the results. Performing data analysis on the contract data.

6. Structuring unstructured data and uploading the results in a user-friendly dashboard (visualization of the data).
Using AI software in projects: approach

**Kick-off**
Together with the client, we will have a kick-off meeting to align expectations and identify key issues.

**Recipe**
To train the recipe, we have included a subject matter expert, two trainers (associates) and a partner review on the final recipe.

**Training**
Training of documents with 5-30 samples per document type (depending on the ML method).

**Review**
The results will be reviewed and improved by two trainers – who function as guides – and two project reviewers.

**Testing**
The process of training and testing continues until the wanted results are reached.

**Visualisation**
The data has gone from unstructured to structured. We can analyze the structured data and visualize this.
Self-organizing team: Agile way-of-working

Roles

Administrator
Creates and modifies projects, users, recipes and workflows

Ingester
Adds documents and works with documents to create and modify clusters. Ensures proper inclusion of documents in the software.

Trainer
Creates and modifies recipes, trains the data points.

Reviewer
Views and edit the data points document review page. Reviews the outcome of the trained data points.

Project Management

Outside support
As Required

Sprint 1

Sprint 2

Team

Tax & Legal Technology
3 Results
Examples of data points

What data did we extract?

- Date of issuance
- Shareholders Resolution
- Transferred Shares
- Number of Shares
- Share type
- Nominal Value
- Shares number
- Pre-emptive rights
- Shares issued at par
- Payment amount

- Additional investors
- Anti dilution clause
- Obligation to make investments
- Tag along/ Drag along
- Exit
- Entitlement advisory board
- Information obligation
- Right to audit
- Ownership
- Assignment
- Transfer restrictions
- Waiver claims
- Agreement to prevail
- Entire Agreement Clause
- Partnership
- Confidentiality
- Termination
- Change of Control
- Amendment
- Assignment
- Adherence
- No rescission
- No waiver
- Governing Law
- Jurisdiction
- Severance/ Partial Invalidity
- Restrictive Covenants
- General time limitation
- General geographical limitation
- Financial interest
- Non solicitation
- Relationship clause
- Time limitation
- Geographical limitation
- Voting agreement

- Name of program
- Percentage of shares
- Pay up price
- Financing
- Liability
- Applicable law
- Jurisdiction
- Confidentiality
- Issue of shares percentage

- Statutory Seat
- Financial Year
- Registered shares
- Certificate holder
- Deposit on shares
- Reduction of issued share capital
- Usufruct and pledge
- Voting rights
- Issue and Transferred requirements
- Appointment Executive Board
- Dismissal Executive Board
The result: accuracy

96,25%  90,36%  82,10%  95,63%

**Memorandum of Understanding**
The memorandum of understanding gave back very accurate results. These documents were derived from the same template document.

**Deed of Issuance**
The deed of issuance in the Netherlands is a notarial document. The contents are similar, although each notary is free to choose their own wording.

**Shareholders’ Agreement**
The SHA is a document in which lawyers use their own language. We found that language can differ as well as the clauses that are included in the document.

**Articles of Association**
The articles of association in the Netherlands are executed by a notary. The contents are similar, although each notary is free to choose their own wording.
Short summary of the project

Key learnings

• A **high volume** is necessary to create (i) a reliable recipe; and (ii) obtain the desired output. Ideal volume would be over 500 similar documents.

• The recipe has an **exponential learning curve**.

• The communication between the **analytical lawyer and the binary computer** and IT support must be optimized. This will be the lawyer’s responsibility.
Thank you