Creating Added Value from Data

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About Us

CREA pro – Business Process and Data Science Experts

- Field of expertise – data science, AI, banking, insurance, telco, manufacturing
- Founded in 2010, 10+ employees, based in Ljubljana, Slovenia
- Projects – sales/demand forecasting, price optimization, marketing models, etc.
- Technology – R, Oracle Gold Partner
- Hollistic approach – multidisciplinary team, present in all stages of the process

Performance improvement
What is Data Science?

Combination of analytics, mathematics, statistics, ML, AI, social sciences and in-depth field knowledge.

**Big Data and Visualisation**
- Complex data sets, high computing power and domain knowledge
- Data in graphic form for decision makers, better understanding of complex concepts

**Machine Learning**
- Machine learning without explicit programming
- Computational statistics in combination with forecasting future events

**Predictive Analytics**
- Sophisticated techniques and tools that exceed the area of traditional BI
- Focus on forecasting future events
Why Now?

**Basis:** partially automated business processes in order to successfully implement advanced algorithms and desire to outperform the competition.
Where to Start?

Basis for Achieving Goals
Company’s performance is based on the way the data is used!

Key Areas
- Insight into customer behavior.
- Providing personalized customer experience.
- Improving business efficiency.
- Real time data analysis for immediate decisions.

Think big, start small and move fast!

ACHIEVING THE COMPANY’S OBJECTIVES: Mindset and culture of working environment.
Investing in the research of own data represents a strategic advantage for the company.
Strategic Planning – Which Goals to Follow?

1. In which processes should we include data science methods?
2. Is the company ready for such a project?
3. When is the right time to start the project?
4. Are we aware of certain traps and obstacles and do we have a strategy to avoid or solve them?
5. Which stakeholders should be present?
6. Do we have resources available?
7. How will we measure the success of the project?
8. What is our vision?
Process of Building Models

1. **Data Providers**
   - Raw Data
   - Raw Data
   - Raw Data

2. **Select Data**

3. **Pre-Processing**
   - Select Data
   - Raw Data

4. **Iterate till data is prepared**
   - Structured Data
   - Machine Learning Algorithms

5. **Learning Algorithm**
   - Iterate to get best model
   - Candidate Model

6. **Deploy Selected Model**

7. **Golden Model**

8. **Applications**

9. **CREApro**
Real revolution lies in the renewal and restoration of every business event involving people, devices and data, and is based on the findings derived from the data.

**Main goal is to capitalize the collected data.**

- Definition of business strategies, targeting the digital capabilities towards them.
- Definition of the influence that data insights have on organization’s performance.
- Appropriate environment infrastructure.
- Company culture that values data.
- Data insights should be used in everyday business process.
Possible Applications

Retention of already existing customers
Understanding of our customers
Product pricing optimization/personalization

Acquisition of new customers
Definition of our target audience
Design of business objectives

Development of new products
Sentiment (opinion) analysis
Demand/sales forecasting and stock optimization
Predictive maintenance

Risk management
Logistics optimization
Use Case – Smart Pricing
What is Smart Pricing?

**Strategic Goals**
Determination of what the organization wants to achieve: maximizing total profits, maximizing revenue, achieving market share, etc.

**Consists of:**
- Customer segmentation
- Evaluation of responses to given prices
- Profit calculation
- Price optimization
- Monitoring and updating

**Use of historical data to determine the best product price from the viewpoint of the customer and bank at the same time.**

\[
\begin{align*}
\max_p \quad (p - c) \cdot d(p) \\
\text{So that:} \quad p_{\min} < p < p_{\max}
\end{align*}
\]
Optimization

Addition of different variables increases the dimensional space – machine learning methods required to perform the computing. Determination of permissible values for individual attributes.

**KEY ELEMENTS:**
Function of price response, revenue and incremental sales costs.

**Expected profit in dependence of the price**

**Multidimensionality of predictive (optimizing?) problem**
One of the most important factors are customer features. Adding different variables increases the dimensional space – machine learning methods required to perform the computing.

**Business rules**
Determination of permissible values for individual attributes.

**Limitations & Challenges**
Legal limitations, fairness perception, market distortion, permissible distinction.

$$\tau(p, x)$$

$$\tau(p^*, x)$$

Max $$\tau(p, x) = \tau(p^*, x)$$

$$p^*$$ = optimal price
Solution

Outcome

- Personalized pricing for microsegments of customers
- Maximized profit for the bank with the highest probability the customer will accept the offer

Challenges

- How to successfully adjust the negotiation process with the customer?
- Successfull feedback collection (rejections of mid offers), adjustment of existing software tools, etc.
Use Case – Demand Forecasting
Companies must understand and monitor both, the sales made and lost orders – the ones that could be realized if the demanded item was in stock!

**Why?**

*Forecasting demand, not sales!*

**Goal**

- Stock optimization based on the market demand.

**Advantage for the company**

- Identification of demand drivers, upfront planning and timely actions.

**Importance of backorders**

- Demand exceeds production or delivery capacity in certain time period.
Historical Data

1. Sales data
2. Returns / reclamations
3. Canceled orders
4. External factors affecting sales (e.g. competition activities)
5. Impact of worldwide economy changes (e.g. price of raw materials)
6. Influence of seasons
7. Impact of marketing activities
8. Relationships with customers (B2B, B2C) – contracts, discounts, special offers, etc.
Process

How to approach?
Grouping the items according to sales trends, patterns — main goal: to reduce the complexity of the entire system. Choosing the right methods, parameters and attributers (which external data to add?). What impacts our sales?

Business rules
Minimum and maximum stock value/units, minimum production per day, lead time, etc.

Objectives
Minimization of related assets, reduction of lead time, production optimization, etc.
4 Principles for Creating Added Value with Data Science

01. Use of simple models
   To minimize the time period.

02. Researching multiple problems
   Simultaneous exploration of various challenges and issues that arise in business.

03. Successful implementation in business processes
   Models available for use by employees on different levels in company’s organization.

04. Focusing on automation
   Automation of data management process, in order to save time.
Most of the world will make decisions by either guessing or using their gut. They will either be lucky or wrong.

Suhail Doshi