

## **ROBOTS WITH MULTILINGUAL INTERACTION SKILLS**

The aim of this study is to investigate the learning robots process and the artificial intelligence technologies use with multilingual skills on the example of such assistants as Siri, Amazon Alexa, and humanoid robots Sophia and Ameca.

Today English is the international language of communication, the language that unites the population of the entire planet, and almost all software is implemented in it.

Very few countries have the sufficient development English level and the English language use by the local population. We see the insufficient education financing and the reluctance of some people to leave their comfort zone in order to master the English language perfectly. All these facts affect the effectiveness of the information technologies full use that lead to the other languages use for a more rational understanding of the information technology industry.

The need to localize artificial intelligence should not be underestimated. Localization, that is, the use of different languages according to the region, makes it possible to better understand the program and work with it [0].

Robotics is entering people's everyday life more and more. Even Apple smartphones, tablets, smartwatches, and computers have built-in Siri - a cloud-based personal assistant and question-answer system. This app uses natural speech processing to answer questions and make recommendations. Siri adapts to each user individually, learning their preferences over time. Due to the fact that Apple realizes the need to make it easier for more users from different countries to use the software in their native language, Siri supports 31 languages that allows the product use to a wider audience [0].

Over the last decade, automated mechanisms have become better at recognizing new tasks and foreign languages which is an important component of artificial intelligence. Automated mechanisms or, as they are often called, robots have been developed for better orientation in their environment.

It is worth noting that robots have a much lower ability to learn than humans. After all, people are more flexible, learn with the help of fewer examples and are able to perform a large number of tasks. Computers can learn to distinguish between speech, objects, and faces through automated technology systems [0].

There's no doubt that natural language processing is quite a complex process for machines, although computers are very good at going from A to B and doing operations on numbers [0].

Learning a foreign language by robots is the task of syntactic and semantic analyzers in computer technology. These systems are based on human-annotated sentences that define the structure and meaning of words. But the selection of materials can be time-consuming and difficult for less common languages [0].

Machine learning develops algorithms that recognize statistical patterns. Each word is assigned a number and we look for consistent patterns in those numbers. If the models are designed flexibly enough, they can derive patterns that are consistently displayed in the examples that have been demonstrated. In the case of language

mapping, the model, we are trying to define, appears as a distribution of word probabilities according to a certain regularity. Once we know how likely a word or sentence is, we can randomly generate new samples that fit the same distribution. If done properly, it will make us sound like the person who creates the original examples [0].

Speaking of language, memory is important. Not only to know the vocabulary, but also to remember what the last few words were read. It helps to understand the meaning of the word that is currently being read. A special type of recurrent neurons in the network known as long short-term memory (LSTM) cells is used. These neurons are designed not only to look and try to "understand" the word, but also to update the state of the algorithm, which acts as a memory of past events [0].

After setting up the neural network, it reads each word and for each word it tries to predict the next one. For example, the models will give "The Failing New York Times". He reads "The" and offers to predict "Failing". He then sees "The Failing" and asks to predict "New". Then he sees "The Failing New" and has to predict "York". This continues for each sentence. Once the neural network is trained to do this, all that needs to be done next is to start a sentence to process and ask the network to finish it. If you want a neural network to come up with something on its own, don't give it input, but ask it to fill in the blanks. Models are theoretically capable of literally anything, given enough computing resources and data [0].

The use of artificial intelligence and humanoid robots can be demonstrated by the example of Amazon Alexa, Sophia and Ameca.

Alexa is Amazon's most affordable and popular voice assistant. Alexa is widely used in household tasks, namely, it can perform a number of preset functions, such as: setting timers, sharing the current weather, creating lists, accessing Wikipedia articles, and much more. Alexa listens to the command and performs the corresponding function or skill. When a user asks a question, Alexa converts sound waves into text, allowing it to gather information from a variety of sources [0].

Another well-known robot with multilingual interaction skills is Sophia which was first activated on February 14, 2016. This robot is known for its human-like appearance and behavior compared to previous versions of the robots. Sophia's architecture includes scripting software, a chat system, and OpenCog, an artificial intelligence system designed for general thinking. Sophia is able to answer certain questions and carry on simple conversations about predetermined topics (such as the weather) [0].

Sophia can speak 38 foreign languages. Many people like the social humanoid robot Sophia that is able to imitate human facial expressions and gestures [0]. In practical applications, the Sophia robot is used to provide services in healthcare, customer service, therapy and education. Sophia is used for elderly people in nursing homes. She also helps crowds at large events or parks by interacting with other people enough to gain social skills [0].

Ameca is a famous robot with a humanoid form. At the time of its creation in 2021, this machine was considered the most advanced robot in terms of human imitation. The robot has a humanoid form, the appearance is not copied from anyone and remains neutral, even with gray skin.

Ameca robot is controlled by the Tritium system developed by Engineered Arts. This system has high modularity and learning ability, which makes it easy to learn new

possibilities [0]. Also Engineered Arts suggest that Ameca can be used to develop and test artificial intelligence and machine learning systems. Tritium's proprietary operating system is designed for remote control, allowing you to communicate with the audience with the help of the robot [0].

In conclusion, we can say that localization of languages for robots, machines and software in general is extremely important, because it can help companies to reach a wider audience, improve user interaction and increase the use of developed technologies.

Prospective developments of robots with multilingual interaction skills will in the near future gain great importance in various areas of human activity with the possibility of further expansion.

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