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Improving the Effectiveness of Model Development and Deployment

SIX USE CASES USING EARNIX MODEL ACCELERATOR™

Reduce Time to Market

Leverage Previous Modeling Investments

Capitalize on Analytics Team Expertise

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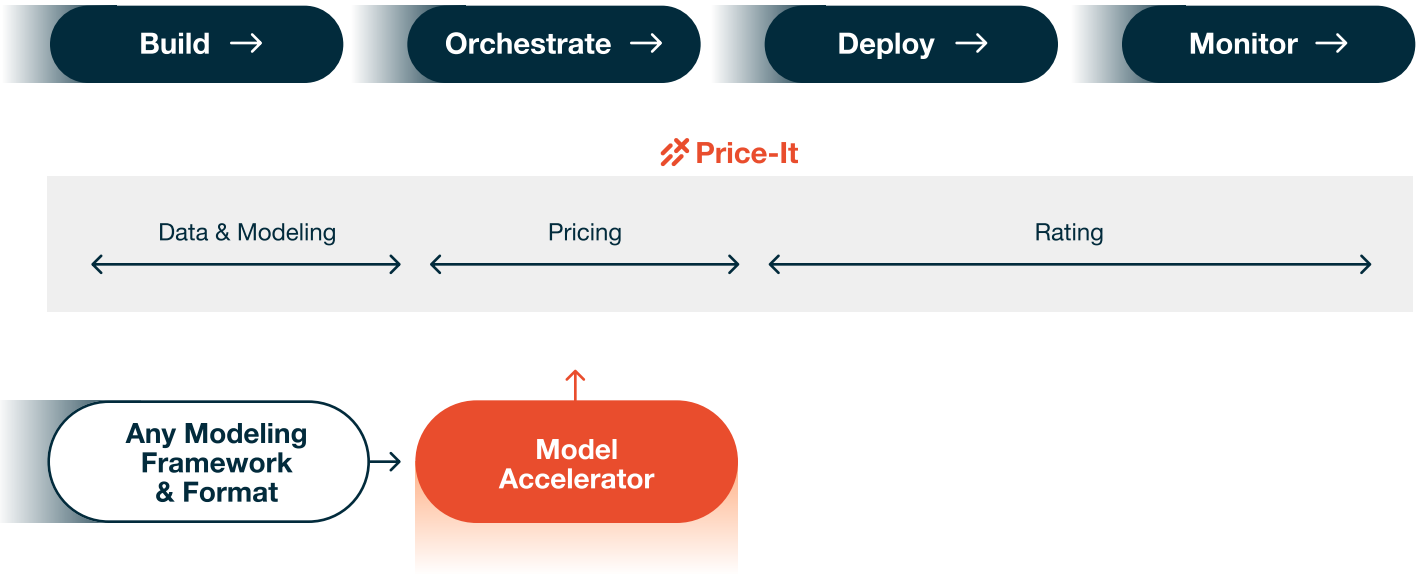
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Introduction

Earnix Model Accelerator is a key piece of the Earnix family of analytic capabilities. It is designed to streamline the process of building and incorporating advanced models, particularly machine learning (ML) models, in the delivery of analytics for insurers and banks.

It works with Earnix Price-It™, which provides a comprehensive, end-to-end model management workflow, including model building, orchestration, deployment, and monitoring. The Earnix environment also uniquely supports close collaboration across pricing, underwriting, and personalization.

Conceptually, Model Accelerator augments an Earnix workflow, as seen in this diagram:



Model Accelerator's Role



Model Accelerator extends the capabilities of Earnix's open analytics approach. With this functionality, it is easier to use, manage, and understand machine learning models in the critical processes of Modeling, pricing, and rating.

In addition to expanding the scope and ease of importing models, Model Accelerator improves the ability to build Generalized Linear Models (GLMs) within the Earnix environment by offering an Automatic Generalized Linear Models (AGLM) tool and hybrid Modeling capabilities.

Model Accelerator's Import function streamlines integration with the most popular analytic frameworks and formats, such as ONNX, H2O, Akur8, DataRobot, Databricks, and others.

Modeling frameworks and techniques supported include Scikit, TensorFlow, Pytorch, Random Forest, XGBoost, GBM, CatBoost, LightGBM, and Neural Networks.

In short, the goal is to allow your team to use tools they are already familiar with, eliminating additional investment that would otherwise be required in learning a new set of tools or integration techniques.

Use Case Format

There are six use cases outlined in this document, designed to guide Earnix customers in the application of Model Accelerator in the most time- and cost-efficient manner possible.

Each use case presents the following information:

- → The challenge(s), business and/or technical, that need to be addressed.
- → A scenario, outlining the existing conditions and how they interfere with meeting goals.
- → How Earnix Model Accelerator addresses and solves those challenges.
- → The value delivered by Model Accelerator in that use case.

Build Any Model, Anywhere, with No Constraints or Limitations

The Challenge

Insurance carriers are not able to use models for multiple purposes, because they are not portable between environments.

The Scenario

- A US carrier has a large data science department which has built many models in Python using XGBoost and Scikit-learn Python libraries.
- These models are used in their decisioning. They now want to use the same models for pricing.
- Due to system limitations, it can't be done.
- The insurer will need to build a new model specifically for pricing: Weeks of preparing data and model building, possibly weeks or months to test and approve it.
- In addition to the technical hurdles and inefficiencies, there could be governance and compliance issues - more models in use means that discrepancies between filings and production are more likely.
- Maintenance of two models is required, which is time- and resource-inefficient.

How Model Accelerator Addresses these Challenges

With Model Accelerator, system limitations no longer exist, the carrier can import its existing decisioning model in minutes and start using it for pricing – without recoding the model.

Value delivered

By importing existing models, insurers can save time, maintain the model in one location (not two or more), and deliver business impact much more quickly.

“Leave No Model Behind”

The Challenge

Data scientists can create elegant and advanced ML models, but insurance carriers are unable to put the models to use.

The Scenario

- Claim amounts are growing. which puts pressure on premiums, competitive position, and company financial performance.
- The data science department built a new claim severity model based on neural networks using the TensorFlow Python package. The model’s accuracy is **3%** better than the currently-used model.
- The insurer estimates that by using this model they would be better able to distinguish between high- and low-risk clients, and offer better terms to the latter, decreasing attrition by **1.5%**.
- Today, they can’t use this model because it is too sophisticated to code into the rating engine. What good is a model that can’t be implemented?
- The insurer will have to default to using the old model for pricing, and will be unable to take advantage of the added accuracy of the new model.

How Model Accelerator Addresses these Challenges

With Model Accelerator, the model will no longer be doomed to sit on the shelf. Once imported with Model Accelerator, the advanced model is ready to use immediately in Price-It rating, with no recoding necessary.

Value delivered

By using the simple user interface of Model Accelerator, Earnix users can easily import the most refined models and instantly place them into production, enabling insurers to gain improved Modeling accuracy, thereby driving revenue, minimizing expense, and reaping greater profitability immediately.

Leverage Model Explainability to Build Internal and External Transparency and Trust

The Challenge

Data scientists need to be able to pre-process data to fit into models. For example, if a model requires complex transformation of features, then the same transformations need to also happen in production. Replicating these calculations requires time, effort and money that could be better spent on more productive tasks.

The Scenario

A data scientist trains a model which requires the transformation of some variables:

- → Numeric variables are scaled
- → New features are created from the combination of variables
- → Missing values are imputed

The model works well, and is approved for use in production. Today,

- → The transformations need to be replicated in the rating engine. It takes a week to code them and compare the results with the original calculations.
- → The model is deployed to production, and is used for pricing.
- → Two months later a support ticket is opened: An apparently low-risk customer received a very high quote and complains about it.
- → Analysis reveals that the implemented model has an error: Missing values.

How Model Accelerator Addresses these Challenges

- → The model, together with the pre-processing code, are imported into Model Accelerator.
- → The model works exactly as it was designed, without the need to recreate the transformation of variables in Earnix.

Value delivered

With Earnix Model Accelerator, feature engineering is easy to do in a lab setting and can also be executed in production, saving time and reducing the chance for errors to creep in between the model development, testing, and deployment phases.

Model Transformation refers to the phase in ML model development in which raw data is cleaned, transformed, and organized to make it suitable for training and analysis.

Leverage Model Explainability to Build Internal and External Transparency and Trust

The Challenge

Model transparency and explainability, especially for “black box” models, is a critical enabler for adoption, both from a users’ trust and understanding perspective, as well as the ability to satisfy regulatory requirements.

The Scenario

- A risk model using one of several leading-edge ML techniques results in a model that has high predictive power, much better than the currently-used GLM model.
- Unfortunately, the model cannot be easily interpreted the same way “old-school” GLM models were.
- The product manager would like to use this model to improve the profitability of her product line, but is apprehensive of the “black box” nature of the model:
  - Which customers’ parameters impact the outcome?
  - How?
  - Is there a risk that the model stops working if the business mix changes?
- Today, the PM requests the data scientist to perform an explainability analysis.
- It takes more than a week for the data scientist to deliver the analysis.
- The results of the analysis are only slightly more comprehensible than the original model: The terms “Shapley values” and “permutation importance” are used extensively.
- The PM is still not sure if it is a good idea to use the model, potentially passing up incremental revenue and profits.

How Model Accelerator Addresses these Challenges

- The PM can view an understandable Explainability Report generated by Earnix Model Accelerator, which shows which features matter most for the prediction, and how they impact the prediction.
- The report convinces the PM that it is safe to use the new model, allowing her to capitalize on its increased accuracy to capture additional customers and profits.

Value delivered

The ability for business users to understand the structure of ML models helps them feel more confident and comfortable in using those models, and to adopt them quickly and more widely to deliver on their business goals. This confidence also extends to being able to answer any questions about the model which might arise with internal or external auditors and regulators.

Leverage Model Explainability to Build Internal and External Transparency and Trust

The Challenge

Trained models, even when providing superior fit for historical data, are not necessarily "usable" for pricing purposes, as they can introduce in a wide variety of undesired pricing anomalies.

The Scenario

- A data scientist trains a demand model using the LightGBM Python package.

  The model has high predictive power, much better than the currently-used model.
- The data scientist imports the model into Earnix Price-It with the hope of using it for pricing purposes.
- The validation is run: The performance is acceptable, but the model is not monotonic in premium.

How Model Accelerator Addresses these Challenges

- Model Accelerator allows the data scientist to easily identify if the model is not delivering expected results. The data scientist can then tweak the model and run variations on it until it is performing as desired.
- The tweaked model works for the new purpose, passes all validations, and can be used in pricing, increasing sales volume and revenue.

Value delivered

Earnix users gain new insights regarding the models they build and intend to use in Price-It, potentially leveraging models originally developed for other purposes. This saves time and effort and leverages previous investments, leading to higher Modeling efficiency, faster time to market, and improved bottom line performance.

Note: Demand modeling is not legal in all regulatory environments.

Leverage Model Explainability to Build Internal and External Transparency and Trust

The Challenge

Analytics teams need a better way to experiment with multiple features and feature engineering settings to create a GLM model in a time-efficient manner.

The Scenario

Today,

- Model building can be a time-intensive process, especially when there are huge numbers of features to analyze and massage.
- The process relies too heavily on trial and error, especially to ensure that the model's behavior aligns with business needs and passes regulatory muster (e.g., monotonicity).
- It can be difficult to review and compare models against each other, then modify the proposed model before putting it into production.

How Model Accelerator Addresses these Challenges

- A pricing analyst can dump all the available features into the Automatic GLM (AGLM) Model Builder.
- The analyst can then set constraints on the model or features in a way that aligns with the business and regulatory environment.
- The AGLM Builder automatically optimizes the model under the constraints the user has provided, and returns the most accurate model.
- The model can easily be reviewed by the user, compared to other models, and modified as s/he sees fit.
- The model is deployed in the specific pricing project, and the project KPIs are calculated and compared against the original results.

Value delivered

Earnix users can automatically create and compare multiple GLM models with various features and hyperparameters to select those that best fit their needs. This provides a new level of flexibility, ease of use, and accuracy in driving revenue and delivering increased profitability.

Summary

Earnix Model Accelerator extends the company's industry-leading open analytics capabilities, streamlining processes to use ML models in production, and providing new techniques to build models faster and more cost-effectively. Earnix empowers a unique capability to take sophisticated modeling to the next level in the most efficient and effective way possible.

Insurers and banks who use the Earnix solution, including Model Accelerator, can look forward to quicker time to market, better utilization of scarce and expensive analytics resources, and expanded revenue and profitability opportunities.



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Maximize the effectiveness and efficiency of your advanced analytics efforts with Model Accelerator.

Delve deeper into advanced modeling with Earnix Price-It at Earnix.com.

Learn more →

Earnix is the premier provider of mission-critical, cloud-based intelligent solutions across pricing, rating, underwriting, and product personalization. These fully integrated solutions provide ultra-fast ROI and are designed to transform how global insurers and banks are run by unlocking value across all facets of the business. It has been innovating for insurers and banks since 2001 with customers in over 35 countries across six continents and offices in the Americas, Europe, Asia Pacific, and Israel.