Business Breakfast

Wo kann KI eingesetzt werden und was wird für ein erfolgreiches KI-Projekt benötigt?

LEMBERG

Hamburg @work
The Network for a New World
DigitalCluster.Hamburg

Olga Lysak

Lou Dutko

Über Lemberg Solutions

Lemberg ist ein Software & Hardware IT Unternehmen.

Startups, KMU und auch Corporates arbeiten mit uns, um neue Produkte zu kreieren und eine digitale Transformation zu implementieren.

140 Mitarbeiter

Ingenieure, Software Architekte, Project Managers, Business Analytiker, Designer, Tester

14 Jahre am Markt

Unsere Reise begann in 2007

Wir arbeiten am europäischen und amerikanischen Markt

Unsere Kunden sind in Deutschland, USA, Niederlanden, Großbritannien, Norwegen, Schweiz, Frankreich

Hauptbüro ist in Lviv, Ukraine

Lemberg ist eins der größten Tech Hubs in Osteuropa

Where can AI be used and what is needed for a successful AI project?

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Lemberg Solutions entwickelt Projekte in folgenden Bereichen:

Digital Services

Mobile & Web Entwicklung
Drupal
Digital Consulting

IoT

Hardware & Firmware Entwicklung

Prototypenentwicklung

KI/ Data Science

Healthcare
Agritech
Real Estate
Fintech
SportTech
Retail
Predictive Maintenance

Where can AI be used and what is needed for a successful AI project?

Automatisierte Bewertung von Duschhygiene

Where can AI be used and what is needed for a successful AI project?

Problemstellung

- Duschverfahren vor dem Betreten der Fleischproduktion

- Keine Beobachtung mit der Kamera zulässig

- Möglichst automatisierte Kontrolle des Duschvorgangs

- Entwicklung einer Duschkultur

- Folgen der afrikanischen Schweinepest - ein verheerender geschäftlicher Schaden

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Sie dürfen nicht beobachten wie der/die Mitarbeiter/-in sich gewaschen hat

Sie dürfen nicht mit der Hand prüfen, wie der/die Mitarbeiter/-in geduscht hat

Deshalb sogar nach einer Dusche weiß man nicht genau, ob es funktioniert hat, dass der Mitarbeiter sich gut gewaschen hat

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Beacon **+** Smartwatch **+** Cloudserver

Pros

- einfache Installation

- die Lebensdauer der Beacon-Batterie beträgt etwa 2 Jahre

- akzeptable Erkennungsgenauigkeit

- Kontrolle ohne menschliches Eingreifen

&

Cons

- Wasserdichte Smartwatches sind teuer

- Lebensdauer einer Smartuhr ist nicht lange

- Wände können transparent sein und dies muss behoben werden

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Herausforderungen

> " Wir wollen, dass alles, was im Stall ist, im Stall bleibt und alles, was nicht im Stall ist, nicht in den Stall kommt

- Falls die Wände zu dünn sind, dann können sich die Signale von Beacons innerhalb eines Radius von 3-4 Meter zwischen den Wänden verlaufen

- Während des Duschvorgangs wurde das Signal von Beacons gedämpft, weil die Luftfeuchtigkeit stieg

- Die Beacons sollen in der Lage sein, ein RSSI-Signal zu liefern, um zu verstehen, welche Mitarbeiter-Smartuhr in der Nähe ist

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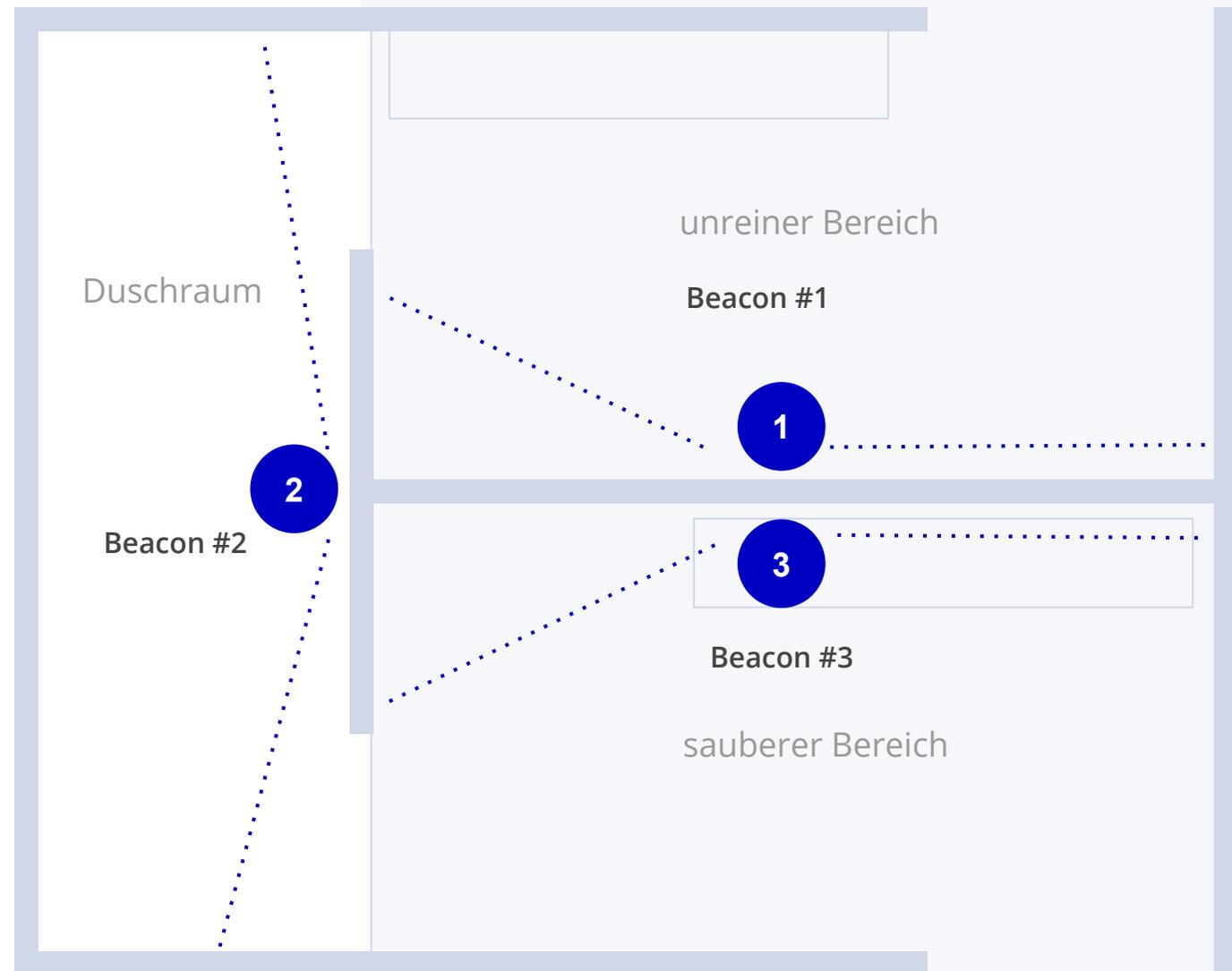
Transparenz der Wände

Probleme und Lösungen

Beacon RF Signale kollidierten miteinander im Umkleideraum
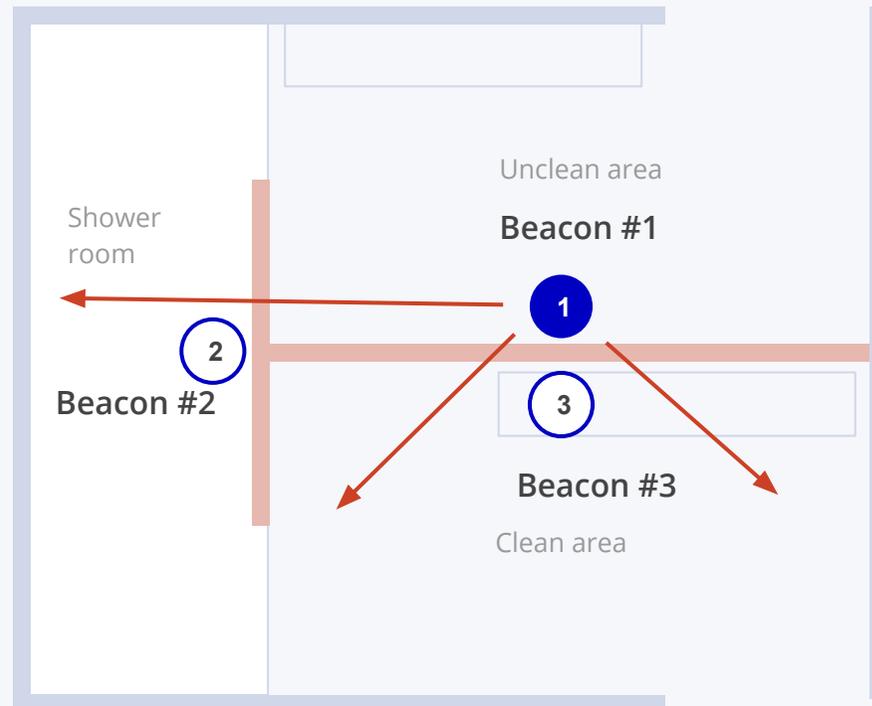
Beacons wurden neu platziert; Schutzmaterialien wurden genutzt
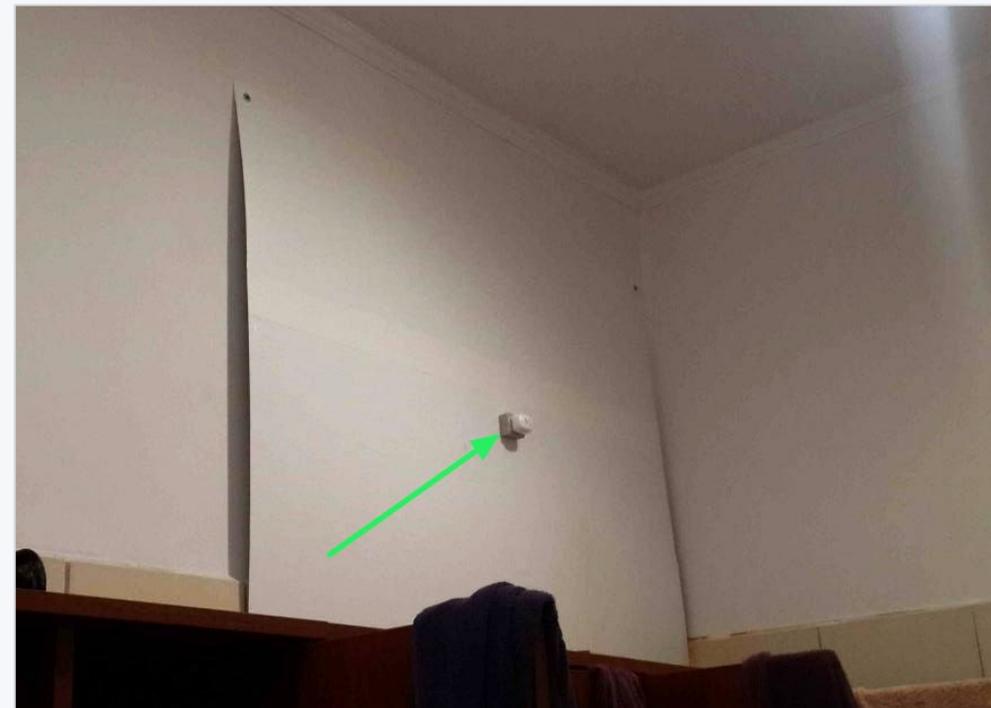
Installation

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Wie duschen wir?

HOW MEN SHOWER

HOW WOMEN SHOWER

RUB THOROUGHLY

WATER WILL WASH EVERYTHING OFF
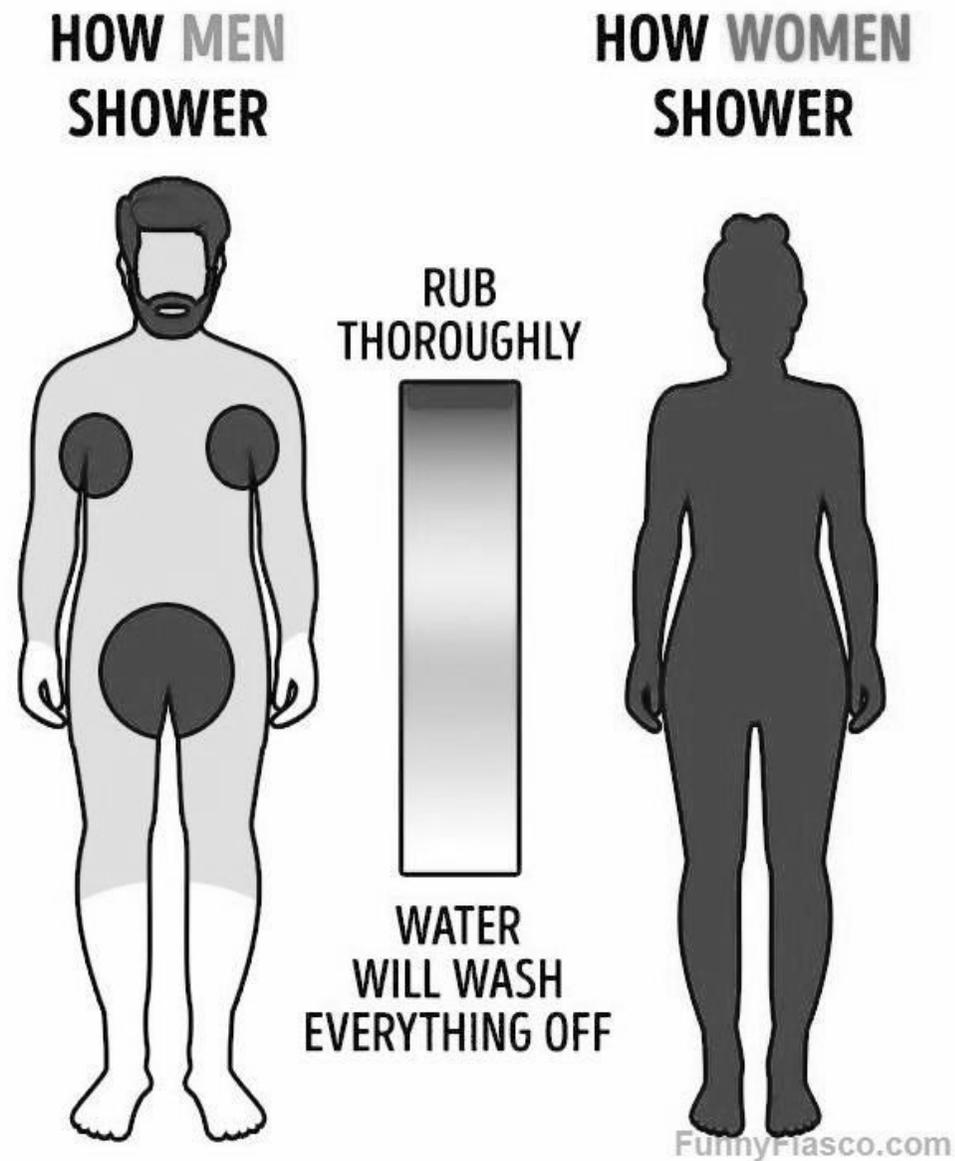
FunnyFlasco.com

Picture taken from FunnyFlasco.com

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Wie die Analytik funktioniert?

- **Dauer des Duschvorgangs**

  - 1 Min. | 3 Min. | 5 Min.

- **Waschintensität oder Bewegungsgeschwindigkeit**

  - Die Hände können langsam oder schnell mit demselben Bewegungsstil gewaschen werden

- **Vielfalt (verschiedene Bewegungen)**

  - Kopf - Typ A

  - Bein - Typ B

  - Hände - Typ C

- **Uhr gehängt**

  - Keine Bewegung oder Pendelbewegungen

- **Uhr durch die Dusche übertragen**

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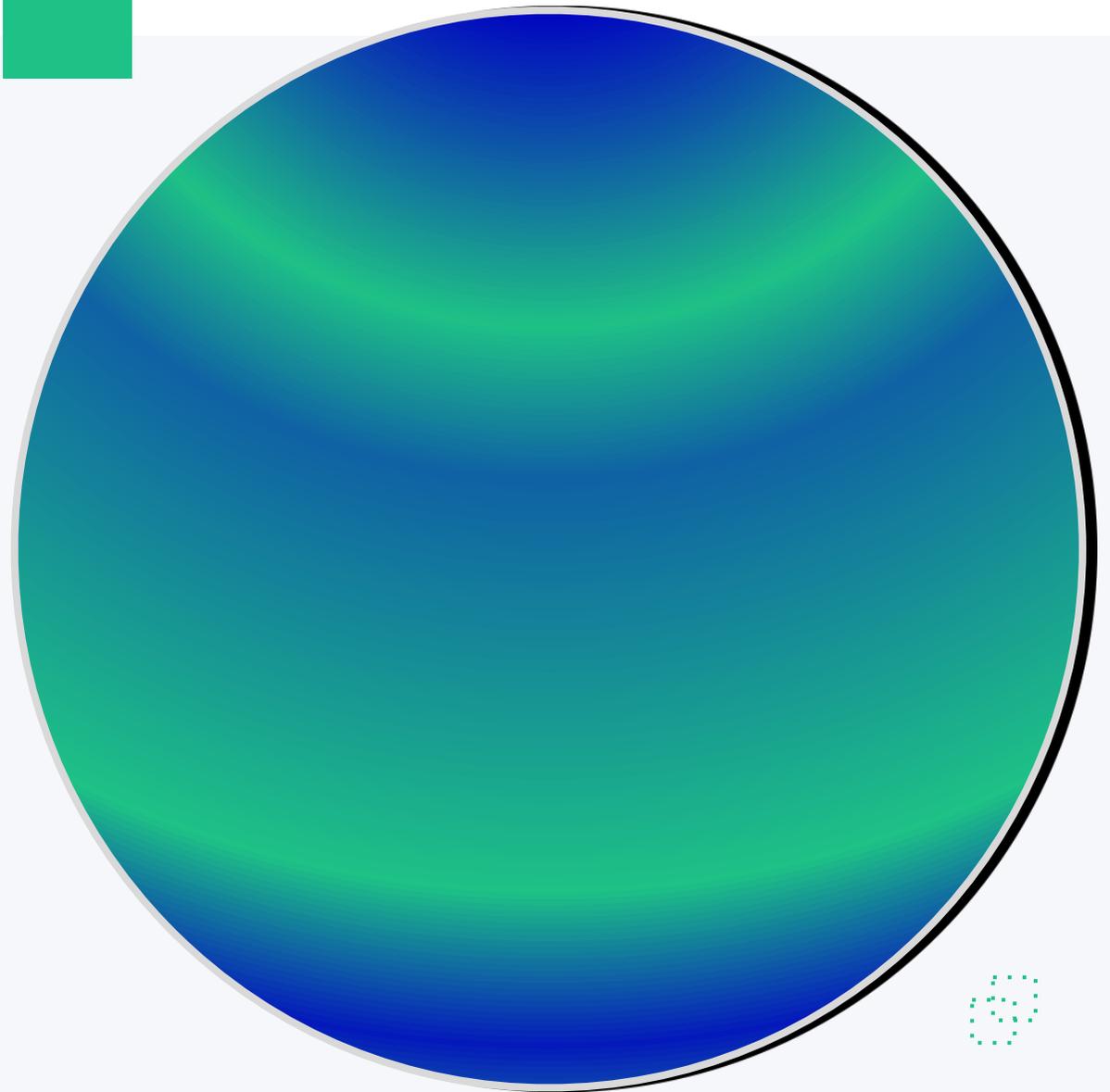
Beispiel auf den Händen

2 - 3 - 4 - 5 - 6 - 7
Unterschiedliche Arten der Bewegungen

Diese Bewegungen erfolgen nach einer bestimmten Zeitspanne **- Dauer**

Diese Bewegungen erfolgen mit einer bestimmten Geschwindigkeit - **Geschwindigkeit der Bewegung oder Intensität**

0 Wet hands with water	1 apply enough soap to cover all hand surfaces.	2 Rub hands palm to palm
3 right palm over left dorsum with interlaced fingers and vice versa	4 palm to palm with fingers interlaced	5 backs of fingers to opposing palms with fingers interlocked
6 rotational rubbing of left thumb clasped in right palm and vice versa	7 rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa.	8 Rinse hands with water
9 dry thoroughly with a single use towel	10 use towel to turn off faucet	11 ...and your hands are safe.

Picture taken from: https://www.who.int/gpsc/clean_hands_protection/en/

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Statistik

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Ergebnisse

Zeitanalyse in verschiedenen Zonen

User 1: 756756004262C925
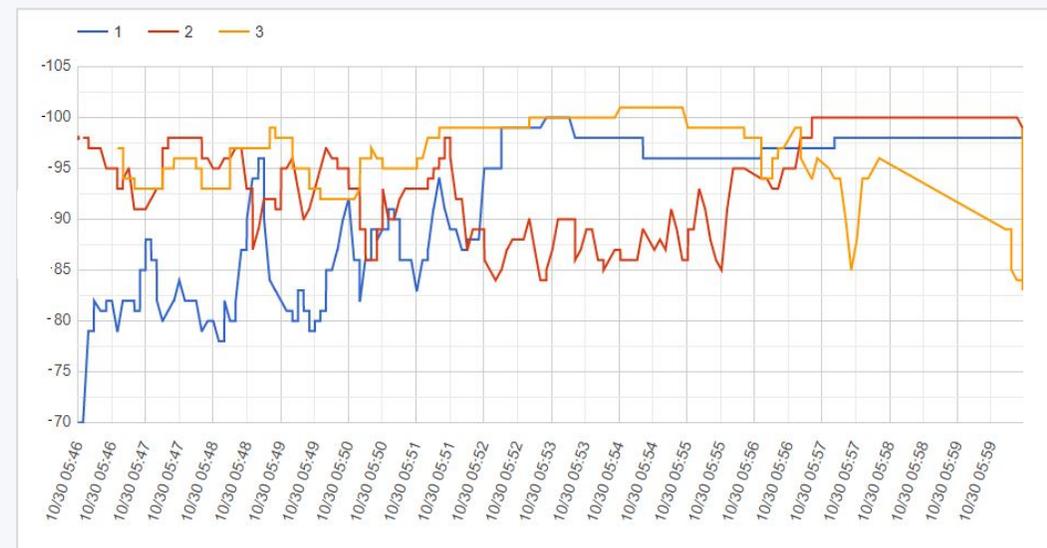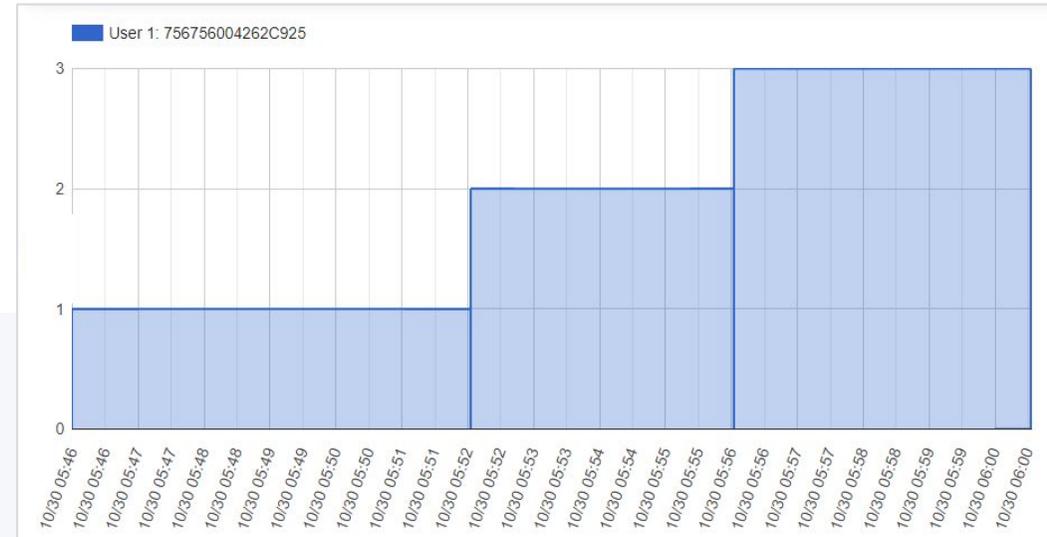
| Zone	Time		Duration, min				
	Enter	Exit	Time Spent	ACCLRM Score	Time Score	Farm Average	Employee Average
2020-10-01							
2020-10-02							
Dressing room before shower	4:49 PM	4:59 PM	09:42	NaN	NaN	0	0
Shower room	4:59 PM	5:11 PM	12:06	NaN	NaN	0	0
Dressing room after shower	5:11 PM	5:37 PM	26:24	NaN	NaN	0	0
2020-10-05							
Dressing room before shower	10:00 AM	10:01 AM	00:24	NaN	NaN	0	0
Shower room	10:01 AM	10:03 AM	02:30	NaN	NaN	0	0
Dressing room after shower	10:03 AM	10:06 AM	02:18	NaN	NaN	0	0

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Anomalien

Wasch Prozedur *A*

Wasch Prozedur *B*

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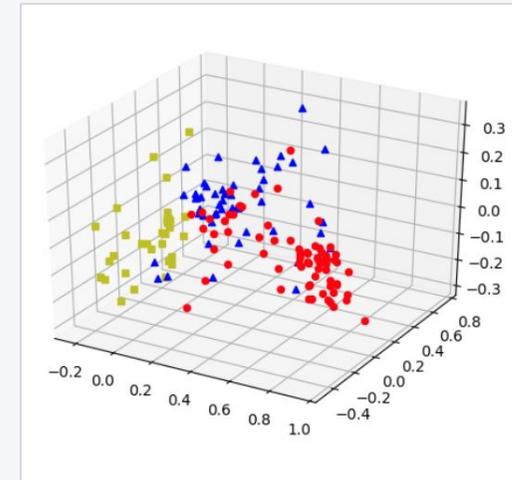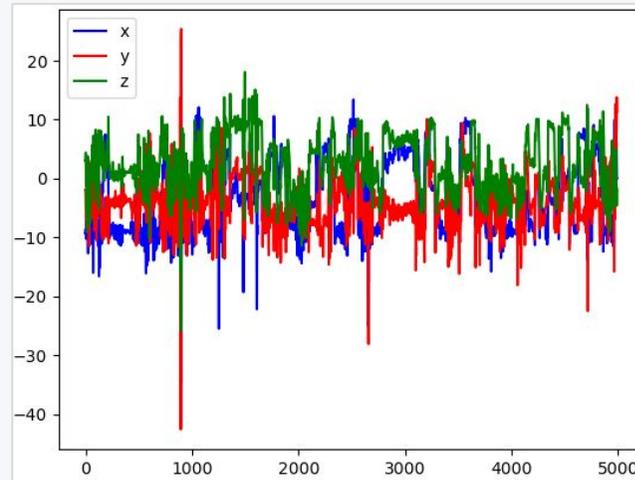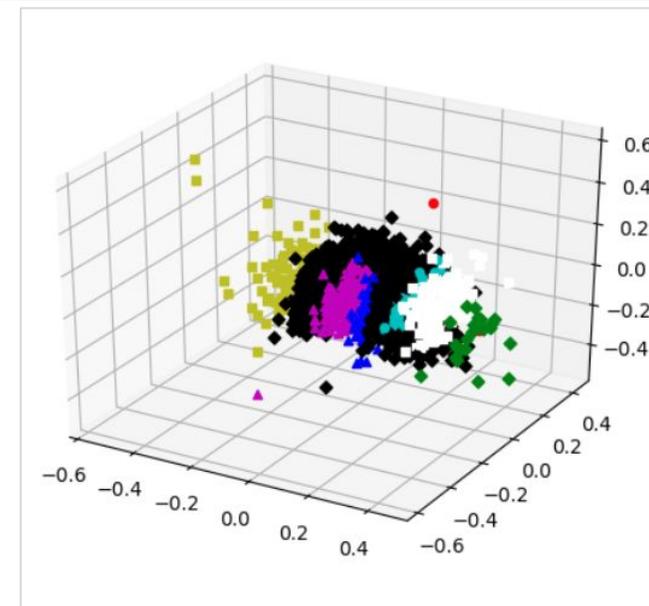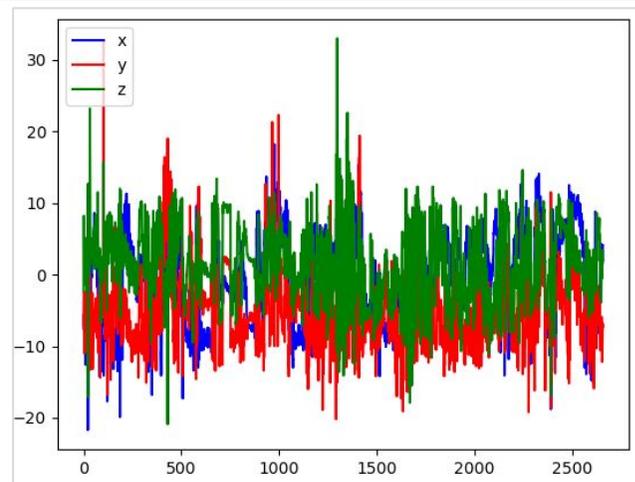
## Die Person legte die Uhr auf das Regal oder den Boden
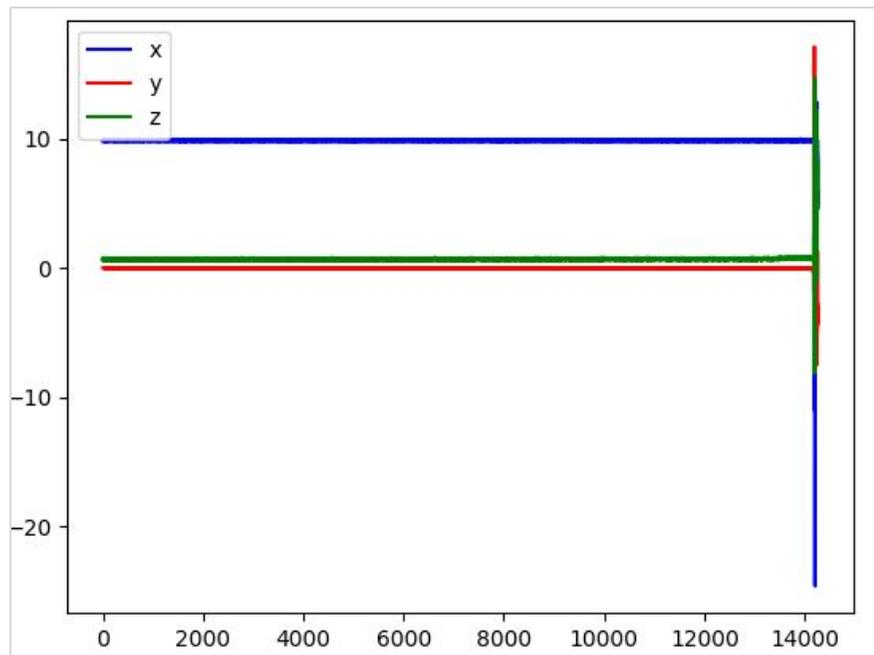
Die Person hat die Uhr nass gemacht
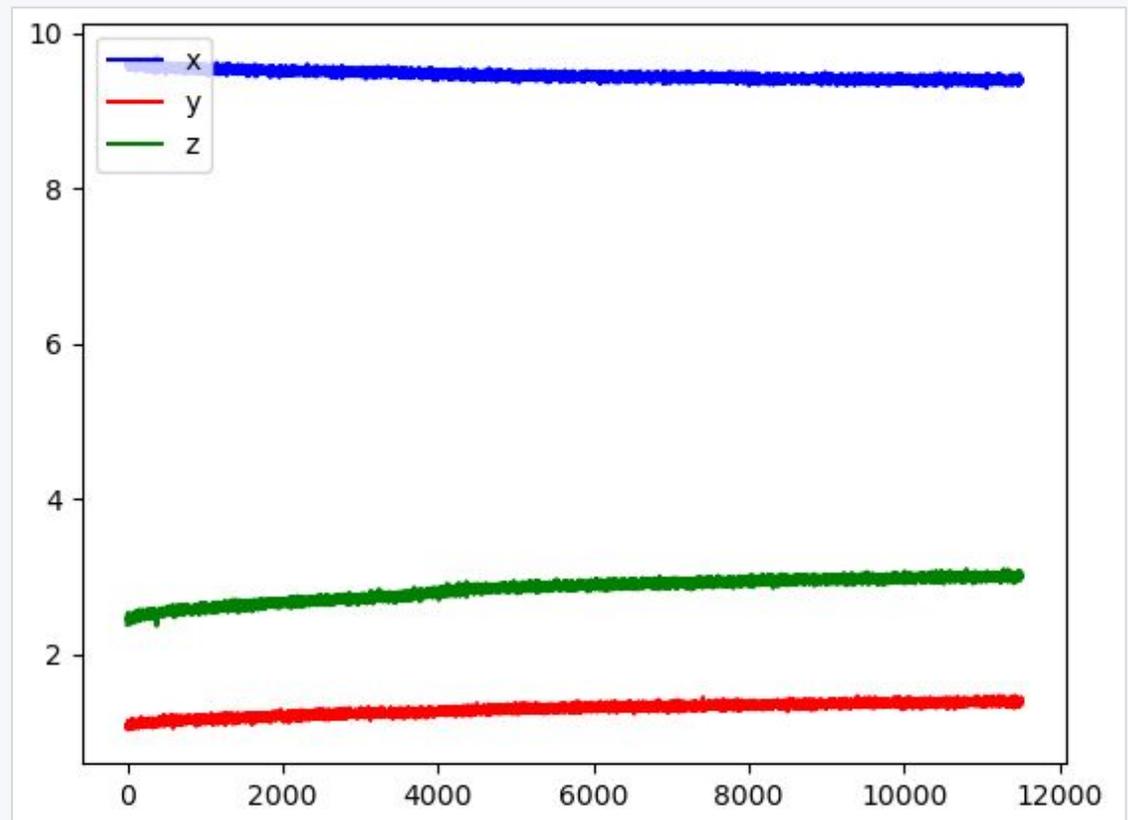
Zusammenfassung der gesammelten Daten

Wenn wir die Häufigkeit der Datensammlung erhöhen und die Gyro-Daten hinzufügen, dann können wir von jedem Körperteil eine Bewertung vornehmen, die Bewegung reproduzieren und eine 3D-Visualisierung wie folgt durchführen

Beschleunigungsmesser (Accelerometer) ◯

~~**Kreiselinstrument (Gyroscope)**~~ ◯

Niederfrequenz ◯

geringer Energieverbrauch ◯

Die beste Option für die Produktion, auch mit möglicher Zonierung

◯ **Beschleunigungsmesser**

◯ **Kreiselinstrument**

◯ **Hochfrequenz**

◯ **Erhöhter Energieverbrauch**

Die Option für eine sehr genaue Analyse nur vom Waschen der Mitarbeiter - kann für die Forschungszwecke verwendet werden

Dashboard

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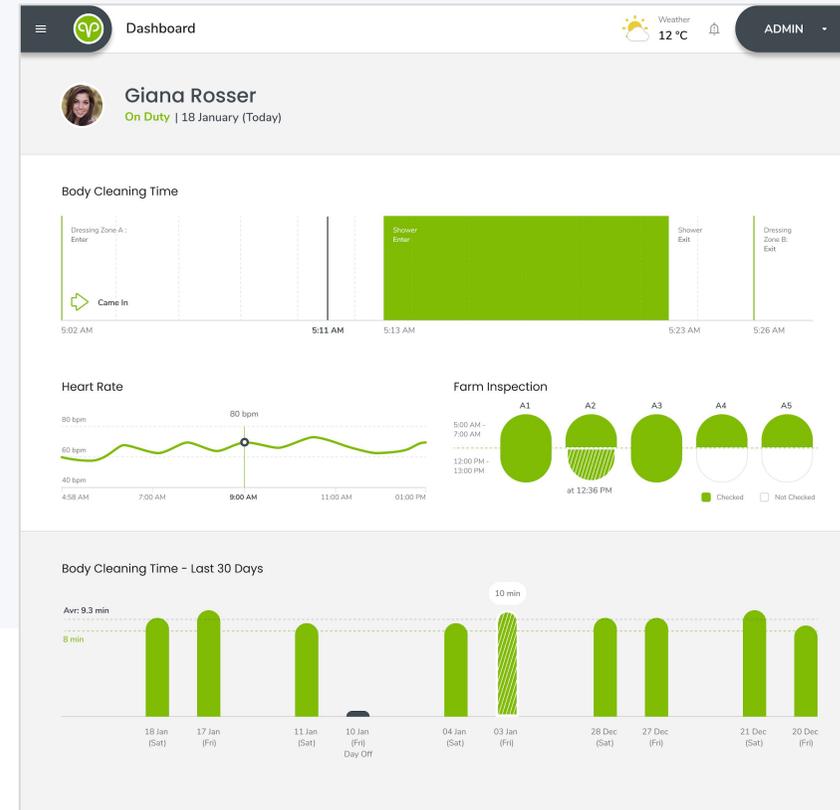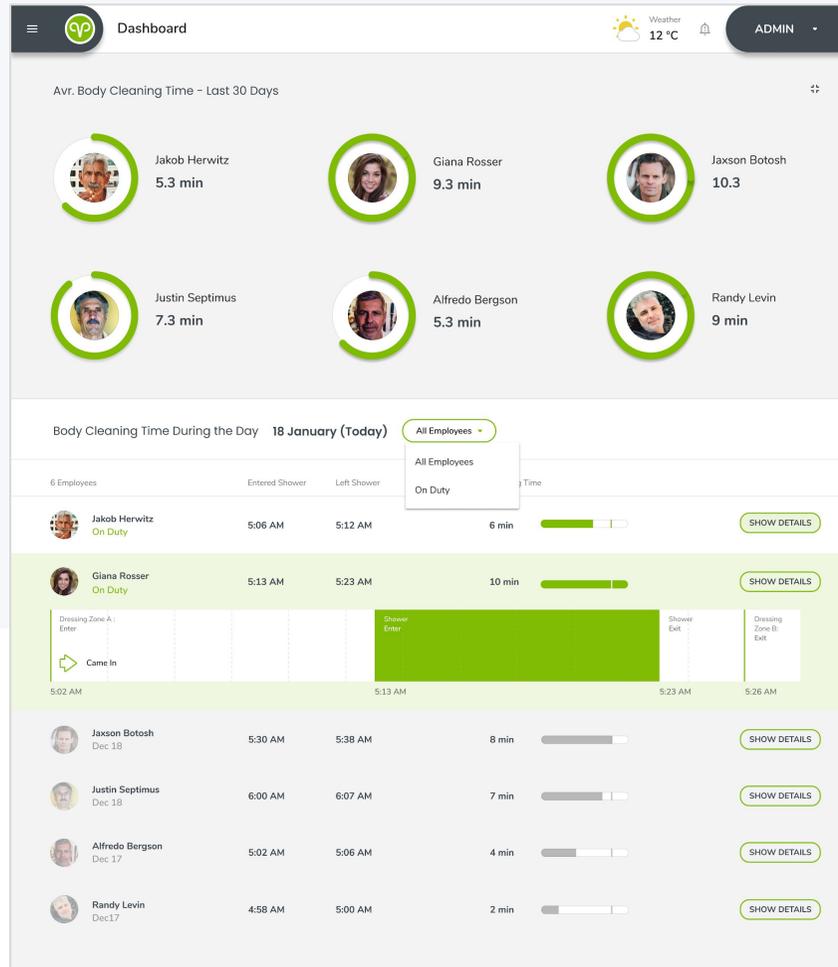
Beispiel einer guten Dusche

MC

Last Shift: Cleaning Time - 5.9 min; Cleaning Quality - 7.

Cleaning Intensity

Dressing Zone A:
Enter

⇨ Came In

Shower:
Enter

Shower:
Exit

Dressing
Zone B:
Exit

5:53 AM   5:53 AM   5:59 AM   6:00 AM

NK

Last Shift: Cleaning Time - 6.4 min; Cleaning Quality - 8.2.

Cleaning Intensity

Dressing Zone A:
Enter

⇨ Came In

Shower:
Enter

Shower:
Exit

Dressing
Zone B:
Exit

6:39 AM   6:39 AM   6:45 AM   6:46 AM

Where can AI be used and what is needed for a successful AI project?

Schlechter Fall

DH

D███████████
O████████████

Last Shift: Cleaning Time - 2.7 min; Cleaning Quality - Session can't be scored.

Cleaning Intensity

Dressing Zone A:
Enter

Came In

Shower:
Enter

Shower:
Exit

Dressing
Zone B:
Exit

12:33 PM | 12:36 PM | 12:39 PM | 12:42 PM

MC

M█████████████
O█████████████

Last Shift: Cleaning Time - 0.95 min; Cleaning Quality - 1.1.

Cleaning Intensity

Dressing Zone A:
Enter

Came In

Shower:
Enter

Shower:
Exit

Dressing
Zone B:
Exit

5:53 AM | 5:56 AM | 5:57 AM | 6:02 AM

Where can AI be used and what is needed for a successful AI project?

Automatic Ordering

The Problem Statement:

It is required to know what amount of products should be ordered for tomorrow

It is important to make an order before 18:00, but shop closes at 21:00

Waste should be minimum

Where can AI be used and what is needed for a successful AI project?

Automatic Ordering

About The Project

The problem of ordering goods at store is solved by the seller manually. This fact has several negative consequences:

- The human factor - people can make wrong decisions. New sellers have less experience and do not forecast as well as experienced ones.

- Significant time spent on manual order formation

- The possibility of premature exhaustion of goods that sell well

- Possibility of expiration of goods and their return if the goods are not sold for a long time

- Irrational use of retail space - unsold balances take place

- Not the optimal choice of assortment by the seller

As a result, the potential of individual store may not be fully realized. We want to change this by developing an efficient automated ordering system.

The system must have the following qualities:

- When forecasting the demand for goods for each individual store should take into account its local characteristics. in a total of 150 stores.

- The system is able to form the optimal product matrix for each store

- The system must be able to adapt to changing conditions (quarantine, etc.).

- Systems should increase sales and reduce losses compared to a decision involving human participation.

Automatic Ordering

Dashboard

- Project lasted **5 months**

- **2 approaches were used** to solve the task:

  - Prediction with regression model

  - Time series forecasting

- Statistics of **two stores** was used to develop MVP

- Quarantine caused by **covid** changed the patterns of behavior of buyers and their preferences (for example goods related to celebrations (eg barbecue) are in less demand), but total sales increased
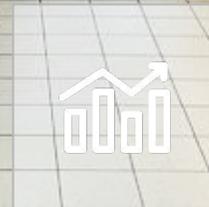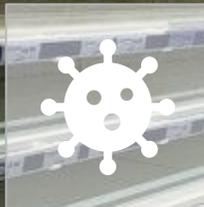
Project Challenges

1. Working with a large number of modeling objects - for each individual product in the store a separate model. As a result, the complexity of testing and selecting the optimal network topologies, caused by large amounts of data being processed.

2. Differences in customer behavior patterns in 2019 and 2020. Hence the problems of extrapolation when testing models.

3. The imperfect information infrastructure of the client caused delays in the preparation of the data necessary to assess the quality of the developed solution.

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Automatic Ordering

Project Team & Responsibilities

System architecture design

Modeling (training and testing) experiments design

Review and research of modeling approaches

Research report preparation

Assessment of additional input information quality

Creating and proving hypothesis about existing patterns in data, pattern extraction and explanation

Factors analysis

Anomalies detection and explanation

PM

- Communication with customer's team
- Scope management
- Milestone planning

5%

Data Scientist Lead

40%

Data Analyst

40%

15%

Data Scientist
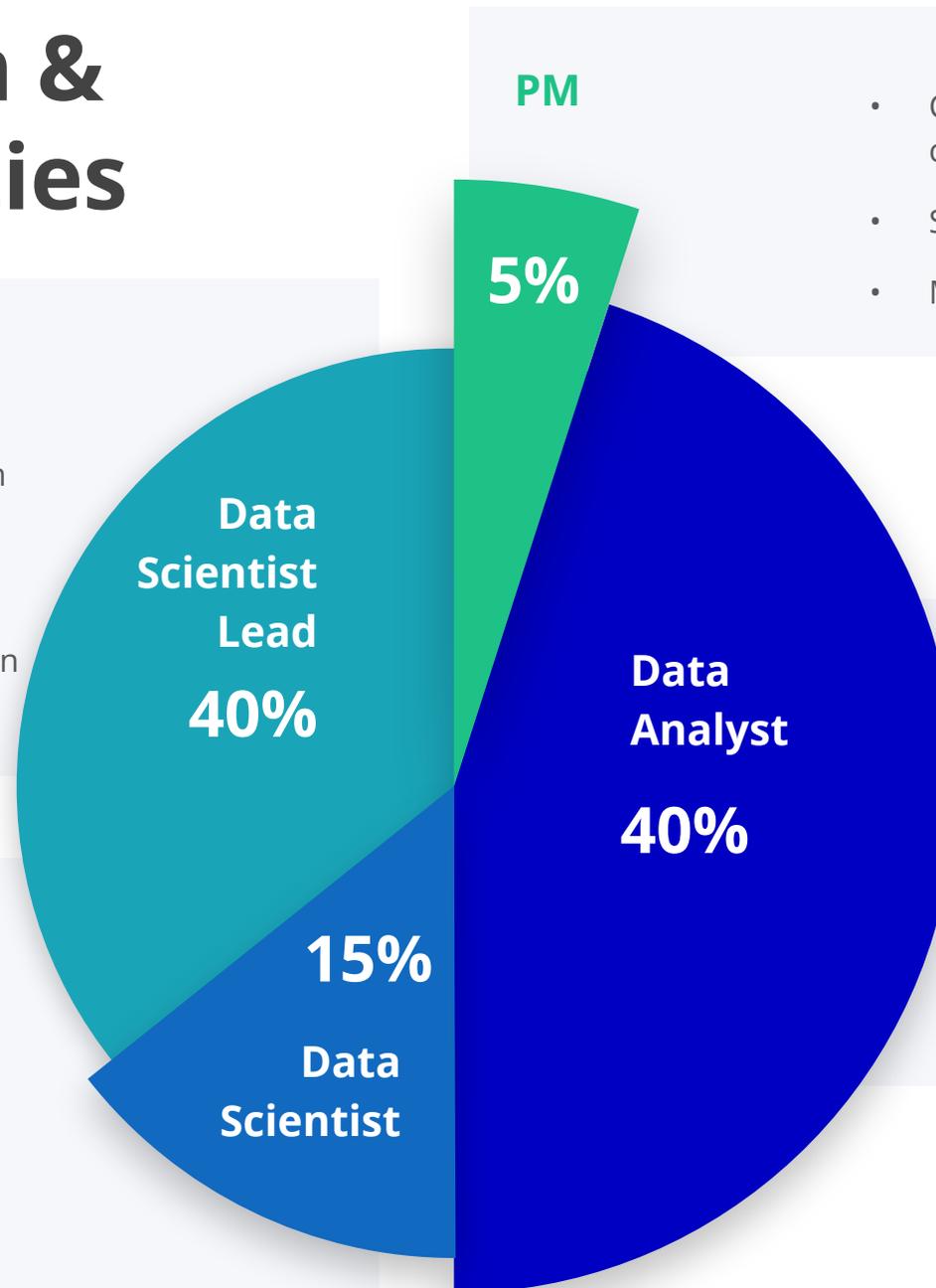
- Data-sets preparation
- Descriptive data analysis
- Training and testing procedures automation
- Data visualization

How prepared was the customer?

Automatic Ordering

Regarding data

This project had the most perfect data we ever worked with. Lemberg was provided by very detailed records of sales from 2 last years.

Data was related to sales in two different shops.

Regarding problem understanding

Customer was prepared very well and had a clear idea of what he needed.

Regarding team that assists in project development

Customer ensured the effective interaction of the Lemberg team with its experts (manager and salesman) to solve the problem.

Where can AI be used and what is needed for a successful AI project?

Automatic Ordering

What we have...

...and what we didn't?

Customer - described the problem from the point of view of business, described the result he expects

Manager - told in detail about the business process, described the environment for integration, gave explanations on the data and anomalies found in them. Described the principles of formation of promotional prices and the logic of choosing the time for promotions. Described the structure of the assortment of the goods, features of different groups of goods.

The seller - in an interview gave insights about the logic of order formation, formalized the significant factors of influence that are taken into account when solving the problem of order formation.

historical data about two years of operation for two stores (all checks for goods sold).

Delays occurred in the preparation of data needed to assess the effectiveness of the system compared to human-made decisions.
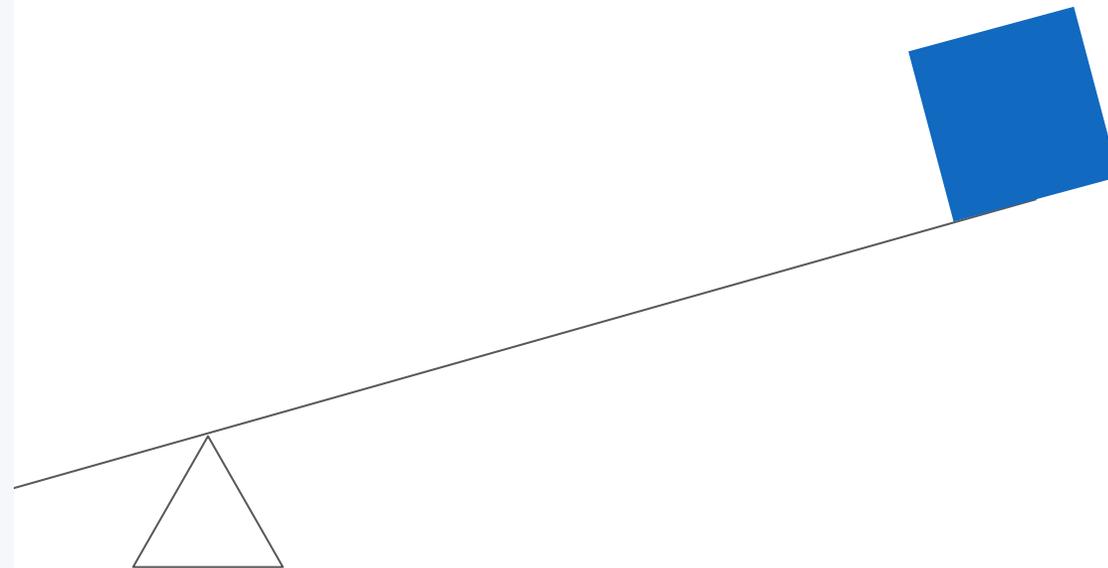
Experts

Pavlo | Data Science expert

Development of prediction approach
that uses regression models
features engineering
patterns extraction
Anomalies detection and explanation

Customer

As a sales expert and operations manager

Andriian | Lead Data Scientist

Descriptive analysis
Model training and testing automation
Anomalies detection and explanation
features engineering
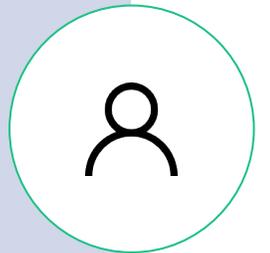
Customer

As a shop manager who predicts
tomorrow's sales

Victor | Data Analyst

Descriptive analysis
Model training and testing automation
Anomalies detection and explanation
features engineering

Customer

As an information system owner responsible
for data collection from shops network

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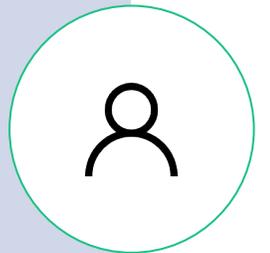
Automatic Ordering

How We Tested

The effectiveness of the solution is determined by comparing the efficiency of the person (seller) and the efficiency of the automatic order system.

1. System performance simulation on historical data for two stores.

2. Field tests - integration of the service into the customer's infrastructure (for two stores) and evaluation of the effectiveness of its work in real conditions, by comparing the results obtained by manual order formation and automated one.

3. Testing the system in real conditions for 150 stores, comparing the effectiveness of manual and automatic ordering procedures.

Automatic Ordering

Project Timeline

Duration: **5 Months**

Milestone #1

- Descriptive analysis

- Preparing questions and conducting interviews with the "seller" and the manager.

- Datasets preparation

- Modeling

Milestone #2

- Automatic ordering system testing and its effectiveness assessment.

- System architecture development

- Product matrix optimization

Milestone #3

- Deployment of the system for two stores in the mode of parallel work with the seller

- Deployment for the entire chain.

- Automatic operation mode of the auto ordering system for the entire network of stores.

Where can AI be used and what is needed for a successful AI project?

Automatic Ordering

Project Budget

Interviews
7.0%

System architecture deve…
20.0%

Research Demo
10.0%

Brainstorming with custo…
5.0%

Research reports prepara…
7.0%

Descriptive Data Analysis
6.0%

Preparing additional input…
15.0%

Model training and testing
20.0%

Anomalies analysis
10.0%

Where can AI be used and what is needed for a
successful AI project?

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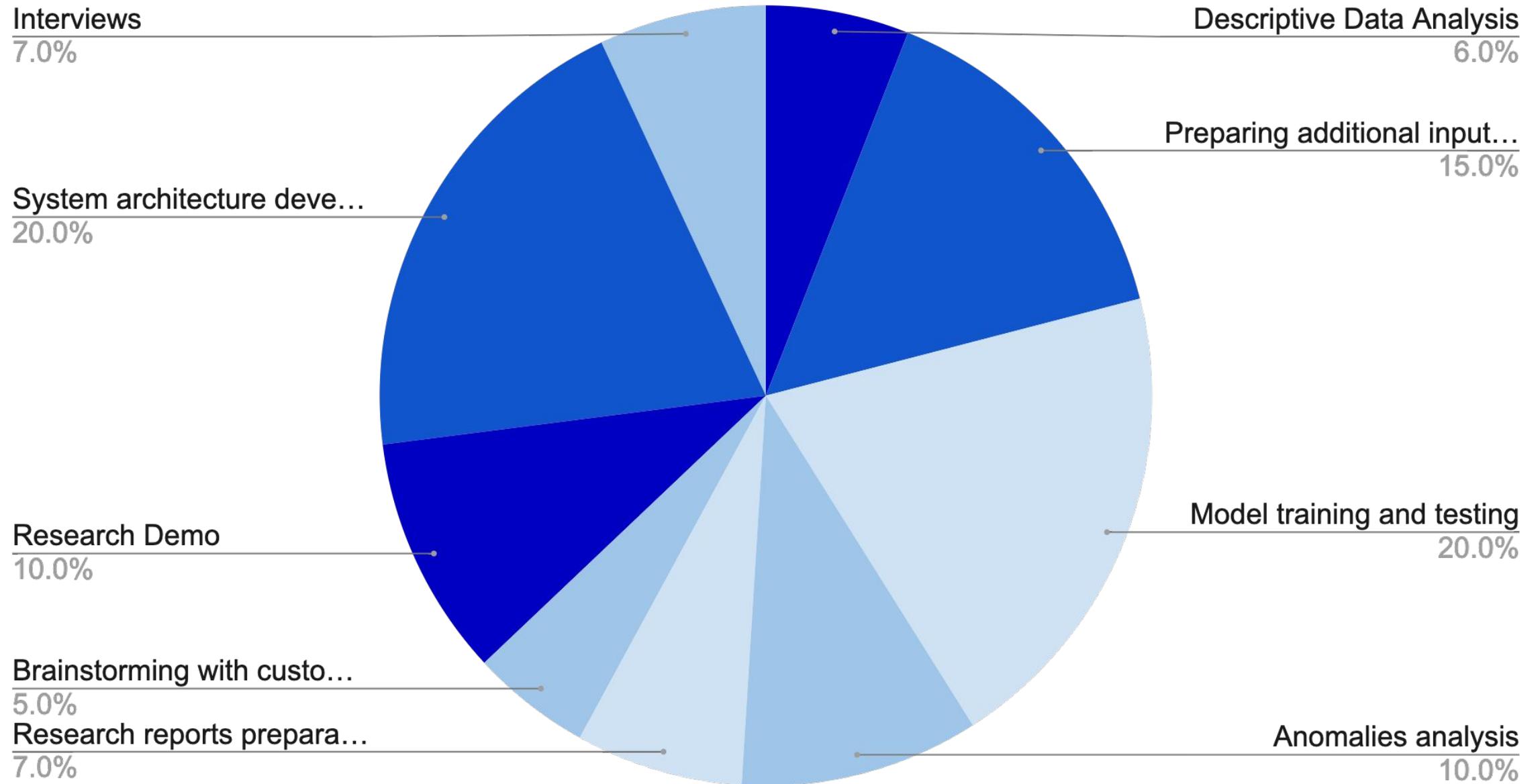
Real Estate Evaluation

Estimated price is $XX.X

Processing

The Problem Statement:

What is a price of a real estate in a specific location?

We don't want to use paid service of property evaluation

We would like to take into account price change dynamics

Real Estate Evaluation

About The Project

The customer came to us with the idea of developing an automated system of commercial real estate valuation, for the purchase of which he already has clients - bankers. It is critical for them to know the real value of commercial real estate, and the assessment must be done constantly and for a large number of objects.

Estimating the value of commercial real estate is a poorly formalized task that is traditionally solved by experts, as the task is complex and involves a large number of factors, and in the absence of a common methodology, we face negative consequences:

- The high cost of the assessment made by a person (average price - 1500 eur)

- A limited number of experts - limited opportunities in the speed of preparation of assessments, as you need to go to the place, etc.

- There is a significant variance for the estimates made by different experts. A spread of 20% is now considered ok, but for businesses, higher estimation accuracy reduces risks.

- The price changes over time, so there may be a need to re-evaluate the same object - extra costs.

Requirements for the solution

The system estimates the cost of renting office space in Greater Copenhagen using historical data.

The system estimates the cost of office buildings based on the cash flow model and the predicted rental cost for space in this building.

The accuracy of the system should be within the limits acceptable to a qualified human expert.

The system is able to take into account the general dynamics of prices in the real estate market. Once or twice a year there is a need for price indexation.

✓ Estimated price is $XX.X

Where can AI be used and what is needed for a successful AI project?

Processing

Real Estate Evaluation
Dashboard

- Duration of **12 months**
- **5 modeling** approaches
  - Approaches had different list of input parameters or different processing logic
  - More than **50%** is **non-usable user-created content**
 - **Models can't be static** - as city is alive
- Core information is **price and total area**
- **Huge % anomalies** non-explainable by available data
- **McDonalds** appear to be a **good anchor on a map**

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Real Estate Evaluation
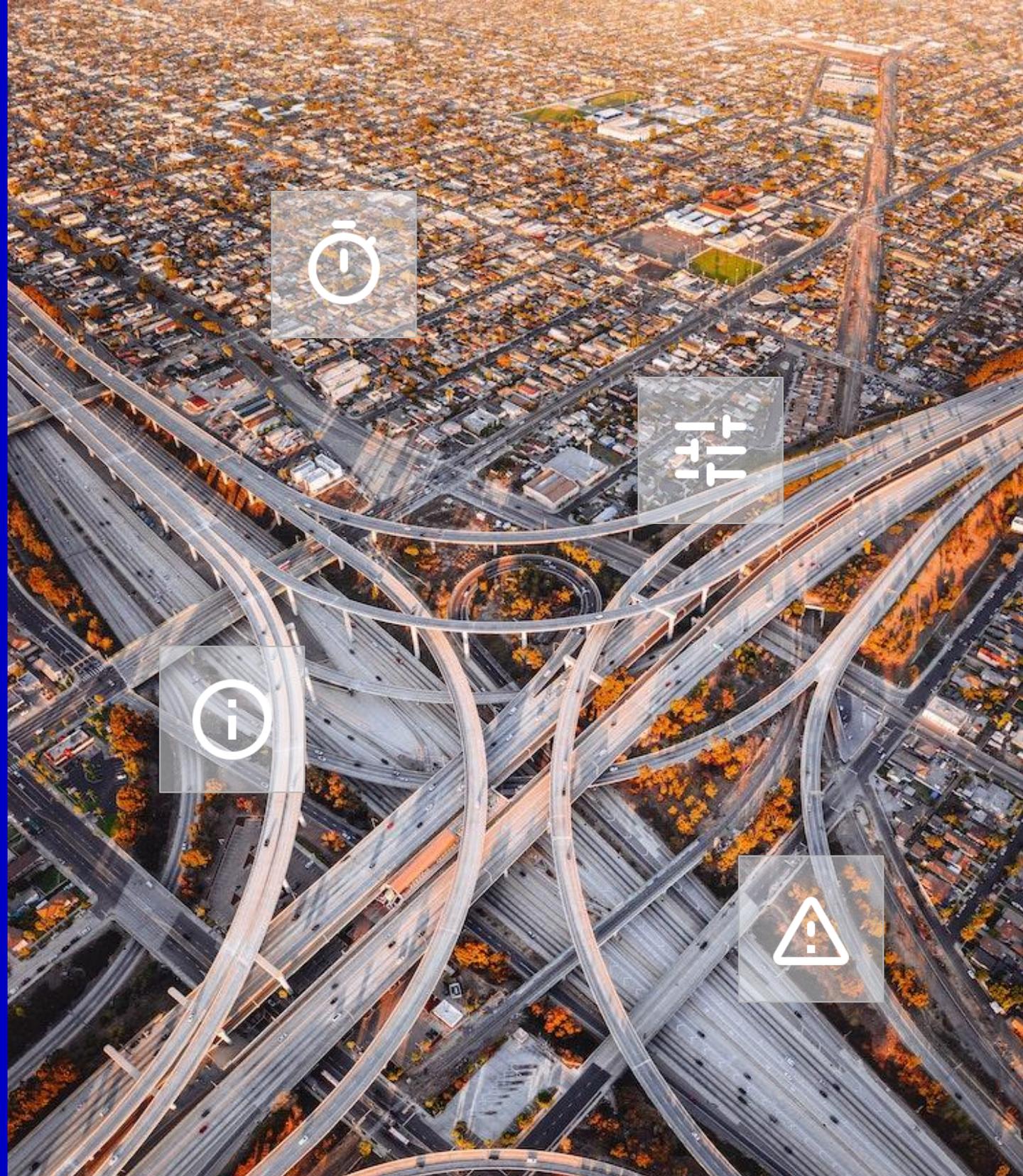
Project Challenges

1. Investigate the results obtained by previous teams. Find out exactly where the problems arose.

2. Investigate available data sources. Combine relevant fragments of information into one structure. Conduct a descriptive analysis of the data.

3. Implement the procedure of automatic noise filtering in data sets.

4. Build a model that can predict the cost per square meter of office space in Greater Copenhagen.

5. Develop a function that, using the estimated rental cost per square meter and cash flow model, calculates the net present value of the entire building.

Where can AI be used and what is needed for a successful AI project?

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Real Estate Evaluation

Project Team & Responsibilities

PM
parttime

- Communication with customers team
- Scope management
- Milestone planning

5%

Data Scientist
parttime

50%

- Model design
- Data-sets preparation
- Descriptive data analysis
- Manual data labeling
- Training and testing procedures automation
- Data visualization
- Factors analysis
- Anomalies detection and explanation

Data Analyst
parttime

45%

- Review and research of modeling approaches
- Manual data labeling
- Data quality assessment
- Modeling experiments design
- Formalization of testing procedures
- Pattern extraction and explanation
- Factors analysis
- Anomalies detection and explanation
- Research report preparation

Where can AI be used and what is needed for a successful AI project?

Real Estate Evaluation

How prepared was the customer?

Regarding data

The customer had historical data accumulated over 10 years of operation of the two portals for the sale and rental of real estate, and also BBR base - Danish Building and Housing Register

Cooperation with Lemberg is the client's third attempt to solve the problem. Two previous attempts were unsuccessful - the models were either incomplete or showed unacceptable accuracy.

Regarding team that assists in project development

Three experts from the customer side works with Lemberg team:

- Real estate portal product owner - technical support regarding databases and information infrastructure

- Real estate expert - helped to formalize the factors of influence, explained the anomalies identified by the DS team. described the methodology used by the expert during the assessment

Regarding problem understanding

the customer is well versed in the subject area. Insufficient level of technical knowledge does not allow to realistically assess the quality of the collected data.

Real Estate Evaluation

What we have...

Hypotheses describing the factors influencing the formation of the rental price of office space per square meter.

Low-quality data sources - real estate rent portal collects user-created content with no moderation, the data structure changes evolutionarily corresponding only to portal needs.

High quality but somewhat outdated Danish Building and Housing Register

Support by real estate expert

...and what we didn't?

A significant part of information about important parameters of real estate objects was lost or was unstructured (floor, year of renovation, facilities, the infrastructure around, secondary kind of use, etc.)

We didn't have criteria that would allow us to clear the general data set from distorted (noisy) records - the approach proposed by the customer (reject values at the edges of the ranges) did not work well.

Experts

Pavlo | Data Science expert

Formalized the knowledge provided by real estate experts, developed a procedure and designed a tool for semi-automatic moderation of information submitted by portal users

Victor | Data Analyst

Developed a methodology of anomalies analysis using information available to the public (Google Maps API, openstreet API), advertising materials published and visual information sources - google streetview, fotos submitted by the user

Customer |
As real estate sales expert

Main input: regarding what is important in sales of office spaces, how the price is formed, what is good accuracy, what has no sense in price creation
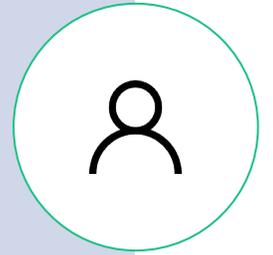
Data Provider |
## A representative of data provider company

Main input: what additional information they may share to improve value of available data - like additional office space features (prices, facilities etc)

Previous Data Scientist |
A representative of data provider company

Main input: what approaches were tried? What hypothesis arised? What data issues were the stoppers? What was impossible to explain?

This input: was important not to go same way. But anyway some ideas had to be retried

Where can AI be used and what is needed for a successful AI project?

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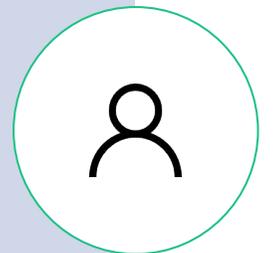
Real Estate Evaluation

How We Tested?

Testing of the model to predict the rental price per square meter of office space took place in two stages:

1. Procedure of model cross-validation on historical data (rotation estimation or out-of-sample testing)

2. The model accuracy assessment on the latest data from ads placed on the real estate portal, data was not available during model development stage

Each stage of testing ended with the detection and explanation of anomalies with the involvement of a real estate expert. The knowledge gained during the explanation of the anomalies helped both in the development of models and in the improvement of noise filtering procedures.

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Project Timeline

Duration: **12 Months**

**#2 - April - Jun
(difficulty level 3/3)**

Aim: to arrange segmented information into one structure, update object description with new features, build initial model

**#4 Sep - Oct
(difficulty level 2/3)**

Aim: Clarification of the model by improving the description of real estate objects with the help of additional features, including extracted from the unstructured part of the information from the customer's database.

**#6 Feb- March
(difficulty level 2/3)**

Aim: to develop a tool and methodology for semi-automatic moderation procedure of new information published on the portal, in order to create high-quality data sets for continuous updating of models corresponding to the new real estate market conditions

**#1 - March -
(difficulty level 3/3)**

Aim: to get acquainted with the problem, with the obtained results, to prepare the concept of solution development

**#3 - July - August
(difficulty level 1/3)**

Aim: Improving the accuracy of the model through the development of its architecture and optimization of filtering procedures for training data sets

**#5 Nov - Dec
(difficulty level 3/3)**

Aim: To solve prices indexation problem

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Project Budget

Data Labeling
7.0%

Research Of Data Sources.
12.0%

Descriptive Data Analysis
5.0%

Preparation of infrastructure
11.0%

Research reports
5.0%

Interviews
2.0%

Preprocessing of
8.0%

Filtering raw data from
17.0%

Model training and testing
13.0%

Brainstorming with
6.0%

Research Demo
14.0%

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Summary

Showers

DATA was 100% collected by Lemberg team. The collection flow was organized by Lemberg and what data is important was also designed by Lemberg

DURATION Project lasts for more than 2 years

CUSTOMER FEEDBACK was immediate as soon as new product version was deployed

VALUE: tracking that employee passed mandatory hygiene procedures

Automatic Ordering

DATA best data we ever had. Good example how everything was properly organized from early project stage

DURATION project lasts for 4 months, first good results were obtained in 4 weeks

CUSTOMER FEEDBACK was immediate also, but here good results related to "lost profits"

VALUE: accurate prognosis and minimum loss of potential profits

Real Estate

DATA all data was provided by customer. Data quality is medium-low - closer to low. Available data was enough for initial modeling and research

DURATION Project lasts for a year

CUSTOMER FEEDBACK organized on monthly basis.

VALUE: evaluation of property prices is very expensive - automatic approach is a source of huge budget savings

Estimated price is $XX.X

Processing

Where can AI be used and what is needed for a successful AI project?

Interessante Fakten

Zusammenfassung :

Als wir herausgefunden haben, wie unterschiedliche Büroeinrichtungen den Preis gestalten, stellten wir im Datensatz fest, dass WC ein wichtiger Preisfaktor zu sein scheint

Kunden Feedback:

Das ist nicht logisch, da alle Büros in Kopenhagen haben ein WC

Lemberg Feedback

Eine solche seltsame Abhängigkeit erklärt die Qualität der gesammelten Daten - nur für 36% der Objekte spiegelt sich das Vorhandensein einer Toilette in den Daten wider, daher versuchen die verwendeten Methoden des maschinellen Lernens, diese Variabilität mit dem Preis in Beziehung zu setzen. Vielleicht werden für teurere Objekte Beschreibungen sorgfältiger erstellt (u.a.über ein WC) - eine Abhängigkeit, die wir beobachten.

Fazit:

Wenn wir sicher sind, dass die Daten eine erhebliche Anzahl von Lücken enthalten, können diese Daten ohne Vorverarbeitung nicht zur Modellierung verwendet werden, da maschinelle Lernmethoden in diesem Fall gefundene gefälschte Abhängigkeiten widerspiegeln würden.

Interessante Fakten

Zusammenfassung:

Als wir ermittelt haben, wie unterschiedliche Infrastrukturobjekte den Preis von Immobilien beeinflussen, stellten wir im bereitgestellten Datensatz fest, dass Yoga-Zentren den größten Einfluss auf den Preis haben

Kunden Feedback:

Es ist nicht logisch, da niemand mehr fürs Büro bezahlen würde, um eine gute Gelegenheit zu haben, Yoga zu machen.

Lemberg Feedback

Die vom Kunden-Tech-Team erstellte Infrastrukturbeschreibung ist falsch, da nur zwei Yoga-Studios für ganz Kopenhagen in der DB präsentiert werden und sich im Stadtzentrum befinden. Diese Tatsache bestimmte die Bedeutung dieser seltsamen Art von Infrastruktur.

Fazit:

Die Beschreibung der Infrastruktur sollte mit realen Werten aktualisiert werden, um zu vermeiden, dass verzerrte Informationen berücksichtigt werden.

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Interessante Fakten

Fazit :

Während unseres Duschhygiene Projektes haben eine folgende witzige Tatsache festgestellt:

- Frauen waschen ihr Körper unter der Dusche in der Regel gründlicher als Männer.

Gleichzeitig:

Die Bewegungsamplitude in einer durchschnittlichen Frauendusche ist viel geringer als bei Männern (Frauen hatten zarte Bewegungen und Männer reiben mit schärferen Bewegungen).

Trotz der durchschnittlich längeren Zeit, die eine Frau unter der Dusche verbringt, beobachteten wir oft lange Zeiträume ohne Aktivität während ihrer Sitzung. Dies kann auf die Besonderheiten des Waschens langer Haare oder auf den Wunsch zurückzuführen sein, das Waschmittel gründlicher abzuwaschen, indem man einfach unter einem Wasserstrahl steht

Auf der Grundlage der oben genannten Tatsachen sollte das Verfahren zur Beurteilung der Qualität des Duschens für Männer und Frauen nicht identisch sein.

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Interessante Fakten

Fazit :

Bei der Analyse der Beliebtheit von Waren stellten wir fest, dass Hühnerfleisch für eine Supermarktkette eines Schweinefleischproduzenten eines der beliebtesten Produkte ist.

Hühnerfleisch sorgt daher für eine ständige Nachfrage und muss im Warenangebot des Geschäfts vorhanden sein.

Da dieses Produkt von Hänchen Produzenten gekauft wird und nicht so rentabel ist wie eigene Produkte, ist es wichtig, genaue Nachfrageprognosen für diese Produktgruppe zu haben.

AI Quick Start Workshop - 990 EUR

1
Vorbereitung

Alles beginnt mit Ihrer Idee und Ihren Daten.

Um sich auf einen produktiven Start vorzubereiten, führen wir eine erste Analyse Ihrer Idee, Ihrer Geschäftsanforderungen und aller zur Verfügung gestellten Informationen durch.

2
Problemstellung

In diesem 1. Workshop diskutieren wir die vorhandenen Infos und Probleme, die wir mit KI lösen möchten, Auch die Ansätze, die wir verfolgen wollen.

3
Research & analysis

Wir analysieren die gesammelten Infos, Ergebnisse unserer Untersuchung und erstellen einen Bericht inkl. Bewertung der vorhandenen Daten.

4
Besprechung von Ergebnissen

Im zweiten Workshop präsentiert unser Team die Ergebnisse unserer Forschung und diskutiert weitere Fragen und Probleme mit Ihrem Team

5
Präsentation

Unser Team erstellt einen Abschlussbericht und schlägt eine KI-basierte Lösung, um das besprochene Problem zu lösen. Es wird auch eine Kostenschätzung des Projektes vorbereitet.

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Connect with us

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