**Exposé**

for the Bachelor´s thesis

**Implementation of Virtual Agent Systems (Chatbots) as a**

**Complement of Customer Service Staff in Service-Based SMEs**

**A study at the Hokona GmbH**

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1. **Introduction**

The technological advances of civilizations have contributed to the evolution of human communication. With the inventions of the XIX and XX centuries (1) in matter of communications, people were able to deliver and receive messages beyond physical borders. The printing press presented unidirectional communication with the receiver, the telegraph offered asynchronous bidirectional connection, the radio broadcasted with unidirectional multiple transmission and the telephone provided simultaneous bidirectional communication. Later, in the XXI century, the invention and globalization of the Internet the communications were widely expanded by the enhanced connectivity between services and users.

Companies have benefited greatly from the possibility of establishing direct contact with their customers, allowing them to increase their services portfolio and improve customer service. However, the access to these extended communication channels also represents an increment in the administrative and operating costs of the business, in order to guarantee the quality of the service. In addition, the 24/7 service availability affects employees who work at night and on weekends, sacrificing their personal and family activities.

In recent years, thanks to the Internet and with help of Artificial Intelligence (AI), a system has emerged to meet the increasing needs of quality and availability in customer service, the Virtual Agent - Chatbot, which offers a complement to traditional customer service staff in service-based companies, benefiting both the company and their employees.

1. **State of research**

The human-computer interaction is not a new topic; back in 1966, ELIZA(2) was introduced as a computer program aimed to simulate the natural language communication between people and machines. Nowadays a variety of systems powered by Internet and Artificial Intelligence offer the possibility to communicate with devices and even control them. Around the market, several digital assistants can be found like Cortana for Microsoft, Google Assistant and Amazon Alexa, they act as a bridge between other devices that may be connected in a network in terms of Internet of Things, and may even look for information outside the network, according with the instructions of the user.

The Virtual Agent Systems offers preprogrammed software programs that can be configured according to customer needs, which means that the company does not have to start with software development from scratch, but can adapt the system according to their needs. The Chatbot solution serves as the basis of the system which reduces development times and costs; in addition, this program is developed so that the robot learns as it is being used, facilitating user interaction with the system and providing accurate information to the customer (3). It can also identify the intention of the communication to narrow the topics that are being searched and also the emotion of the person it is communicating to, by means of trigger words that can express if a person is angry or happy, so that the agent can have a proper response and if needed, redirect the conversation to a service employee.

The implementation of such system in a company requires investments beyond economical resources, since it also encounters social and technological challenges. The idea of artificial intelligence tends to disturb the employees who fear being replaced by robots. However, although some jobs will be lost, others will be created, and others will change, like bot designer, bot supervisor, pacifier of the angriest clients. The market is evolving, and so can the employees evolve too, non-technical personnel would be trained to ensure the quality of the service provided by the virtual agents. This situation can be observed in the investigation (3) realized by Facebook M and calendar.help where a process that includes big tasks can be divided in several small tasks to be performed by another systems and personal individually. In the case of customer service, a big task like the promotion of a new service can be assigned to virtual agents that will contact all the customers of the company and can give more information in case they have additional questions, and in case the costumer wants to acquire the service, it will redirect the conversation to a service employee to finish the marketing process. At the end some job positions will be removed and changed, and people may lose their jobs, but the quality of life of the people working in customer service will improve, and employees can see these changes like an opportunity to get trained in other fields and improve their careers. As stated in recent analyses (4), managers see the usage of artificial intelligence as a way to interact between systems and people to increase the productivity of their companies.

A recent study (5) conducted to a mixed group of participants sixteen participants with university degree in Canada, in which they were required to test two Chatbot systems to get advice in the purchase of a product, encountered that for some users the utilization of chatbots was challenging and in some cases inaccurate and not user friendly. In complex questions the tested virtual agent was unable to understand properly the intent of the user. The customer experience was also relevant in the tests and how the participants felt about, one participant for example, mentioned that the conversation with one of the systems felt like taking an exam and with the other system the interaction was a good experience.

1. **Problem Statement**

Hokona GmbH is a sister company of Be1Eye GmbH based in Hamburg, which implements and develops solutions for SAP Business One, and supports customers with their own software developments and SAP products.

In certain support cases, which represent recurring situations, the causes and solutions can be summarized and summarized in a database with solutions (knowledge database) that the client accesses and can probably find a solution before a support case is reported.

In this case, there is no interaction with a support representative or consultant and it is possible that the user, when looking for the answer to the problem, cannot determine exactly how to search the solution database; which is why implementing a virtual agent in the form of a chat bot is an option that guides the user in the search and leads him to an effective response that is available even when the support staff is not working during working hours, e.g. B. at night or on weekends.

The service staff of the company is composed of four employees who also perform consulting tasks, who sometimes are not completely available to perform the customer support cases and the response time of the support tickets can be longer than expected. In addition, such a workload has been affecting the life of the employees which could derive to health problems such as stress or burn out.

There is already a basic knowledge common where errors/problems and their solutions have been collected. It will be completed and maintained by the Hokona GmbH. and will be provided for this project.

The development of this chat bot software solution is shown using SAP Conversational Artificial Intelligence, the platform allows the development of chatbots in different languages, sentiment and intention recognition, and integration with SAP and non-SAP. The platform also offers analytics, so the acceptance can be measured and interpreted by the chatbot.

Hokona uses JIRA as a ticket system, the chatbot should recognize the intention and sentiment of the user, look for information in the knowledge database and if the question has not been answered or the problem has not been solved, it should decide whether it creates a ticket or a support employee to be contacted.

The company will provide the necessary resources for the development and internal implementation of this project.

The acceptance of the Chatbot will be then messed by evaluating the experience of the service support employees, in order to determinate if the implementation will improve the quality of the customer service process and reduce the workload of the customer service staff.

**References**

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