

Board Enterprise Analytics Modelling (BEAM)


Drive better decision-making through more meaningful and predictive insights from your data

Board BEAM seamlessly integrates advanced and predictive analytics with planning and business intelligence, making it easier than ever for anyone to quickly gain powerful business insights and take action.

Conceived and developed in collaboration with IDSIA, a Swiss research institute recognized among the top 10 players worldwide in the Artificial Intelligence space, Board BEAM is a ground-breaking answer to two key unmet business needs. Firstly, the necessity to embed more advanced analytical and predictive capabilities into companies' business processes, ensuring the agility necessary to operate at the ultra-rapid pace of today's markets. Secondly, the need to do this in a simpler way, allowing business users to take the lead without having to depend on an army of experts to manually build analytical data models, as is necessary with traditional data-mining and analytics products.


Board BEAM is extremely flexible, user-friendly, high performing, and natively embedded into the Board platform. BEAM offers a revolutionary solution to effectively incorporating all the power of predictive analytics into daily business operations and the decision-making process.

Board BEAM provides a solution that covers many analytical areas through two different modules: Predictive Analytics and Clustering.



PREDICTIVE ANALYTICS

Exploit all the power of Board BEAM's automated predictive modelling to execute extremely accurate forecasts in a fraction of the time compared to traditional analytic solutions.



CLUSTERING

In a few clicks automatically group your customers, products etc. into clusters and immediately use them as analysis dimensions in your Business Intelligence environment.

Predictive Analytics

Board BEAM offers advanced forecasting capabilities through the use of autoregressive linear models of the ARIMA family.

Thanks to its automated modelling approach, Board BEAM can automatically evaluate the characteristics of each time series, consequently producing a suitable model, and run forecasts thousands of times faster than other solutions. The foresight achieved can be refined by adding further information to the scenario to reflect the impact of external variables (covariates) on the forecast.

Forecast results are immediately available as measures in the Board platform, making it easy to embed predictive analytics into analytical, planning, and simulation applications.

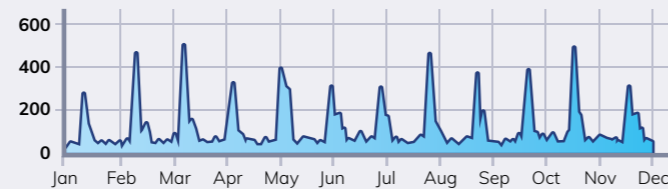


How it Works

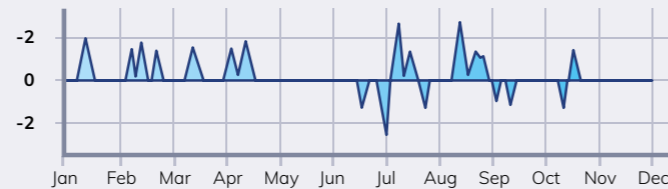
Analysis and labelling of time series

Once fed with historical data, Board BEAM first categorizes time series as follows:

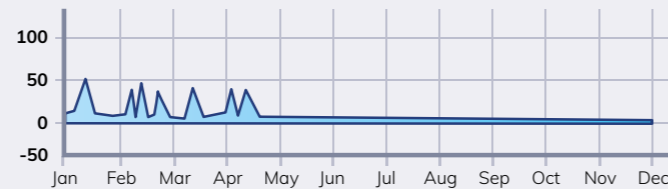
Smooth: observations are consistently different from 0 (MDI Median inter-Demand Interval <1.3)



Intermittent: observations are characterised by extended periods of no demand (MDI > 1.3)



Discontinued: the time series is constantly zero in the last year (all of last year values =0)



If the time series is labelled as discontinued or if it contains no observations, the Zero predictor is used for the forecast.

If the time series is labelled as intermittent, it is modelled via the Croston-SBA (Syntetos and Boylan Approximation) model, which is a state-of-the-art calculation for predicting intermittent time series.

Time series labelled as smooth are entered into an automatic preparation and competition process between ARIMA family models, as described below.

Models Competition

Once a historical series has been labelled as smooth, it goes through an automatic process designed to properly model trends, seasonality, and covariates, and to subsequently identify the best forecast model for each time series.

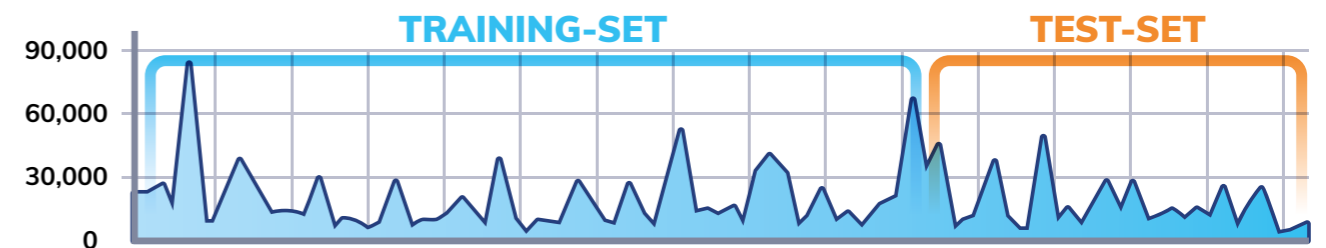
The process includes the following steps:

Data series pre-processing

To improve the predictive accuracy of the model in this phase, the system normalizes data (data trimming), and based on a recursive statistical test, automatically de-trends and de-seasonalizes any time series that needs it.

Training and Test set identification

In this phase, any time series is split into two parts: a training set, on which candidate models are applied, and a test set, on which the accuracy of those models is measured.



Model selection: the IDSI-ARX® (autoregressive exogenous) algorithm

Once the time series is prepared, and the training and test set are defined, a predictive model can be identified.

At this stage, BEAM runs the IDSI-ARX®, an automatic proprietary prediction procedure conceived and designed by IDZIA, a Swiss University Research Institute ranked amongst the top ten Artificial Intelligence excellence centers in the world.

IDSI-ARX® is a linear autoregressive model. It assumes a linear relation between the future values of a variable and past observations. The selection of the model structure is performed via a competition among the candidate models (Persistent and Seasonal Naïve Predictors and linear autoregressive models belonging to the ARIMA Family). The model structure that shows the lowest error in the competition, by minimizing the MASE (Mean Absolute Scaled Error), is eventually chosen.

Outliers detection and exclusion

Board BEAM automatically detects anomalous data in a time series where the prediction of the model has a large error. In particular, data points recognized as anomalous are those in which the error is greater than 3.5 times the standard deviation of the model from the mean. Once the outliers of a time series are detected, the model is retrained to ignore them.

Covariates management

Covariates are external variables such as promotions, marketing campaigns, weather conditions, etc. that are useful to forecast a certain time series. For example, usually the sales of a product can be better predicted if its price history is available as external information (a covariate).

Board BEAM ensures extremely flexible management of covariates. The system is able to receive a set of covariates for a given time series and automatically identify the significant ones, while discarding those that are irrelevant. Once fed with all the data, Board BEAM automatically creates alternative predictive model structures characterized by a different sets of variables (covariates), runs a competition between them, and consequently selects the set of covariates that minimize the forecast error (MASE).

Hierarchical Forecasting and reconciliation

Board BEAM allows business users to define a forecast hierarchy, choosing the different levels of aggregation on which they want to execute the forecasts. (i.e. product, product line, product category).

Once a hierarchy is defined, all the tasks previously described are automatically replicated on all its levels – producing different forecasts for each aggregation level.

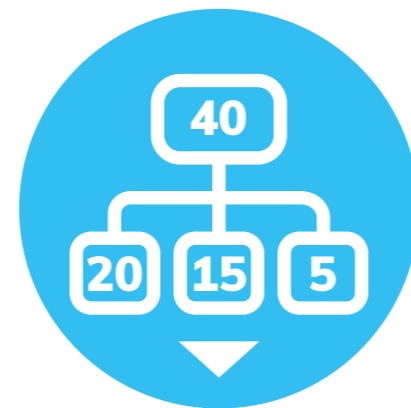
At this stage, the users can decide not to reconcile the forecasts or to run an automatic top-down or bottom-up reconciliation.



Not Reconciled



Bottom-Up



Top-Down

Clustering

Board BEAM allows users to automatically define clusters of similar objects by utilizing the k-means methodology. Business users choose the number of groups and the observation sets (e.g. profitability and turnover) and Board instantaneously creates k-means clusters and makes them available as dimensions for analysis in the standard Planning and Business Intelligence environment.

The seamless integration between the clustering capability and the Board platform not only enables the immediate creation of reports, graphs, and self-service analyses based on clusters, but also the use of clusters as forecasting or planning units.

Furthermore, the capability to manage scenarios allows users to create several clustering options and always use the best-fit based on the type of analysis or business process they are handling.



Key differentiators



Designed for Business Users

Board BEAM offers business users all the power of the most advanced statistical techniques without the need to physically develop, test, and select the analytical models.

A standard business user with a basic knowledge of common statistical concepts will be able to produce state-of-the-art forecasts, create clusters, and use analytical functions with just a few days of training.



Immediate use of analytical models in Planning and BI applications

Board BEAM is natively integrated into the Board platform, ensuring immediate interaction between the traditional BI and Planning functionalities and the new analytics environment.

This means that any cluster created is immediately available as an analysis dimension, any forecast as a measure, and any advanced statistical function as a native algorithm.



Extremely efficient predictive analytical models (time vs accuracy)

The proprietary algorithm IDSI-ARX[®] - an exogenous, competitive, Autoregressive Integrated Moving Average (ARIMA) model, which is the core of Board BEAM, has been benchmarked against the world's top performing R-based forecast engines. The results show that Board BEAM is able to forecast with similar levels of accuracy but hundreds of times faster than other systems.



Automated predictive modelling approach

Users only need to define the confidence interval and the forecasting hierarchy and then feed the system with covariates (factors that affect the forecast). Based on these inputs, Board BEAM will automatically manage every single time series to produce the most accurate forecast through a competition between several candidate analytical models.



Extreme flexibility to define and change analytical models

The native integration between BEAM and Board, combined with the outstanding performance of the automatic modelling, makes it simple and extremely fast to feed the system with a high number of covariates and attributes and immediately understand their impact on the forecast accuracy.

Covariates do not need a specific format or pre-calculation to make them suitable for the BEAM analytical engine. Any time series, Boolean values, algorithm, date etc. can be used to feed the model with more information to improve the overall accuracy of the model.

Furthermore, it is not necessary to build covariate time series with the same granularity of the observed time series because Board automatically calculates these at the aggregation level needed for the forecast.



High performance HBMP in-memory technology

Board's proprietary in-memory technology, HBMP, maps data at bit level, ensuring one of the fastest data-retrieval speeds available on the market today.

Unlike R-based systems, this technology enables the analysis of thousands of time series in a few seconds, making it possible to quickly re-run scenarios varying the assumptions, and quickly compare and evaluate the future impact of different business decisions.



Scalability to very large data sets/Big Data

The hybrid in-memory nature of Board's HBMP technology allows for maximum scalability without sacrificing high performance.

When dealing with very large data sets, it is possible to only hold data indices and mapping in-memory while leaving physical data on the disk. As the result, any "out of memory" problem is eliminated and the RAM is not overloaded with physical data, making it possible to achieve far superior scalability without any significant performance slowdown.

About Board

Board is the Intelligent Planning Platform that offers smarter planning, actionable insights and better outcomes for more than 2,000 companies worldwide. Board allows leading enterprises to discover crucial insights which drive business decisions and unify strategy, finance and operations to plan smarter and achieve full control of performance across the entire organization. With Board, companies can manage and control their entire planning process from goal setting down to operational execution in one, user-friendly environment.

Partnering with Board, global enterprises such as H&M, BASF, Burberry, Toyota, Coca-Cola, KPMG, and HSBC have deployed end-to-end planning applications at a fraction of the time and cost associated with traditional solutions. Board International was founded in 1994 and has now 25 offices around the world and a global reseller network. Board has been implemented in over 100 countries.

Board International has long been recognized by leading analysts and subject matter experts including Gartner, Nucleus, and Dresner.

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