From Simple Question-Answering Systems to "Intelligent" Chatbots:
A Conceptual Framework for Using Computational Intelligence and Analogical Reasoning to Smartify Web-based Dialogue Systems

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Customers are more and more using the Internet to search for relevant information and seeking less personal advice. For this reason, various organizations are examining whether and to what extent the use of dialogue systems can be useful in certain contexts. Information and communication technologies are considered to be a potential means to develop new strategies for customer loyalty, cost savings and increases in efficiency and to digitalize the previous analogue processes or to optimize existing digitalized ones.

Following a design science research approach, the first section focuses on a simple question-answering system called Honolulu Answers, developed by Code for America for the city of Honolulu, Hawaii. This system is examined from both a business and an IT perspective using a rebuilt software prototype. The hands-on example helps to identify what kind of added value this system can provide within a city context.

Afterwards, following a transdisciplinary approach with a focus on ethnographic research, this thesis focuses on the development and implementation of text-based chatbots for the IT user help desk of Swiss Post. In a corporate context, the usefulness of the implementation of a chatbot can be derived from the use case. From a technical point of view, it depends on the required *intelligence* level, in terms of how human-like the chatbot should act, which resources, skills and know-how are needed.

Finally, based on one of the weaknesses that simple question-answering systems and chatbots have in common, the thesis addresses the challenge of processing *unknown* data elements. This section introduces a conceptual framework founded on fuzzy logic and analogical reasoning. Since it has been proposed that dialogue systems use fuzzy approaches to understand and extract information from natural language, the processing of vague information should also be considered when developing the ability to create analogies. The findings of the qualitative evaluation have particularly shown that the theoretical foundations of *fuzzy analogical reasoning* cover an essential part of human information processing.

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