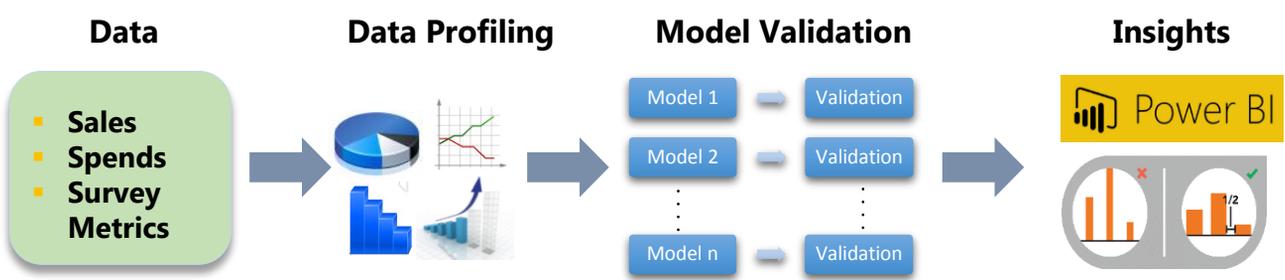# Latentview's Model Automation Framework

LatentView has come up with an entirely new model automation framework which helps in building thousands of models with an additional rule based engine layer that helps in choosing the best models. Latentview has built this solution for one of the leading Technology Companies, which develops, manufactures, licenses, support and sells computer software, consumer electronics, personal computers, and services. LatentView leverages MAF to tie data from multiple sources to provide a single stop solution to the stakeholders, perform analysis, generate insights and provide business recommendations.

The client's Marketing team is primarily interested in understanding the effectiveness of their Advertising and Marketing budget in affecting consumer perceptions positively. . The primary data on consumer perceptions is obtained through surveys. LatentView's MAF Solution would help stakeholders build statistical models to quantify the impact of spends and perceptions on the key metric. Additionally, stakeholders were interested in understanding the effectiveness of spends and to measure its impact at various levels of spends. This primarily helps to understand the inflection, optimal & saturation points of spends. The solution would also be used to forecast the key metric and test various scenarios by altering spends, to understand its impact on sales.

Data	Data Profiling	Model Validation	Insights
• **Sales** • **Spends** • **Survey Metrics**		Model 1 → Validation Model 2 → Validation ⋮ ⋮ Model n → Validation	Power BI

Salient Features

The standard approach used to take around one week to complete the above analysis and also had to churn out multiple cuts of the analysis. Additionally, for each combination (country, segment, time period, etc.), the entire process had to be repeated all over again. Since the client's analytics team required support for multiple such requests, a robust solution which automates the entire process with substantial time reduction was the prime need of the hour.

MAF enables an end-to-end automation of the modeling process from variable selection, variable transformation, establishing relationships, feature selection, model building, model fine-tuning to selection of best models. The model outcomes are represented in a user interface.

The solution is developed as a modular framework to accommodate any future requirement changes. The user will also be able to select the dependent variable and the independent variables with which the model needs to be built. Additionally, there are options to select a subset of data for which we will need to run the model. The subset will be based on the date range selected and the population selected.

Solution Architecture

Normal Approach

Modeling was done using **R**. Iteration done with 400K combinations to get the models

Best models were identified and Final output was created using **Excel**

Final output presented using **PowerPoint**

LatentView's MAF

Feeding the data in form of flat files in **Azure ML**. Iterating with 400K combinations to get final model in **Azure ML**

Exporting the data to **Azure SQL DB** to be stored in tables, triggers return to update the latest results to be displayed

Interconnecting these tables with **Power BI**, for visualizing live results

The user has the flexibility to select the model population, time period, target and predictor variables through the Azure ML interface. Azure ML fetches the data from the Azure SQL DB, transforms the data for establishing relationships and builds the model. From millions of models built, the best models are selected based on rule-based criteria. The final model results are stored in the DB and Power BI is used to visualize the model results.

Process Benefits

- Model Automation Framework(MAF) has resulted in time savings of ~90% in comparison to the standard approach

- Accuracy and Reliability have seen massive gains due to this automation, and the entire framework is built on cloud and it is completely robust and scalable

- Azure ML brings a host of special features enabling running & testing thousands of modules in lesser time to identify the best-suited model
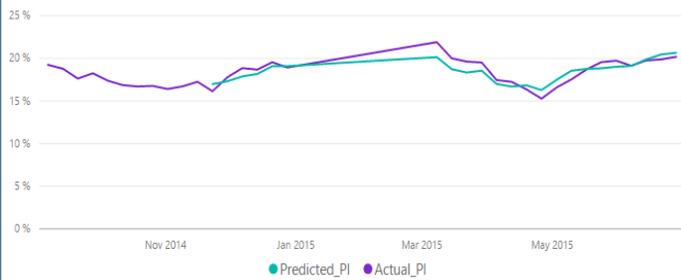
Business Benefits

- Marketing decisions are quicker owing to the fast turn around in insights generation through LatentView's MAF

- Able to derive the insights for different form-factors, countries, time-periods, etc. by just changing the input parameters in MAF's solution in a click of a button

- Ability to provide the best model in a bundle of hundred thousand models using Azure ML - thereby giving the correct/robust model for future use.

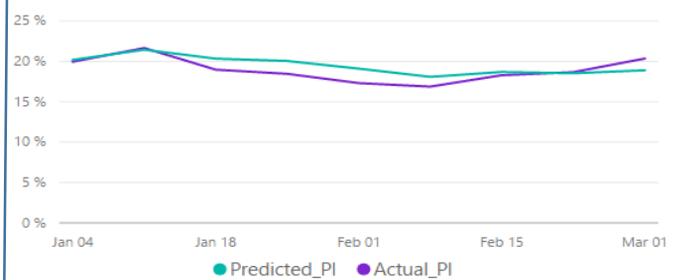# Transformation and Differentiation

This was one of the first solutions the Client had built on the Cloud. The architecture was also completely based on the Microsoft Technologies. With Azure ML, we have a lot of flexibility in not only using the inbuilt functions but also to use the Custom R modules as and when necessary. Integration across Azure ML, Azure SQL DB, and Power BI was also seamless.
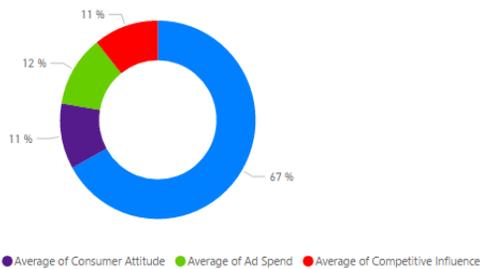
Snapshot - Model Result

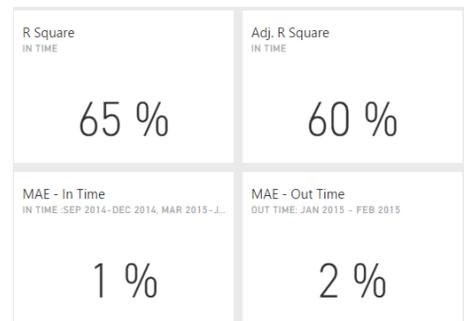### Actual vs Predicted Purchase Intent (Training Period)

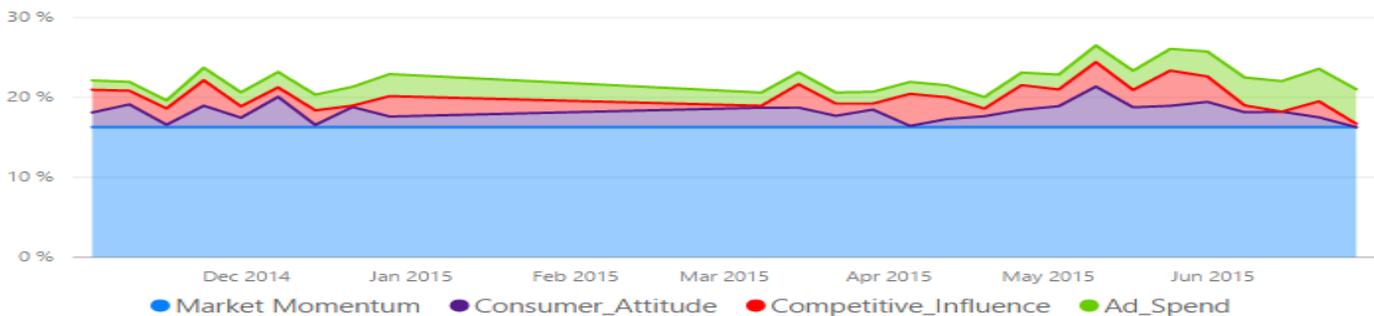### Actual vs Predicted Purchase Intent (Post Period)

Drivers of Purchase Intent

- Average of Market Momentum
- Average of Consumer Attitude
- Average of Ad Spend
- Average of Competitive Influence

Model Statistics

R Square IN TIME	Adj. R Square IN TIME
65 %	60 %
MAE - In Time IN TIME :SEP 2014-DEC 2014, MAR 2015-J...	MAE - Out Time OUT TIME: JAN 2015 - FEB 2015
1 %	2 %

Time Series View – Purchase Intent Drivers

- Market Momentum
- Consumer_Attitude
- Competitive_Influence
- Ad_Spend

LatentView

Actionable Insights • Accurate Decisions