Methods of Recovering Punctuation Mark in the Text in Speech Recognition System and its Specific Aspects

Jumayeva Dilnoza Bakhshulloyevna

Navoi State University Faculty of Pre-School and Primary Education Major of Primary Education dotsent v.b f.f.f.d(PhD)

Abstract. *This article provides general information about the methods of restoring punctuation marks in the text and its specific aspects in the speech recognition system, and their features are revealed. The issue of punctuation recovery has been analyzed by NLP, a common method for Automatic Speech Recognition (ASR) systems.*

Key words: *language models, punctuation, formal and informal text, spoken language, automatic speech recognition, natural language processing, ASR, punctuation functions.*

INTRODUCTION. Today, sentences generated by language models do not contain punctuation marks. Therefore, in various natural languages, punctuation marks are a set of symbols that determine the structure of a sentence and express, interpret or express an emotion. Punctuation is important in writing to make each sentence or section easier to read and understand. Punctuation marks are used incorrectly in many formal and informal texts. Text sequences resulting from automatic speech recognition (ASR) systems typically do not contain punctuation marks. Therefore, it is very important to choose the appropriate punctuation marks for the transcribed text in order to understand the text correctly. Punctuation prediction is a pressing problem in many natural languages. Some studies treat this issue as a sequencing task. In recent years, this problem has been solved using neural networks. High-precision models are being developed and implemented based on different approaches for punctuation prediction in different natural languages (English, Chinese, Arabic, and Italian).

Punctuation recovery is a common NLP problem for Automatic Speech Recognition (ASR) systems. Automatic speech recognition is a programming technology that allows computers to recognize and transcribe human speech. ASR systems are essential tools for NLP applications such as voice assistants, call center automation, and natural language translation. Today, with the rapid growth of digital content, ASR has become an essential component of many applications and services.

LITERATURE ANALYSIS AND METHOD. Today, the accuracy and quality of digital written communication is very important. Participating in informal chats or preparing professional documents, communicating effectively relies on the accuracy of our language. While traditional spelling and grammar checks are valuable tools for detecting errors, they often require more than understanding context. This limitation has given way to more advanced solutions using Natural Language Processing (NLP) tools. In this paragraph, we will look at the development of a modern spelling and grammar checker using NLP tools. It should be noted that the proposed solution is superior to traditional rule-based systems and provides a more convenient user experience in the age of digital communication.

The ever-increasing importance of digital communication has placed great importance on the clarity and precision of the written text. From online chats to professional correspondence, our ability to

express ourselves effectively depends on the accuracy of our natural language. Traditional spelling and grammar checking methods have long been valuable tools for error detection and correction, but their limitations in contextual understanding and adaptation have not yet been addressed. This has prompted the development of more advanced NLP solutions that offer a broader approach to natural language tasks.

DISCUSSION. Natural language processing is an interdisciplinary field that combines expertise in linguistics, computer science, and artificial intelligence to enable computers to process and understand human language. Using NLP tools, our spelling and grammar checker provides users with the ability to identify and correct more specific and context-sensitive errors. NLP-based proofreading applications detect spelling and grammar errors in text and analyze context, syntax, and semantics to provide more accurate corrections and suggestions.

In the last few years, voice assistants (Voice Assistants, VA) such as Google Home, Amazon Echo, Siri and Cortana have been widely used. The basis of these applications is the automatic speech recognition (ASR) NLP task. In the NLP applications mentioned above, information in text format is formed from data in audio format. Therefore, this type of algorithms are also called Speech-to-Text algorithms. NLP applications such as Google Home and Siri not only recognize text from audio, but also interpret and understand the semantic meaning of the spoken word, analyze it, and respond. Therefore, they can answer questions or perform actions based on user commands.

RESULT. Human speech is fundamental to our daily personal and work lives, and speech-to-text has many applications. These types of NLP applications can be used to transcribe the content of customer support or sales calls, for voice chatbots, or to record the content of meetings and other discussions.

Audio data consists of sounds and noises. Human speech is a unique situation. For audio data processing, they are digitized and converted into spectrograms. However, spoken language is more complex because it encodes natural language. Problems such as audio data classification start with an audio clip and predict which class this audio belongs to from a given set of classes.

Summary.Speech transcripts generated by Automatic Speech Recognition (ASR) systems usually do not contain punctuation marks or capital letters. Due to the absence of punctuation in the fragments of the automatically recognized speech, it affects the process of understanding the text. The main goal of Natural Language Processing (NLP) punctuation restoration (PR) and capitalization restoration (CR) is to improve the readability of texts without punctuation marks created by ASR.

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