Melbourne User Group

Automated machine learning for analytics teams

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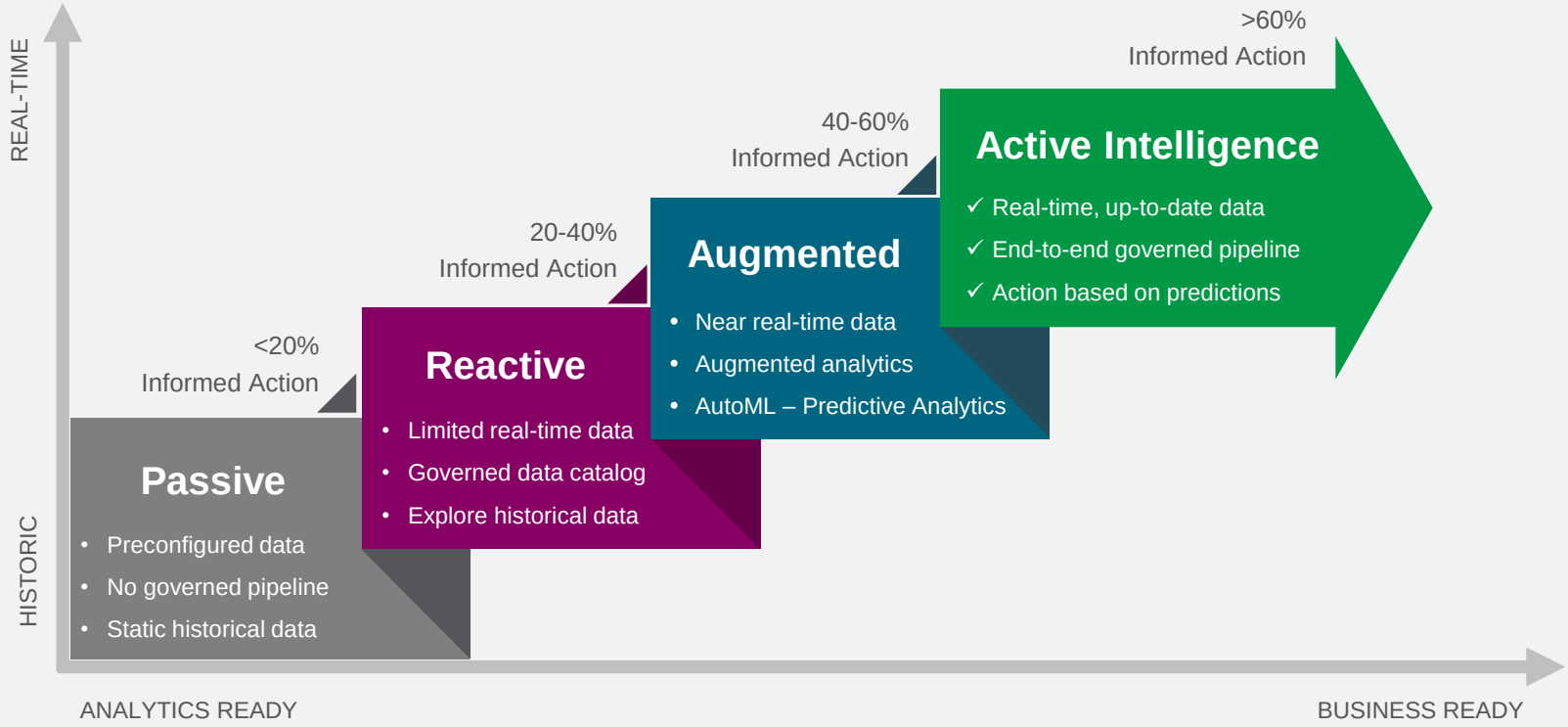
Agenda

- Intro to Machine Learning
- Qlik AutoML
- Value and Use Cases
- Hands-on
- Deployment Options
- Discussion & Questions

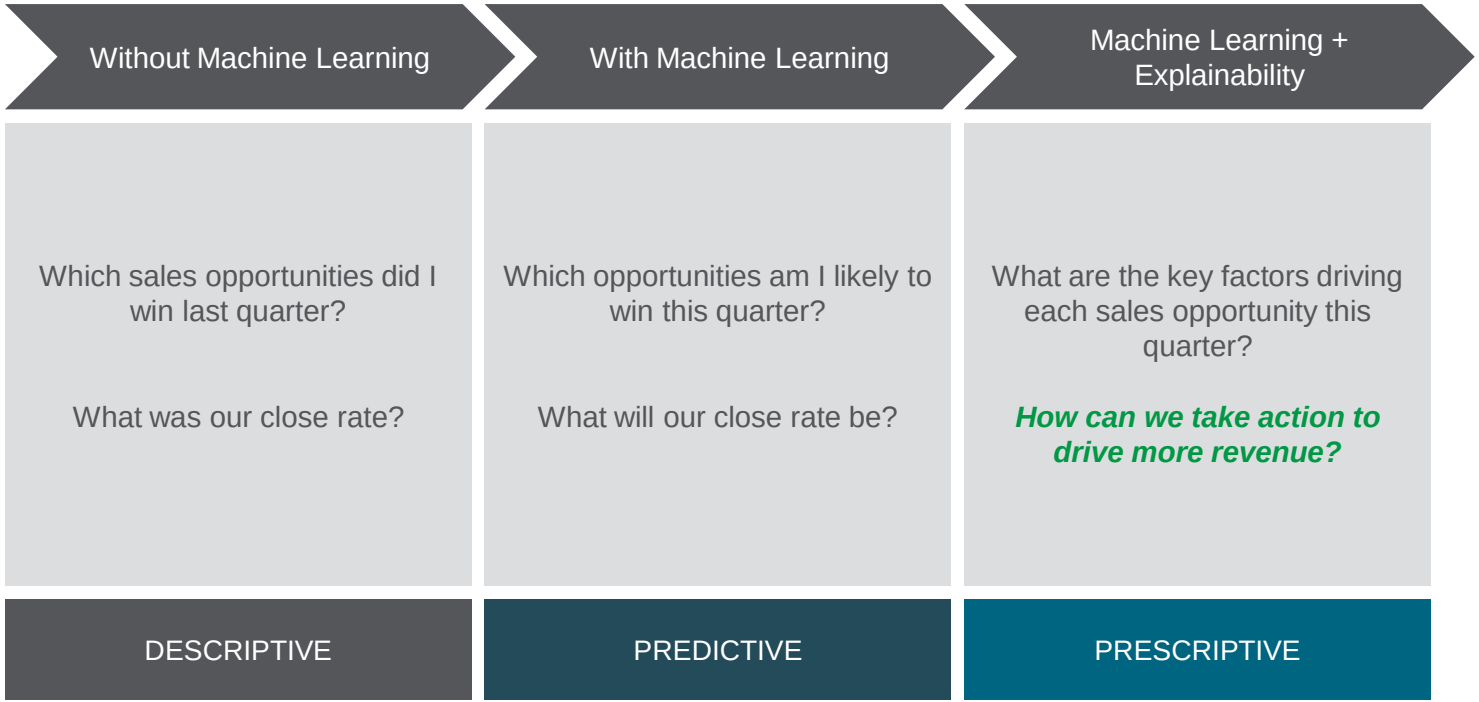
Analytics Continue to Evolve

From passive BI to Active Intelligence



Driving up the Value of Analytics

Answering deeper questions and taking action with ML



ACTIVE INTELLIGENCE

Trigger the Action

- Alerts
- Automations
- Reports
- etc.

What is Machine Learning?

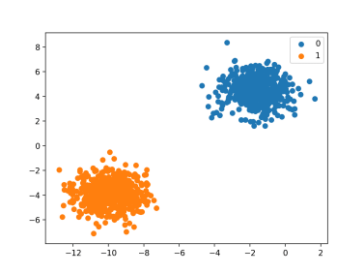
Recognizing patterns and drivers in historical data to create models that predict future outcomes

Framing business questions for ML

Types of problems that ML solves

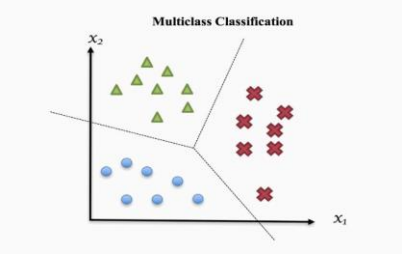
Binary Classification:
Any question that can be answered with a Yes or No

- Will a customer churn? Y/N
- Will my inventory stock out Y/N
- Will my project be on budget? Y/N
- Does preventative maintenance need to be performed?
- Will a patient cancel their hospital appointment? Y/N



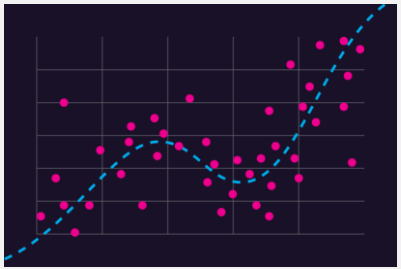
Multi-Class Classification:
Questions where they could be multiple outcome choices

- What product will a customer purchase?
- What subscription type best fits the customer?
- Which inventory groups will be out of stock?
- What facility will a patient be discharged to?

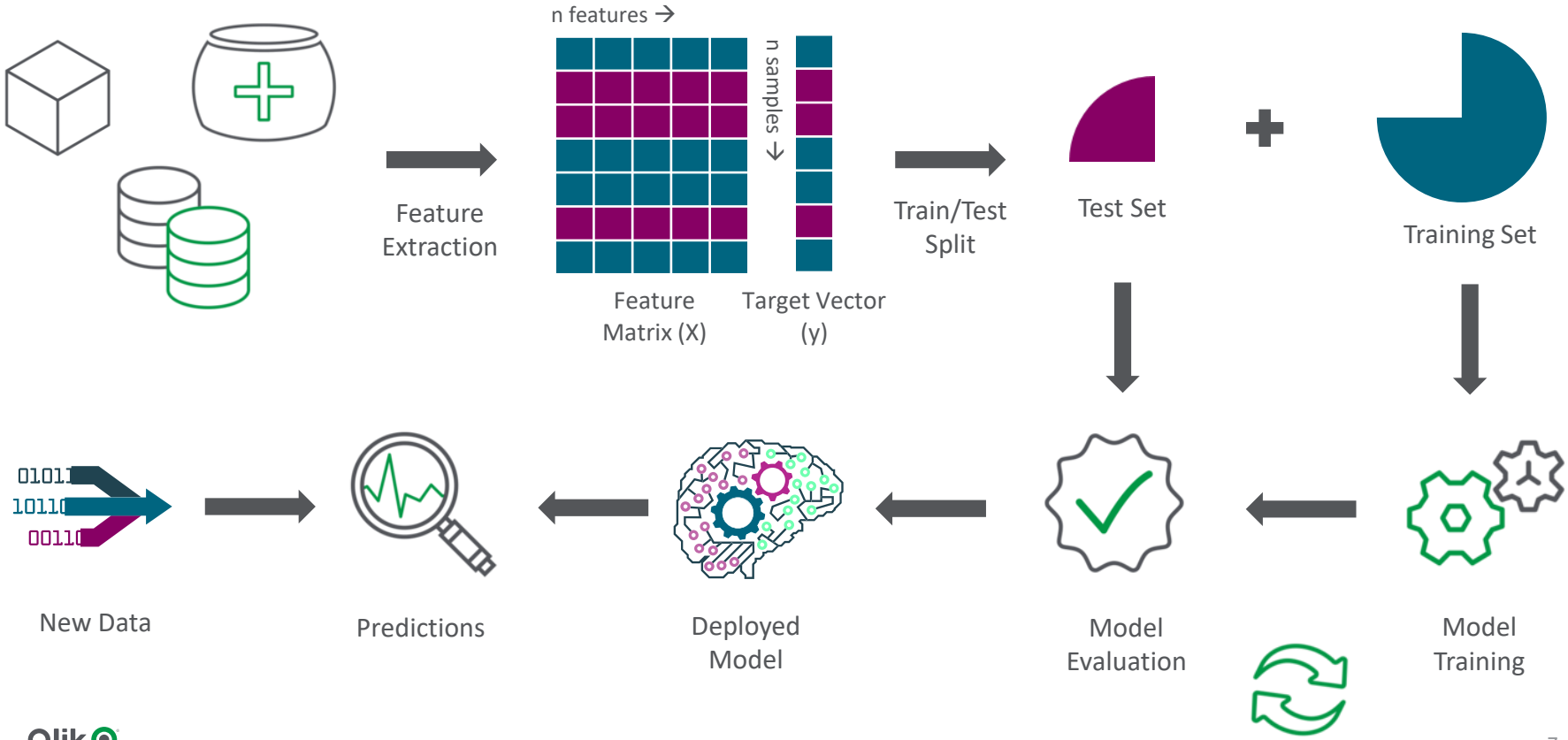


Regression/Numeric:
Predicting a number at a future point

- What is the expected Lifetime Value of a customer?
- What will total sales be in Q4?
- How long will a patient be in the hospital?
- How many website conversions will be completed in December?
- How much inventory will be on hand?



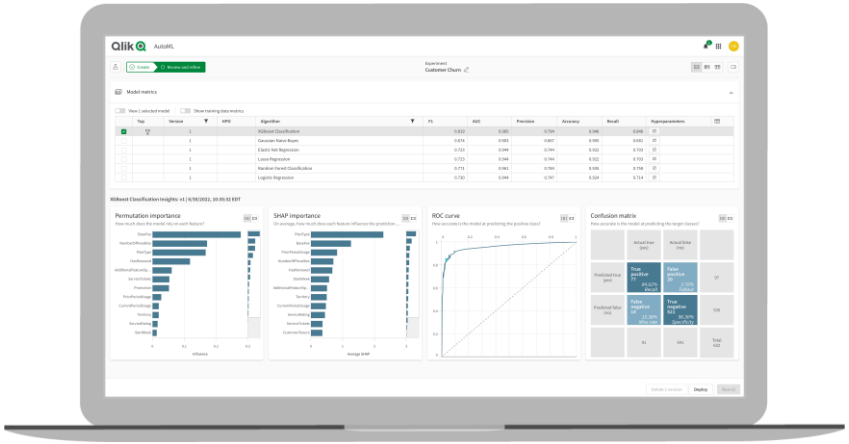
Supervised Machine Learning



Introducing Qlik AutoML

No-code, Automated Machine Learning for Analytics Teams

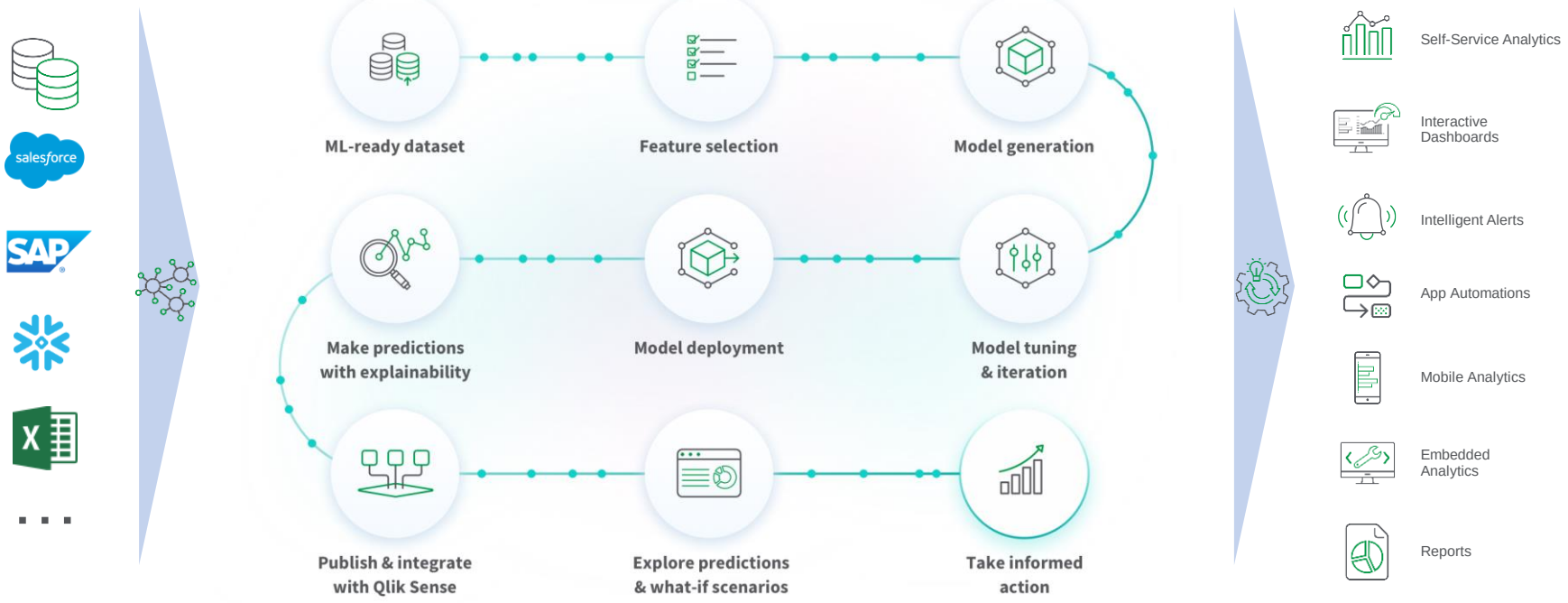
- **Easily create predictive analytics**
  - Find Patterns and understand key drivers in historical data and build ML models
  - Use models to generate predictions on current data sets
  - Explore predictive data and “what-if” scenarios in Qlik Sense
- **Uniquely designed for analytics teams**
  - No-code model development
  - Unlimited experimentation
  - Easy model deployment
- **Explainable AI**
  - Delivers prediction influencer data at the row level
  - Understand not just what might happen, but why, and what action can be taken to affect outcomes
- **Fully integrated into Qlik Cloud**



G2 – Data Science and Machine Learning Platforms

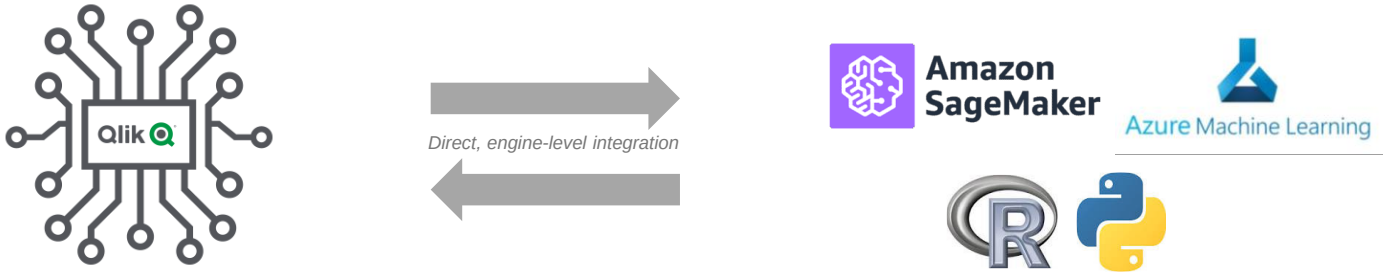
End-to-end AutoML Workflow

From historical data to predictive insight and action



Deploying real-time models in Qlik Sense

Deliver the power of AI / ML to business decision makers



- Real-time visual exploration of predictive calculations in Qlik Sense
- As the user makes selections, relevant data is identified and sent to calculation engines
- Results are instantly visualized for the user, driving further exploration

- Third party engines quickly process contextual, user-specific data sets
- Calculations are made and returned in real-time
- Far more speed than conventional batch techniques

Everyone Benefits from AI and ML

Qlik unlocks the power of predictive analytics for all users

Exploratory Analysis	Complementary Machine Learning	Data Science and ML Platforms
		
Qlik Sense	**Qlik Sense & Qlik AutoML**	**3rd Party Tools**
• Insight Advisor, Natural Language • Consume AutoML and Data Science in Qlik Sense	• AutoML, Visualization, Authoring • Publish AutoML Models and Consume Data Science in Qlik Sense	• Amazon SageMaker, AzureML, DataRobot, DataBricks, etc. • Publish Data Science Models in Qlik Sense
Business Decisions	New Use Cases	High Value Problems

Qlik democratizes insight generation to decision makers, driving tremendous value

The Value of AutoML

Machine Learning for the “other 90%” of use cases

Sales

- Sales Pipeline – Win / Loss Forecasting
- Customer Churn / Retention
- Customer Prospecting / Targeting

Marketing

- Demand / Revenue Forecasting
- Customer Lifetime Value
- Customer Next Best Offer

Finance

- Capital Investment Optimization
- Expense Management
- Risk Management / Reduction

Operations

- Workforce Demand Prediction
- Capacity Allocation
- Appointment Cancellations

HR

- Employee Retention / Attrition Prediction
- Employee Satisfaction
- Recruiting / Candidate Profiling

IT

- Software / Licensing Usage
- Infrastructure Performance Prediction

Supply Chain

- Inventory Stock-Outs Prediction
- Supply Chain Performance / Bottlenecks
- Transportation Optimization

Service & Support

- Support Case Prediction
- Predictive Maintenance

AutoML Use Case

Finance

Capital Investment Optimization

For

Organizations considering capital investments such as new assets, IT projects, real estate, etc.

In

Retail, Manufacturing, Financial Services, Hi-tech, Services, Telco, etc.

Qlik

What capital investments have we made in the last 12 months?

What was the ROI on those investments?

Which capital investments should we make with the best ROI?

Which characteristics on an investment or asset drive the highest ROI?

Build recommendations into a dashboard and delivery to financial management for analysis

Value

Better identify investment opportunities with the highest ROI potential and least risk

Challenges

- Poorly defined investment process and insight into financial impact
- Projects have lost money
- Poor business decision were made around strategic investments

Examples

- Naylor built a POC with Qlik AutoML models to help understand and plan investments and capital needs for each quarter

What would it mean to increase ROI for capital investments by even a few percentage points this year?

AutoML Use Case

Finance

Expense Management

For

Organizations with sales and services, personnel that incur expenses

In

Professional Services, Software, Hi-Tech, Financial Services, Life Sciences, etc.

Qlik

How much did our workforce spend on expenses last quarter?

What were the major categories of expense?

What do we project our expenses to be next quarter by category?

What are the key factors driving expenses?

How can we **best take action** to reduce our expenses?

Trigger reports to managers with expense projections and directives to cut costs for applicable categories

Value

Reduce expenses and gain visibility and consistency into future expenditures

Challenges

- Growing expenses are cutting into overall profitability
- No predictability into future expenses
- Hard to understand where financial polity violations are happening

Examples

- Naylor built a POC with Qlik AutoML models to predict budget by project for each quarter to reduce overhead and reduce areas where expenses are excessive

What would it mean to reduce your overall expenses by 10% or more?

AutoML Use Case

Finance

Risk Management / Reduction

For

Organizations with products that have inherent risks of issues or failure that can impact the business

In

Manufacturing, Consumer Products, High Tech, Software, etc.

Qlik

Which product recalls / issues have you had in the past?

How much money did we lose?

What is the next product likely to be recalled?

How much money do we stand to lose?

What are the specific factors driving potential product issues?

Which actions can we take to reduce the risk of future product recalls?

Trigger an alert to on a potential increased risk to product management and operations, with recommends to reduce risk

Value

Reduces and costs associated with product failures and improve company reputation

Challenges

- Products being recalled for unforeseen reasons
- Products not performing as expected, damaging company reputation
- Significant money lost

Examples

- A US midwest manufacturer used Qlik AutoML to predict product defects to reduce product recall
- A North American food supplier built a POC with Qlik AutoML with the goal to help predict future food quality issues, preventing recalls, and poor brand exposure

What would it mean if you could better identify and mitigate areas of risk before they happen?

AutoML Use Case

HR

Employee Retention / Attrition

For

Organizations in competitive markets with high attrition rates, who need to retain high-value talent

In

Software, High-Tech, Services, Financial Services, Retail, all

Qlik

How many employees left over the last two years?

Which employees left?

How much attrition are we forecasting in the next year?

Which high-value employees are at an increased risk of leaving?

For employees at risk of leaving, **what are the specific factors** driving that decision

How can we **best take action** to keep them?

Generate a list of high-risk employees and possible areas and incentives to offer

Value

Retain more high-value employees, reducing hiring and onboarding costs, increase employee satisfaction and output

Challenges

- High attrition rate
- Loss of key employees puts initiatives at risk
- No insight into reasons employees choose to leave

Examples

- A leading auto-manufacturing company constructed a POC with Qlik AutoML to understand which drivers caused employees to leave and which steps they could take to retain high performers
- A leading UK retailer is building a POC with Qlik AutoML to understand how to keep key personal across their retail locations

What would it mean to reduce employee attrition by 10% and retain key talent?

AutoML Use Case

HR

Employee Satisfaction

For

Organizations in competitive markets looking to maximize employee satisfaction and retention

In

Retail, Healthcare, Manufacturing, Telco / Utilities Software, Services, all

Qlik

What was our level of employee satisfaction last year by key topic area?

What do we expect our **employee satisfaction to be** in this coming year?

Which specific factors will drive low employee satisfaction?

How can we **best take action to** improve employee satisfaction?

Generate workflow for HR / management with predicted areas of weakness to determine improvement steps

Value

Retain more employees and improve employee satisfaction and production, reduce employee turnover costs

Challenges

- Employees are not happy
- Productivity is low
- Attrition is increasing
- No insight into reasons / drivers

Examples

- Beyond 12, an education non-profit, is using Qlik AutoML to understand how to best keep students engaged, stay in school, and increase overall graduation rates
- Qlik is actively employing AutoML to help with predictive employee engagement

What would it mean to increase employee satisfaction and reduce attrition?

AutoML Use Case

HR

Recruiting / Candidate Profiling

For

Organizations needing to expand their workforce with key hires

In

Software, High-Tech, Services, Financial Services, all

Qlik

What were our hires in the last 12 months?

What were the characteristics of those hires?

What open roles do we expect to have going forward?

What are the candidate attributes needed in those roles?

For predicted roles, **which candidate attributes are most valuable** and why?

What is the profile for my ideal candidate

Generate lists of recommended candidate attributes for hiring managers and recruiters

Value

Hire more qualified talent that fits organizational priorities

Challenges

- Hired the wrong people into key roles
- Lack of needed skills / qualities in key roles
- Misalignment with company culture and priorities

Examples

- A European consumer products company is exploring the use of Qlik AutoML to understand the makeup of successful hires

What would it mean to more consistently hire the right talent for mission-critical roles

AutoML Use Case

IT

Software / Licensing Usage

For

Large organizations with high levels of software usage and license costs

In

Financial Services, Software, Professional Services, High-Tech, Media, etc.

Qlik

What was my software license usage in the last year?

Did I have underutilized licenses or subscriptions?

What is my **expected license usage** in the coming year?

Which new licenses or subscriptions are likely to be wasted?

What factors determine whether my employees will use their software licenses?

How can we **best take action** reduce excess costs?

Send automated emails to users asking them to confirm usage requirements for high-cost software

Value

Reduce costs by rationalizing software spend

Challenges

- High and growing levels of software costs and subscriptions
- Significant under utilization of software
- No insight into reasons / drivers

Examples

- Naylor built a POC with Qlik AutoML models to predict budget by project for each quarter to reduce overhead and reduce areas where expenses are excessive

What would it mean to reduce license / subscription software spend by even a few percentage points?

AutoML Use Case

IT

Infrastructure Performance

For

Organizations with on-premise infrastructure or datacenters

In

Financial Services, Software, Professional Services, High-Tech, Media, etc.

Qlik

What was our IT infrastructure performance last year in our data center?

Where were there capacity issues or failures?

How should we plan our infrastructure capacity in the coming year?

Where might there be **capacity issues or failures**?

What are the key factors driving potential capacity issues?

How can we **best optimize our infrastructure** to ensure performance?

Send alerts IT staff for potential capacity issues based on predictive analytics

Value

Ensure a consistent high performance IT infrastructure that meets SLAs and business demands

Challenges

- Low performance in infrastructure is decreasing ability to meet SLAs
- Unable to understand how to solidify IT infrastructure
- Hard to predict where issues will arise

Examples

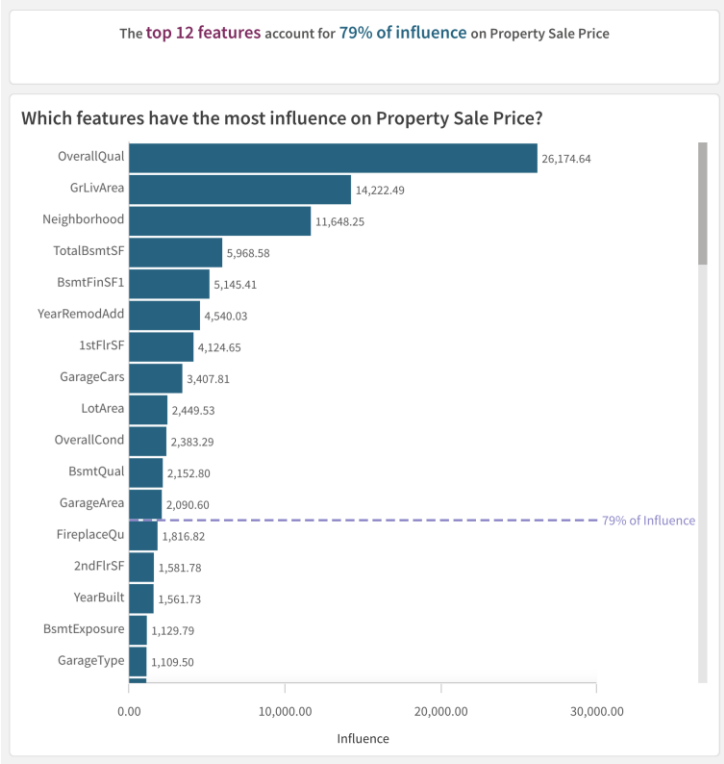
- With Qlik AutoML, Skullcandy was able to forecast specific parts or features in their products that have failed in the field, identify correlations, and make improvements on those parts before going to market

What would it mean to more accurately anticipate IT infrastructure issues and better prevent them?

Hands-on

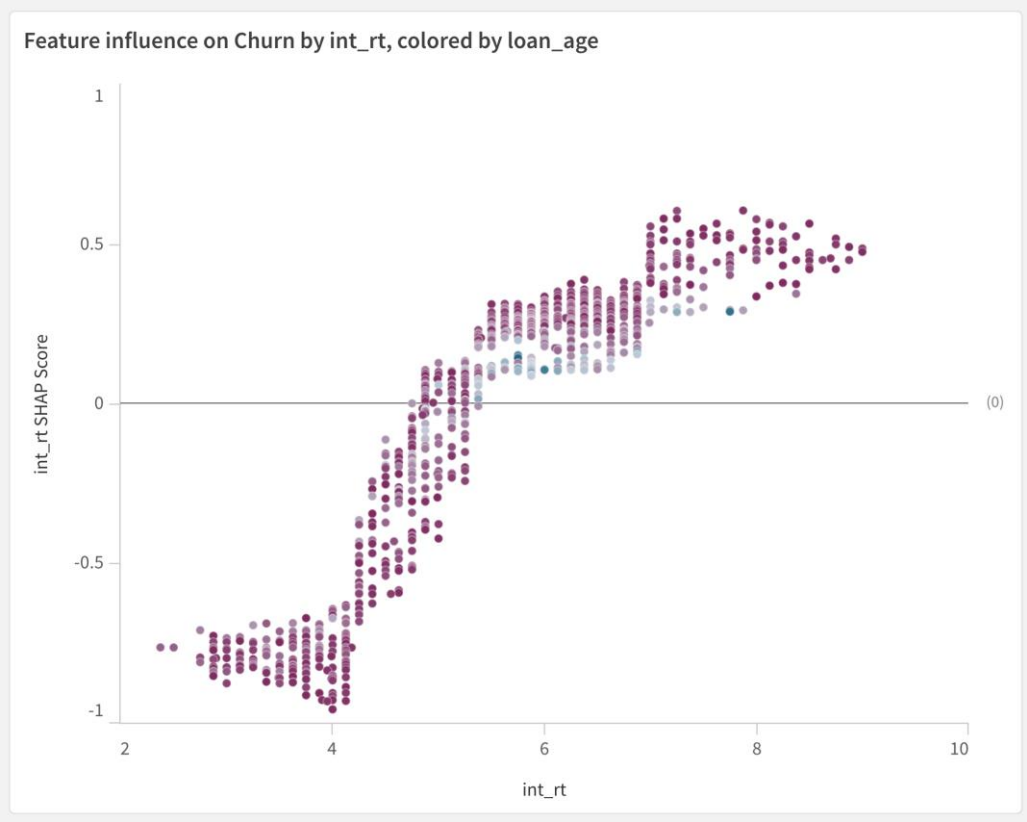
Explainability and Predictions

- An important first step before we make predictions is to understand our model and make sense of it.
- Explainable AI is the process of understanding how each field and value influences the predicted outcome.
- In many use cases the explainability of a model can be more important than making predictions



Deeper Understanding with SHAP Values

- SHAP values are a method of calculating the amount of influence each value has on the prediction being made.
- These can be aggregated to field level, or explored at transaction level to explore the spread of different values



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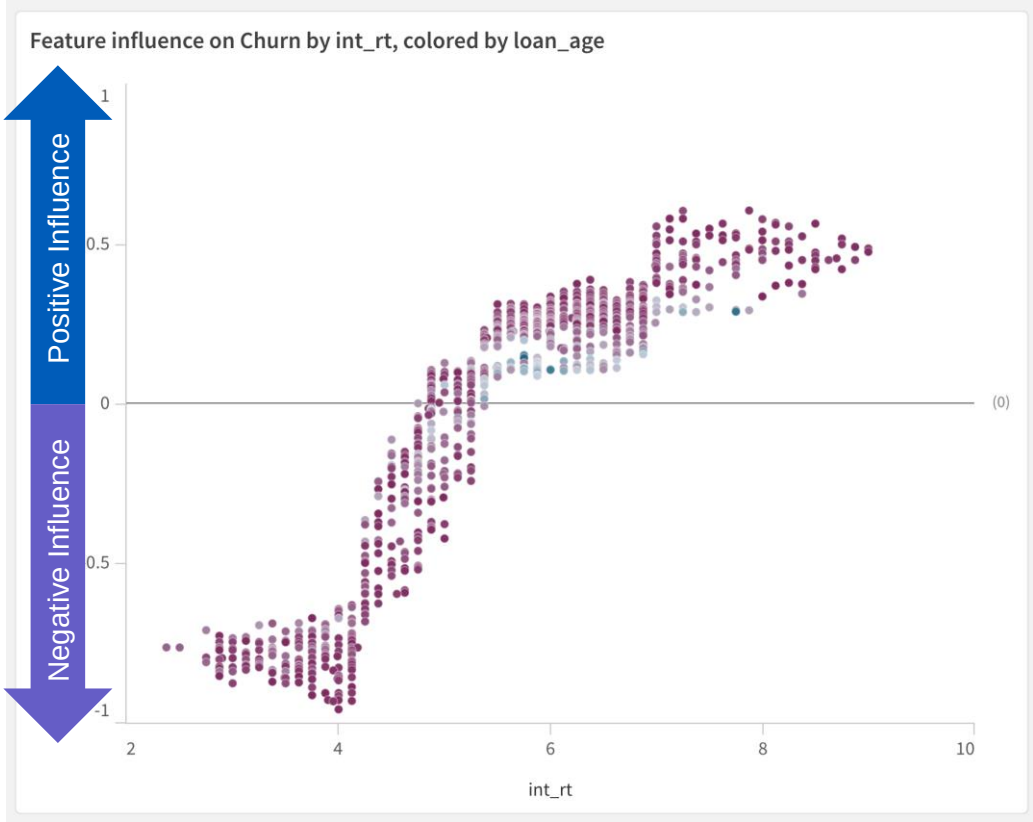

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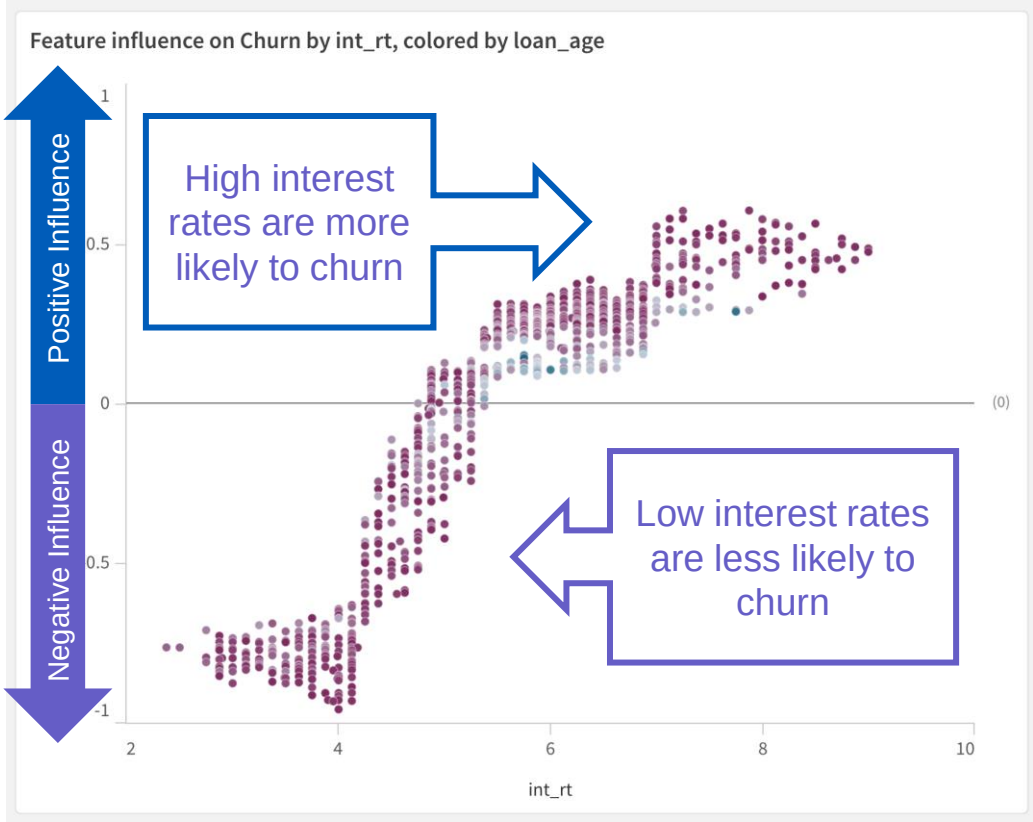
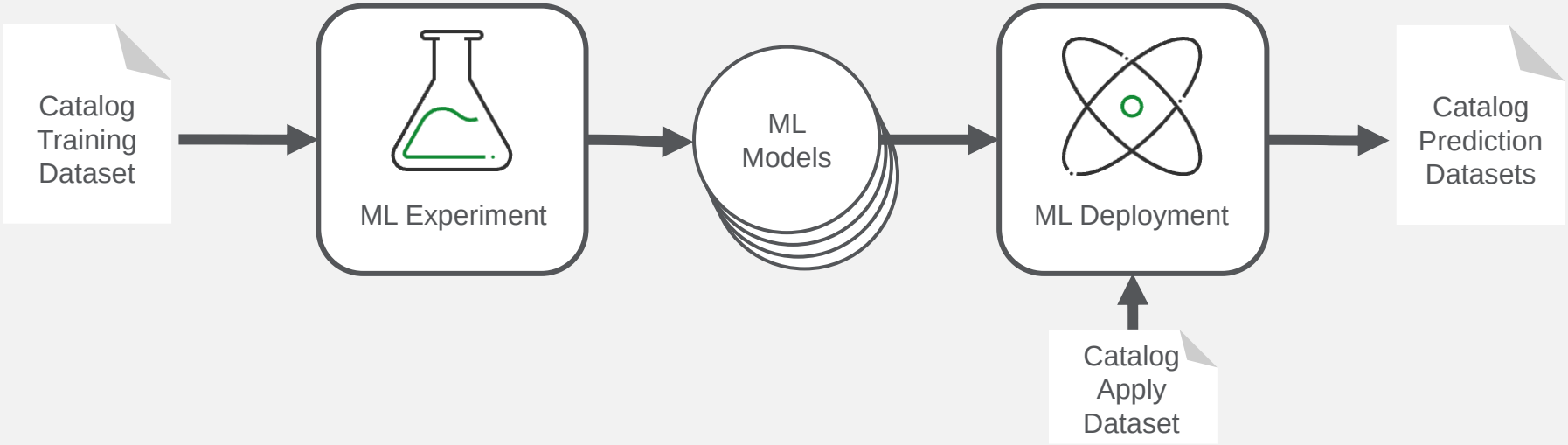


AutoML with Qlik Cloud

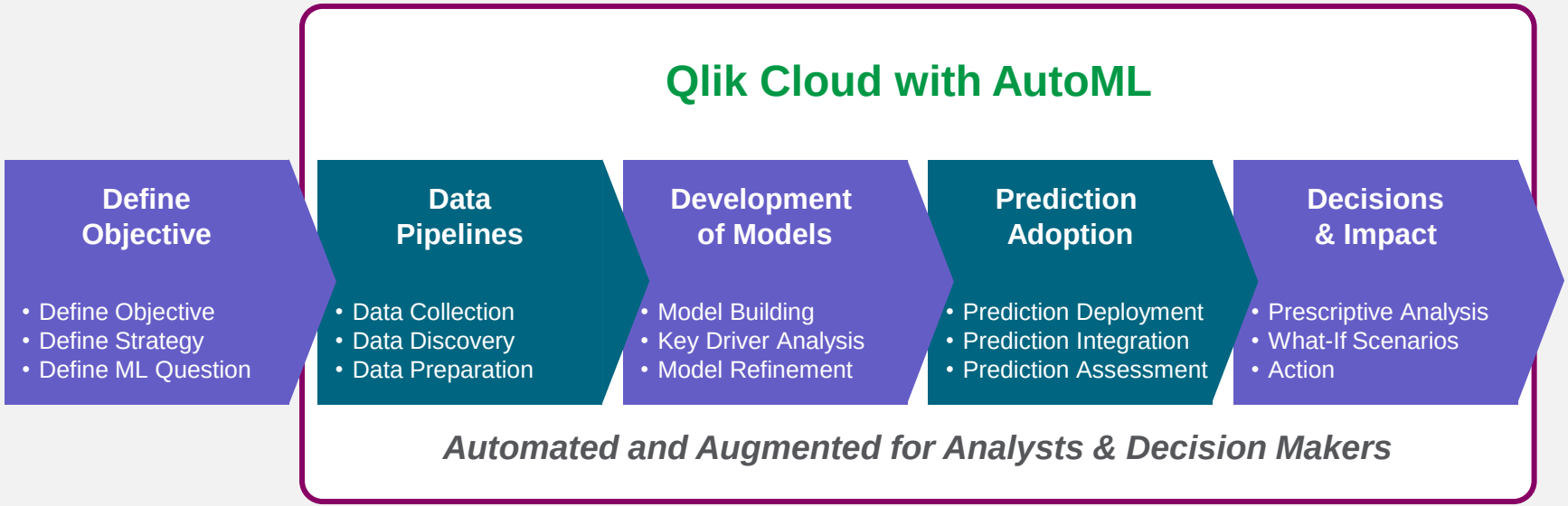
ML Experiments and Deployments



- Integrated with Qlik Cloud catalog datasets
- Iterative experiments in AutoML
- Unlimited models created, with the best being deployed
- Once deployed, a model can be used to make predictions
- Predictions are stored in new datasets ready for analysis

The Data Science Lifecycle

How Qlik automates the lifecycle for successful outcomes



Identifying a Goal and a Use Case

An ML experiment needs to solve a specific goal and use case.

Ask a specific question

The dataset needs to be designed to answer that question.

Create a ML Ready Dataset

Expect to learn and evolve your experiments to create better models.

Iterate and learn

What Makes Qlik AutoML Different

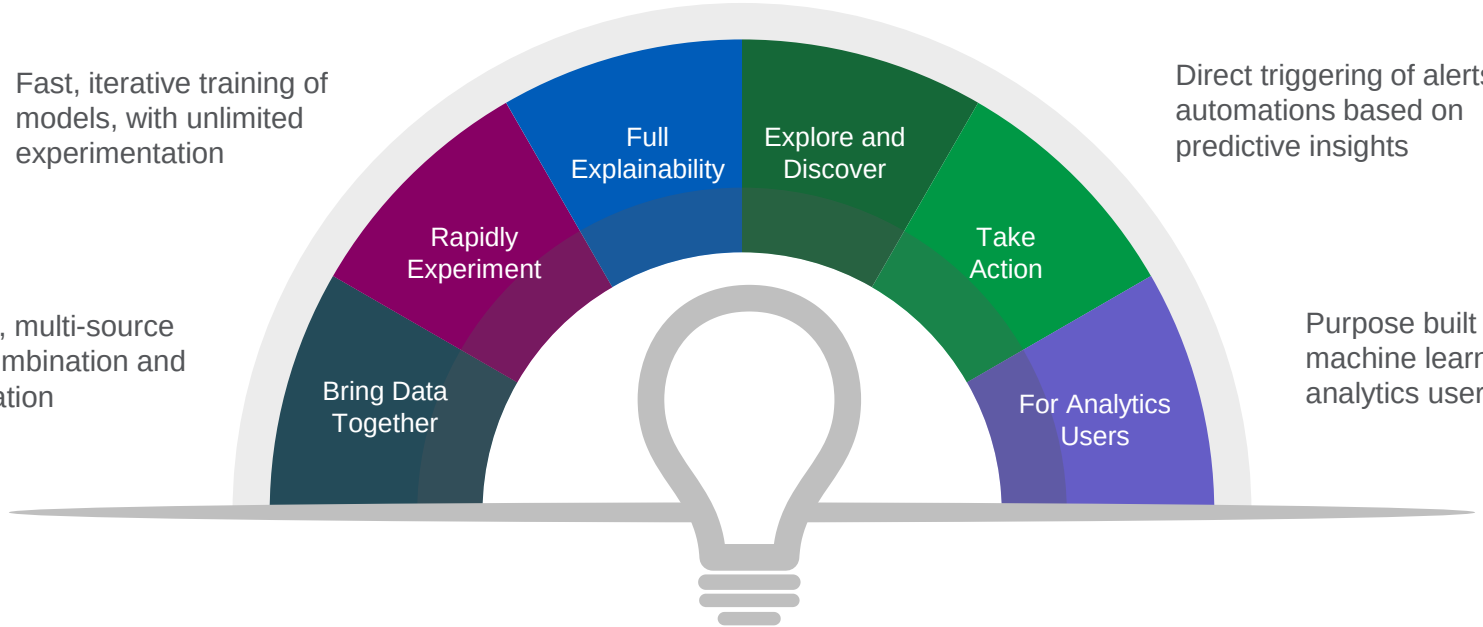
Fully integrated into Qlik Cloud for end-to-end value

Predictions with full explainability data including Shapley values for each row

Associative exploration of predictive data and what-if scenarios, with real-time calculations

Fast, iterative training of models, with unlimited experimentation

Direct triggering of alerts and automations based on predictive insights



Robust, multi-source data combination and preparation

Purpose built to simplify machine learning for analytics users and teams

Discussion & Questions

Qlik®

TO BE CERTAIN.