Sales Forecast WellPack AG

Implementation of a Sales Forecasting Decision Support System based on internal and external economic data

Student



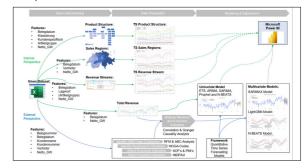
Roger Rinderer

Objective: The volatile nature of economic development and the occurrence of disruptive events, pose significant challenges to estimating future market trends. These uncertainties highlight the need for robust forecasting systems that provide reliable insights to support tactical and strategical decisions for companies. WellPack AG wants to enhance their operational planning and therefore the goal of this project work is to establish a robust sales forecasting decision support system based on time series forecasting. This system should be capable of predicting future sales trends by leveraging patterns in historical sales data and incorporating external economic indicators.

Approach: To identify external economic and industryspecific indicators for the company, a RFM and an ABC classification are used to categorize A&B-Class customers. With the use of AI language models customers were assigned to industries and a pivot table was used to evaluate the highest revenuegenerating industries. The Granger Causality Test was applied to assess the informative value of historical developments of the economic indicators for predicting the company's future revenue. In order to select appropriate forecasting models, a framework comprised of various statistical and machine learning time series forecasting models was developed. For the univariate and the multivariate case, where economic indicators are incorporated as well, several classical and novel time series forecasting models were applied. Lastly, the time series preparation and modelling processes were implemented into Python Visuals in the business analytics service Power BI.

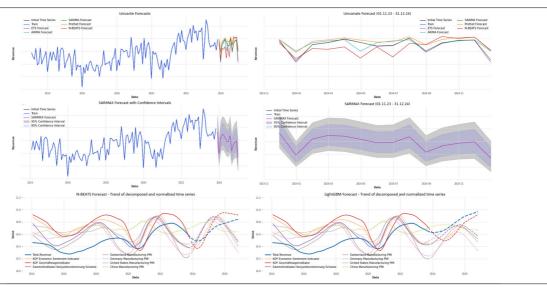
Result: The process applied in this project proved to be a promising and a successful way to predict future shifts in a company's overall economic situation. The new sales forecasting system offers valuable insights into trends and disruptions. Specific recommendations to improve this sales forecasting system were given and will provide even more crucial insights for strategic decision-making.

Project overview Own presentment



Framework - quantitative time series forecasting models Own presentment

	Quar	titative Ti	me Series For	ceasting I	Models			
Statistical Models								
	Universitate / Malificariate	Linearity / Non-Linearity	Stationary / Non-Stationary data	Parametric / Non-Parameter	Handling of Mission Value	a Time Hoviens &	denduction Tax	e dather
Exponential Smoothing Models								
Simple Exponential Smoothing (SES) resp. Simple Moving Average (SMA)	Univariate	Linearity	Stationary	Parametric	840	Shert-term	1944	Robert Coodell Brown
sof's Method	Univariate	Linearity	Stationary	Parametric	840	Shart-term	1957	Charles C. Holl
lob Winters' Method	University				No		1990	Charles C. Hot and Peter Winters
louble Seasonal Holl-Winters (DSHW)	Universale	Levealty		Parametric	No	Shert-term	2003	Rob J Hundman and J.W. Taslor
								Humdman R. J. Koetler, A.B., Ord J.K. & Snyder, F.
ARMA Models								
						Shert-term		
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easonal Autoregressive Integrated Moving Average (SARMA)	University	Linearty	Stationary	Parametric				George Box and Gwihm Jenkins
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Inverse Seasonalties ARMA (SCARMA)	University	Lineally	Stationary	Parametric	500	Shortherm	2020	Sustantian and Rostan
VAR Nodels								
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ector Autoregressive (VAPL) Inclos Autoregressive Masters Aureane (VMSMA)	Multistate	Linearty	Stationary	Parametric Desenation	Mo	Shart-Jerm	19000	Onitarihar & Sates
ector Autoregressive Moring Average with Exigenous variables (VARMAX)	Millionado	Linearty	Stationary	Parametric	No	Dear or other	19005	Christipher A. Sims
ARCH models								
atoregressive Conditional Heteroskeduaticity (ARCH)	Univariate	Linearity	Stationary	Parametric	No	Short-term	1982	Robert F. Engle
Internalized Autoregressive Conditional Heterosikedasticity (GARCH)	Universate	Linearity	Stationary	Parametric	No	Short-torm	1986	Tim Bolierslev
BATS models								
Iox. Cos transformation, ARMA errors, Trend, and Seasonal components (BATS) Econometric seasonality. Box Cox transformation. ARMA errors. Trend.	Univariate	Linearity	Stationary	Parametric	540	Shart.tem	2012	De Livera, Hyndman, and Snyder
ind Seasonal components (TIBATS)	Universitie			Parametric	No	Short-term	2012	De Livera, Hindman, and Snider
Autole Linear Regression (M.R)					No		1934	
			and Deep Learni					
hahit	Historiata / Multivariata	Non Linearthy	Non-Stationary data		Yes	N/R	2047	Excelopida Core Data Science team
22 Boost	Univariate / Multivariate		Non-Stationary data		Yes	both	2014	Tiangi Chen and Carlos Guertrin
Uboolt	University / McEversity	Non-Linearity	Non-Stationary data	man and Minetec	Tes	DO3	2014	Trang Oven and Carlos Guetern Microsoft
LIFATS	Univariate / Multivariate	Non-Linearity	Non-Stationary data		Tes	003	2020	Creshin Carpor Chapatos and Benge
LBEATS and Shart Term Memory 6.STMI: those of RMIN	Univariate / Multivariate		Non Stationary data Non Stationary data		Yes	bah	2020	Oveshier, Carpor, Chapados, and Bengio Hochreiter and Schmidhuber
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Summary forecast results Own presentment

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Subject Area Business Engineering, Data Science

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