



Dynamic Pricing in Fashion Stores

Principles & Practical Implementation

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About Darwin Pricing LLC

Dynamic Pricing Solutions and Data Science Consulting since 2013

- Q1 2013: **Personalized Pricing & Price Optimization** for online dating platforms
- Q3 2013: **Geo-Pricing Solution** used by over 900 online retailers, mostly in the US market
- Q3 2016: **Start-Up** founded in Basel/Switzerland
- Q4 2016: Exhibitor at the **Web Summit** in Lisbon/Portugal
- Q1 2017: Investment by the **Swiss Startup Factory** in Zurich/Switzerland
- Q2 2017: Partnership in the **SAP Pricing Software** area with SPOSEA in Eindhoven/Netherlands
- Q4 2017: **Dynamic Pricing Solution of the OTTO Group** in Hamburg/Germany, focus on fashion and sporting goods, profit and stock optimization as well as competition analysis
- Q4 2018: **Dynamic Pricing Solution for Fashion Stores and Omnichannel Retailers**

Fashion: Boon and Bane for Textile Retailers

- ★ Success of new collections barely predictable
 - ⇒ No planning security
- ★ Reordering lengthy (maritime cargo) or impossible (one-time production)
 - ⇒ Coping with stock surplus and stock shortage
- ★ Limited storage capacities
 - ⇒ Liquidation costs and seasonal clearance sales



Goals of dynamic pricing

Automated, proactive price adjustments during the season. Business goals:

- Maximizing total revenue and net profits
- Season articles (fashion): Selling off at the highest possible calculation until the end of the season
- Permanent articles (classics): Avoiding selling off before the next planned goods receipt
- Early detection of stock surplus, shortages and range of coverage and proactive action
- Generating strong revenues from selling off remaining stocks and avoiding liquidation costs

Digitalizing Price Tags

Operationalizing dynamic pricing in omnichannel commerce:

- ★ Hardware investment (price tags, WiFi)
- ★ Process adjustments (POS system)
- ★ Central price management, online/offline synchronization





Dynamic Pricing Process

Core piece of the dynamic pricing system: Sales forecasting

- How did prices impact purchasing behavior in the past few months?
- Weekly forecast for every article, depending on prices, competition, inventory and seasonality
- Projection until end of the season, taking into account stocks and seasonality curve
- KPI computation for revenue and net profits until end of the season
- Determination of the optimal price list using various algorithms
- Update of digital price tags overnight, possibly after manual approval
- Price corrections as needed in the course of the season



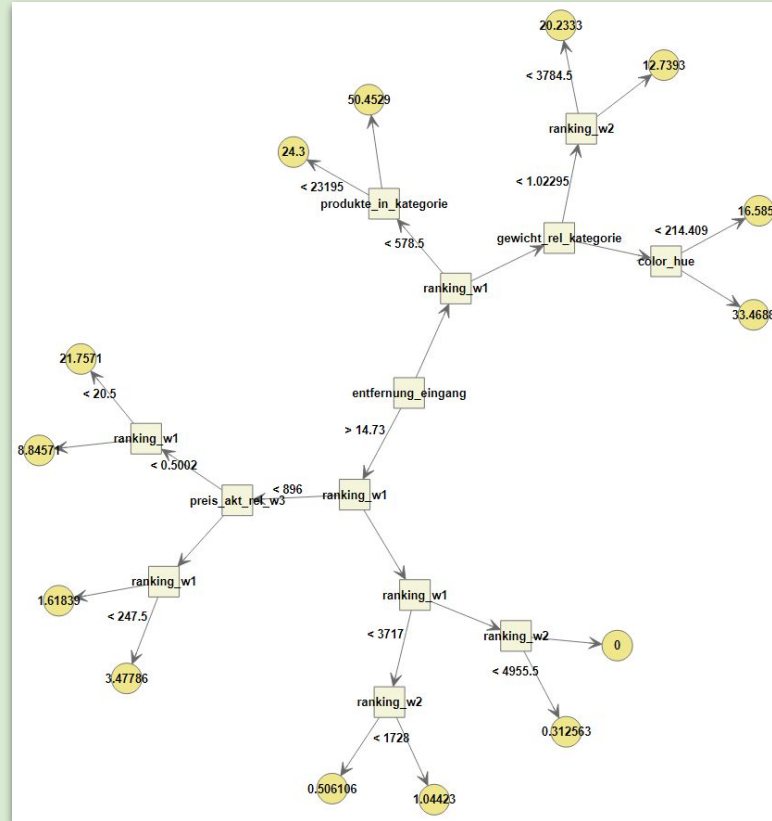
Sales Forecasting with Boosted Trees



Relevant Features for Sales Forecasting

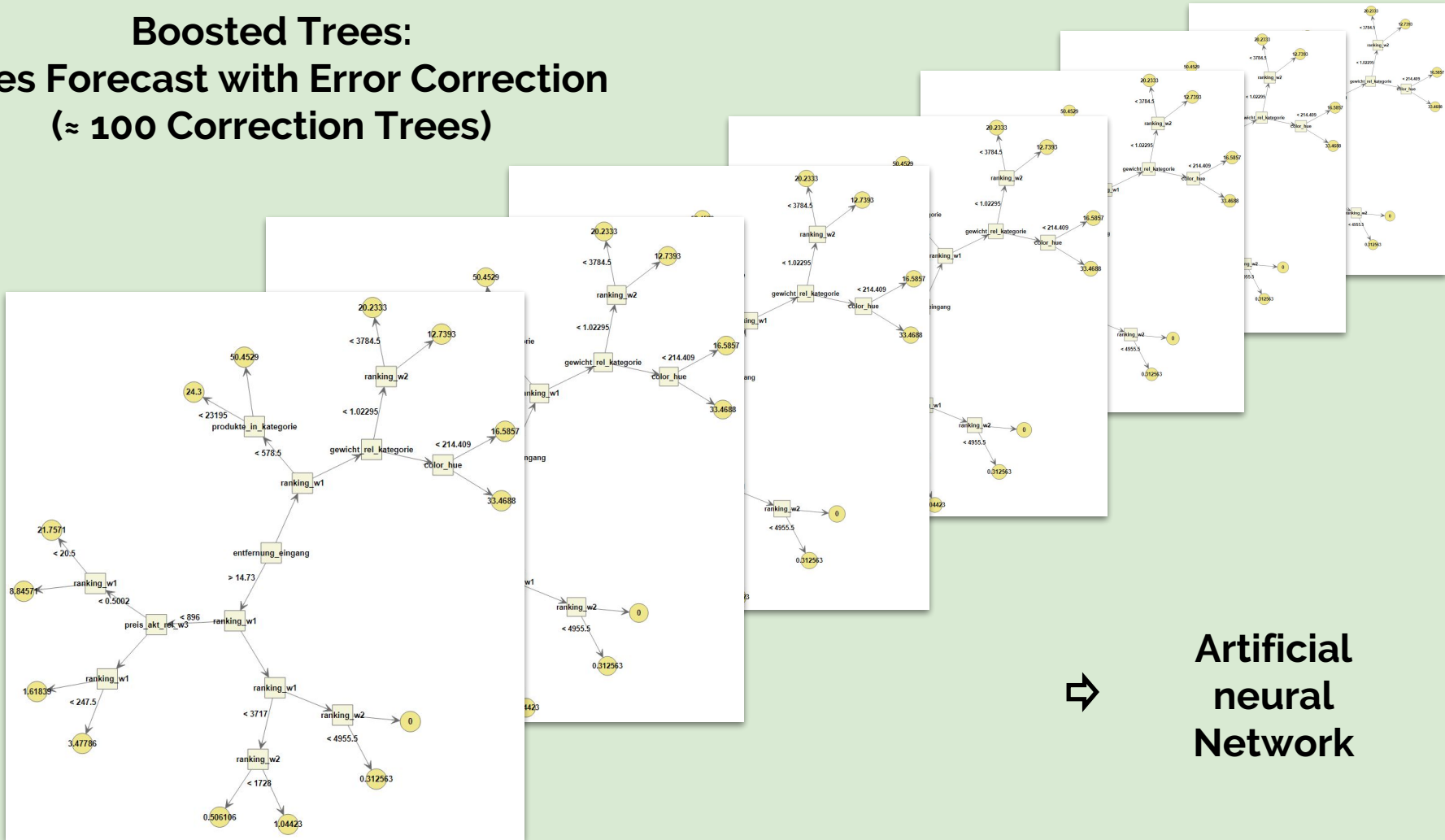
- Tops/Flops Analysis: Ranking of the best selling brands and products
- Placement: Distance to the store entrance, showcase products, position in search lists (online), ...
- Promotions: Price changes in the last few weeks, promotional discount offers, catalogue products, ...
- Characteristics: Material (weight), color (hue, saturation, brightness), size, quantity, ...
- Classics: Since how long a product has been introduced into the assortment
- Sellout: Stocks and availability in fashion stores
- Seasonality: Sales figures during the previous year for the same product category in the same store
- Price, profit margin: Determination of the price elasticity for each product
- Relative price: Competitor prices and cannibalization by substitutable articles in your own assortment

Decision Tree: Product Characteristics \Rightarrow Sales Forecast (\approx 20 Decision Steps)



Boosted Trees:

Sales Forecast with Error Correction (≈ 100 Correction Trees)



Artificial
neural
Network



Prerequisites

Quality and quantity of the underlying data are decisive for sales forecasting.

Better data ⇨ More accurate sales forecast ⇨ Best results and stable prices

- Relevant product details: Category, brand, size, color, material, weight, quantity, ...
- Current and historical sales data: Assortment, prices, stocks and sales numbers on a daily basis
- Recommended retail prices, purchasing costs, shipping and return costs, rebates and discounts, ...
- Scheduled clearance sales date and delivery dates for stock optimization
- Liquidation costs for remaining stocks

Price Elasticity

For the sake of transparency of our price recommendations, we are displaying the price elasticity curve of each article (sales quantity vs. price) as well as the corresponding KPIs revenue and net profit:



Skinny Fit Jeans
29,99 €





Business Rules

Further pricing policies can be defined and adjusted in a flexible way depending on the current operative situation:

- Minimal price: e.g. purchase price plus VAT, or a minimal calculation for each brand
- Uniform prices: e.g. all product sizes for the same price, or same prices in all physical stores
- Price ladders: e.g. price changes in 10 € steps only for articles in the price range ± 100 €
- Update frequency: e.g. no more than one price change a week for each article
- Price lock: e.g. no price changes on product launch or for specific brands
- Market prices: e.g. prices within a $\pm 20\%$ price corridor around main competitor prices



Benefits of Dynamic Pricing

Reaching the same business goals in a more efficient and reliable way:

Dynamic Pricing:

- Systematic, comprehensive
- Controlled, data driven
- Proactive, predictable
- Considers a number of factors: Demand, seasonality, stocks, delivery dates, revenue, calculation, net profits...

Manual Pricing:

- Punctual, seldom
- Gut feeling, personal experience
- Reactive, hectic
- Addresses problems one at a time: Calculation, purchase frequency, customer acquisition, seasonal sales, clearance...

Thanks for your attention!

Time for Questions & Answers

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