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Metody zwiększenia skuteczności wirtualnych konsultantów poprzez minimalizację niepoprawnie rozpoznawanych intencji z wypowiedzi klientów

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Abstract

The subject of this dissertation focuses on methods that can improve the effectiveness of virtual consultants that are used within Contact Centres (CC) for their hotlines. These systems are dedicated pieces of software used to handle contacts with customers. With the constant development of science and technology, virtual consultants are becoming more popular within organisations. Artificial intelligence methods have been a contributor towards the popularity. Virtual Consultant solutions are implemented in the form of voicebots and chatbots.

Voicebots use ASR (Automatic Speech Recognition) to transcribe the customers speech. The effectiveness of voicebots relies on a high-quality ASR system. In the Contact Center, due to the low quality of sound signals, achieving satisfactory transcription parameters is a relatively difficult task, especially for less popular languages, including Polish.

For both voicebots and chatbots, NLU (Natural Language Understanding) platforms are an important element. These platforms are highly effective in recognizing the intentions from customer statements, but only when the actual intention is consistent with the semantics of the statement. The linguistic analysis of real telephone conversations and text conversations from the Contact Center hotline showed that the emotions occurring in the statement also have a significant impact on recognizing the real intentions of the interlocutor.

The aim of this research was to develop methods that will help improve the effectiveness of virtual consultants. To improve effectiveness of virtual consultants we must minimize the incorrectly recognized intentions from the customer statements.

Within this study methods have been developed which improve the quality of automatic transcription and recognize hidden intentions, considering the emotions contained in the customer statements. The method of improving the quality of automatic transcription minimizes the number of incorrectly recognized phrases by preprocessing and postprocessing ASR data. While the method of recognizing hidden intentions minimizes the number of incorrect actions performed by the bot for recognized intentions by applying inference rules based on emotions recognized in customer statements.

Experiments using the developed methods have been carried out on real voice and text conversations from the Polish-language Contact Centre. These experiments have confirmed that the proposed methods developed have a high effectiveness. Based on standard ASR and NLU methods, a virtual consultant system has also been developed. This system contains built-in methods which will help to improve the quality of automatic transcription and recognize hidden intentions. Using the developed methods tests have show an improvement in the effectiveness of virtual consultants in the Contact Centre using the polish language.

Keywords: Call Center, Contact Center, voicebot, chatbot, emotion recognition, intention recognition, ASR systems