

AUTOMATED MACHINE LEARNING HYPE OR NEXT BIG THING?

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LIFE IS FOR SHARING.

KASPAROV'S DEEP BLUE MOMENT - 1997



IMAGE: PETER MORGAN/PELTERS



LIFE IS FOR SHARING.

- 
- **WHAT IS AUTO ML?**
 - **OWN EXPERIENCES**
 - **WHAT'S THE FUTURE?**
 - **LESSONS FROM DEEP BLUE?**

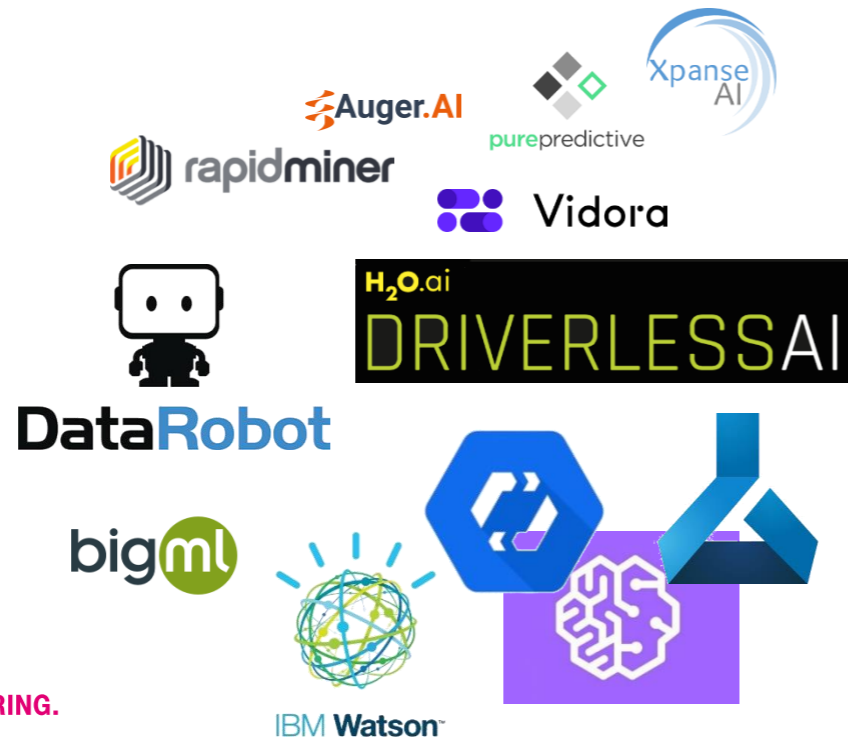
AGENDA

AUTOMATED ML = MACHINE LEARNING FOR EVERYONE?

Open Source



Commercial



“With Driverless AI, **everyone** including expert and junior data scientists, domain scientists, and data engineers **can develop trusted machine learning models.**”

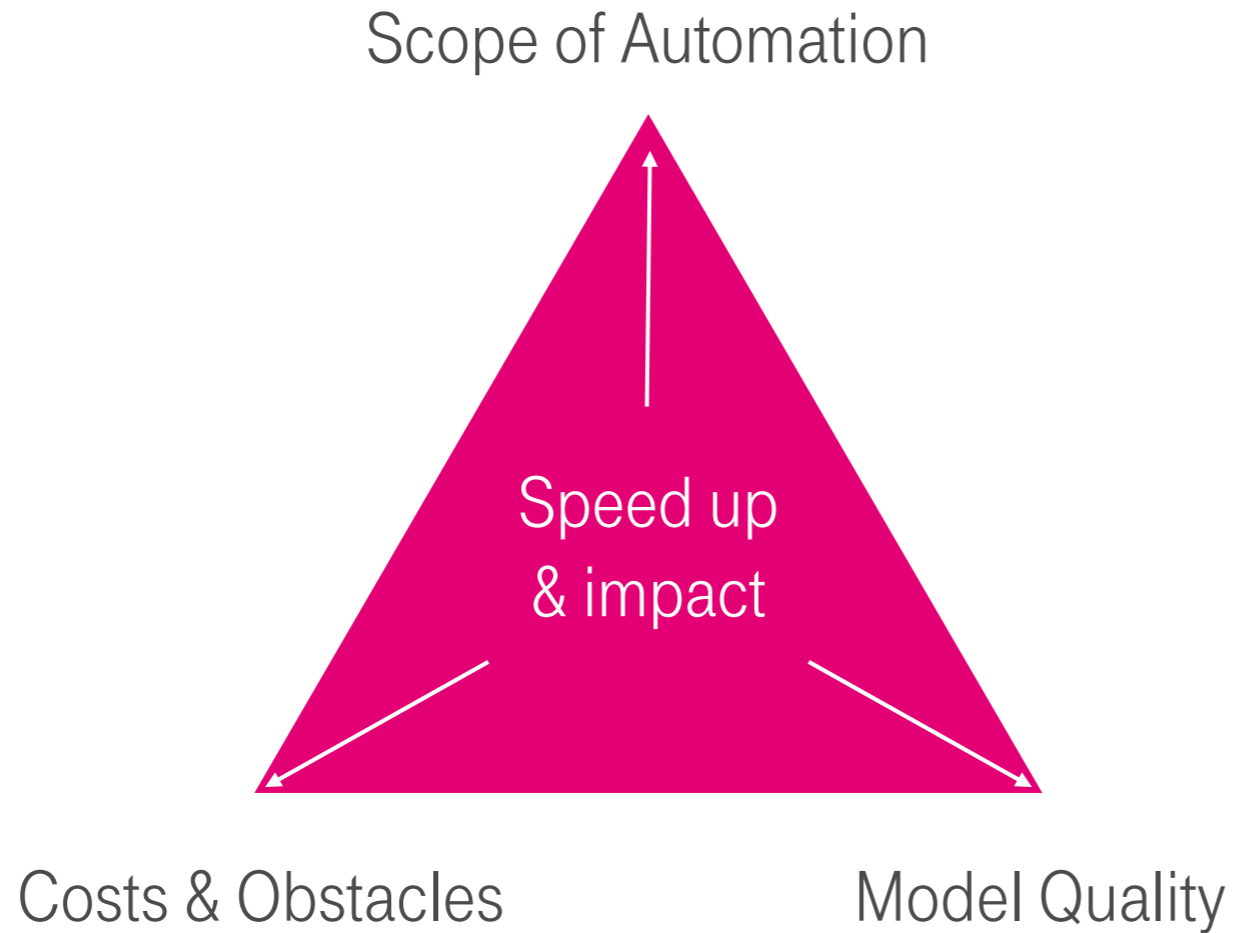
“With DataRobot you can **put the power of data science into the hands of vastly more users**, capitalizing on their domain expertise and driving business value faster.”

“Machine Learning for everyone.” (bigML)

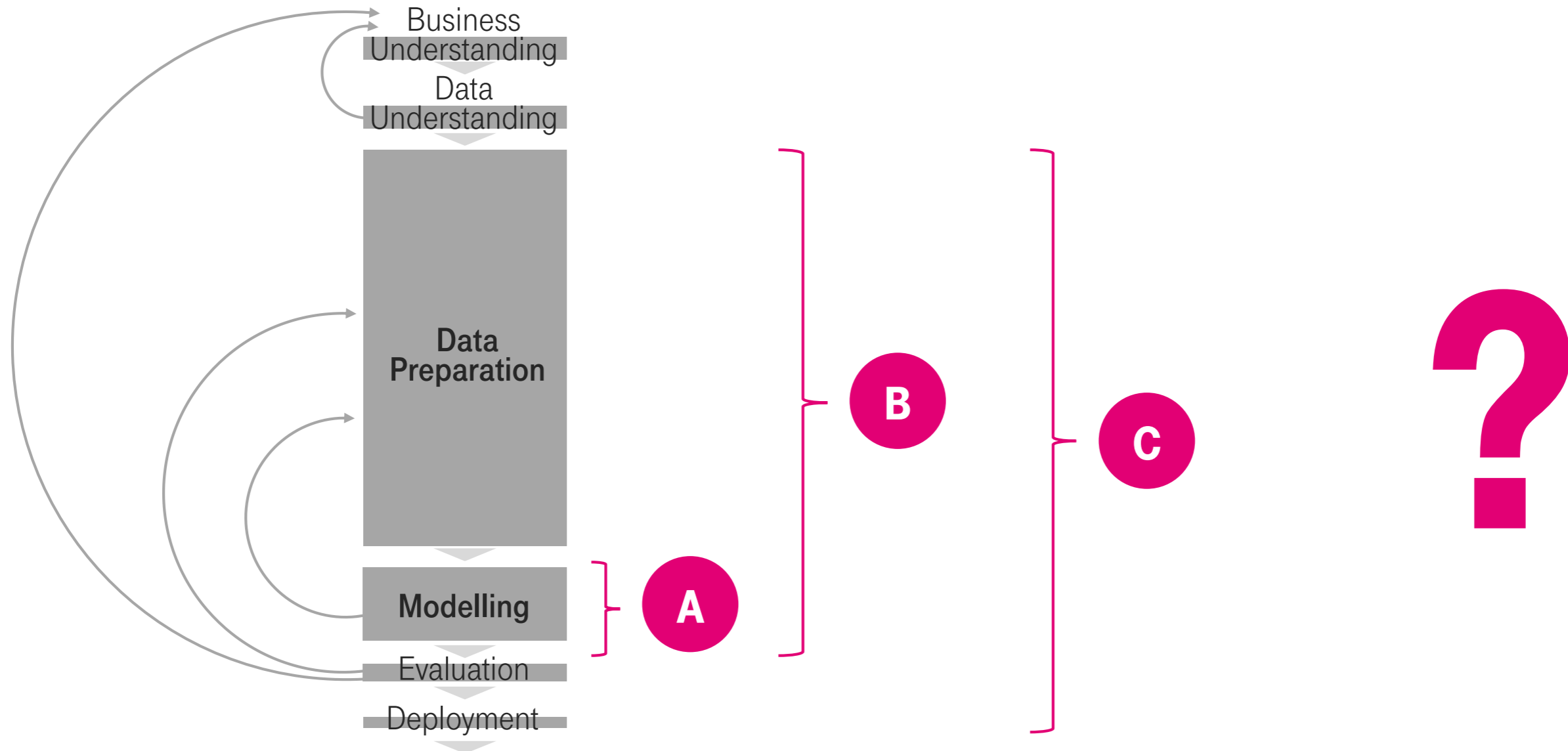


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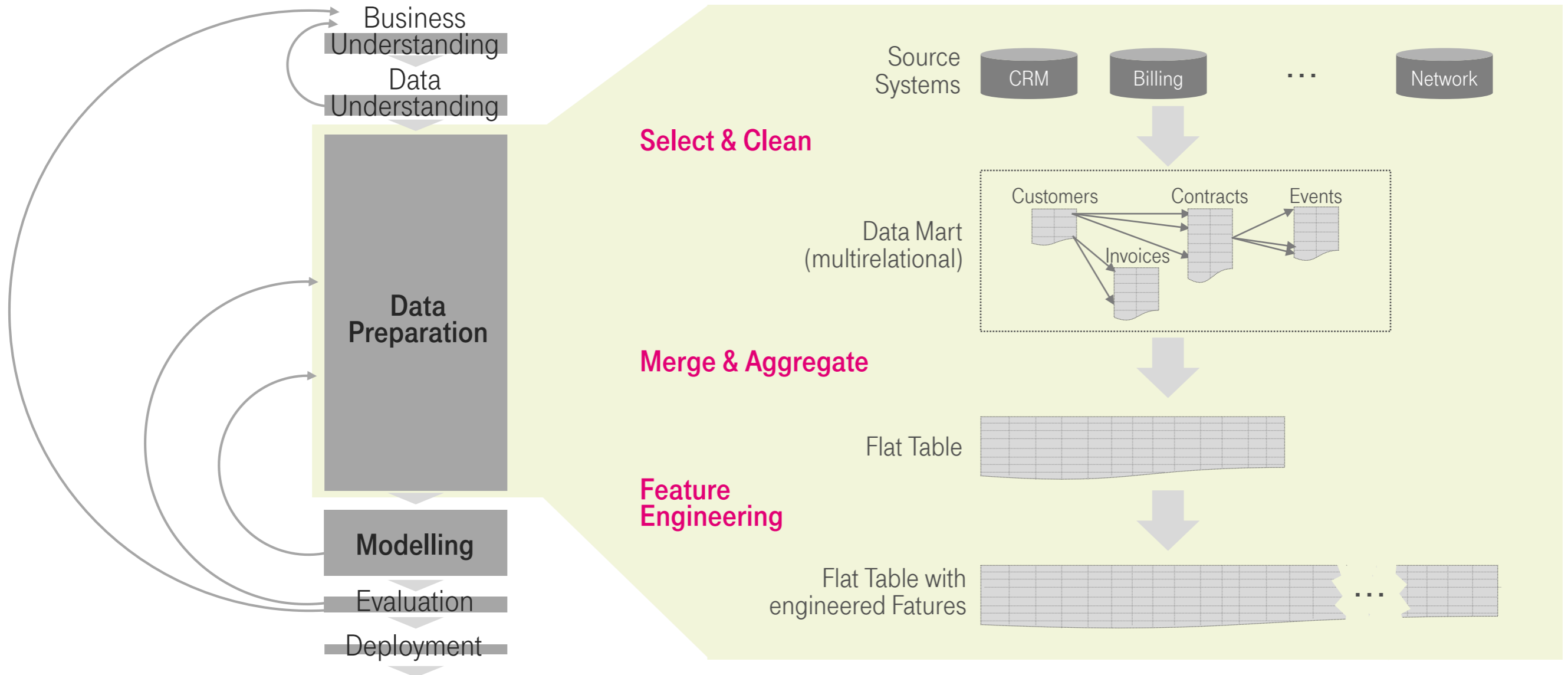
WHAT IS CURRENTLY POSSIBLE WITH AUTOMATED ML?



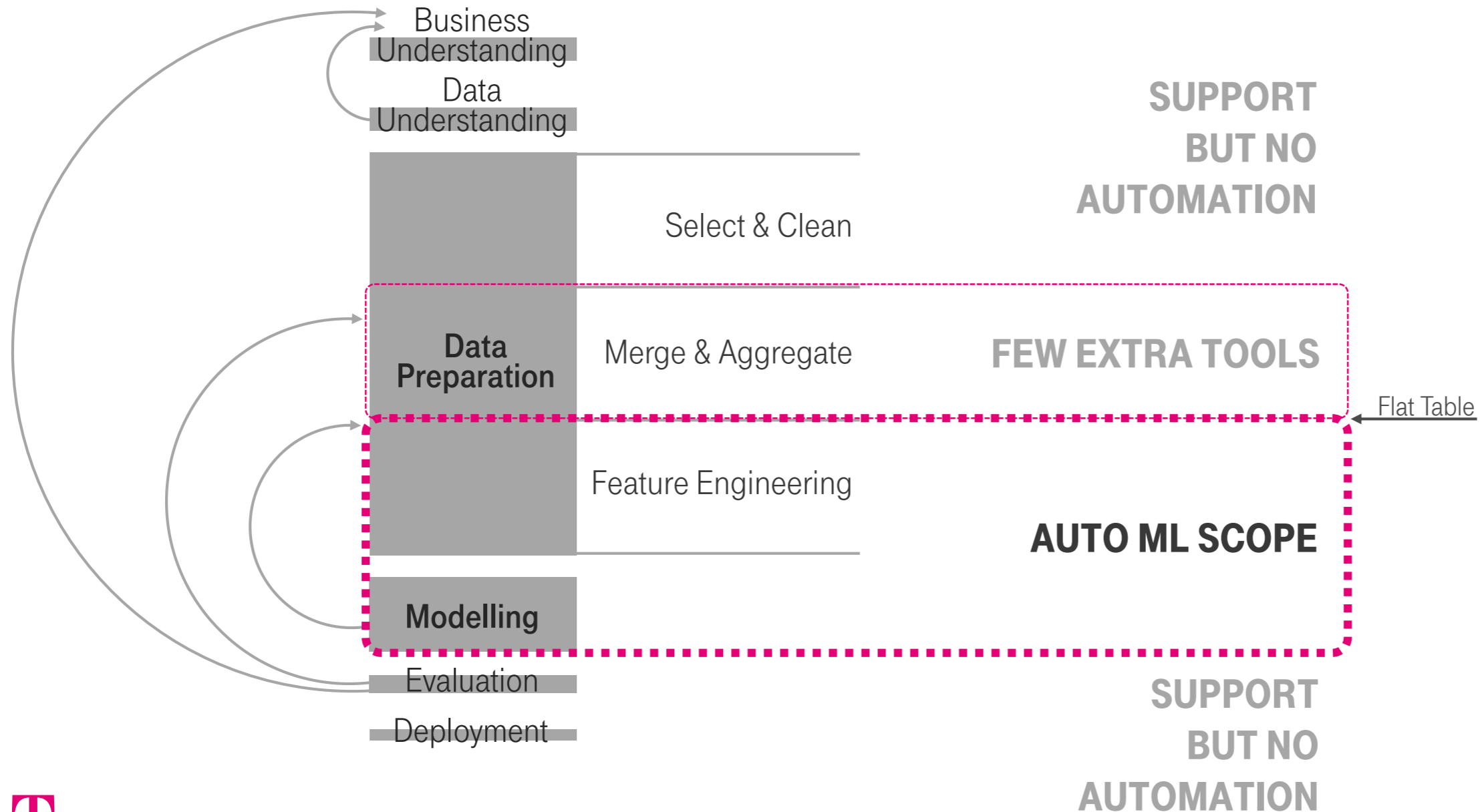
SCOPE OF AUTOMATED MACHINE LEARNING?



FEATURE ENGINEERING IS NOT DATA PREPARATION



AUTO-ML STARTS WITH A FLAT TABLE – MOSTLY



USE CASE: CHURN PREDICTION CHALLENGE

Binary Classification Task

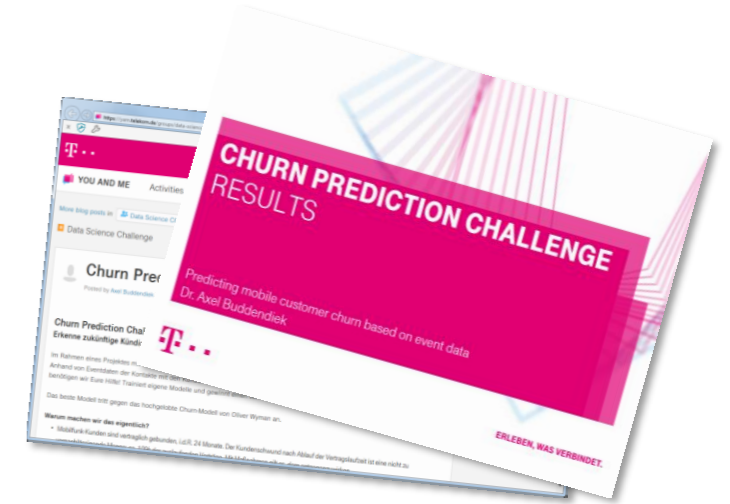
- 2 Mio contracts*
- 80 Mio events* related to customers and contracts
approx. 10,000 unique detailed event types

Rationale

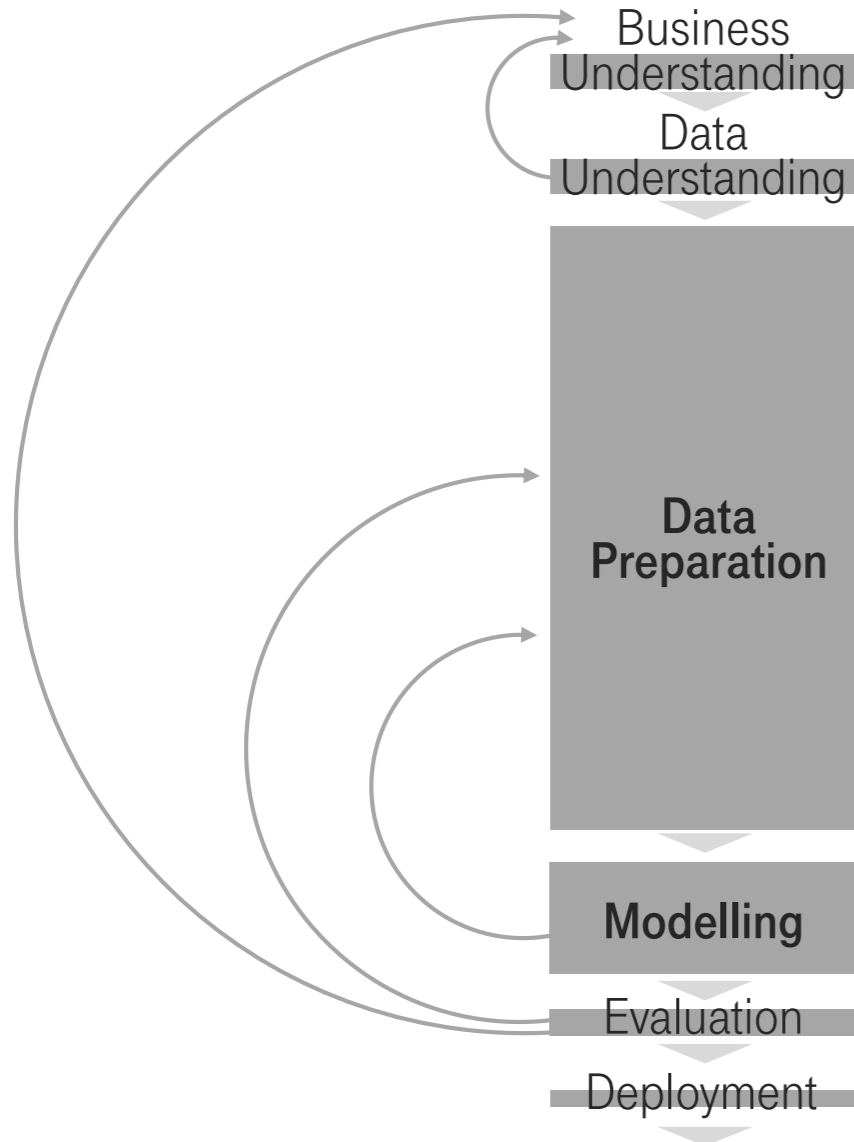
- Readily available data set with reasonable sizing
- Benchmark results available (Data Scientists & Vendors)

Plan

- Invest as little Data Science know-how as possible



RUNNING DRIVERLESS AI ON THE CHURN CHALLENGE DATA



Visualization & Overview Stats

Not used here

Extensive Feature Engineering

Hand-coded: One-Hot-Encoding to aggregate events on contract level: 1030 attributes, 593k records

Feature & Model Tuning

H2O discarded 348 attributes before feature engineering

17.514 features created
=> 837 selected for model building

Stacking final model

1,824 models computed for feature evolution

137 models computed

Tuning converged on logloss KPI after 17 hours

41 ensembles stacked
4.5 hours additional compute time

LIME & Co for model interpretability

Evaluate Quality on Test Set: 25.6 out of 30

1-click Deployment

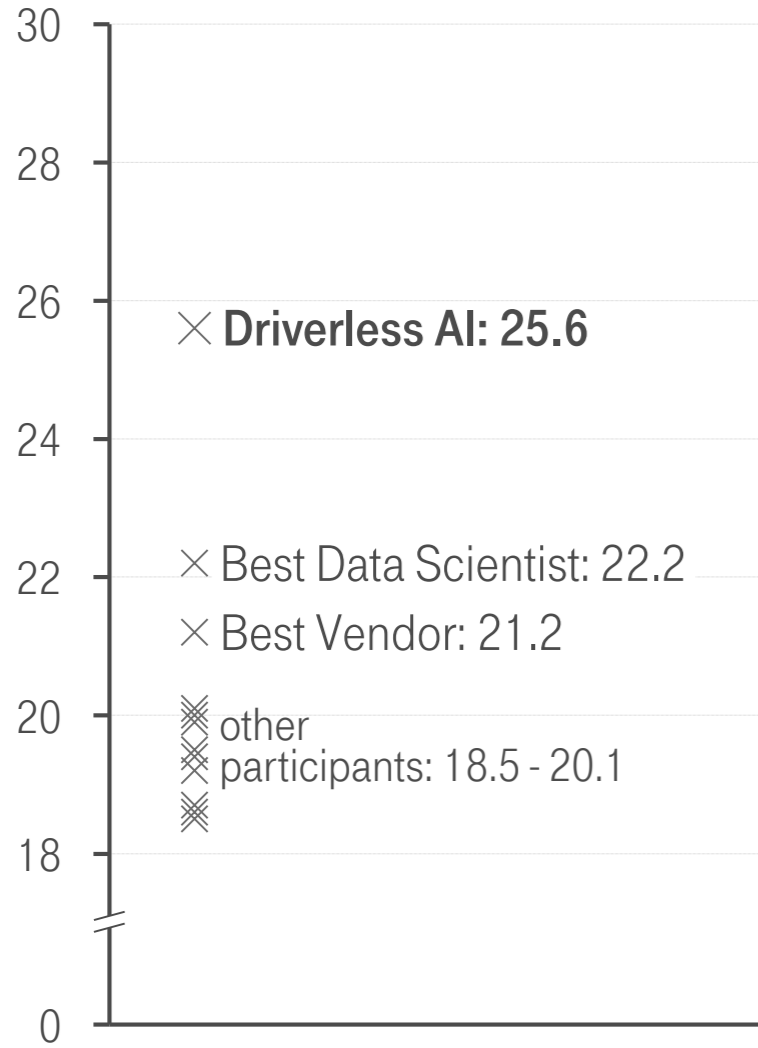
Not used here

No support for Merge & Aggregate



DRIVERLESS AI OUTPERFORMED HUMAN DATA SCIENTISTS

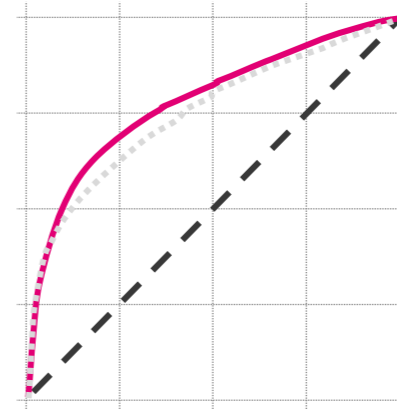
Evaluation Score: Gini+Lift+RankCo indexes



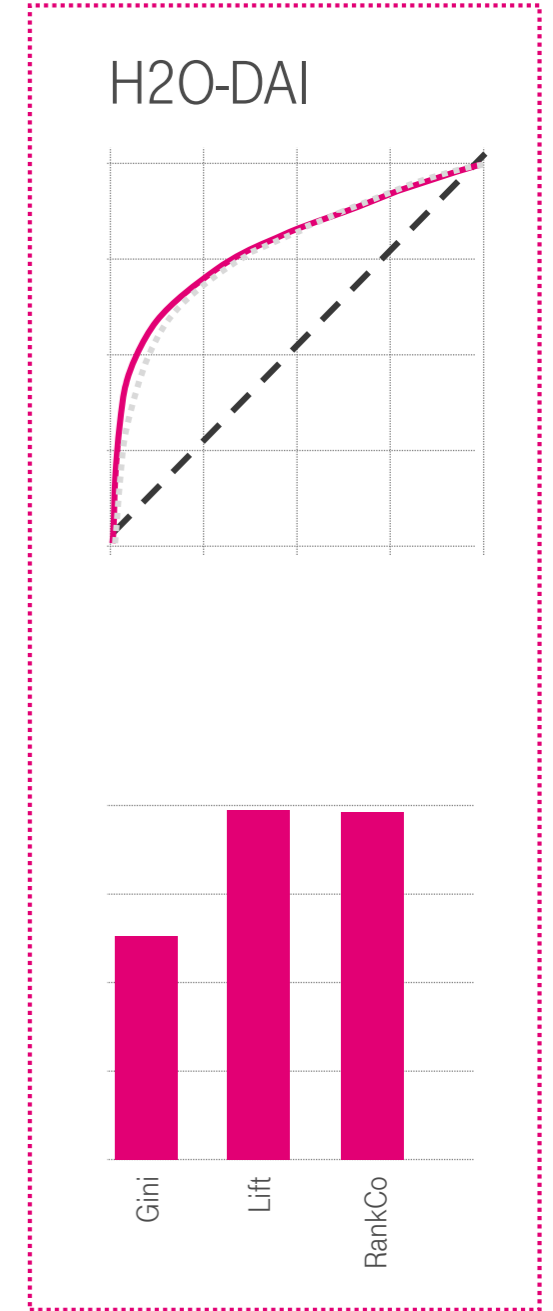
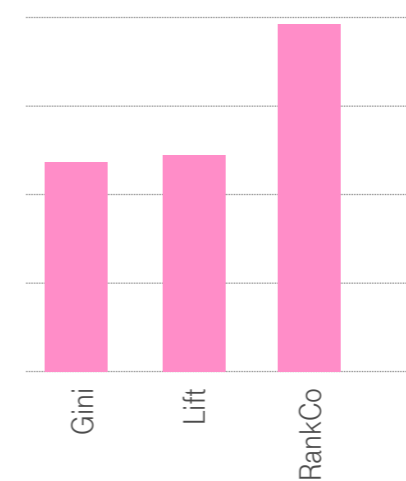
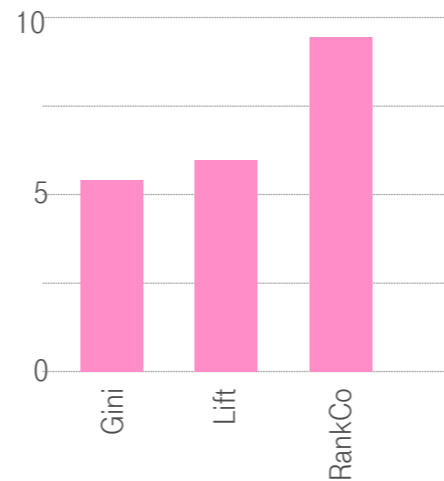
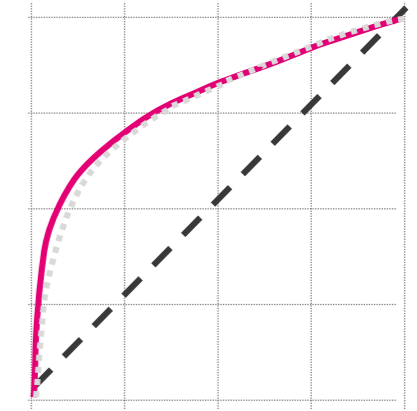
Best Vendor



Best Data Scientist



H2O-DAI



FURTHER USE-CASES SHOW: PERFORMANCE ON PAR WITH HUMAN DATA SCIENTISTS

Use Case	Training data size	Prediction	Result
TDG Churn Challenge 2017	593k records, 1.030 attributes	Binary Classification	Best result
TDG Discount Prediction Challenge 2018	109k records, 1.300 attributes	Multiclass Classification	8th out of 20 / 2nd with v1.6.1
Flinkster (external Challenge)	50k records, 80 attributes	Binary Classification	Shared best result
Indoor/Outdoor Prediction TMA (inofficial)	60k records, 165 attributes	Binary Classification	On par with Data Scientist
Data Driven Network Rollout	13k / 10k records, 355 attributes	Binary Classification	On par with Data Scientist
Call Volume Forecast for Customer Service	33 months, hourly data	Time Series Forecast	Best result
Roaming Traffic Forecast	7 years	Time Series Forecast	Significantly worse than Data Scientist



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FINDINGS AND CONCLUSIONS

HYPE ?

NO!

NEXT BIG THING ?

**TOO MANY
OBSTACLES**

WHAT'S TO COME?

**AUTO-ML WILL
BECOME A
COMMODITY**

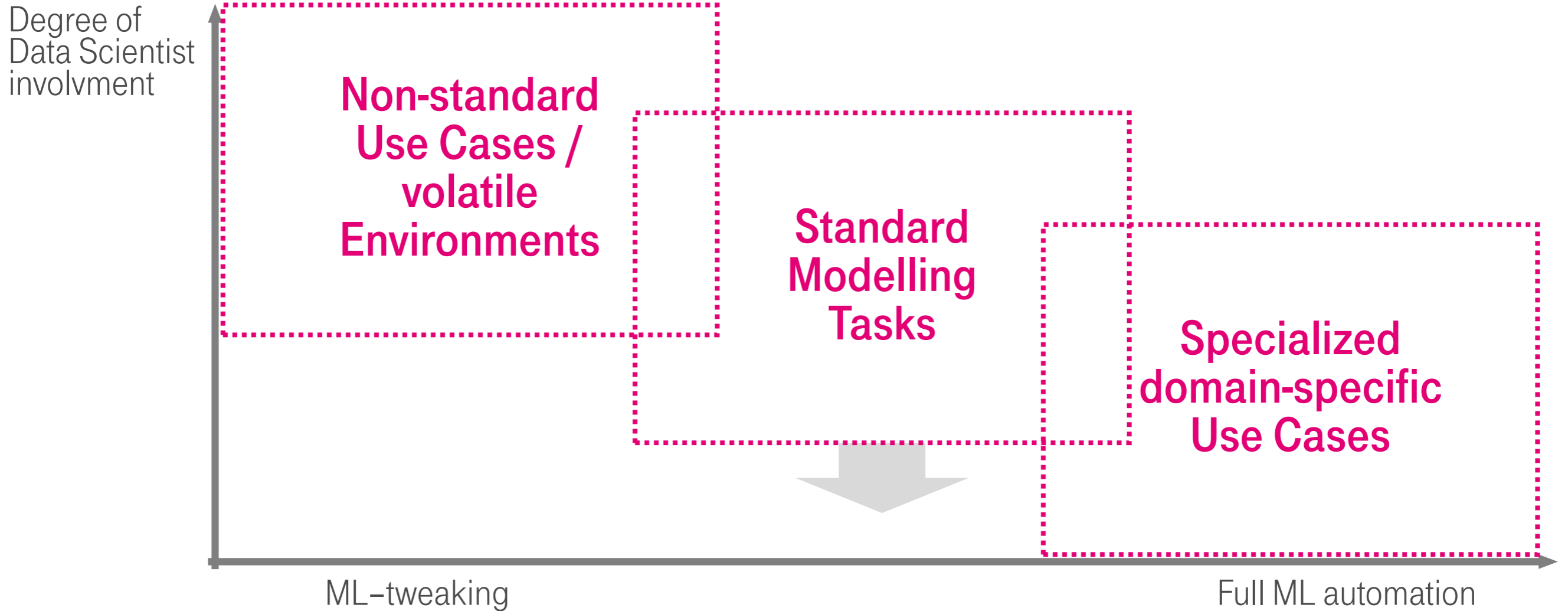
- Slightly over-optimistic Marketing Claims
- Full automation of Feature Engineering + Modelling
- High quality & Speed up

- Hardware requirements & License costs
- Automated Data Preprocessing
- Data availability + Productionizing at Scale

- Data Scientist role is going to change
- More Data Engineering, less repetitive ML tasks
- More complex use cases
- More use cases in parallel
- More non-Data Scientist users of ML-Automation and – Support tools
- Auto-ML is for Data Scientists



AUTO-ML IS GOING TO BECOME A STANDARD TOOL



LESSONS TO BE LEARNED FROM DEEP BLUE

- We still like playing chess
- Resistance is futile
- Utilize the computer to learn and improve own understanding
- Team up: Combine human creativity & computational efficiency
- Focus on more complex environments and leave the tedious bits behind



WHEN ARE WE GOING TO EXPERIENCE THE ALPHA-ZERO MOMENT IN DATA SCIENCE?



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THANK YOU!



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