Volume 2, Issue 10, October 2024 **ISSN (E):** 2938-3757

IDENTIFY UZBEK GESTURES USING ARTIFICIAL INTELLIGENCE

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Abstract
The article discusses Uzbek gesture recognition using artificial intelligence (AI) technology. It is aimed at analyzing existing methods in AI and developing effective solutions to improve communication among hearing-impaired people.

Keywords: Artificial Intelligence, Uzbek Sign Language, Machine Learning, Convolutional Neural Networks, RNN, LSTM.

SUN'IY INTELLEKT YORDAMIDA O'ZBEK IMO-ISHORALARNI ANIQLASH

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Annotasiya
Maqolada sun'iy intellekt (SI) texnologiyasi yordamida O'zbek imo-ishoralarni aniqlash ko'rib chiqiladi. Eshitish qobiliyatini yo'qotgan odamlar o'rtasida muloqotni yaxshilash uchun SI da mavjud usullarni tahlil qilish va samarali yechimlarni ishlab chiqishga qaratilgan.

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Kalit so‘zlar: Sun’iy intellekt, O‘zbek imo ishora tili, Mashina yordamida o‘qitish, Convolutional Neural Networks, RNN**,** LSTM.

ОПРЕДЕЛЕНИЕ УЗБЕКСКИХ ЖЕСТОВ С ИСПОЛЬЗОВАНИЕМ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА

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Аннотация
В статье рассматривается распознавание жестов узбеков с помощью технологии искусственного интеллекта (ИИ). Целью SI является анализ существующих методов и разработка эффективных решений для улучшения общения среди людей с потерей слуха.

Ключевые слова: Искусственный интеллект, узбекский язык жестов, Машинное обучение, Сверточные нейронные сети, RNN, LSTM.

Introduction

According to the World Health Organization, more than 5% of the world's population, or 430 million people (including 34 million children), need rehabilitation to overcome problems related to hearing loss. According to estimates, by 2050 their number may exceed 700 million, which is 10% of the population. Also, in Uzbekistan, sign language is the main means of communication, and there is a large number of hearing impaired people. However, the lack of effective gesture recognition technologies makes it difficult for them to interact with the outside world. With the development of computer technology in the world, new opportunities are opening up to help disabled people. Sign language is the most important means of communication for the hearing impaired. In Uzbekistan, as in other countries, the need to improve the interaction of hearing-impaired people with other members of society is becoming more and more urgent. Despite current efforts, including the development of mobile applications and sign translation technologies, there are still no effective solutions for the automatic recognition of signs in USL.

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Sign language recognition problems

Uzbek gestures, like other gestures, have a number of specific features. For example, there are regional differences that make it difficult to create a universal recognition system. Another important factor is the lack of high-quality data for training machine learning models. Gestures in OIIT can differ in details such as hand movements, which makes the task of automatically recognizing them difficult.

Gesture detection methods

The most suitable method for the task of gesture recognition is the method of Convolutional Neural Networks, which allows you to effectively train gesture recognition models on big data sets in the analysis of visual data.

Several approaches based on artificial intelligence (AI) and machine learning (ML) are used for gesture recognition. Among the main methods are computer vision (CV) and deep learning.

CNN algorithms

(Convolutional Neural Networks, CNN) is a popular method of image and video processing. CNN extracts key features from images and helps in gesture recognition.

Algorithms for identifying contours and key points - to recognize the contours of the movements of hands and fingers. These algorithms can analyze hand position and changing shape to classify gestures.

Advantages:

• Ability to work with traditional cameras without sophisticated sensors.
• Real-time high definition software.

Disadvantages:

• Dependence on lighting conditions.
• Camera quality and computing resource requirements.
• Possible problems when gestures overlap with other objects in the image.

Deep learning

Deep learning, especially recurrent neural networks (RNN) and long short-term memory (LSTM), are often used to analyze video sequences. These models can "remember" a sequence of actions and, based on the analysis of frames in a video stream, tell you what gestures a person makes.

Recurrent Neural Networks (RNN) and LSTM - to work with time series and analyze movements over time.

Advantages:

• Ability to process a complex sequence of actions.
• High accuracy when training large volumes of data.
• Can be used for complex applications such as virtual reality and medical diagnostics.

Disadvantages:

• Training requires a lot of computing power.
• Dependence on the volume and quality of educational information.
• There may be problems with processing large video streams in real time.

Gesture recognition software in Uzbekistan

Currently, there are several technologies in Uzbekistan aimed at helping people with hearing impairment, one of them is sign language interpretation, this technology is used to communicate with people who have lost their hearing by providing interactive services online. However, there are currently no programs for automatic recognition of Uzbek gestures.

Conclusion

In Uzbekistan, it is necessary to develop software solutions that take into account the characteristics of the Uzbek sign language and use the latest achievements in the field of artificial intelligence and machine learning to improve communication with people with hearing impairment. Such software can significantly improve the way of life of these people, as well as contribute to the development of an inclusive society.

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