18th XBRL Europe Day

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Amsterdam, The Netherlands

# Machine Learning on Danish annual reports in XBRL

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- Member of XBRL-Denmark

# Danish status/timeline on XBRL on annual reports

2010 Januar:   Started to build a new XBRL-taksonomi (DK-GAAP)

Nov.:   Bill introduced in the danish Parliament

Dec:   New platform «go live»
Voluntary fillings

2011 April:   Law passed in parliament

2012 Januar:   Mandatory for 95% - smallest companies (31/1)

Juni:   First deadline for digital filling

2013 Januar:   Mandatory for all Companies (1/1) (except IFRS)

2014 Januar:   Mandatory for IFRS-companies (1/1)

2015 Januar:   Free public access to all XBRL/PDF document

# Data on annual reporting in Denmark:

- 236.000 companies fill annual reports to DBA

- Deadline: 5 month after the end of fiscal year

- 90% of all annual reports are made and filled by auditors

- "Open" reporting

- Rules are defined in the Danish financial statement act
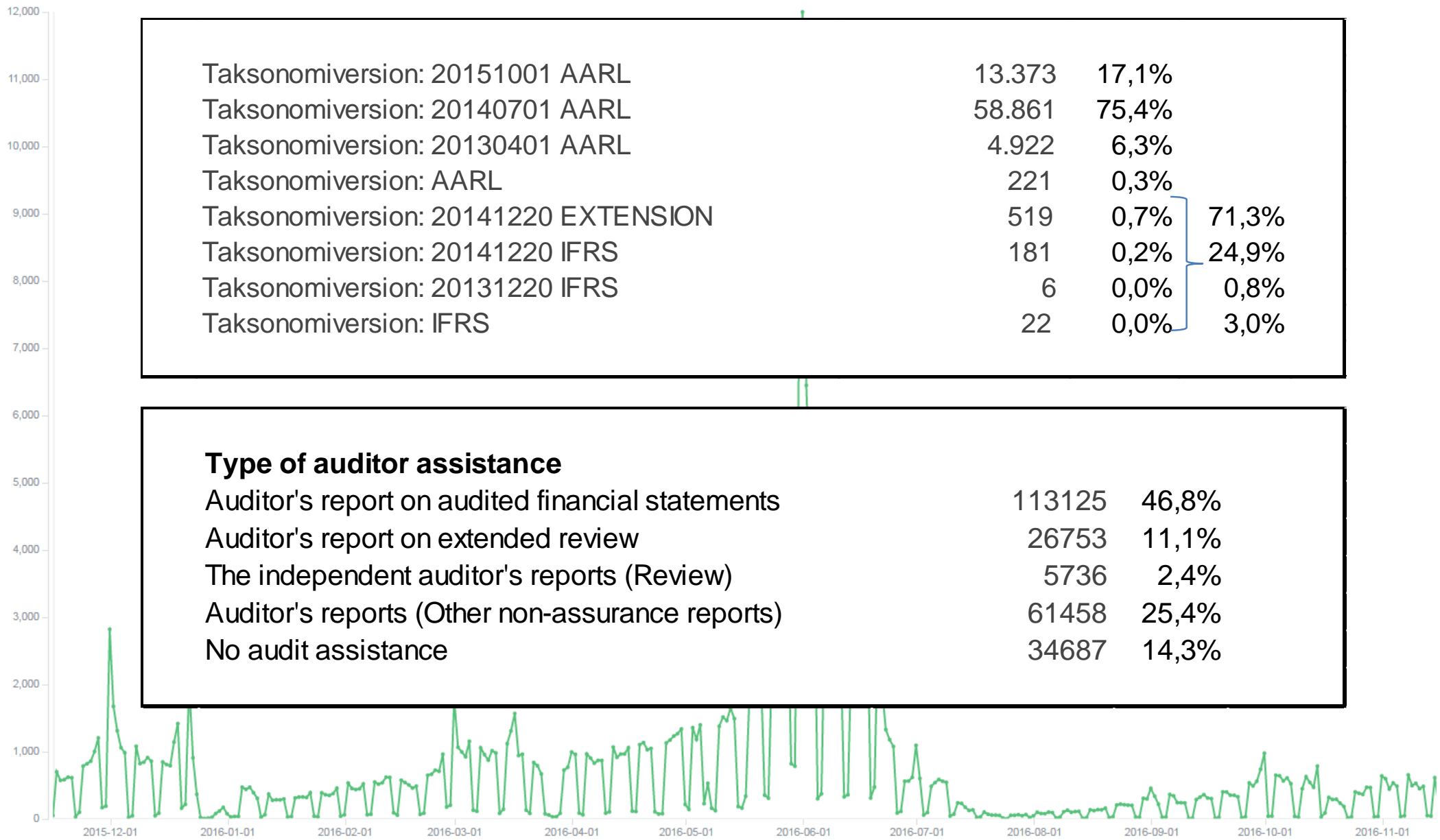
| | | |
|---|---|---|
| Taksonomiversion: 20151001 AARL | 13.373 | 17,1% |
| Taksonomiversion: 20140701 AARL | 58.861 | 75,4% |
| Taksonomiversion: 20130401 AARL | 4.922 | 6,3% |
| Taksonomiversion: AARL | 221 | 0,3% |
| Taksonomiversion: 20141220 EXTENSION | 519 | 0,7%  71,3% |
| Taksonomiversion: 20141220 IFRS | 181 | 0,2%  24,9% |
| Taksonomiversion: 20131220 IFRS | 6 | 0,0%  0,8% |
| Taksonomiversion: IFRS | 22 | 0,0%  3,0% |

**Type of auditor assistance**

| | | |
|---|---|---|
| Auditor's report on audited financial statements | 113125 | 46,8% |
| Auditor's report on extended review | 26753 | 11,1% |
| The independent auditor's reports (Review) | 5736 | 2,4% |
| Auditor's reports (Other non-assurance reports) | 61458 | 25,4% |
| No audit assistance | 34687 | 14,3% |

ERHVERVSSTYRELSEN

## Why the Danish business authority uses XBRL-data?

- To monitor and control the annual reports. Why?

- To ensure compliance to Danish and international accounting regulation and standards.

- To develop new policy based on evidens.

- To monitor and control auditors, companies, funds

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# Why Machine learning?

- "In the growing at high

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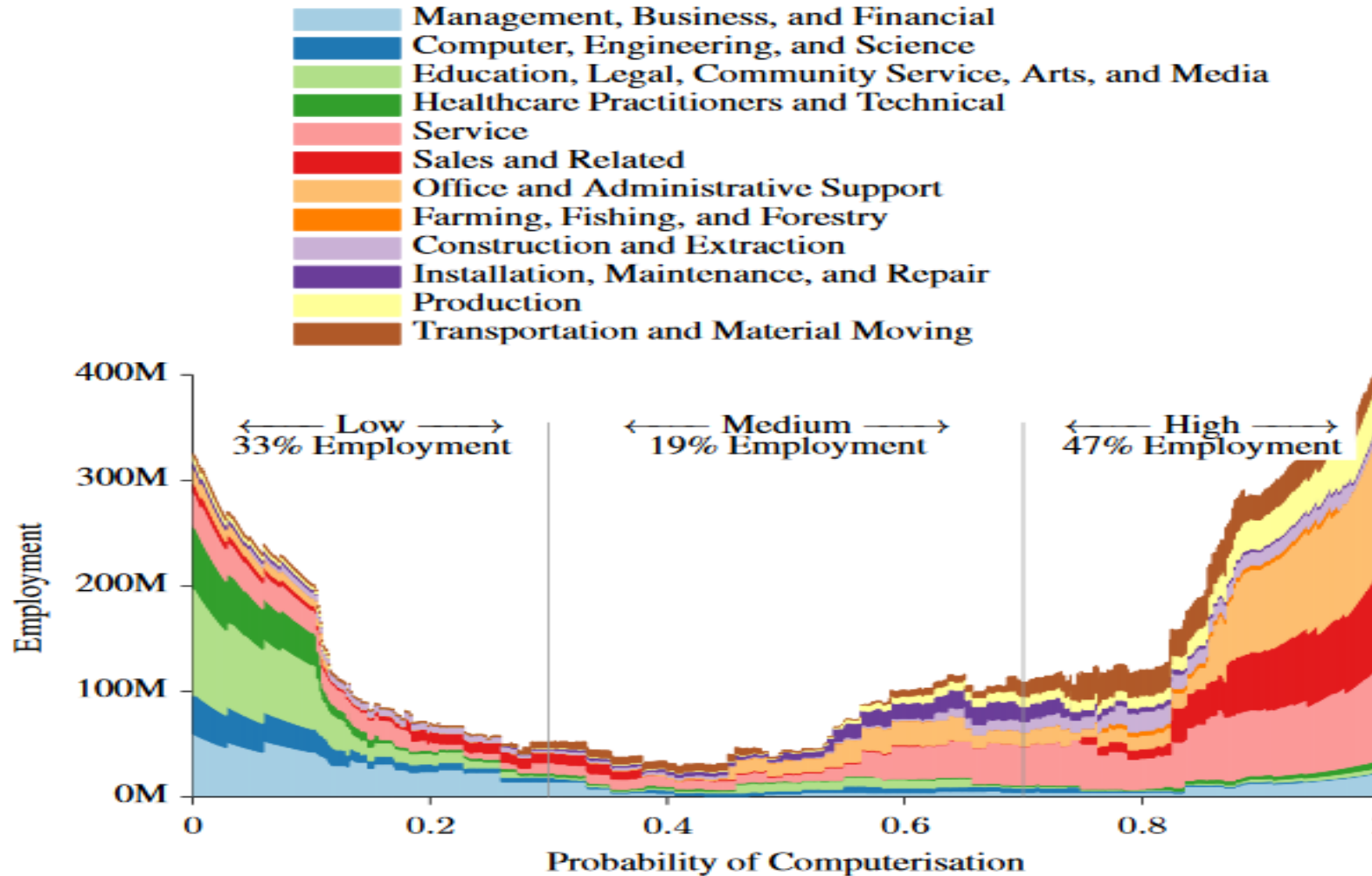


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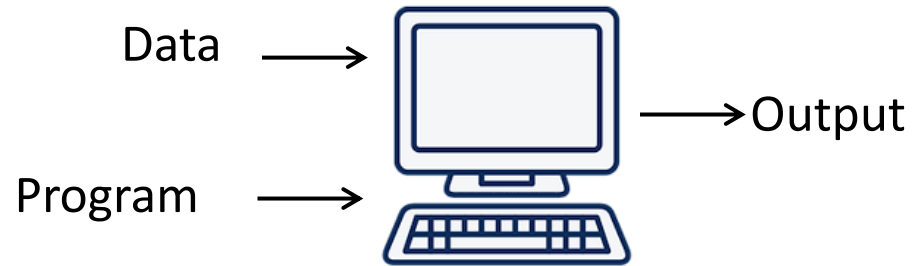
# What is Machine learning?

- *Combines*
  - Statistics
  - Modern computing power
  - advanced algorithms
  to find patterns in data,

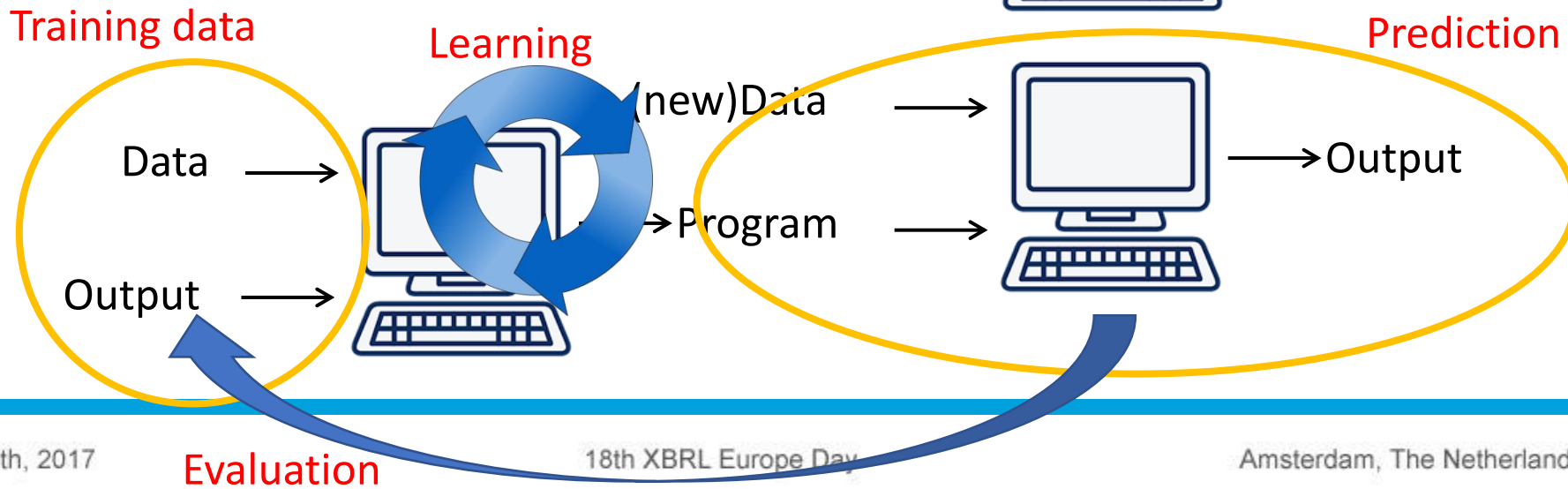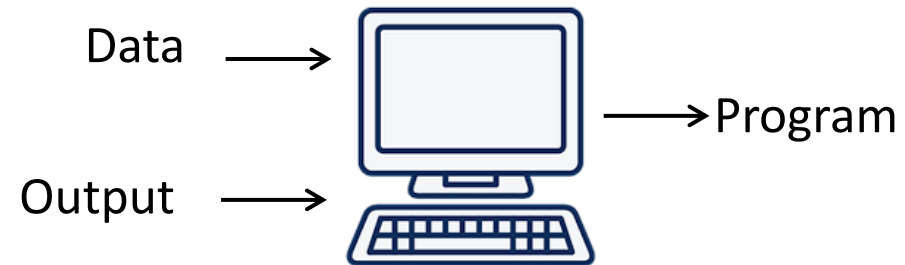.... in order to make data-driven predictions or decision.

- **ML gives computers the ability to learn without being explicitly programmed!**

# Traditional computing vs Machine Learning



*Traditional Computing:*

Data →

Program →

→ Output

*Machine Learning:*

Data →

Output →

→ Program

Training data

Learning

Prediction

Data →

Output →

(new)Data →

Program →

→ Output

Evaluation

# CASE I - Errors on value off, and write downs on Land and buildings

- Based on our annual supervision of annual reports.!

**3 %**

- 1. iteration: unprepared data.

**- %**

**Prepare data**
**Domain knowledge**

- 2. iteration with prepareds data

**65 %**

**Evaluation!**

- 3. Iteration with more entities based on interation 2

**92 %**

# Case II: Qualifications of audited financial statements
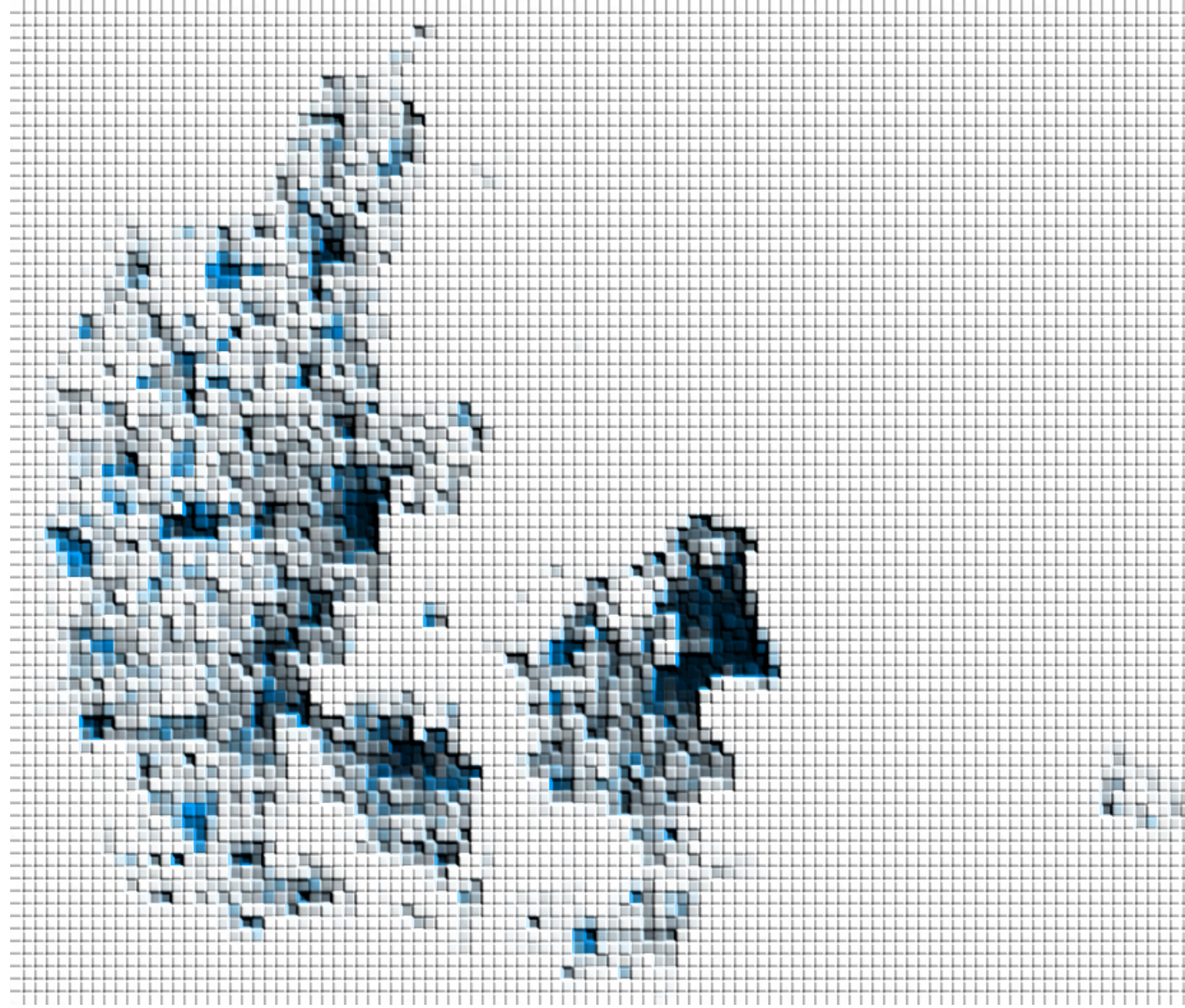
# Case II: Qualifications of audited financial statements

| | Accuracy | Precision | Sensitivity | Specificity |
|---|---|---|---|---|
| Going Concern | 96,6 % | 93,7% | 89,7% | 98,4% |
| Entire annual report | 98,0% | 70,3% | 58,7% | 99,3% |
| Fundamental | 95,4% | 90,0% | 68,5% | 99,0% |
| Valuation off…. | 90,9% | 87,9% | 75,8% | 95,4% |
| Disagreement | 78,6% | 27,9% | 93,6% | 15,0% |
| Lack of audit evidence | 90,3% | 89,6% | 83,0% | 94,5% |
| Inventories | 98,3% | 93,6% | 93,1% | 99,0% |
| Deferred tax | 99,7% | 97,5% | 94,4% | 99,9% |
| Profit (Loss) | 98,3% | 89,9% | 82,0% | 99,4% |
| Receivables from group enterprises | 97,7% | 78,0% | 66,3% | 99,2% |
| Investments in group enterprises | 96,7% | 86,1% | 79,3% | 98,6% |

# NEXT: Business usage of Machine learing

- X.....
- Supervision of annual reports
- Guide the companies before or while filling
- Early Warning: identifying companies in distress
- Automated Business Reporting
- Underpinning policy Development

.... and

- Cleaning data
- Tagging data
- Visualisering of data

# Questions?