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Increasing Trust to AI in Finance:

AI Model Validation Framework

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Pisa, May 30th, 2023

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Introduction

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Introduction

- **Validation of AI Models** in the financial sector has become **one of the most crucial lifecycle phases** of AI models to be deployed.

- Although, the sector is highly regulated and already familiar with the validation of **traditional statistical methods** in credit risk, that **needs to be extended and adapted** to as-is standards and frameworks that also include validation standards of **advanced analytical algorithms, not only limited to credit risk** but that can also be applied to divergent business domains.

- The **Prometeia AI Model Validation Framework** enables validation teams to follow a **standardized guideline** for controlling and checking AI models in order to ensure in terms of **qualitative** (ethical, data privacy, bias, robustness, fairness and governance) and **quantitative** (model choice, performance scores, explainability, feature interpretability, overfit detection) perspectives.

Challenges

Challenges

Lack of a gold standard

In some cases, it can be difficult to determine what the correct output should be, making it challenging to validate the model's performance.

Data Bias

Biases in the training data can lead to biased models, which can be difficult to validate. Certain types of instances might be selected more than others (sampling bias), resulting in an inaccurate representation of the real world. This type of bias can lead to a poor generalization of learned algorithms, affecting their overall performance.

Models that are overfitted to the training data may perform well on the training set but poorly on new data, making it difficult to validate their generalizability.

Overfitting

Lack of Interpretability

Some AI models, particularly deep learning models, can be difficult to interpret, making it challenging to understand how they are making their predictions.

Accountable parties and their responsibilities for unfair, biased results of AI models are an open discussion: (1) Biased data, (2) model developer not taking the necessary precautions, or (3) validators not detecting possible bias, weakness and unfairness.

Responsibility and Accountability of Models

The performance of an AI model can degrade over time if the underlying data distribution changes, making it necessary to continuously validate the model's performance.

Changing Data Distributions

Scaling Challenges

As AI models become larger and more complex, it can become difficult to scale the validation process to keep up with the increasing computational demands.

The Framework

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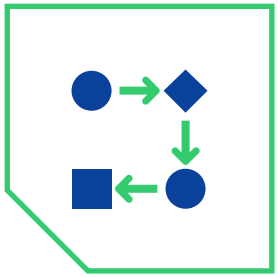
The Framework

The Prometeia AI Model Validation Framework supports users in the model validation process prompting which **questions they should ask about** the model in different contexts, **the information needed to answer** these questions, and other important issues.

In order to examine the model from different perspectives, the validation process is implemented under **three main contexts**, in line with the **EBA and ECB guidelines** and best practices.



Conceptual Soundness

Quality of model design, construction and documentation are assessed. In addition to conventional steps like data validation, ML-related steps in methodology suitability are further examined: the selection of the correct model, feature extraction/selection and hyperparameter optimizations.

Model Performance

Model outputs are compared against the outcomes observed. In ML, many different metrics and tests can be derived to quantify results. The important part is to provide guidelines to compare outcomes objectively and define feature interpretability/explainability with advanced methods.

Model Usage

Not only validating outcomes and soundness but also the integration to processes, the design of reflecting and digitizing processes with ML models, end-users' "human-in-the-loop" strategy should be considered. In addition, the model governance precautions, and continuous learning techniques can be questioned where necessary.

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Key Benefits

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Key Benefits

Fastening Adoption of AI by creating "Trust"

Standardizing the process of validating AI models can increase awareness and encourage early adoption of AI. According to reports, 44% of AI models are in the pre-deployment phase, and only 56% of them are in the deployment phase1. One way of improving trust is to validate them before going into production.

Improving Internal Procedures and Tasks

One of the main challenges faced by organizations is that they lack sufficient resources to efficiently monitor and validate their models within a reasonable timeframe. This is especially challenging because of the increasing complexity of models due to new technologies like ML and AI. As a result, organizations are facing unwanted delays and backlogs. A standardized validation approach can help in streamlining and aligning deployment processes.

Compliance with Legislation Frameworks & Standards

Ensuring that AI models are validated and monitored in compliance with legislations such as the EU "AI Act" and the "EBA Discussion Papers on Machine Learning for IRB Models" can reinforce the appropriate and responsible usage of AI models.

Deploying AI Model Validation Process in a SaaS Approach

Using a software-as-a-service (SaaS) approach that is integrated into Model Governance and Risk Management tools can be a valuable addition to the Prometeia AI Model Validation Framework, enabling validation teams to work more efficiently and effectively. Automating the validation process allows for an increase in the number of models validated in a given period, as well as an increase in the frequency of periodic validations.

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