» Data Analytics and UX/Interaction design «

Dr. Chandan Kumar
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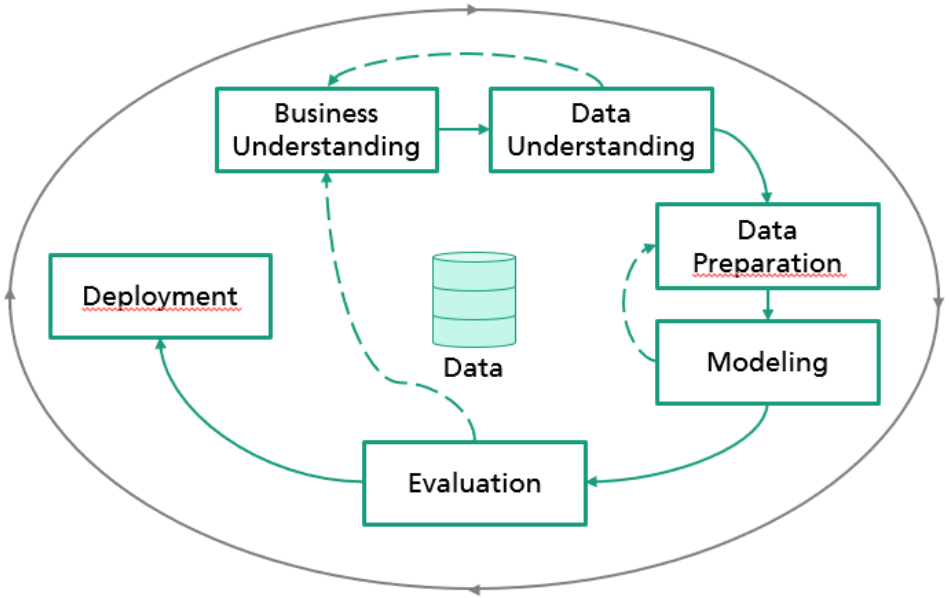
Data Analytics and Forecasting

Process and decision optimization

Quality control, logistics, customer analytics...

- Time Series Analysis
  - Analysis of patterns, trends, and seasonal fluctuations in data to make predictions.
- Regression Analysis
  - Prediction of the value of the dependent variable based on the values of the independent variables.
- Machine Learning
  - Utilization of historical data to create models capable of making predictions.
- Generative AI
  - Employment of generative models for the simulation and generation of future data point



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Data Analytics and Forecasting

Business Adoption

"Business adoption of Big Data continues to be a struggle, with 73.4% of firms citing this as an ongoing challenge."

New Vantage Partners Big Data and AI Executive Survey

"87% of data science projects never make it into production"

VentureBeat

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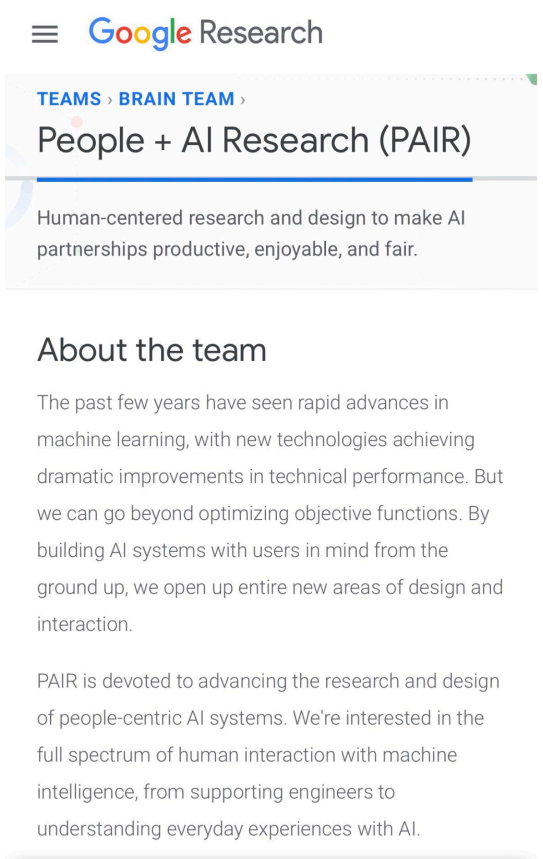
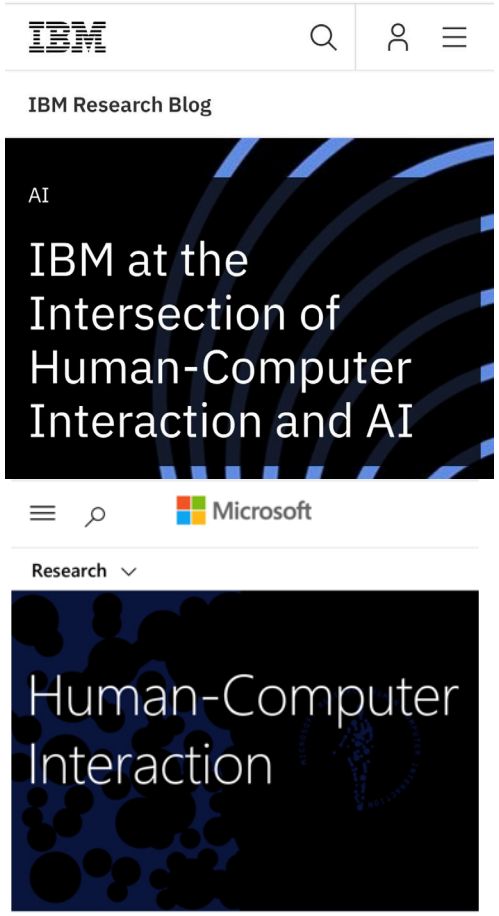
Data Analytics, ML, AI

The importance of interaction design





https://iui.acm.org/2024
Usable Large Language Models and Generative AI

https://chiir2024.github.io/
Human Information Interaction And Retrieval

https://chi2024.acm.org/
https://www.um.org/umap2024/
https://aaai.org/aaai-conference/

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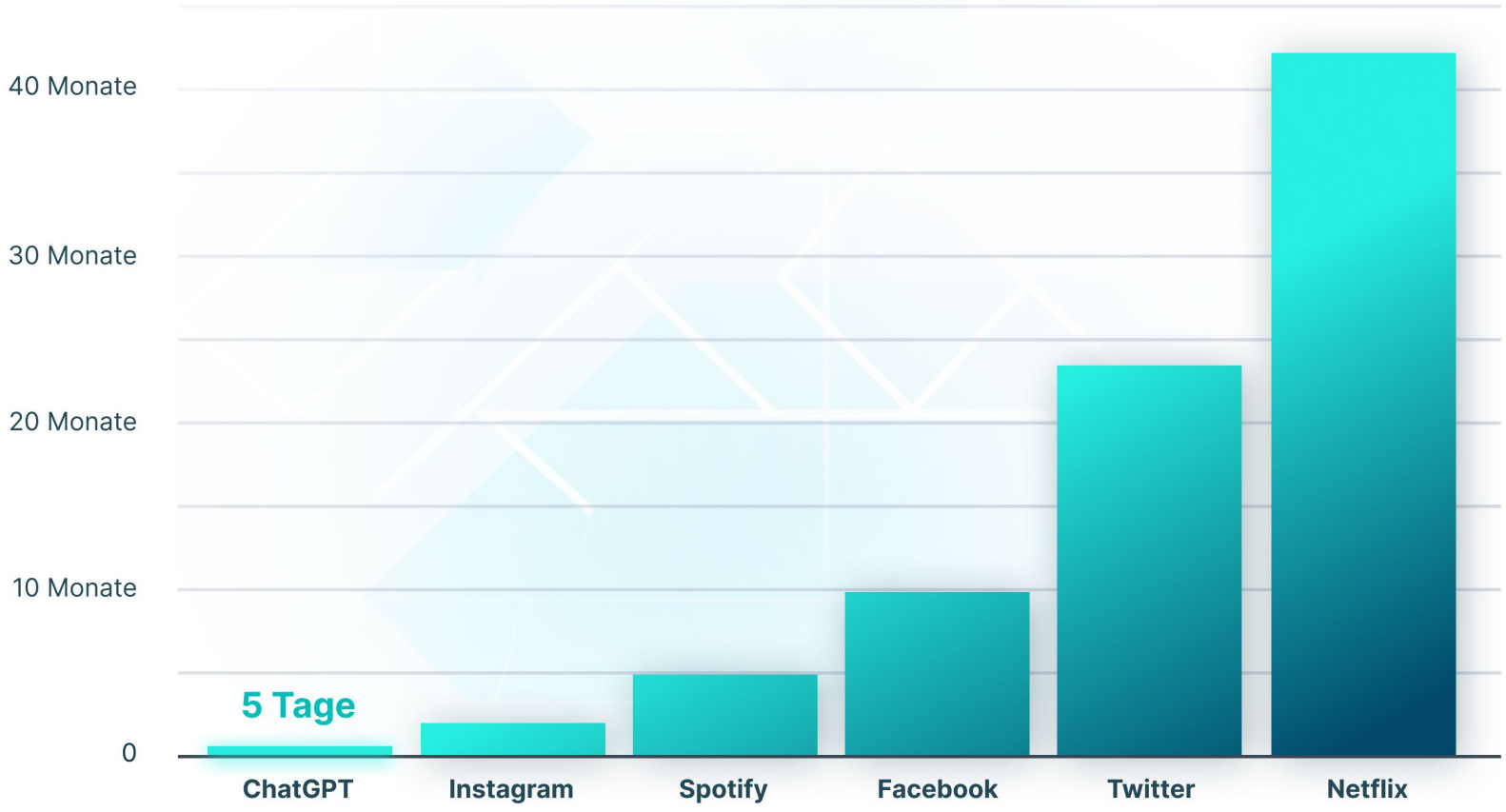
Data Analytics, ML, AI

The importance of interaction design – ChatGPT example



Quelle: 89+ Amazing ChatGPT Stats For 2023 (GPT-4 Update) - DiscoverTheTech

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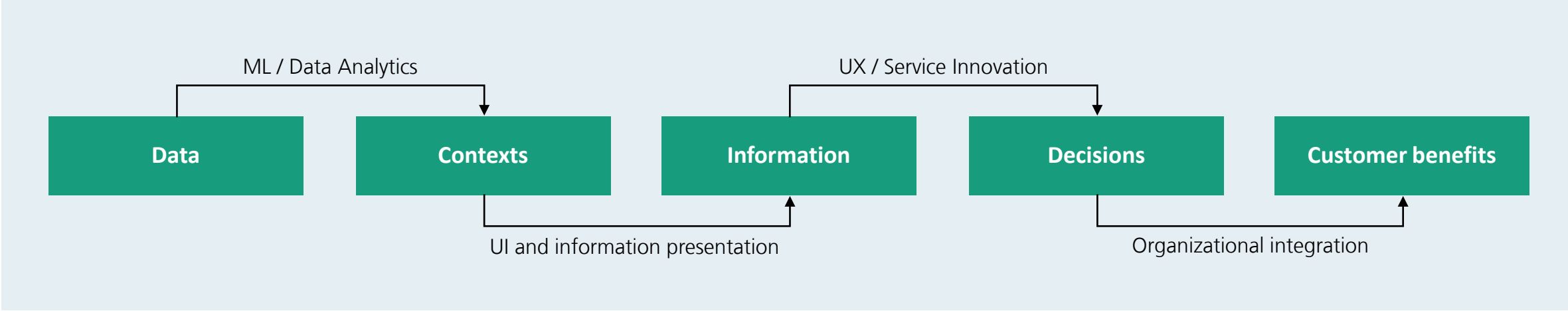
Interaction Design and Technologies

Our Mission: Creating better Experiences through the Fusion of Data and Design



"We empower enterprises to make informed, effective, and ethical decisions through the integration of tools and expertise in data analytics and user experience design"

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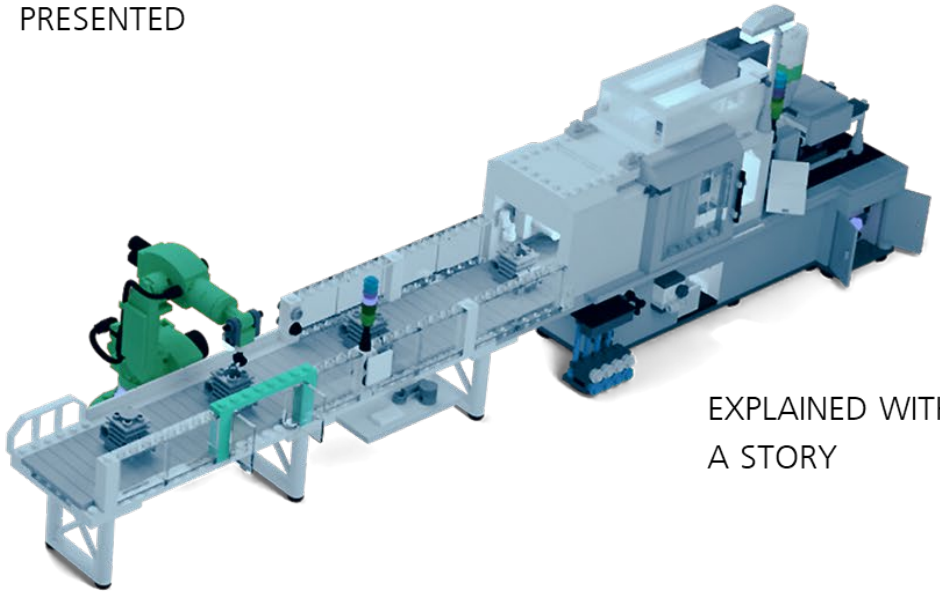
Interaction Design and Technologies

Our Approach

DATA

SORTED AND CLEANED

PRESENTED



EXPLAINED WITH
A STORY

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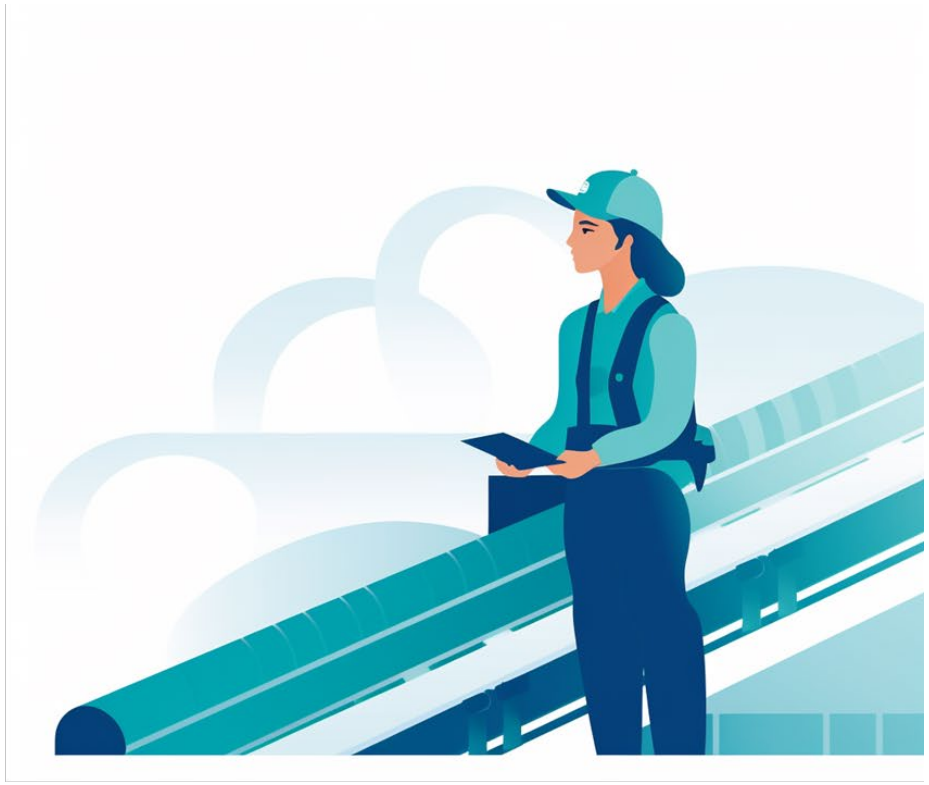
AI and Interaction design

Data for error handling: trust through control and feedback

Data

User



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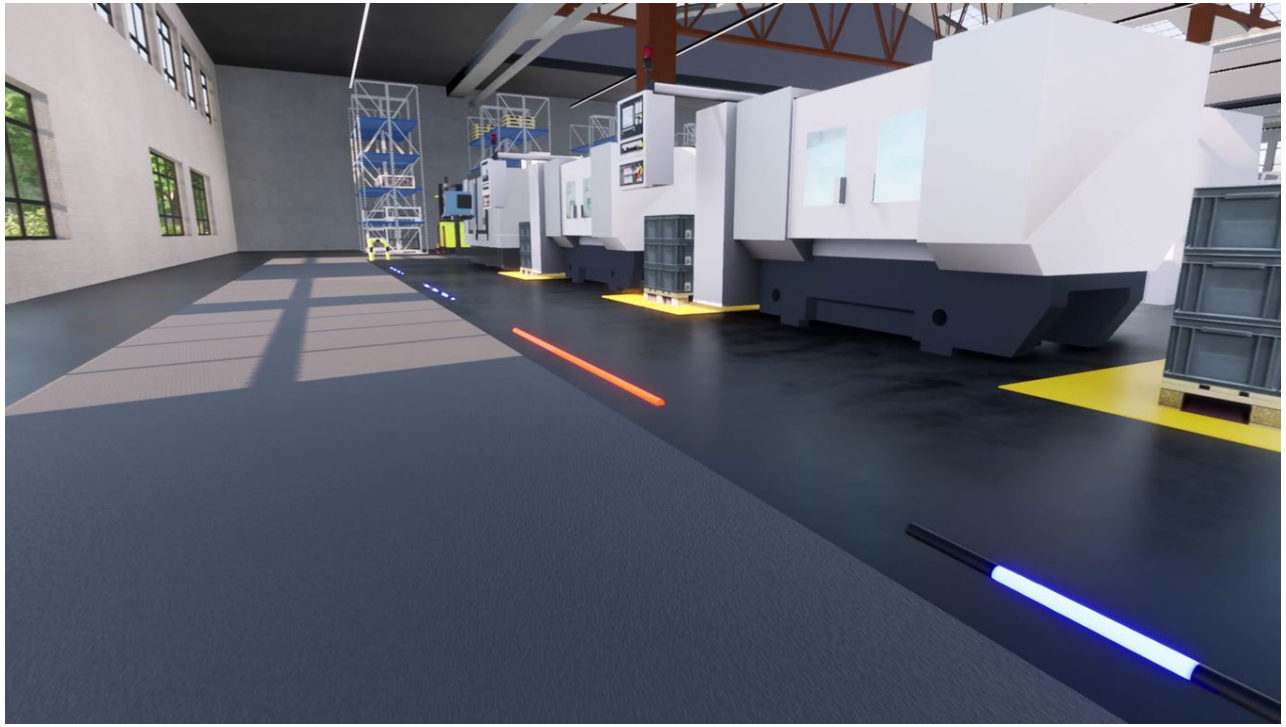
AI and Interaction design

Data for error handling: Active Worker Assist

- Analysis of machine log data
- Anomalies and correlations in the prediction of machine cycle times
- Multimodal visualization systems
- Guide workers to machines for interventions
- Study on acceptance and feasibility



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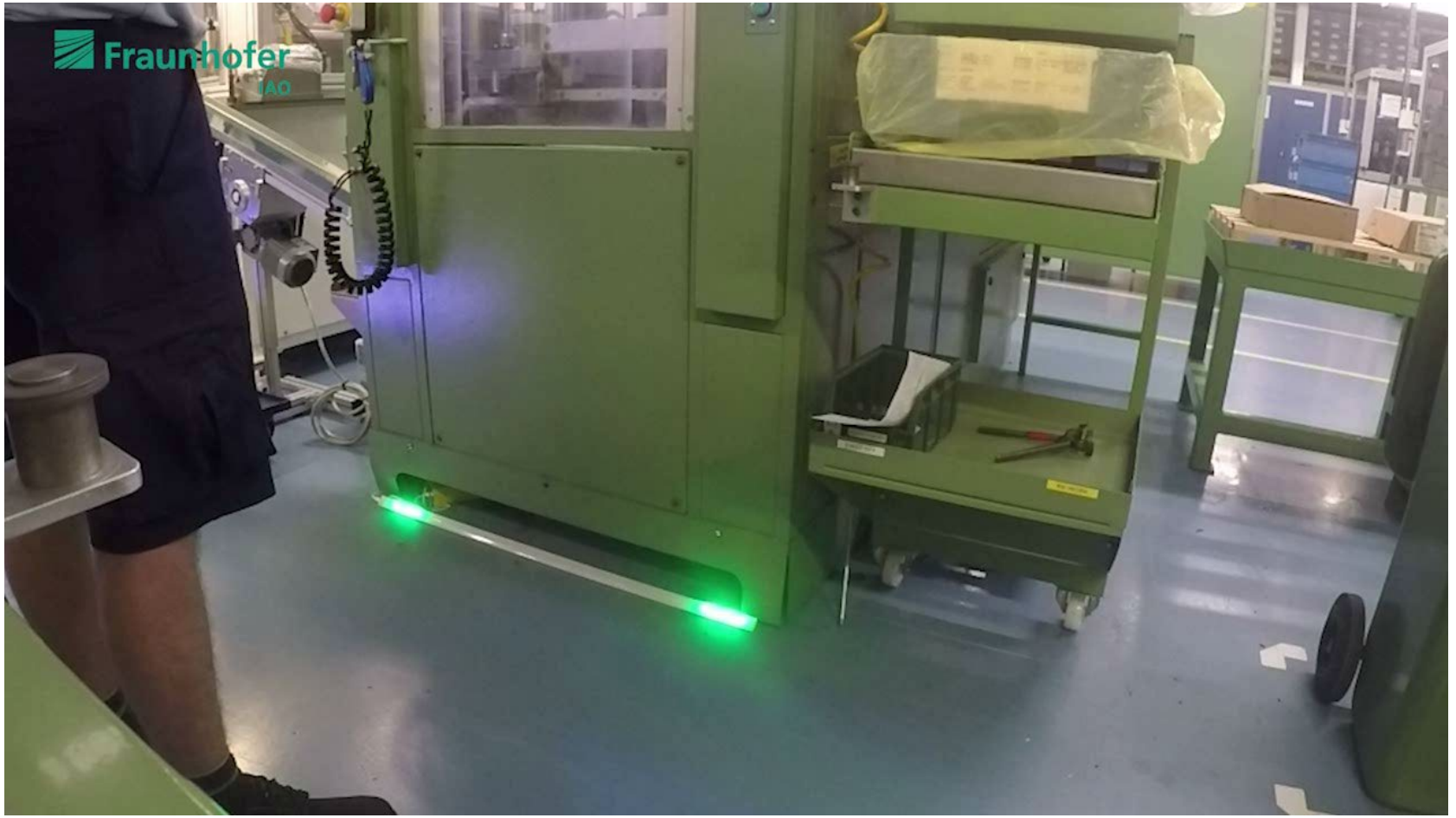
AI and Interaction design

Data for error handling: Active Worker Assist



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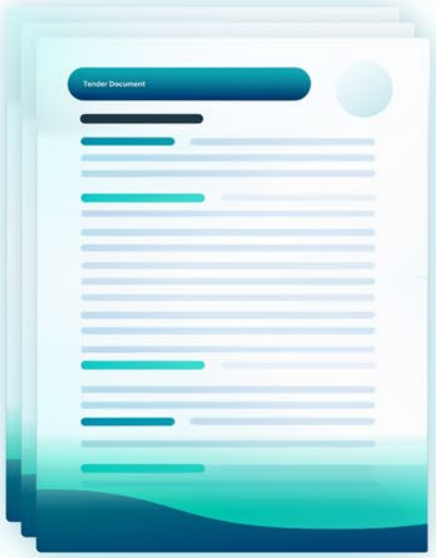
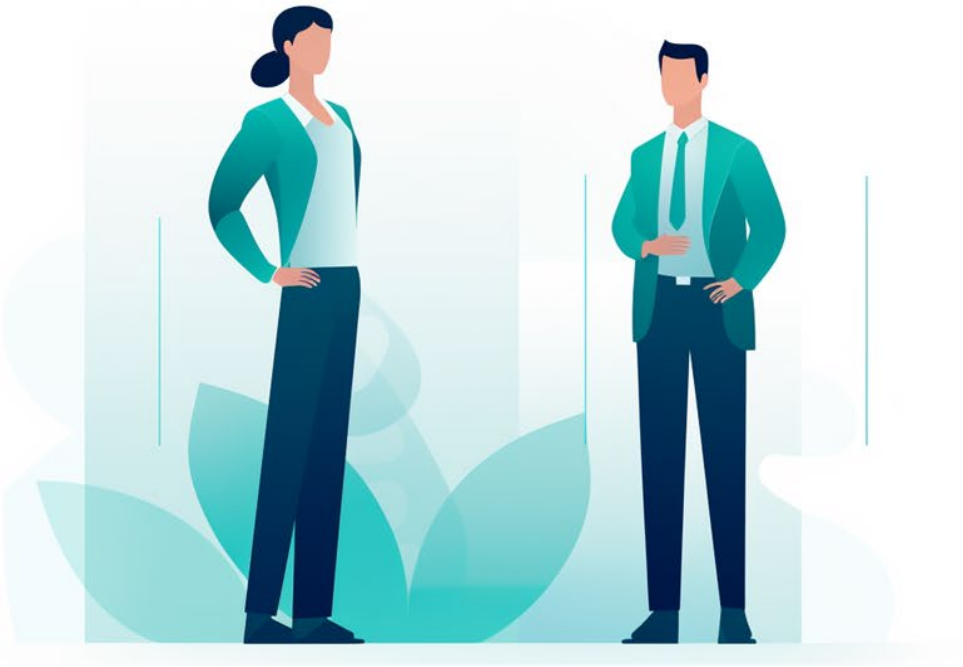
AI and Interaction design

Customer Request Handling: LLM and Semantic Search

Data



User



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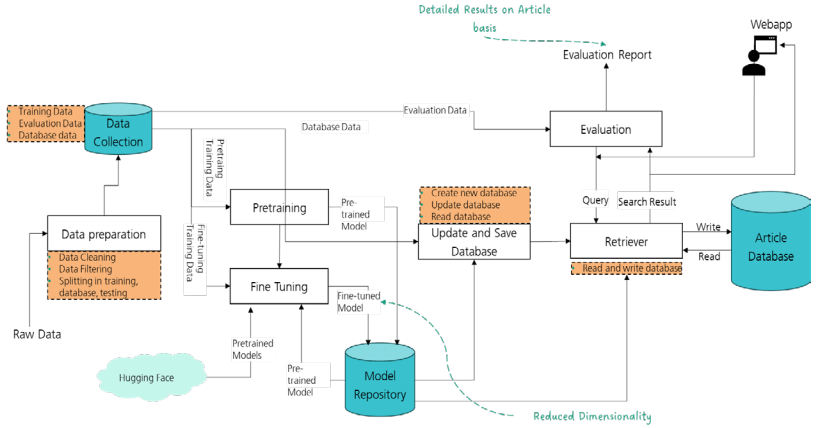
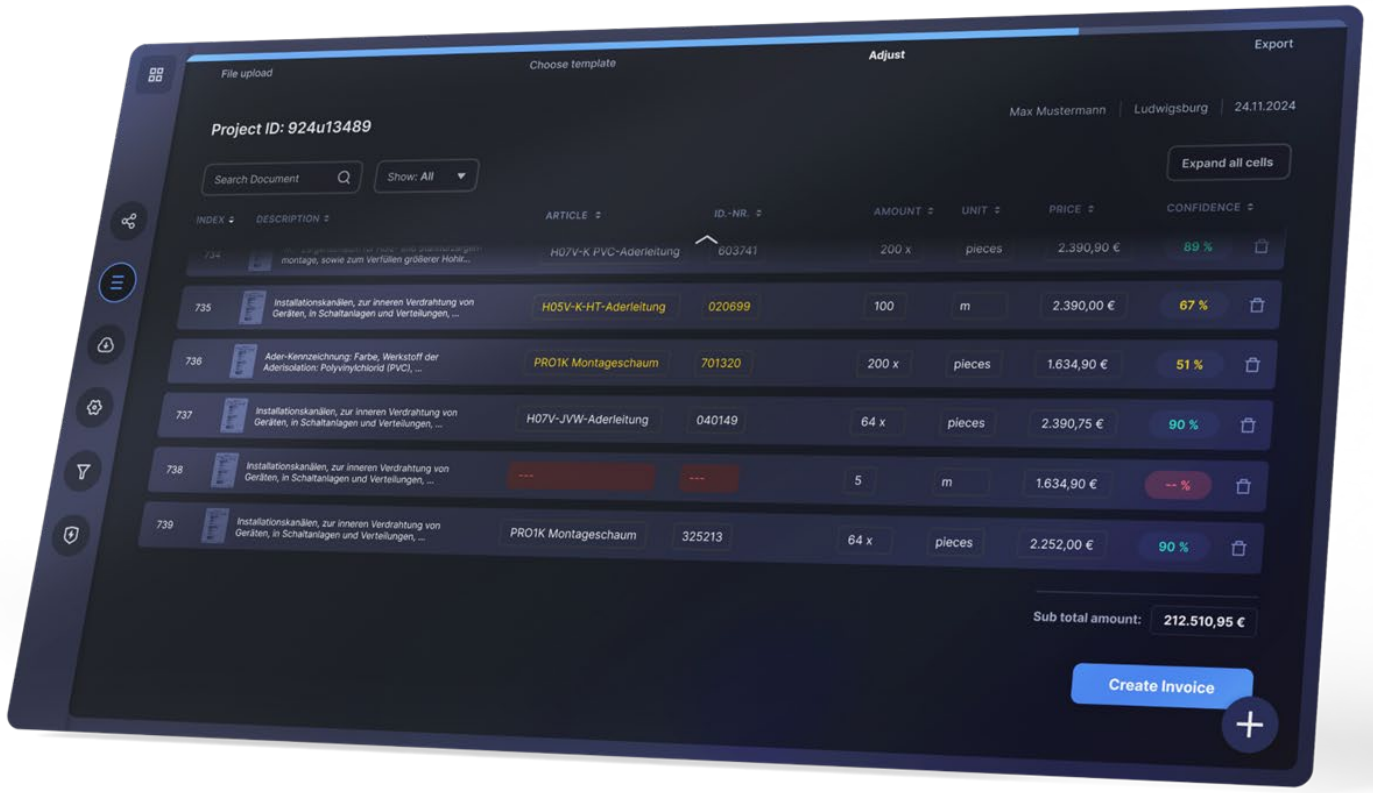
Customer Request Handling: Automation of tender requests

- Identifying relevant products (>70.000) from a large corpus of tender documents.
- A semantic search retrieval system that leverages a language model to automatically match products with descriptions in tender documents
- We built and delivered a data pipeline that includes data processing, domain knowledge transfer to language model (i.e., fine-tuning)





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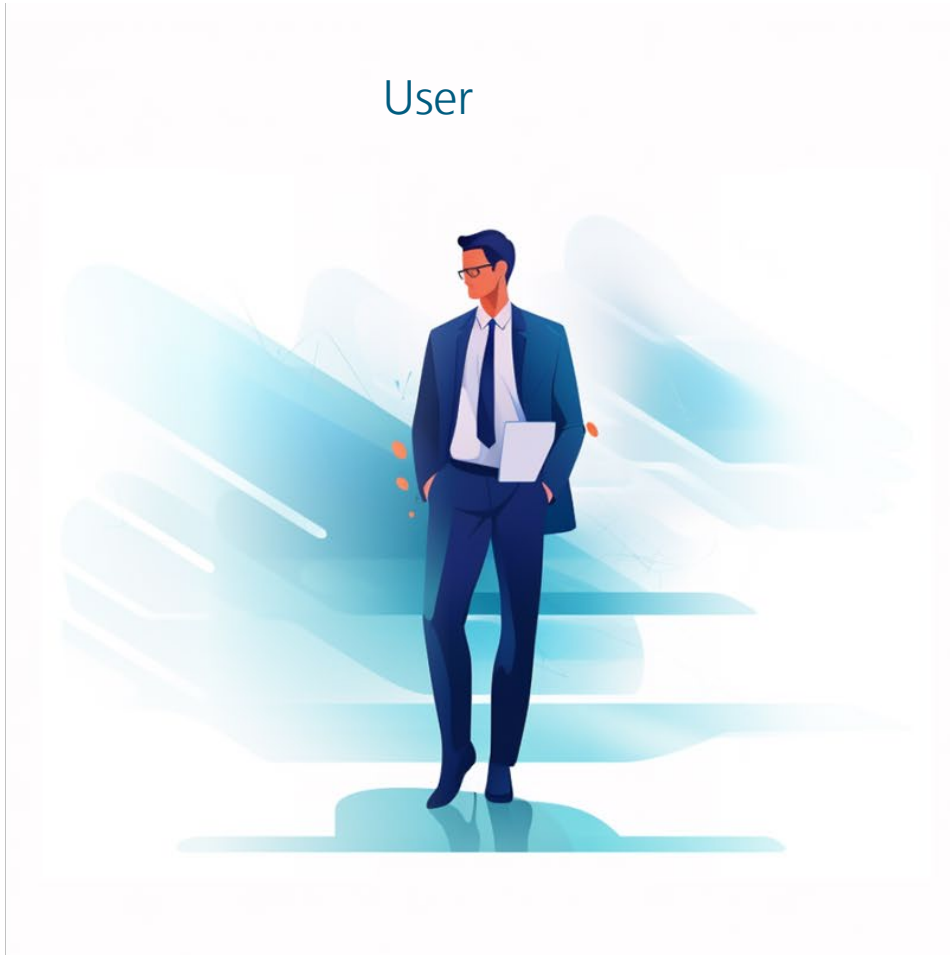
Data for decision-making: understanding through visualization

Data

User



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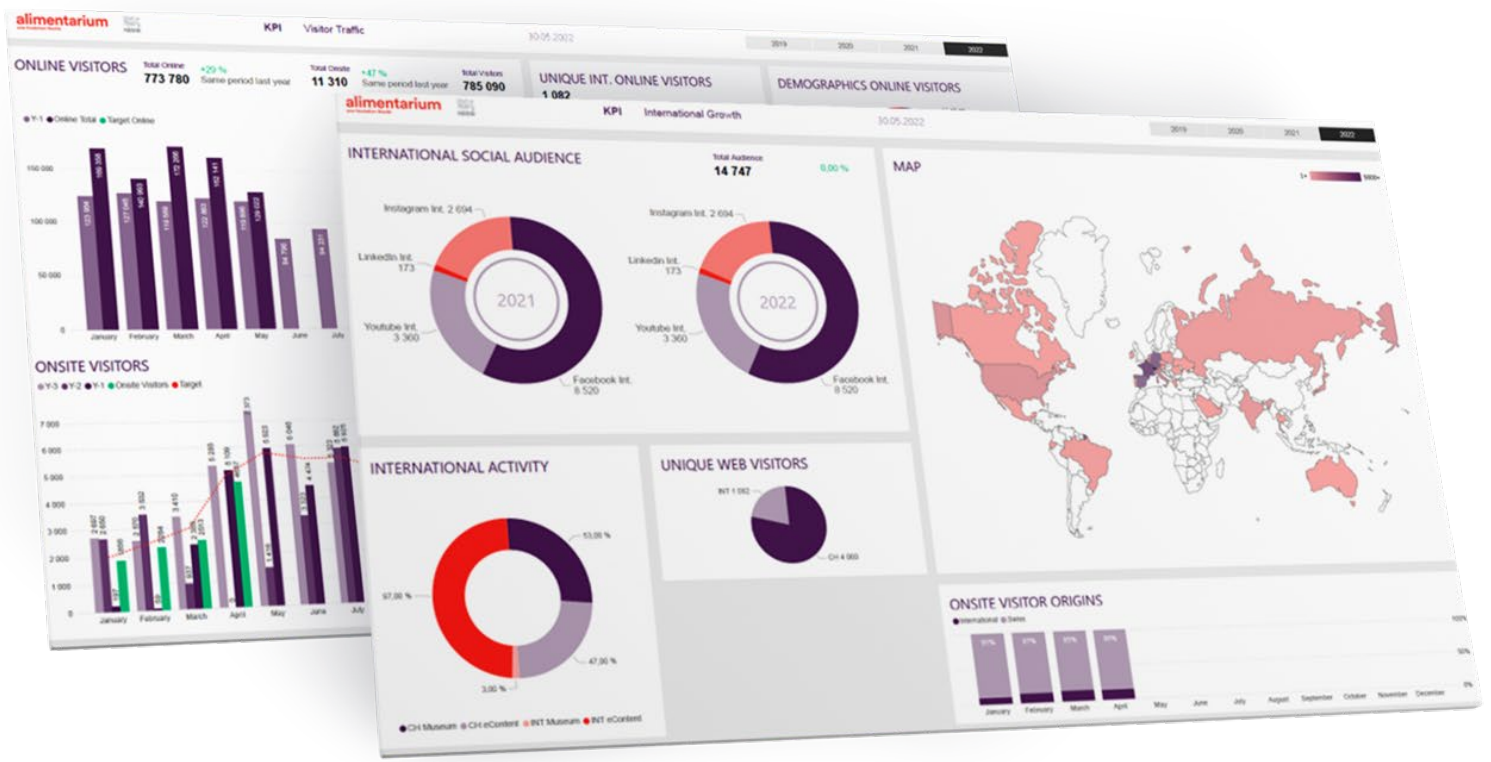
AI and Interaction design

Data for decision-making: KPI-Dashboard and reporting

- UX Workshop with Museum Team
- Multi-criteria data collection
- Data structuring
- Dashboard Design
- Visualization methods with PowerBI



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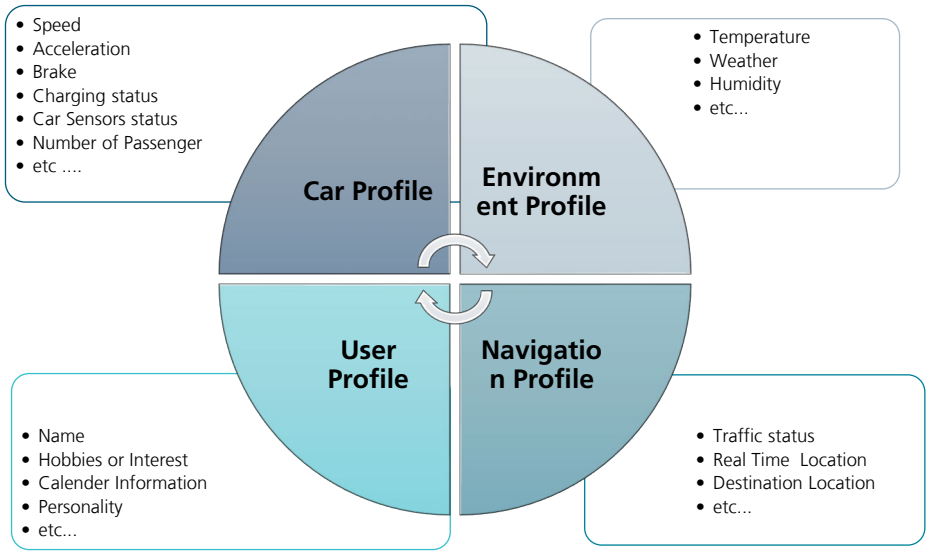
AI and Interaction design

AI recommendations: Proactive and personalized interaction

Data



User

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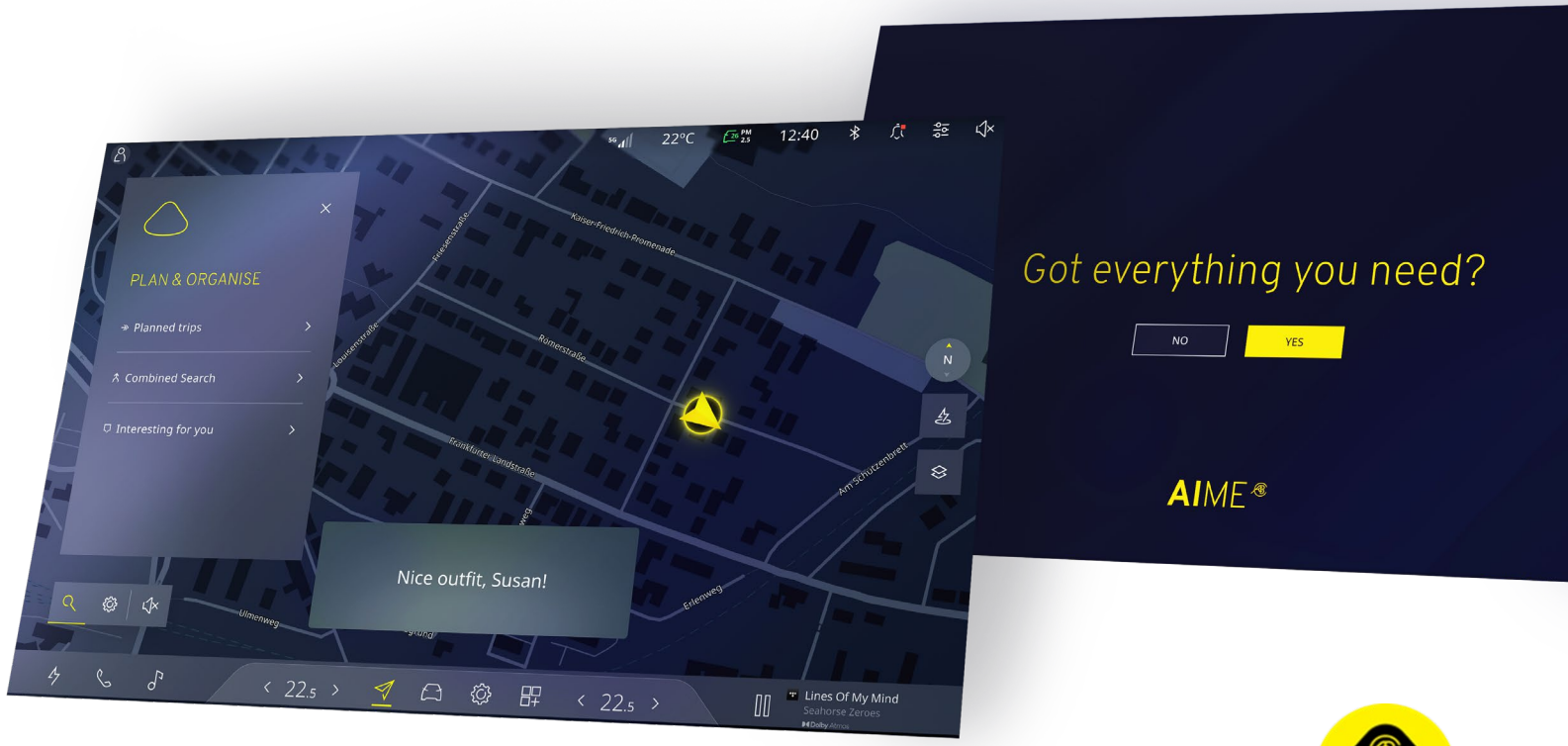
AI and Interaction design

AI recommendations: Enhancing HMI interaction in future cars

- Knowledge graphs
- Information Extraction
- Named Entity Recognition
- Ranking Model
- Single Layer Perceptron
- Interactive Learning
- Image Processing / CNN
- Generative AI / GAN
- User-Based Filtering

- User themes
- Ideation workshop
- Focus group
- Formative User test
- Summative User Test



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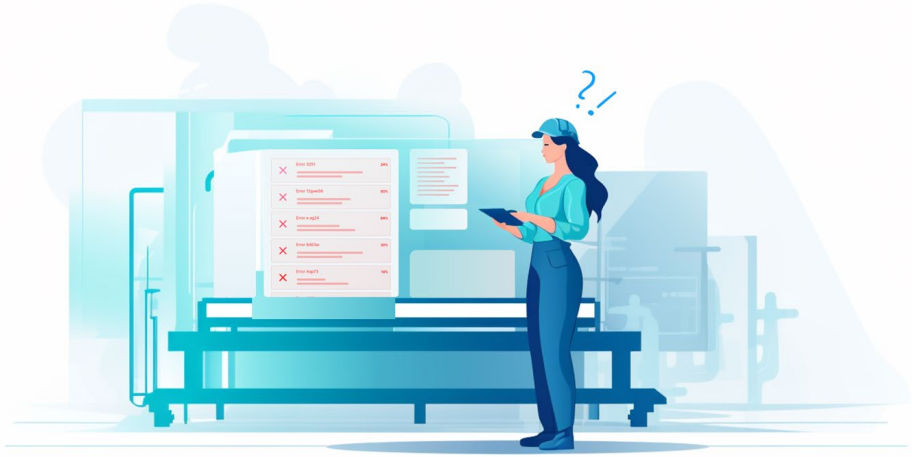
Data Analytics and Design

Learnings and Guidlines

Right data to the right person, at the right time and format...

- **User Identification:** Who comprises the user base?
- **Data Preferences:** What specific data and insights are users seeking?
- **Frequency and Timeliness:** How often should each set of data and insights be delivered to meet user needs?
- **Format and Interface Requirements:** Which formats and interfaces best cater to user requirements?
- **Essential vs. Desirable Requirements**: What are the indispensable versus preferable requirements for users?
- **Minimum Standards:** What are the baseline requirements concerning data quality, model accuracy, etc.?
- **User Familiarity:** Which tools and platforms are the end users already acquainted with? will users need upskilling to adapt to new tools/platforms?



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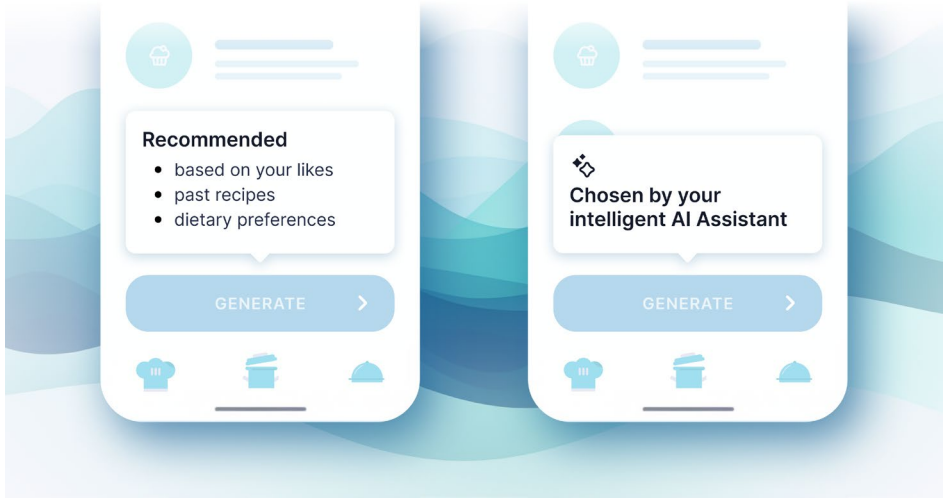
Data Analytics and Design

Learnings and Guidlines

Provide visibility and context to foster trust…

- Clearly present the current filters applied when displaying filtered data in an application.
- Display the timestamp of the last data refresh for datasets.
- Showcase the key factors or features influencing a particular forecast or prediction.
- Integrate tooltips to explain the definition of metrics.
- The option for users to provide feedback (explicit/implicit).



"The design and development team possesses a comprehensive understanding of end user personas, encompassing their needs, motivations, challenges, and the contextual requirements for the application"

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Intersections of Data Analytics and Interaction Design

It is Bidirectional…

Interaction Design -> Data Analytics

Making sense of ‘Big’ data analytics, visualization, intuitive access to end users, feasibility evaluation of data analytics algorithm

Data Analytics -> Interaction Design

Computational modeling of users, Data informed design, understanding traffic, A/B testing, large scale quantitative studies

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Interaction Design and Technologies

The Team behind

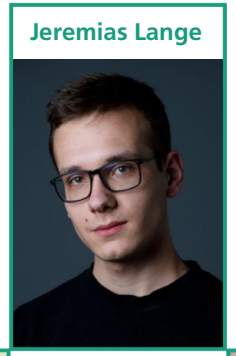
SET OF METHOLOGY

Data Analytics / ML | Visualization | Design | User Experience


Andreas Schuller


Chandan Kumar


Janina Bierkandt


Jeremias Lange


Daniela Nedic


Bhupender Saini


Christian Knecht


Eileen Wemmer


David Blank


Elisabeth Büllesfeld

AREAS OF APPLICATION

Manufacturing | Automotive | Customer Experience | Life Sciences

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