Qlik AutoML

Machine Learning for Your Analytics Teams

LEAD WITH DATA™ Qlik Q

With limited data science resources, most organizations struggle to make future predictions about what might happen in their business and why. Are you missing key opportunities to apply the power of predictive analytics to drive the best action? Qlik® AutoML is for you.

Qlik AutoML (automated machine learning) brings AI-generated machine learning models and predictive analytics directly to your organization's larger community of analytics users and teams, in a simple user experience focused on augmenting their intuition through machine intelligence. With AutoML, you can easily generate machine learning models, make predictions, and plan decisions – all within an intuitive, code-free user interface.

Qlik AutoML easily connects and profiles data, identifies key drivers in the dataset, and generates and refines models. You can then make future predictions and test what-if scenarios. Results are returned with prediction influencer data (Shapley values) at the record-level, allowing you understand why predictions were made – which is critical to making the best decisions and taking the right actions. Predictive data can be easily published into Qlik Sense® and other cloud platforms, and models can be integrated using advanced analytics integration for real-time exploratory analysis.

With Qlik AutoML, your analytics teams can go beyond descriptive analysis to predictive and prescriptive analytics, with detailed insight that's uniquely powerful when combined with our best-in-class, associative exploration.

Forecast
What is the forecasted outcome of "weekly_sales"?
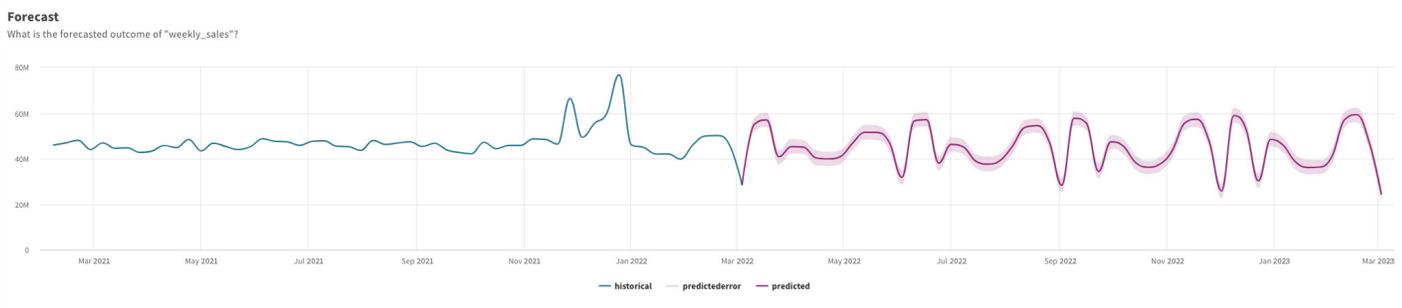
What Is AutoML?

Machine learning (ML) is a branch of artificial intelligence (AI) focused on the process of recognizing patterns in historical data to predict outcomes in the future. ML uses historically observed data as an input, applies a mathematical process against that data, and creates an output called a machine learning model based on patterns in historical data. This model can then be used to make future predictions and test scenarios.

AutoML, or automated machine learning, is an approach to machine learning that automates the data pipeline, data processing steps, feature selection, algorithm selection, model training, model hosting, and deployment processes through the use of AI. Designed specifically for data analytics teams, Qlik AutoML empowers analysts and analytics teams to make predictions about business outcomes, understand why those predictions were made, and take the most effective action to influence those outcomes. This capability is known as prescriptive analytics.

Industries and business functions worldwide use machine learning (and now AutoML) for a variety of predictive analytics needs – use cases ranging from sales forecasting to churn reduction, customer acquisition, inventory optimization, spend analysis, and more. As you can see, the breadth and depth of ML is extensive.

Manufacturing & High Tech
- Demand Forecasting
- Quality & Machine Breakdown
- Warranty Analytics

Healthcare
- Patient Admission Forecasting
- Readmission Analysis
- Appointment Cancellations

Communications
- Customer Segmentation/Churn
- Quality/Process Control
- Next Best Offer/Action

Financial Services
- Credit Risk Analysis
- Loan Default
- Customer Growth / Retention

Public Sector
- Crime Prevention
- Transportation Optimization
- Recidivism

Retail & Consumer
- Customer Repurchase Propensity
- Retail Store Selection
- Inventory Stock-outs

Life Sciences
- Territory Alignment
- Campaign Management
- Demand Forecasting

Energy & Utilities
- Customer Churn
- Accounts Payable
- Peak Demand

Typically organizations require data science teams and sophisticated programming to produce machine learning models, which limits the breadth of problems businesses can address. For example, if your organization has 100 possible applications of ML, your data scientists usually only address the top 10 priorities – in a very deep and sophisticated way. But what happens to the rest? This is where AutoML comes in. It unlocks the other 90% of projects – allowing your analytics team to generate predictive insights and apply them to more everyday business problems.

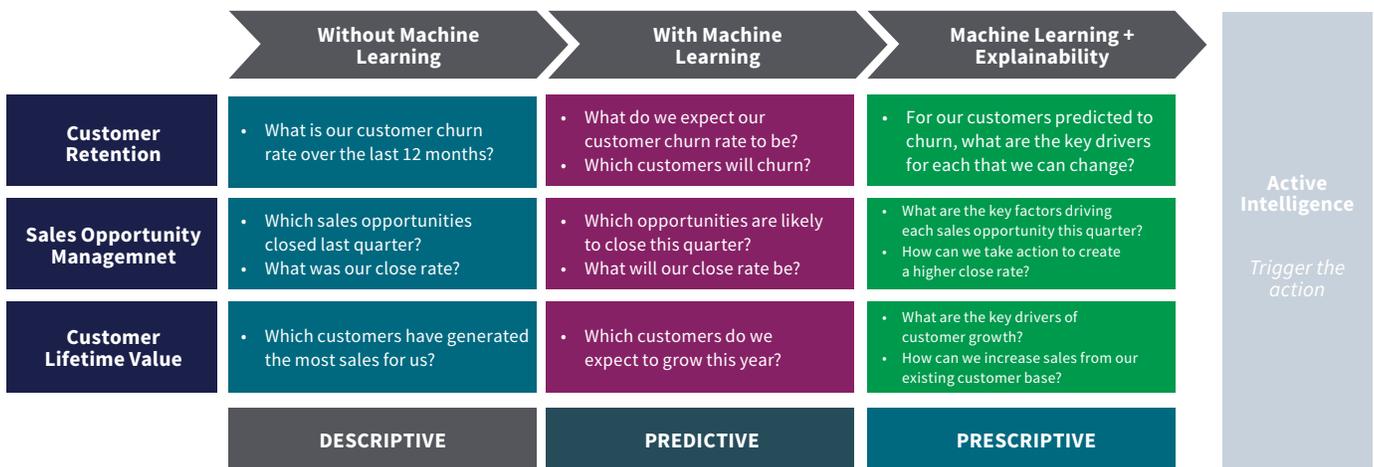# What's the Value of AutoML?

With AutoML, you can significantly up-level the value of your analytics. Here's how and why. For many years, business intelligence has been historical and passive in nature. As an analytics user, you'd look at past sales opportunities and seek to understand what happened – to answer "which opportunities did I win?" You would uncover some insight about why you won or lost by analyzing deals further, then attempt to apply those learnings to the future.
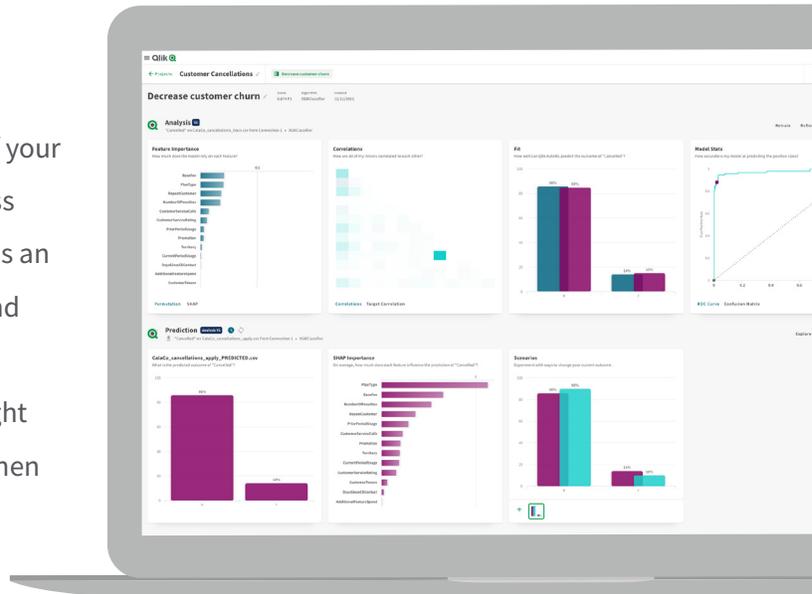
With Machine Learning, you can uncover the key drivers for why things happened and build a model that can be applied to forward-looking data to predict outcomes. This approach gives you much more concrete insights so you can better plan your business. But in most cases, knowing what's likely to happen still doesn't help you affect the outcome.

This is where explainable AI comes in. Generating explainability data allows your users to easily see not just what's likely to happen, but the factors driving those outcomes. Armed with this insight into prediction influencers, your teams and leaders can determine where to actively target action steps and investments to positively affect future outcomes.

From there, you can leverage our active analytics capabilities such as alerts and automations to initiate action and monitor these factors to make sure they're continuously being optimized for the best possible results.

	Without Machine Learning	With Machine Learning	Machine Learning + Explainability	
Customer Retention	• What is our customer churn rate over the last 12 months?	• What do we expect our customer churn rate to be? • Which customers will churn?	• For our customers predicted to churn, what are the key drivers for each that we can change?	**Active Intelligence** *Trigger the action*
Sales Opportunity Managemnet	• Which sales opportunities closed last quarter? • What was our close rate?	• Which opportunities are likely to close this quarter? • What will our close rate be?	• What are the key factors driving each sales opportunity this quarter? • How can we take action to create a higher close rate?	
Customer Lifetime Value	• Which customers have generated the most sales for us?	• Which customers do we expect to grow this year?	• What are the key drivers of customer growth? • How can we increase sales from our existing customer base?	
	DESCRIPTIVE	**PREDICTIVE**	**PRESCRIPTIVE**	

How Does Qlik AutoML Work?

STEP 1

Load Your Data

Qlik AutoML includes a broad set of connectors that allow you to directly connect to data warehouses, business intelligence tools, and cloud applications such as AWS S3, Snowflake, Google BigQuery, and more. Use your existing tools or Qlik Data Integration to prepare a training dataset, and Qlik AutoML will load the data and establish the ML pipeline. As data is loaded, Qlik AutoML applies a variety of data science techniques to prepare data to make it machine learning ready, such as null handling, cardinality, encoding, feature scaling, cross-validation, and holdout.

STEP 2

Generate a Machine Learning Model

Once your data is loaded and prepared, Qlik AutoML builds the predictive model. Qlik AutoML automatically tests best-of-breed algorithms for the dataset to determine the best fit. With the click of a button, you'll see model results from hundreds of approaches and information about how they perform. Qlik AutoML will automatically select the best performing model, but your users can still choose any other model explored along the way – allowing them to contribute business context and intuition the machine learning may have missed.

STEP 3

Explore Key Drivers, Refine Your Model

Qlik AutoML provides model metrics that expose all the relevant data science and statistical metrics to show you exactly how a model performs. For example, if you're familiar with AUC, F1, Recall, Precision, Accuracy, R-squared, and RMSE, you can evaluate these statistics. There's no black box here.

Feature Importance is a measure of how critical various key drivers are to the predictions in a model. Qlik AutoML uses two approaches for this: Permutation Importance and SHAP Importance. With Feature Importance, you'll know exactly what key drivers are influencing the outcomes in your data. Ever wonder what the most important factors are for lead conversion? With Qlik AutoML, you get your answer.

STEP 4

Predict Future Outcomes

Next, load forward-looking data into Qlik AutoML and it will process the data using the model you built, then automatically add predictions and explainability values to your dataset. Qlik AutoML will include the predicted outcome as well as the probability of the prediction for each row of your dataset. In addition, it also adds a new column adjacent to every column in your dataset

with Prediction Influencers, or Shapley values, communicating the positive or negative influence each column has on the prediction made. In other words, you'll know the key drivers for each prediction made, and subsequently, what action you can take to influence the outcome.

You can download predicted datasets or securely deploy them into Qlik Sense or your analytics solution of choice. Or, you can integrate the model itself through Advanced Analytics Integration APIs to deliver real-time predictive calculations into Qlik Sense.

STEP 5

Test Scenarios and Plan Decisions

Qlik AutoML includes a Scenario Builder for what-if decision planning. This lets you test your ideas before you invest resources in them, resulting in better decisions – faster and with less overhead. Qlik AutoML helps you play out future actions before you take them, comparing scenarios side by side so you can dive into your best actions with confidence.

In addition, you can leverage Qlik Sense to develop predictive analytics-oriented applications that tell the story of what's going to happen and allow your users to interact through powerful Associative exploration. These apps include a full set of Prediction Influencers (Shapley values), allowing your users to evaluate possible actions without needing the expertise to use Qlik AutoML directly. Decision makers can understand predictions and the steps they can take to affect the outcomes at the record level – by cohorts, geographic regions, or any other selections they make. And through Advanced Analytics Integration, as your users make selections or change variables in Qlik Sense, they get new calculations directly from Qlik AutoML – in real time – so they can easily ask new questions and pivot their thinking in new directions. You've now achieved true prescriptive analytics.

STEP 6

Take Action

Qlik focus on Active Intelligence means capabilities that compel immediate action based on your data. Traditional BI was built to inform humans, and by extension to inform action, but not to trigger action. Active capabilities such as intelligent alerting and application automation are meant to drive action when specific conditions arise. Combining Qlik Sense and Qlik AutoML, you can now drive human action and orchestrate events or workflows based not only on historical data but also on predictive analytics as well. Have a customer that would be more likely to renew if they were on a different plan? You could trigger an automated email to deliver an offer the same moment that insight is uncovered. That's the power of Active Intelligence.
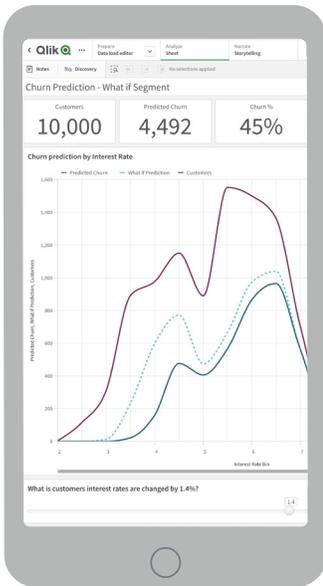
Why Qlik for Augmented Analytics?

When AI came on the analytics scene, Qlik took a very different path than the black-box tools appearing at the time. We felt strongly then, and still do today, that AI should be used to enhance human intuition, not replace it. We helped pave the way for the approach the industry now calls Augmented Analytics. Insight Advisor in Qlik Sense is an intelligent, AI assistant that auto-generates advanced analytics and insights, automates analytics creation and data preparation, and powers natural language interaction including search-based discovery and conversational analytics. Combined with our industry-leading Associative Analytics Engine, you get Augmented Analytics that are uniquely context aware and fully interactive, enhancing intuition and data literacy for users of all skill-levels.

We're bringing the same principle to machine learning. Qlik AutoML delivers automated creation of machine learning models, predictive analytics, and scenario analysis specifically for those same analytics users, helping them move toward becoming citizen data scientists. Qlik AutoML is uniquely designed for business analysts and analytics teams, augmenting their skills and allowing more people to apply the power of data science and machine learning to a broader set of use cases, driving tremendous value.

And for areas where professional data scientists are focused, Qlik delivers the power of those investments directly to business decision makers, augmenting their experience with advanced and predictive calculations. Our Advanced Analytics Integration supports the real-time exploration of data science and machine learning models within Qlik Sense. Direct, engine-level data exchange with third-party data engines delivers new calculations as users interact, allowing people to refine context, test scenarios, and evaluate results interactively and visually. We offer native connectors for Amazon Sagemaker, Amazon Comprehend, Azure ML, DataRobot, and connectivity for custom models built in languages such as R and Python.

With Qlik, you get the most complete set of Augmented Analytics capabilities available, across the full range of users and use cases in your organization. No compromises. All users can now reach their full potential with data.

Customer Story

Appalachian Regional Healthcare: Machine Learning Drives Rapid Reduction of Appointment Cancellations

Challenge

Missed appointments are a costly inefficiency for healthcare providers, where margins are small and not all patients carry traditional health insurance. Appalachian Regional Healthcare (ARH) wanted to identify the patients most at-risk of cancelling their appointments.

Solution

ARH uses Qlik AutoML to predict which patients are most at-risk for missing or cancelling their appointments. They use machine learning to analyze a variety of barriers such as transportation, distance, local weather and more, to understand key drivers and make predictions. Armed with this information, nurses and support staff can reach out to the highest-risk patients with reminders and reassurances.

Results

ARH reduced cancellation and no-show rates 5-10%, seeing results in a matter of months and ultimately driving millions in savings. More importantly, they were able to ensure more patients received the care they need. ARH continues to expand this solution to all the clinics in its network.

> "If you're developing from scratch, you need a workforce very well versed in tech. Qlik AutoML gets you in the game sooner and gives you the building blocks to create something bigger, faster."
>
> **- Brent Styer, Director Information Technology Data Science, Appalachian Regional Healthcare**

Qlik Q

About Qlik

Qlik's vision is a data-literate world, where everyone can use data and analytics to improve decision-making and solve their most challenging problems. Our cloud-based Qlik Active Intelligence Platform delivers end-to-end, real-time data integration and analytics cloud solutions to close the gaps between data, insights and action. By transforming data into Active Intelligence, businesses can drive better decisions, improve revenue and profitability, and optimize customer relationships. Qlik does business in more than 100 countries and serves over 50,000 customers around the world.
qlik.com