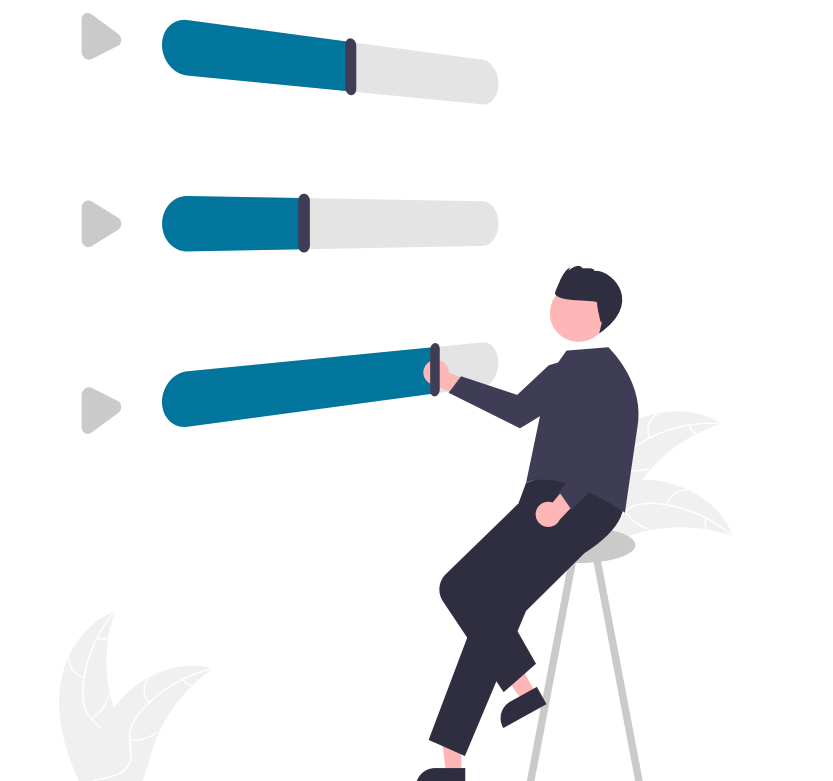# Smarter Predictions =

Smarter Decisions

**How Machine Learning Is Revolutionizing Automated Decision-Making**

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Automated Decision-Making in the Information Age

The number of critical decisions that many companies need to make daily can be overwhelming. Whether it's figuring out which combinations of promotions to push to individual customers at scale, the optimal volume of a product to stock at a retail location, or any of the other innumerable determinations businesses must regularly make, one thing is clear—better decisions are often critical to success.

It is essential for companies to strengthen business operations with efficiency, consistency, and precision. As organizations embark down the path toward digital transformation, the goal is to augment, and if feasible, automate, as many decisions as possible. This automation will save not only money and preserve resource bandwidth, but more importantly, it will play a vital role in delivering a superior customer experience.

Decision platforms have evolved to help businesses manage automated decision-making. The Information Age should be great news to business leaders—as more data often correlates to better decisions. But even though data offers the promise and potential to increase decision-making accuracy, the reality is that Big Data poses a problem:
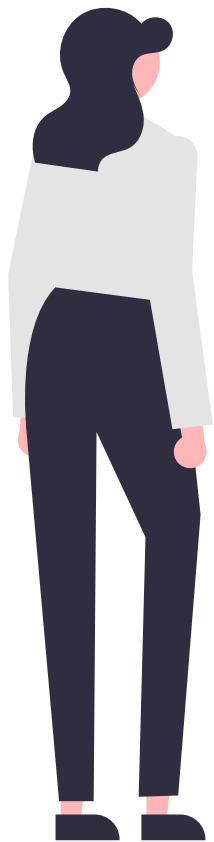
How to transform disparate and sometimes meaningless data into actionable insights that drive values-driven decisions?

This growing complexity is not an insignificant challenge. However, those who can harness this new world of signals into their decision logic will have a competitive edge. Imagine being able to calculate risks and rewards more accurately and efficiently than any of your rivals. This creates a new paradigm and new world of possibilities. Businesses that can consistently make better and faster decisions will have a distinct advantage—potentially even over competitors that can beat them handily in other areas like product, price, and brand equity.

This is where artificial intelligence, and more specifically, machine learning (ML), can help.

The combination of machine learning and decision automation technologies allows us to transform traditional "if this, then that" logic into experiential "what if?" decisioning at scale, and faster than ever before.

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Machine Learning Predictions = Smarter Decisions

It's estimated that the average adult makes more than 35,000 decisions per day. Our brains can calculate an innumerable amount of details and data in an instant. It seamlessly takes input, processes that information, performs calculations, and produces outputs in thoughts and actions. Decision platforms work similarly. Based on the inputs—for example, customer data—these systems process and calculate this information into a suitable output following a prescribed business rule structure.

While this comparison between the human brain and a decision platform is valid, the material difference is clear. The human brain can take in new, unstructured information, process it, and learn with a high degree of accuracy. On the other hand, in a decision platform, the logic is planned out and authored first, based on expected inputs and desired outputs—however, the ability to automate decisions highly at scale is where this technology provides true value to any enterprise.

Decision platforms can handle complicated business decisions at seemingly lightspeed, but only if they're structured. This is why Big Data—which all agree can revolutionize decision-making—is also incredibly difficult to incorporate. Every new data point introduced into a decision increases the complexity but can also increase the contextual precision.

Recall your last car purchase. *Price*, *brand*, *mileage*, *appearance*, *performance*, and maybe a handful of other data points influenced your purchase decision. Maybe you found a great car that matched your needs—but then one data point, specifically *its terrible safety rating*—made you reconsider. What if you suddenly had hundreds of other data points to take into account? It would be difficult for you to make a decision without the aid of a decision platform.

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It's easy to manage automated decisions based on hundreds or thousands (or more!) of data points with the structured decision tables found in today's decision platforms. Decision tables allow users to write thousands of rules with the click of a button, eliminating the need for time-consuming, manual processes, simplifying complexity, and providing agility and transparency. Additionally, some decision platforms also offer the ability to author rules using custom, familiar vocabulary. This also expedites the rule-writing process.

Further, decision platforms have evolved to incorporate predictive models to help us minimize risk by recognizing trends in historical datasets that result in certain outcomes and identifying those similar patterns in the future. Those predictions then become incredibly valuable inputs into the automated decision process. Take our previous example of buying a car, but from the dealership's perspective. What if they knew that customers similar to you who had previously looked at the same car also didn't purchase due to the safety rating? If they could have predicted that outcome, maybe they would have made the sale if they had focused your attention on a car with a better rating?

While the value of predictive modeling in automated decision-making is conceptually easy to understand, developing predictive models requires the time, expertise, and budget that many companies may not have.

And here is where machine learning becomes the essential innovation for the next advances in decision platforms. If you want to know, for example, who is likely to churn out of your 30 million customers so that you can preempt their departure with a reason to stay using automated logic, you'll need a machine learning model. If trained on enough historical data on which customers both have and haven't churned, the model can accurately predict which customers are most likely to leave. This then becomes an input into automated logic designed to create the optimal offer for this specific customer.

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Avoid the Black Box: The Need for Explainable Machine Learning

Machine learning dramatically enhances the power of decision platforms by analyzing business data and making predictions—and then (as the name indicates) learning over time to make even better predictions in the future. But, while there is a lot of excitement about how machine learning can transform business operations, many business leaders share concerns about handing over too much to "intelligent" software.

What are the potential risks to my business? What are the consequences? How would I even know if my machine learning models are delivering biased outcomes?

A widely reported recent example of this issue relates to Amazon's automated recruiting engine introducing gender biases into its calculations:

> *Amazon's experimental recruiting engine…[learned] to penalize resumes including the word "women's," until the company discovered the problem. In effect, Amazon's system taught itself that male candidates were preferable. It penalized resumes that included the word "women's," as in "women's chess club captain." And it downgraded graduates of two all-women's colleges, according to people familiar with the matter.*

Despite its position as one of the world's biggest tech companies, even Amazon wasn't immune to issues with its machine learning algorithms. So, while machine learning has the potential to transform business operations, **actionable explainability** is a necessary component for the next era of decision platforms—and that is one of the core philosophies driving our product roadmap here at InRule Technology®.

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Explainable AI (XAI) are systems that provide transparency into the specifics of their decisioning processes. This provides several key benefits and gives business leaders the confidence to deploy machine learning:

Explainability makes it easy to ensure things are working correctly

AI technologies are gaining momentum in today's enterprises. In fact, research from Forrester revealed that 67% of IT decision-makers said they expect their AI/ML use cases to increase at least slightly over the next 18-24 months. However, there needs to be an insight layer for humans to monitor and optimally utilize their machine colleagues.

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At any moment, your team should be able to assess how and why a machine learning model is returning a certain prediction and why your decision automation returned a specific outcome. Gaining this insight needs to be straightforward and seamless.

Explainability makes your company smarter

The power of machine learning is that it can efficiently recognize non-intuitive patterns and trends in giant datasets that often go unnoticed by even the best data scientists. One of the unique benefits of explainable machine learning is that your teams can understand *exactly* which data points impacted predictions and the weight that each of those factors had on the prediction. This kind of information isn't just for data scientists, but for anyone looking to enhance processes and outcomes.

For example, a global telecom provider may know that one of the leading indicators of customer churn may simply be the type of contract in place. Perhaps customers with month-to-month contracts churn at a higher rate than ones with annual agreements. Without a detailed understanding of the problem, a company might conclude the best option is to discontinue month-to-month contracts, costing some customers but holding the rest tighter. A more nuanced response to this problem requires the more nuanced understanding of how this effect is different for customers with different product combinations in different locations. But teasing out those details can be quite difficult, requiring lots of math and computation. And even with that, having an accurate black box Machine Learning classification prediction of *who* is likely to churn doesn't tell you *why*, and won't be enough to inform how to effectively intervene and convert at-risk customers to longer-term contracts or otherwise retain their business.

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Explainability enables you to improve your logic

As your machine learning models make predictions, your teams can make more informed choices and build automated decisions that are based not only on those predictions but the specific factors that went into each one.

In the prior telecom customer churn example, maybe the next step after predicting which month-to-month customers have the highest possibility to leave, rules are created to proactively approach high-risk month-to-month customers with enticing promotions to switch to an annual contract. When you consider what it takes to manage a business at scale with potentially tens of millions of customers and prospects, even small enhancements to your automated logic could equate to significant gains to the bottom line.

Explainability helps you manage compliance—especially in highly regulated industries

In no other use case is explainable AI more important than in industries such as pharmaceuticals, financial services, and other highly regulated sectors.

These industries face ongoing compliance requirements, and the consequences of being out of compliance—even accidentally—can be disastrous. Although decision automation and machine learning can be valuable tools to speed up and make better decisions, the risk that they may stray from regulations and requirements is real.

According to a recent report from Deloitte:

The cost of compliance and risk mitigation over the last eight years has jettisoned almost all discretionary funding available to firms. Compared to pre-financial crisis spending levels, operating costs spent on compliance have increased by over 60 percent for retail and corporate banks. Policymakers, regulators, and shareholders are looking for firms to not only meet new regulatory requirements but to ensure the effectiveness of all that has already been built.

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Decision platforms provide explainability to ensure compliance with regulations or adherence to corporate guidelines.

End-to-End Explainability: The InRule® Advantage

As our world continues to be defined by a trend toward action in real time with more data and growing complexity, automation will shift from a business interest to a business requirement that can make or break a company's ability to keep pace with increasing customer expectations and the ever-increasing speed of business. The use of decision automation in tandem with machine learning makes this next generation of digital transformation more approachable and attainable.

InRule Technology has always focused on explainability and transparency to make decision automation easier and more accessible to business leaders. Our point of view is that one should not need a data science specialist to build sophisticated rules and manage a best-in-class decision practice. This key differentiator has made our technology one of the leading decision platforms in the market.

InRule's explainable AI approach ensures that your automated decisions and machine learning predictions are rooted in a foundation of end-to-end transparency to enhance your business and bypass some of the common pitfalls addressed in this article.

For more information about InRule, our decision platform, and our end-to-end explainability, visit our platform overview.

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