DANMARKS NATIONALBANK

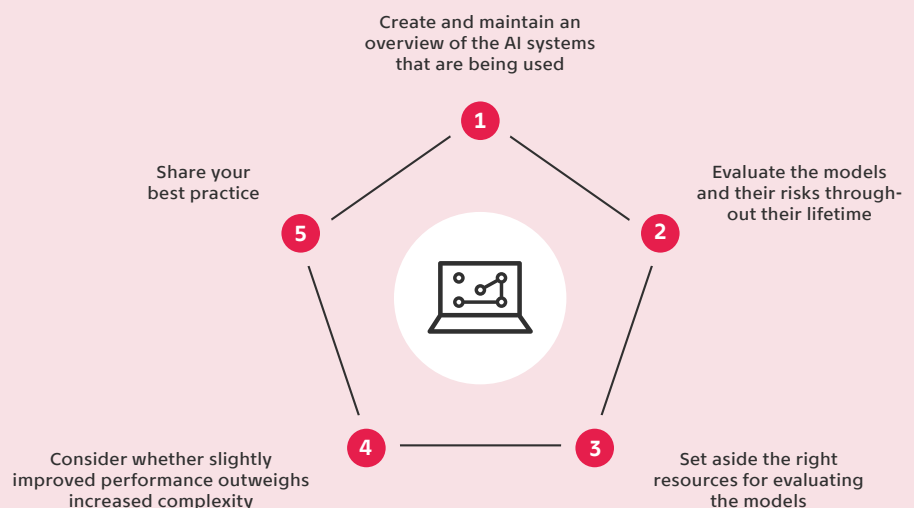Artificial intelligence spreads in the financial sector

Five suggestions for banks that want to use artificial intelligence

In their efforts to optimise their business, banks and insurance and pension companies are developing systems that make use of artificial intelligence (AI). But financial companies need to be aware that the systems must be monitored so they do not risk, for example, discriminating against customers based on race or gender. Otherwise, companies may encounter problems not just with their reputation but also with the upcoming stricter EU rules in this area, which allow for fines of up to 6 per cent of the company's annual turnover. In a new publication,

Danmarks Nationalbank's experts list five points that companies should be aware of.

An AI system in the financial sector typically consists of large amounts of data, an automatised IT infra-structure and an advanced statistical model, often based on flexible machine learning techniques. Machine learning means that the model adapts to data very flexibly compared to traditional models. AI and machine learning are particularly interesting for financial companies, because they can improve their

Five suggestions for banks that want to use artificial intelligence

1. Create and maintain an overview of the AI systems that are being used
2. Evaluate the models and their risks throughout their lifetime
3. Set aside the right resources for evaluating the models
4. Consider whether slightly improved performance outweighs increased complexity
5. Share your best practice

ability to identify patterns, find contexts and make predictions. Used in the right way, AI systems can form a quick overview of complicated contexts and give banks, for example, more accurate estimates of their financial exposure, the probability of defaults, and the robustness of their portfolio. These insights can increase banks' willingness to lend money and thus benefit society as a whole.

But there is also a flipside to these benefits. The system's decision-making process can be hard to understand, and if the complex systems are not adequately monitored and controlled, they may inadvertently lead to discrimination. For example, the models may systematically produce different assessments of the likelihood of defaulting on a loan based on the customer's race or gender. These so-called algorithmic biases may have different causes, and they can occur at different steps in the development of the model. They can occur already when data is collected for the development of the model; for example, a historical data set on loan applications with a large majority of loans given to men can reinforce existing biases.

The European Commission has tabled a proposal to regulate the use of AI, recommending fines of as much as six per cent of a company's annual revenue in the case of non-compliance. The fines will be imposed on top of existing anti-discrimination legislation.

Danmarks Nationalbank's data experts have drawn up five principles that financial companies should focus on to live up to ethical and regulatory standards as they increase their use of AI.

1. Prepare and maintain an overview or catalogue of the various AI models that the organisation uses. This will raise awareness within the organisation and create focus on where the various risks are.

2. Evaluate the models, not just while developing them, but throughout their lifetime. An AI system is not a static construct. As the world changes, new data may produce new biases where there were no biases before.

3. Set aside the right resources to evaluate the models. Also, ensure that employees have the right competences for the evaluation. This means that experts are needed both to develop and test the machine learning models.

4. In the development work, ask critical questions about whether possible improvements to the model outweigh the increased complexity that the improvements will result in. The more complex a model becomes, the harder it can be to adjust if a suspicion of bias arises.

5. Create a forum with other participants from the financial sector where they can share experiences and best practices in the field. This will encourage broad and uniform compliance with the rules in the area.

You can read more about the suggestions in the new publication, which is available here: (*link*).

Data in new ways

Data volumes have grown exponentially. By 2025, an estimated 450 exabytes of data will be created each day. This is equivalent to hundreds of millions of personal computers being filled with data on a daily basis. The vast volumes of data are highly diverse, but new and sophisticated methods enable analysis of this data in new and more efficient ways.

New data types and new data collection methods may be used in various contexts in Danmarks Nationalbank's ongoing work.

In order to acquire more knowledge and a better basis for assessing the Danish economy, Danmarks Nationalbank focuses on new data types and methods in a series of publications.

ABOUT THIS NEWS

Artificial intelligence

Banks and insurance and pension companies are increasingly developing systems that use artificial intelligence. This News outlines five suggestions from Danmarks Nationalbank's data experts, which financial companies should have increased focus on in order to live up to both ethics and legislation when entering this area.

New data creates new knowledge

**LARGE NUMBER
OF NEW DATA SOURCES**

SERVER

DATA
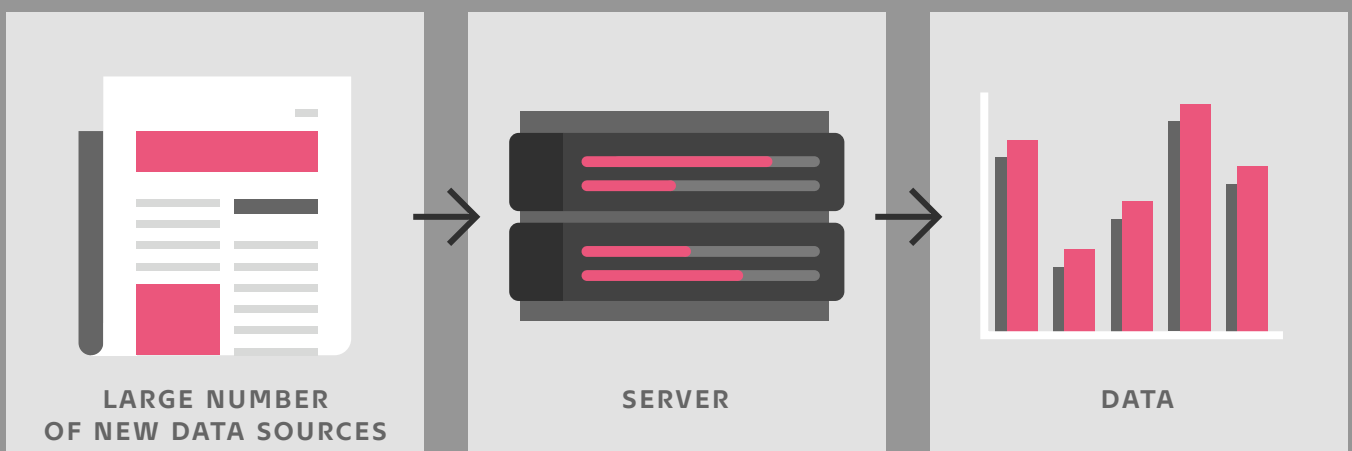
**DANMARKS
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NEWS

News offers quick and accessible insight into an Analysis, an Economic Memo, a Working Paper or a Report from Danmarks Nationalbank. News is published continuously.

ANALYSIS

Analyses from Danmarks Nationalbank focus on economic and financial matters. Some Analyses are published at regular intervals, e.g. *Outlook for the Danish economy* and *Financial stability*. Other Analyses are published continuously.

REPORT

Reports comprise recurring reports and reviews of the functioning of Danmarks Nationalbank and include, for instance, the *Annual report* and the annual publication *Danish government borrowing and debt.*

ECONOMIC MEMO

An Economic Memo is a cross between an Analysis and a Working Paper and often shows the ongoing study of the authors. The publication series is primarily aimed at professionals. Economic Memos are published continuously.

WORKING PAPER

Working Papers present research projects by economists in Danmarks Nationalbank and their associates. The series is primarily targeted at professionals and people with an interest in academia. Working Papers are published continuously.

The news article consists of a Danish and an English version. In case of doubt regarding the correctness of the translation the Danish version is considered to be binding.

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