Use Case: Consumer Online Insurance

"If it were just a question of pricing based on actuarial claims prediction then everyone would have solved the problem by now…"

Whenever people consider analytics in the context of online insurance they usually think of pricing models based on claims probability. Predicting claims is an important measure and useful, but it is only a small part of the picture. You need to know far more if you want to provide online insurance personalized digital products, achieve good results, and intelligently automate and simplify the customer acquisition process. Using advanced analytics and new digital predictive data sources, this case study explains how significant profitability uplifts were achieved by pushing far beyond the boundaries of actuarial science; by using a Behavioral Data Warehouse (BDW), Decision Engine (DE) and a Model Library (ML) – as part of our Clarity™ Solution.

Client

A major, international, insurance carrier and insurance broker; one of Europe's larger insurance companies, focused on the subprime and near-prime market.

The client's analytical focus is on the UK and European market, targeting profitability and market share improvements in the highly competitive online personal auto insurance business.

The client's primary digital customer acquisition channel is via online aggregators and online price comparison sites. To provide attractive offers to consumers that are shopping around for the best auto insurance deals on price comparison sites, prior to submitting optimal online, *real-time* car insurance quotes for own and partner insurance products, the following questions needed to be answered:

1. *Do we want to compete for this consumer on a comparison site?*
2. *Is the potential customer likely to convert once on our or insurance panel member website?*
7. *What is the probability of fraud / gaming?*
8. *When and / or how should we best contact the abandoned customer?*
9. *How many times is the customer likely to renew the policy?*
14. *Which products and add-ons should we offer?*
15. *How likely is the customer to cancel the policy once purchased?*
16. *What is the probability of default?*

3. *How likely is the customer to renew the policy?*
4. *What is the claims frequency and severity probability for this customer?*
5. *If accepted, what does customer on-going behavior tell us?*
6. *Should we offer the customer additional products?*
10. *What is the estimated customer life time value?*
11. *Should we underwrite this business?*
12. *How should we price it?*
13. *How should we adapt the customer digital journey to optimize the above?*
17. *When might those issues occur?*
18. *If the customer defaults, how likely are we to collect?*
19. *What is the claims probability for this potential customer?*
20. *What are the next best actions?*

While the client was using well proven operational claims and policy management systems, to profitably compete and accurately answer the above questions online at quote time, the client needed to rely not only on internal data sources such as loss histories but incorporate many new consumer behavior and 3rd party predictive data elements and digital data sources into its modeling, analytics and pricing framework.

Problem

To meet corporate business objectives and improve competitive posture, the auto insurance portfolio KPIs required improvement. The client wanted to utilize real-time advanced analytics and new digital data sources, to optimize customer acquisition via the aggregators channel to improve:

- cancelation
- fraud/gaming
- renewal
- claims
- default
- add-ons upsell
- conversion
- pricing and
- profitability

The solution chosen was the BDW, DE, and ML platform integrated into the client's real-time, pricing and quotes engine. The software used was:

- Decision Engine
- Model Library
- Analytical Data Workbench
- Behavioral Data Warehouse

Implementation Approach

1. Using a proven MVP (Minimum Viable Product) Methodology, a rapid Proof of Concept (POC) was performed to identify business value with a focus on answering the following questions:

a. Does client' data contain more predictive quality than is currently obtained?	**Yes**
b. Can this be further enhanced by adding social/behavioral data and other 3rd party data? and, if so,	**Yes**
c. What is the likely scale of improvement?	**Significant**
d. What is the best implementation path for high ROI POC results.	**Build an Analytical Data Warehouse and Analytical Center of Excellence**

2. Build and deployed Analytical Data Warehouse (ADW)

3. Validated and tuned ML models on production data

4. Integrated DE with real-time pricing and rating insurance broker work-flow

5. Assisted in business adoption of advanced analytics

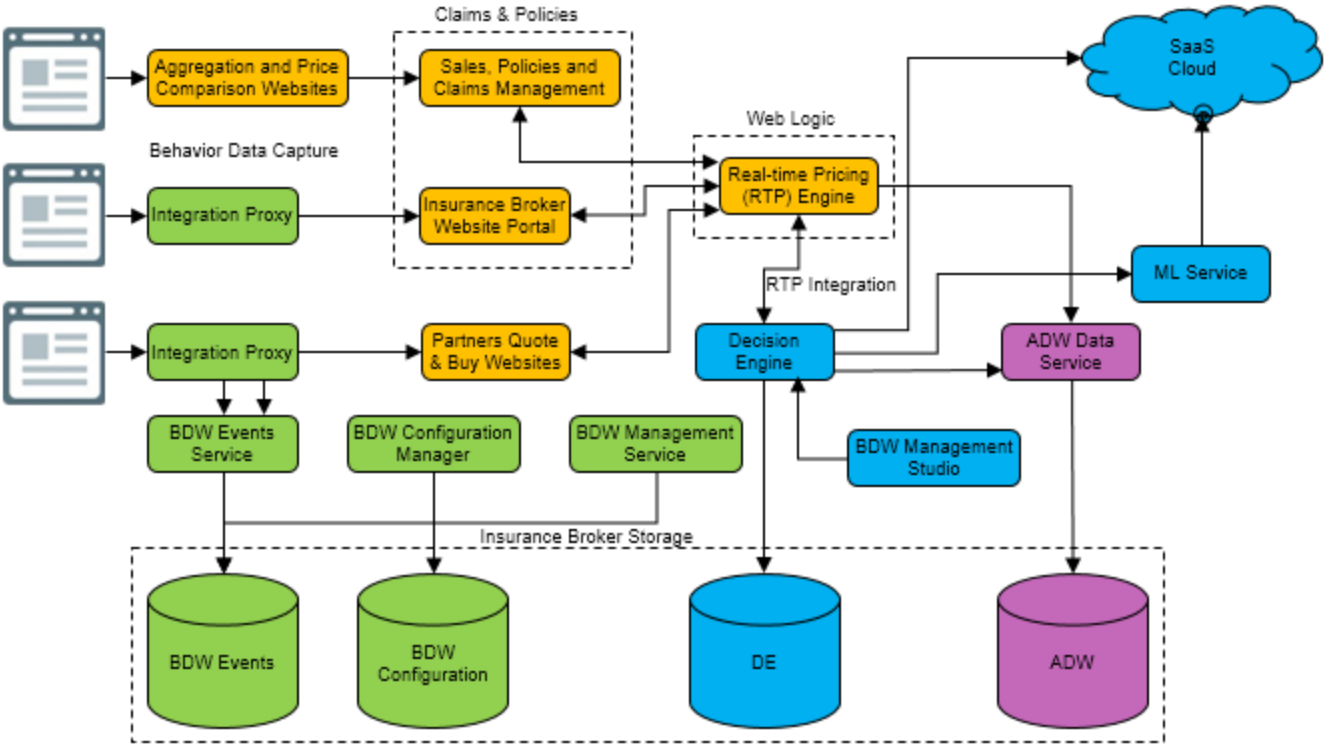
Solution

Integrated BDW to client's websites, portals and mobile applications to capture customer behavior, device, bureau and social data. As part of MVP / POC, integrated internal and external data sources, including bureau and aggregators data. Using the ADW and ML, tuned default, fraud/gaming, renewal, cancellation, conversion, add-on prediction, claims probability models. These models were optimized on data available at quote time. The ML models primary use is to serve as real-time inputs to the insurance broker pricing engine at quote time. The POC ML models were benchmarked against the existing client's production models, where available.

Although the benchmarking results were promising, the POC revealed several predictive data quality issues that required the additional buildout of an Analytical Data Warehouse (ADW) prior to productionalization.

After the raw internal data was extracted from multiple insurance broker systems, cleansed, enriched, transformed and integrated, a further range of additional predictive data was captured into the Analytical Data Warehouse (ADW). This included aggregator, behavioral, social, device, and bureau data. DE and ML models, utilizing ADW were integrated into the client's real-time pricing engine to facilitate highly sophisticated rating decisions.

After comprehensive testing of the BDW, ADW, DE / ML solution, an enhanced, intelligent pricing system was deployed to the client's production environment as shown in the image below.

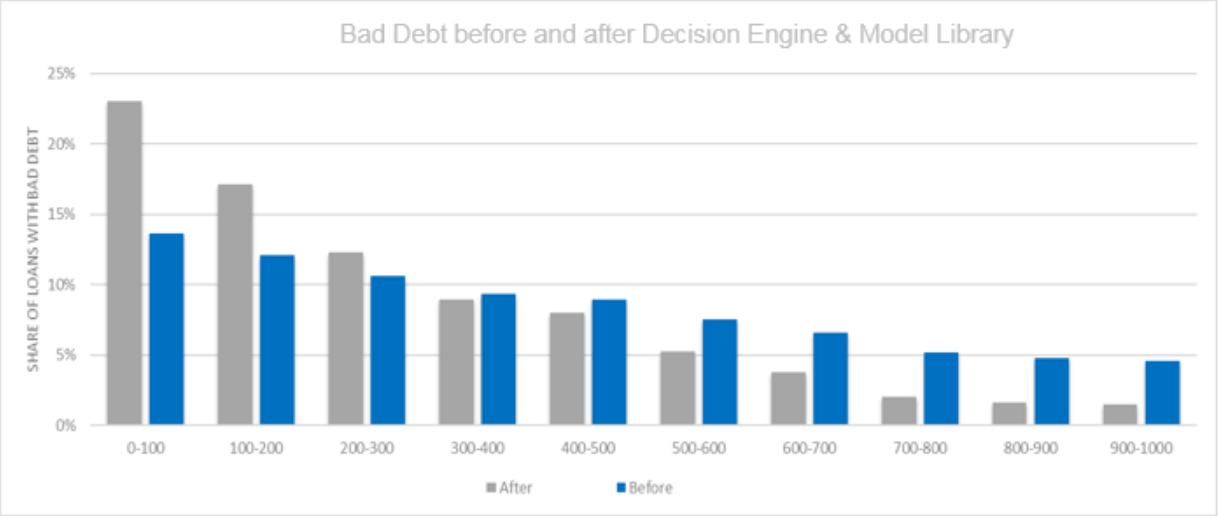


Results

Default Prediction

More than a half of Insurance Broker customers choose to pay for their auto policies in instalments. However, the Insurance Broker pays a full premium to the partner insurance companies at the policy outset. Thus, the Insurance Broker bears part of the risk of a customer default. As a result, Insurance Broker profitability significantly relies on the ability to successfully measure and manage customer credit risk.

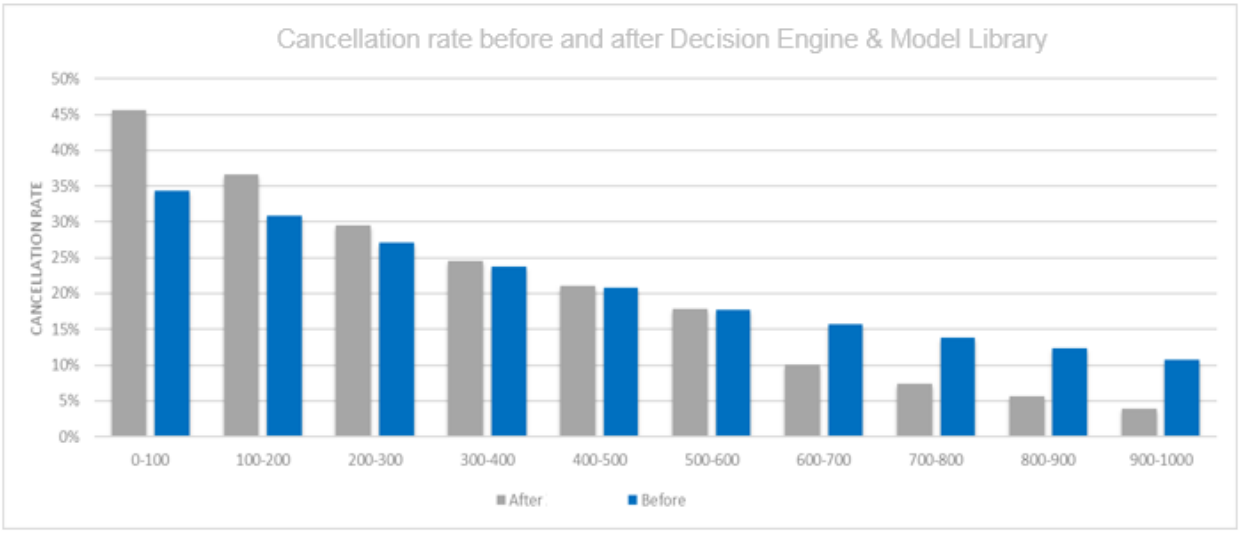
The DE and ML considerably improved the accuracy of bad debt or default prediction, using sophisticated non-linear prediction algorithms and additional, new digital data sources.



Cancellation Prediction

Cancellation of an insurance policy negatively impacts the customer LTV and leads to decreased profits. Thus, it is important to estimate the probability of cancellation at the policy quotation stage to allow for this risk to be reflected in pricing.

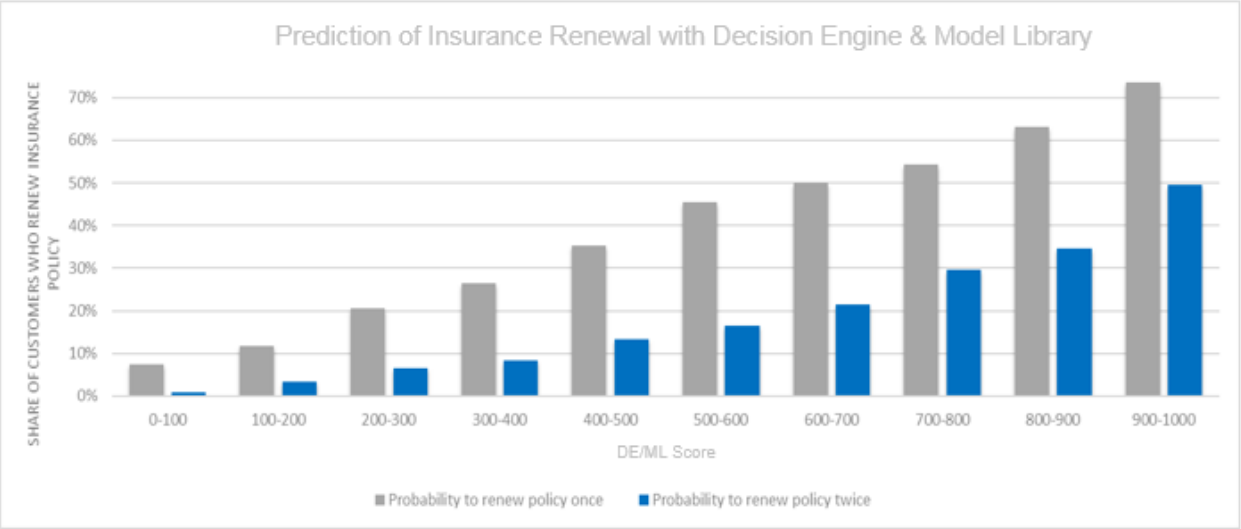
The ML cancellation prediction model, tuned on customer's social data is shown below.



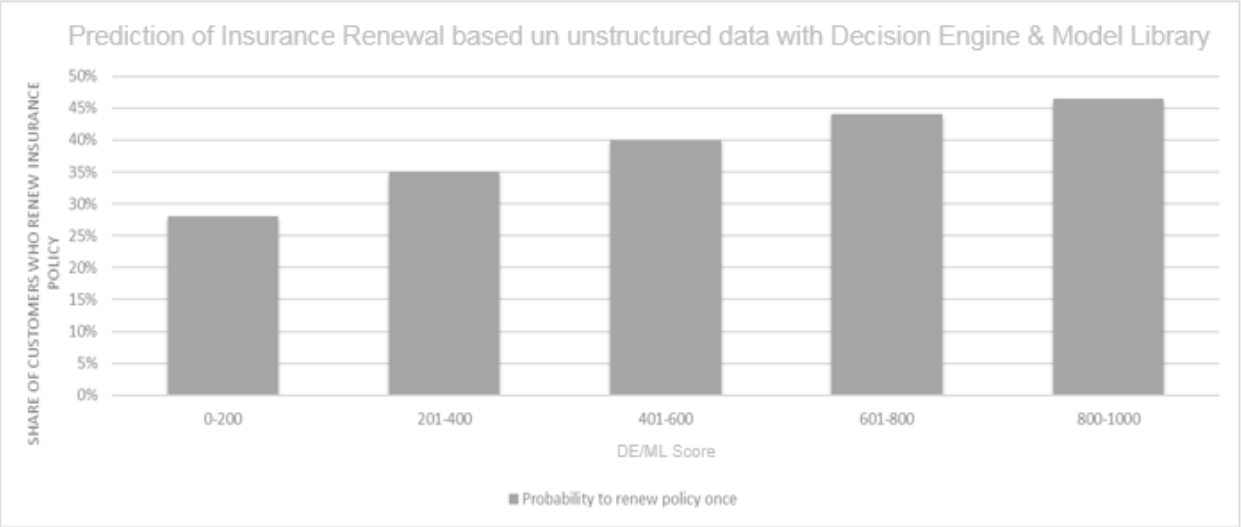
Additional new digital data sources significantly contributed to the DE and ML improvements in cancellation prediction.

Renewal Prediction

New customer acquisition is expensive. In addition, Insurance Brokers and Insurance companies will often discount a first year policy to acquire the “right” customer. Thus, the number of times a customer renews their insurance policy directly affects the customer’s LTV and the auto insurance business profitability. The DE and ML improvements in renewal prediction are shown below.

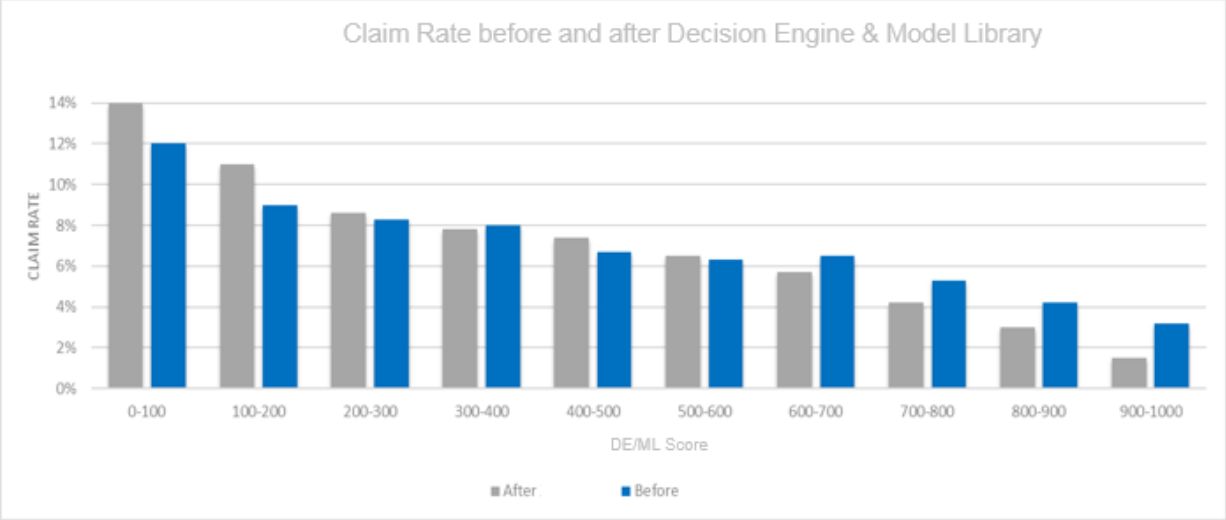


As a part of data enrichment strategy, unstructured data from live-chat and CSRs notes was utilized as additional inputs to the renewal prediction model.



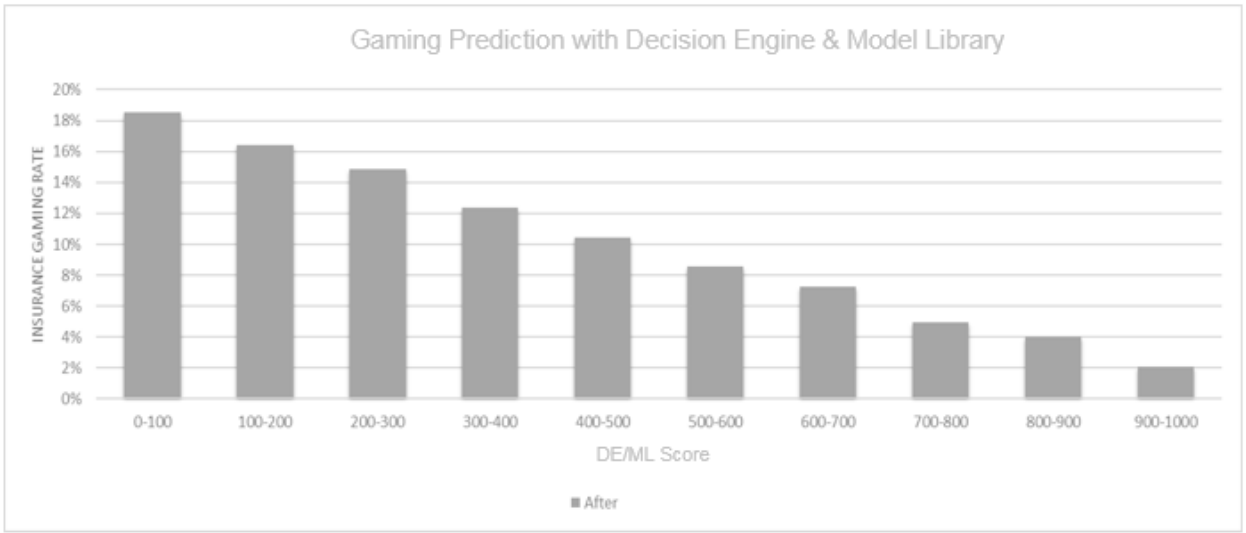
Claims Prediction

Claim prediction is a key determinant of insurance policy price and improvement in quote-time. Claims prediction provides an insurance broker with the ability to negotiate better pricing and terms with partner insurance companies. DE & ML improvements in claim prediction are shown below.



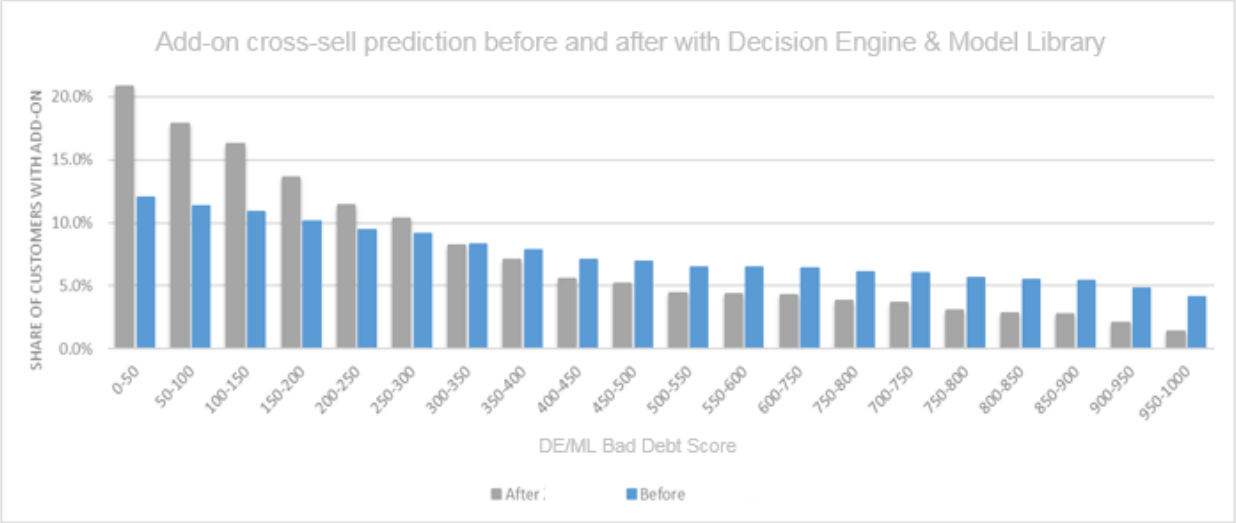
Fraud/Gaming Prediction

Customers who intentionally change their personal data to reduce the insurance policy price also have a high cancelation rate, and perform worse than expected in terms of credit risk and renewals. Detecting segments of customers who tend to "play" with insurance quotes allowed further improvements in the pricing strategy.



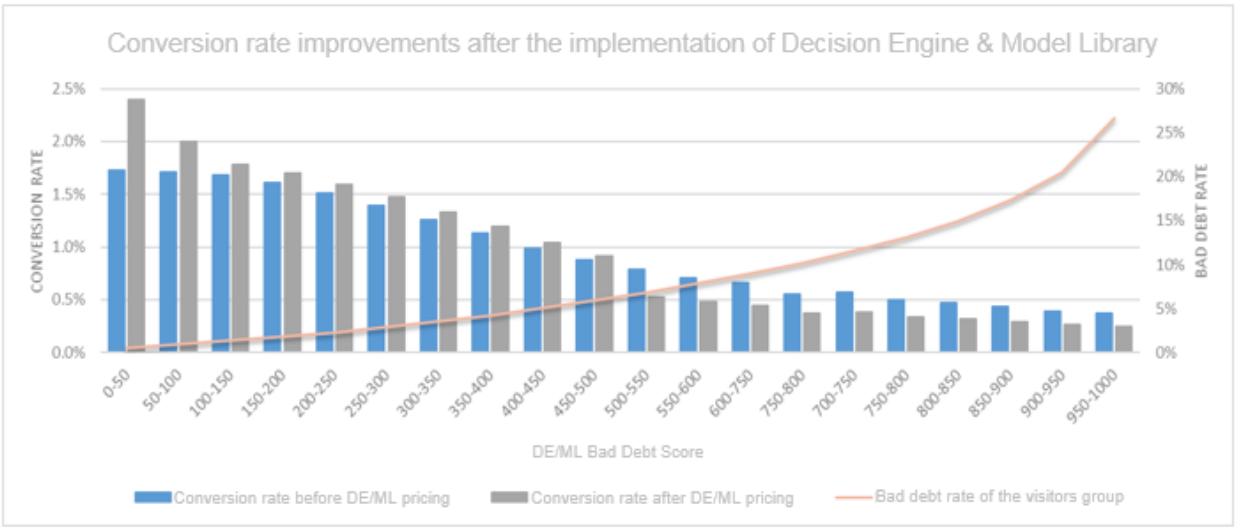
Add-ons cross-sell prediction

To acquire a new customer, a reduction in the auto policy price can be offset by a customer who is likely to buy policy add-ons. The ML add-ons cross-sell model calculates the likelihood of a customer buying specific add-on products at quote time.



Conversion prediction

The ML conversion model allowed to increase the conversion rates within low risk customer segments by offering them progressively better terms, and increased profitability within the high-risk customer segments by charging them a higher premium.



Overall Improvements

The overall improvements achieved are summarized below:

Results

- 10% increase in profitability
- 17% increase in add-ons profit
- 47% increase in conversion
- 11.8% increase in cancellation prediction
- 13.9% increase in default prediction
- 20.4% increase in renewal prediction
- 200% increase in gaming/fraud prediction

Contact us for additional information

acquired insights

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