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Oleh MATIUSHCHENKO
National Technical University «Kharkiv Polytechnic Institute»
ORCID iD: 0000-0003-3596-5737
e-mail: oleh.matiushchenko@cit.khpi.edu.ua
Ganna ZAVOLODKO
National Technical University «Kharkiv Polytechnic Institute»
ORCID iD: 0000-0003-0000-8910
e-mail: Anna.Zavolodko@khpi.edu.ua

EXPERIENCE USING VOICE ASSISTANTS

Natural user interfaces are becoming popular. One of the most common today is interfaces with activated voice, including smart personal assistants such as Google Assistant, Alexa, Cortana, Siri, Alice, Bixby, Mycroft. This article presents the results of their evaluation in three dimensions: capabilities, language support, and how natural responses users experience. Evaluations were performed by analyzing existing reviews. The results show that Alexa and Google Assistant are much better than Siri and Cortana. However, there is no statistically significant difference between Alexa and Google Assistant, and neither of them integrates into modern messengers with a note-taking function, which is a significant disadvantage of such devices.

Keywords: *voice assistant, Google Assistant, Alexa, Cortana, Siri, Alice, Bixby, Mycroft*

Олег МАТЮЩЕНКО,
Ганна ЗАВОЛОДЬКО
Національний технічний університет «Харківський політехнічний інститут»

ДОСВІД ВИКОРИСТАННЯ ГОЛОСОВИХ ПОМІЧНИКІВ

Природні інтерфейси користувача стають популярними. Один із найпоширеніших сьогодні є інтерфейси з активованими голосом, зокрема розумними персональними помічниками, такими як Google Assistant, Alexa, Cortana, Siri, Alica, Bixby, Mycroft. У цій статті представлені результати їх оцінки в трьох вимірах: можливості, підтримка мов, і наскільки природні відповіді, які відчувають користувачі. Оцінювання проводили шляхом аналізу існуючих оглядів. Результати показують що Alexa і Google Assistant значно кращі, ніж Siri і Cortana. Проте немає статистично значущої різниці між Alexa та Google Assistant, та в жодного з них немає інтеграції в сучасні месенджери з функцією ведення нотаток, що є суттєвим недоліком таких пристроїв.

Ключові слова: *голосовий асистент, Google Assistant, Alexa, Cortana, Siri, Alica, Bixby, Mycroft*

Statement of the problem in general form and it's connection with important scientific or practical tasks

The use of voice assistants to obtain information in cell phones and PCs, and to organize activities in houses and offices is a rising trend that combines many other factors such as Artificial Intelligence, Data Management, and Security. New

approaches that once sounded far-fetched no longer do, such as the use of voice first, before text, and using the internet and commands to control our electronic devices. Existing review articles do not cover all seven voice assistants and do not compare according to the criteria highlighted by the authors, which was the reason for writing the article [9,11]

Analysis of the latest research and publications

Various aspects of airspace control system are covered in the works Brüggemeier Birgit, Isyanto Haris, Arifin Ajib Setyo, Lopatovska Irene, Gärtler Marco, Schmidt Benedikt, Hachman Mark

Highlighting the previously unresolved parts of the general problem introduction

Voice assistants are fast becoming a standard feature of many smart home devices and modern applications. From smart speakers and smartwatches to smart TVs and smart thermostats - these voices assist devices are used in almost every area of our lives.

Statement of the main material

1. Google Assistant.

Google Assistant- A virtual assistant based on artificial intelligence, developed by Google, available on mobile and smart home devices. Users mostly interact with Google Assistant using natural voice, although keyboard input is also supported. The assistant can search the web, schedule events, and alarms, configure hardware settings on a user's device, and view information from a Google user account. Google has also announced that the Assistant will be able to identify objects and collect visual information through the device's camera, as well as support the purchase of products and sending money[1,8,12].

Supported languages: English, Cantonese, Chinese (Traditional), Danish, Dutch, French, German, Hindi, Indonesian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish.

Supported platforms: Android, Google Nest, Android Auto, Wear OS, Android TV, Chrome OS, Smart Speakers, Headphones, Smart Displays, Google Allo, iOS, iPadOS, Ubuntu, Raspberry Pi.

Available functions: local information (weather forecast, arithmetic operations, information about the nearest restaurants, shops, construction of the route to the place); event planning (traffic information, event reminders); do in Google; play content (turn on music, videos, podcasts, news).

2. Alexa.

Alexa Is Amazon's voice digital assistant based on artificial intelligence, which provides a complete ecosystem of smart devices. Alexa can respond to simple queries and perform a variety of tasks or commands that you give. In addition, it provides its users with entertainment, information, and general assistance through its artificial intelligence capabilities[2,8,14].

You can give voice commands to Echo speakers, which gives the desired results. For example, you can ask Alexa to play music, provide sports results, check the weather or update news, chat with friends, family, read emails, and more.

Alexa can simply be run by giving it a command. The Echo device uses language recognition to perform tasks or commands specified by the user.

Supported platforms: Android, Amazon Echo, Fire OS, iOS, Android, Linux, Windows

Available features: play songs, retell Kindle book, find nearby restaurants, movie or sports schedule, track Amazon delivery, receive news, receive emails

3. Cortana.

Cortana Is a virtual assistant developed by Microsoft that uses the Bing search engine to perform tasks such as setting reminders and answering user questions [3,12,14].

Cortana has been launched as a key component of Microsoft's planned "transformation" of future operating systems for Windows Phone and Windows.

Supported languages: English, Portuguese, French, German, Italian, Spanish, Chinese, Japanese.

Supported platforms: Windows 11, Windows 10, Windows 10 Mobile, Windows Phone 8.1, Harman Kardon Invoke, Microsoft Band 2, Microsoft Band, Surface Headphones, Skype, Windows Mixed Reality, Amazon Alexa, Xbox OS, Android, iOS.

Available features: fingering, Bing search, music recognition, dice toss simulation, coin toss, notepad

4. Siri.

Siri is a virtual assistant that is part of Apple Inc.'s operating systems. iOS, iPadOS, watchOS, macOS and tvOS. The assistant uses voice prompts, gesture-based controls, focus tracking, and a natural user interface to answer questions, make recommendations, and act by delegating requests from a set of Internet services. The software adapts to the individual language needs of users, search, and preferences with constant use. The returned results are individual[4,8,14].

Supported languages: English, French, German, Japanese, Chinese, Korean, Italian, Spanish, Russian, Portuguese, Polish, Norwegian, Romanian, Swedish, Czech, Croatian, Finnish, Arabic, Thai, Turkish.

Platforms: iPhone, iPad, iPod Touch, Mac, Apple TV, Apple Watch, HomePod

Available functions: opening programs, calls, searching for information on the Internet, managing the "Smart Home", developer tools: SiriKit

5. Alice.

Alice - Intelligent personal assistant for Android, iOS, and Windows operating systems, as well as Yandex's own devices developed by Yandex. In addition to the usual tasks, such as searching the Internet or weather forecasting, she can also run programs and chat. Alice is also a virtual assistant for the Yandex Station smart speaker [5].

Languages: Russian

A platform for developers: Yandex.Dialogues

Platforms: Android, iOS, Windows

6. Bixby.

Bixby is a virtual assistant developed by Samsung Electronics. In May 2017, Samsung announced that Bixby will be introduced to its Family Hub 2.0 line of refrigerators, making it the first non-mobile product to include a virtual assistant [6].

Platforms: Samsung phones and tablets with Android 7.0 and above, Galaxy Home Mini, Galaxy Home.

Languages: English, French, Korean, Chinese, German, Spanish, Italian, Portuguese.

Available functions: interaction with the "Smart Home", searching for information on the Internet, calls, sending messages, playing songs, games, anecdotes

7. Mycroft.

Mycroft is a free, open-source virtual assistant that uses a natural language user interface. His code used to be copyright, but now it is under license. Named after a fictional computer from the 1966 science fiction novel The Moon is a Strict Mistress [7].

Open source: Yes

Platforms: Linux, Mycroft Mark 1, Mycroft Mark 2

Mycroft is modular. Some components can be easily "replaced" by others: Wake Word detection, speech-to-text (STT), intent parser

Conclusions from this research and prospects for further developments in this area

Available features can be customized by the engineer or selected from the list below: get information from the Internet (weather, news), set reminders, alarm clock, jokes, fairy tales, games, rolling dice, control "Smart Home", play music with Spotify, sending messages to the Telegram, viewing and voicing emails.

This article describes the results of the evaluation of seven intelligent personal assistants to determine the best assistant for keeping audio notes. The study included the most popular personal assistants on the market. The results show that Alexa and Google are much better than Siri and Cortana. No public information to confirm that Alexa is better than Google Assistant or vice versa. On the other hand, Cortana and Siri show the worst performance, the latter giving the lowest results. It would be interesting to expand this research in the future by exploring other types of intellectual capabilities of assistants. Further research is needed to evaluate the user's interaction with intelligent assistants and to better understand how the interaction may affect the results: a statistically significant difference between Alexa and Google Assistant, and none of which integrates into modern messaging and support messengers. Ukrainian language, which is a significant disadvantage of such devices.

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