



AKUR8

Munich RE



The Impact of Machine Learning on Insurance Pricing

October 15th, 2021



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Introduction

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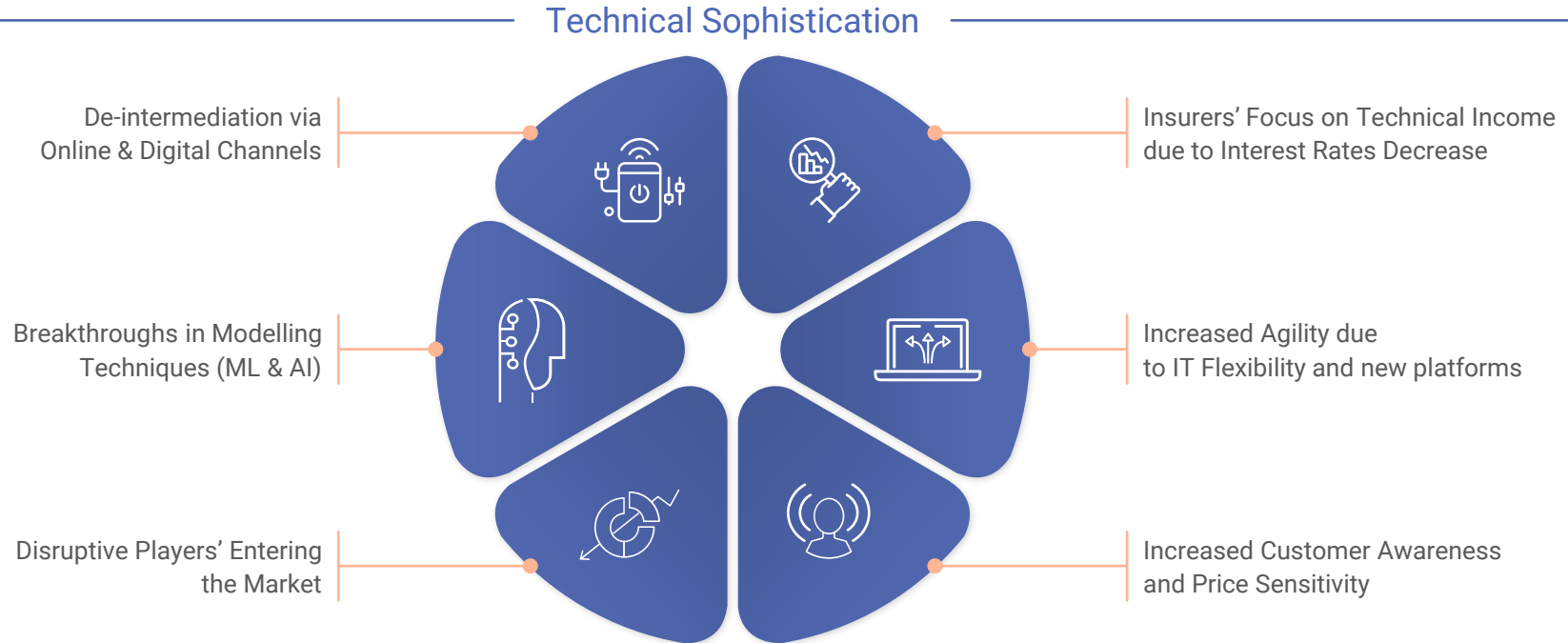


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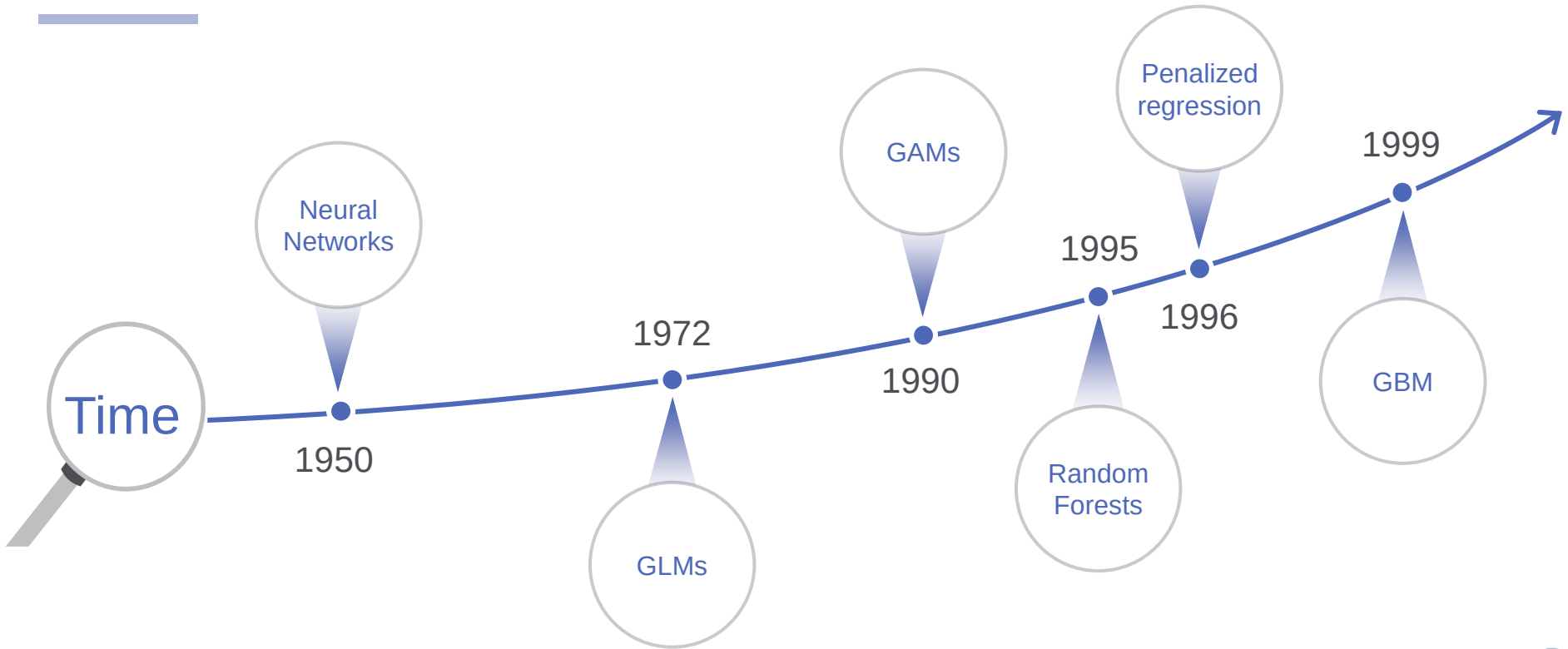
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Technical Sophistication is at the centre of insurers' challenges



Technical Sophistication is the differentiating factor

The race of algorithms





Machine Learning and AutoML

Insurance pricing goes well beyond the pure ratemaking process



Increasing premium sophistication
to target new profitable customer or market niches



Managing the portfolio
pruning bad customers and retaining the good ones



Growing sales
competing on e.g., price comparison websites



Entering in a new channel, launching a motor/household products from scratch

The complex challenge of technical sophistication

Traditional manual pricing process is long (months), iterative and inefficient.



TRADITIONAL
MANUAL PRICING



GENERIC
MACHINE LEARNING
ALGORITHMS

ML models can address those pains but are not explainable (*black box*), creating unacceptable adverse selection and regulatory issues.

AutoML as the solution to optimally combine the benefits of the two approaches

GLM/GAM – Rating structure example



The customer drives a 5 years old BMW M3.

The current vehicle value is SGD100,000.

She is female, 45 years of age and lives in Gotham City.

She had 1 claim in the last 3 years and wants to get a new TPL cover.

Base	150.00
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Age	Relativity
18–20	2.00
21–25	1.75
26–30	1.40
31–40	1.15
41–55	1.00
55–65	1.10
66–75	1.25
76+	1.40

Policy age	Relativity
0	1.00
1–2	0.90
3–5	0.80
6–10	0.65
11+	0.60

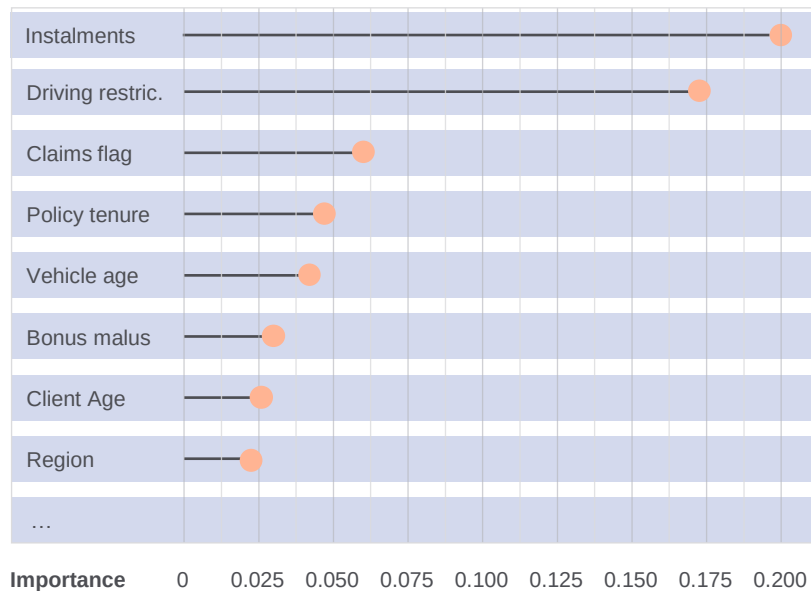
Vehicle age	Relativity
1	1.00
2	0.90
3–5	0.85
6–10	0.65
11+	0.60

Brand	Relativity
Audi	0.85
BMW	0.95
Mercedes	1.00
Fiat	0.65
Toyota	0.70
Other	0.95

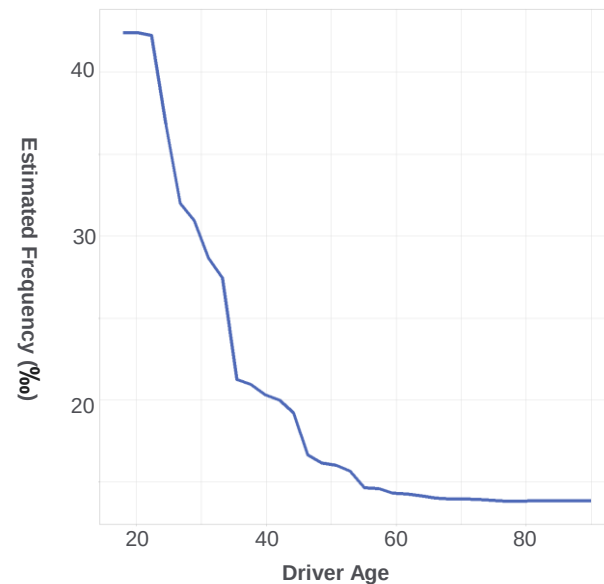
Claim free years	Relativity
0	1.60
1–3	1.40
4–7	1.15
8+	1.00

$$\text{Risk Premium} = 150.00 * 1.00 * 1.00 * 0.85 * 0.95 * 1.40 = 169.58$$

Variable Importance Plot



Partial Dependence Plot



AutoML – What is it?

However, the actuary benefits from the clarity of these features because they make the high-quality models more compelling and actionable.

AutoML reduces the hours of manual intervention by an actuary while maintaining and even enhancing the predictiveness of the models.

AutoML automates the model building process and only requires from the actuary: model selection, hyper tuning and judgement focusing on suitability of the results for the market.



Automatedly generated features also have the potential to find new KPIs for an organization to monitor and act upon.

The actuary remains a key part of the process, from data collection, feature engineering and model selection. Interpretability and impact analyses remain the responsibility of the actuary.

One can think of AutoML as a generalized search concept for finding the optimal solutions in an output which is understood. AutoML shows great promise in providing solutions for AI in providing explainable and reproducible results.

A pricing actuary had to start with a hypothesis, gather the correct dataset, try some data visualization, engineer extra features to harness all signal available, train a model using step wise regression and finally combine, implement and test implementations.

AutoML vs. Machine Learning



Machine
Learning

VS.



AutoML

Tests full universe of algorithms for best predictiveness

Democratizes data science making it accessible to your PA

Hands off approach

Available across multiple industries

Built around GAM/GLM model outputs

Specifically designed for insurance

Implementation suitable for policy admin systems: tables, rate formulae, apis

Removing traditional risks associated with blackbox AI

Offering the best trade-off possible between high speed & performance and transparency, control & interpretability

Pricing actuary remains at the centre of the process

AutoML transforms the economics of extracting value from your datasets

Where to divert the effort

Payoff



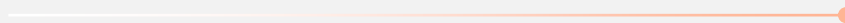
New Datasets

Test new external datasets and engineered features



Identify Segments

Identify profitable segments underpriced by the market



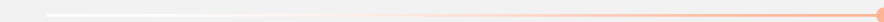
Ancillary Products

Transfer pricing sophistication to ancillary products
e.g., breakdown cover



Tiered/Multi Product

Transfer the pricing sophistication to multiproduct which have more perceived value

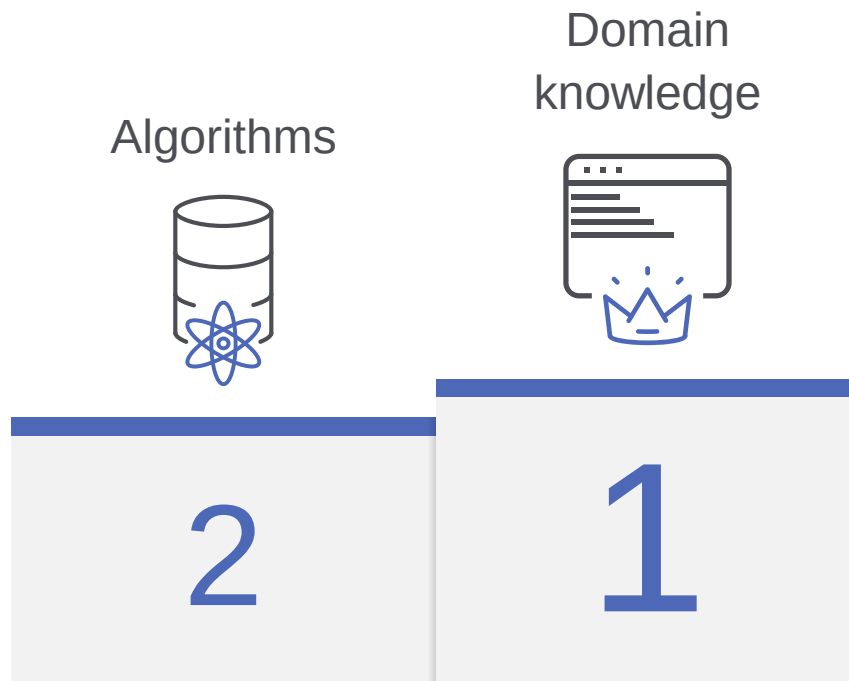


New Initiatives

Marketing campaigns, day one pricing for new products, group schemes



Domain knowledge wins over algorithms



From linear to AutoML-enabled pricing

Initial situation



- Creating leading digital insurance platform
- **Data-driven growth & profitability** amid regulatory changes
- Mix of M&A, start-ups and organic growth
- Leverage synergies of existing businesses and new platforms

Project approach

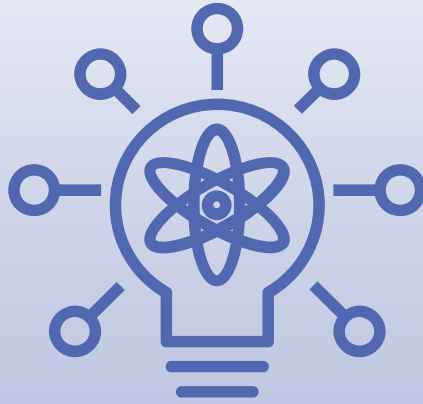


- **AutoML** approach for risk pricing and conversion rate modelling
- Know-how transfer and resources for research and implementation
- Data analytics and monitoring toolbox, data & process improvements jointly with multiple teams involved

Result



- **45,000+ models** trained, **1000 re-pricing** simulations, **4 million external data points** enrichment
- Value generation **4%** of net LR improvement
- Long-term partnership



Akur8 Overview & Demo

Akur8 Overview



Launched
2018



Global Offices
NYC, Paris, London,
Asia (2022)



Employees
65+



Languages spoken
20+



Activity
Insurance Pricing - P&C and Health



Active customers
30+



Munich RE



wefox

canopus



AG2R LA MONDIALE

wakam

Beesafe



Our vision

We revolutionize
insurance pricing
with
Transparent AI

4 years of R&D to develop the only ML algorithms that can automate modeling while keeping a fully transparent output



	 Traditional approach	 Generic ML Algorithms	 AKUR8
MODELING PROCESS	MANUAL	AUTOMATIC	AUTOMATIC
OUTPUT MODEL	TRANSPARENT (GAM/GLM ¹)	BLACK BOX (GBM ² , Random Forest)	TRANSPARENT (GAM/GLM ¹)

(1) Generalized Additive Models / Generalized Linear Models

(2) Gradient Boosting Machines

Akur8 allows insurers to implement a rate making process that is fast, accurate and safe



SPEED



10X

Faster

PERFORMANCE



+10%

Predictive
Power

TRANSPARENCY

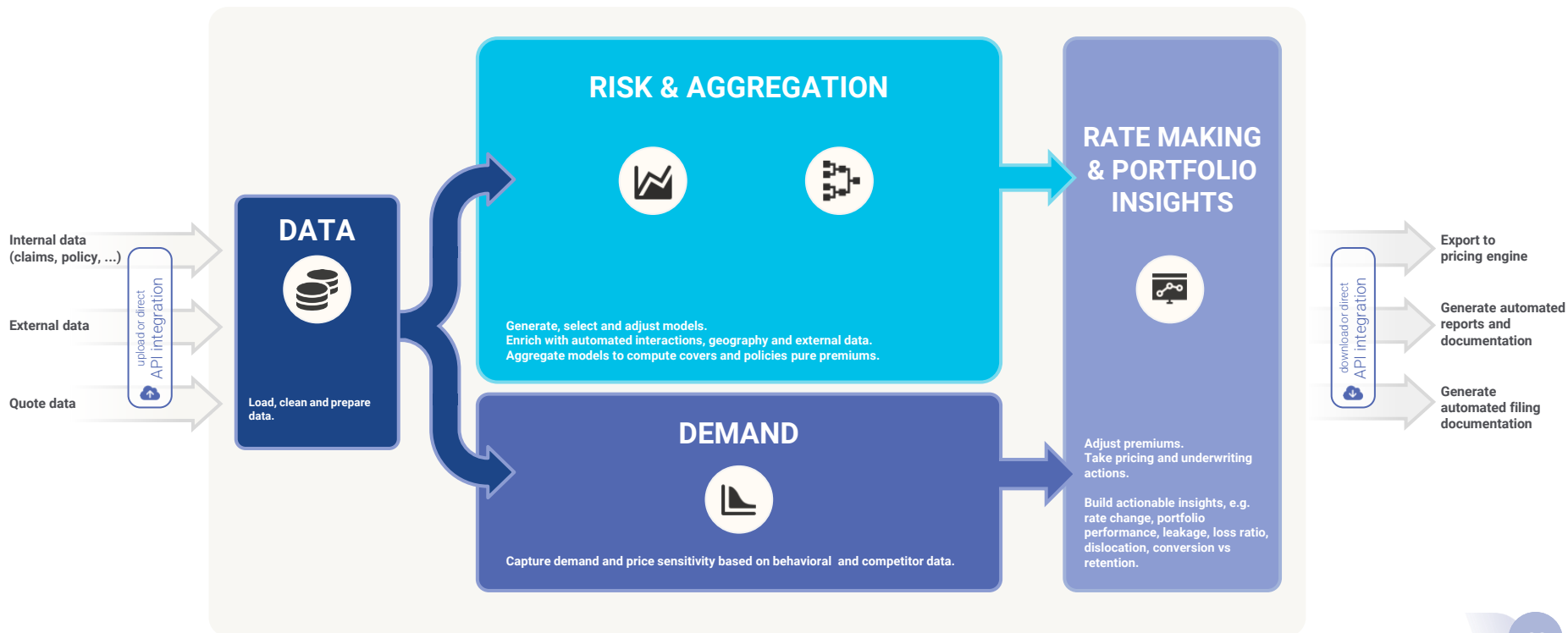


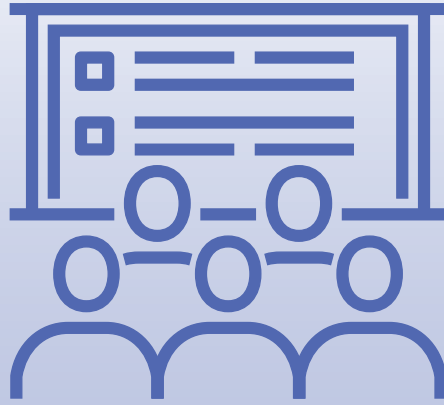
Avoid costly mistakes

Comply with regulation

Increase internal buy-in

A modular insurance SaaS pricing solution





Live Demo



Q&A Session

Check our website to stay up to date





Thank you for your attention

October 15th, 2021



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