

UDC 004

## CHAT-BOT OF AUTOMATION OF WORK WITH CLIENTS OF SERVICE OF SUPPORT OF ONLINE SERVICE

*ARTSIOM KARPENIA, KONSTANTIN RAKHANOV*  
Polotsk State University, Belarus

*The problems of service support and a possible way to automate the work of online support is described.*

**Introduction.** One of the main tasks of online services is to support customers. Customer support includes consulting before buying a product or service or after-sales support. The availability of high-quality customer support makes it possible to compete more effectively in the market. Customer support is provided in various ways: by phone, by correspondence in web chats, by e-mail, with the help of instant messengers.

To support customer online services, you must have a full staff, which includes specialists in working with clients, sales, technical specialists, service chiefs who will handle requests. The costs of maintaining support services are eventually pawned in the final price of the product, which increases costs and reduces competitiveness.

From the list of incoming requests from customers to the technical support, the largest number of requests are of the same type. On some online services, the number of similar requests is about 80% of the total number of hits. Automatic or automated processing of the most frequently encountered applications can significantly reduce the burden on online service support specialists.

The problem of automated processing is the "recognition" of the semantic load of queries. The current development of speech recognition systems allows us to accurately determine the meaning of what has been said, which allows us to develop a system capable of interacting with customers with the help of natural language [1].

Based on the current assessment of the market, chat bots, for messengers - a promising direction, which is currently experiencing rapid growth. The growth of the market is largely due to the fact that the number of messenger users has exceeded the number of users of social networks drawing. [2-4]

In 2016 there was a jump in commercial activity in the sphere of messengers (conversational commerce). This is understood as the use of chat rooms, instant messengers or other natural language interfaces (including voice) for communication with people, brands, services. Probably, right now we can talk about a new paradigm of user interaction with online services - messaging-as-an-interface [4].

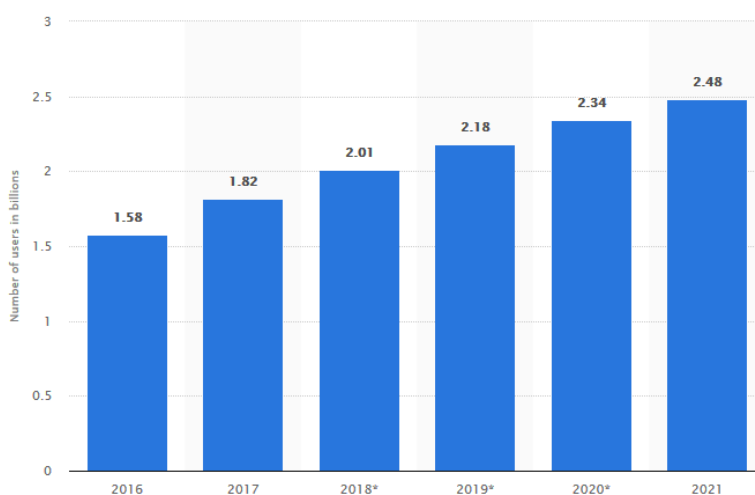


Fig. 1. Number of mobile phone messaging app users worldwide from 2016 to 2021

The natural language interface allows the user to interact with the software through the use of natural language.

The software has a natural language interface that allows you to reduce the entry threshold for using this software. Lowering the threshold of entry is due to the fact that the user does not need additional skills. The user is able to interact with the software using conventional language constructs.

At the same time, the number of people using instant messengers to contact brands has also grown. According to analysts, in the coming years the interest of commercial companies in chat bots will continue to grow [6].

Now in the business sphere, bots are used for several purposes: consultations, content distribution, search by parameters, gathering information about customers, accepting orders and sales.

Often, users have questions about the operation of services or the problems that they solve with the help of online services, for which the services organize the hotel service for processing requests. The service aggregates customer requests from various sources: calls, chats, e-mail. Then the operators process them, which takes a certain amount of time. When the number of requests exceeds the online support staff, queues arise, which entails an increase in the service time [5-6].

Business growth entails the need for a large staff of employees to provide appropriate user support. The costs of maintaining the staff of online support staff ultimately fall on the end customer.

At the same time, most user requests are of the same type, which allows them to be transferred to processing by automated means. Automation of similar requests will reduce the burden on support.

According to a large Russian developer of bots, the company "Nanosemantika" (working with Beeline and Webmoney), the presence of chat-bot removes up to 40% of the load from the operator-consultants [7].

#### Task formulation

Functional requirements for the software:

- interaction with customers through natural language interfaces;
- the possibility of training the system for various areas of business;
- work in various messengers;
- providing API for interaction with web-applications;
- possibility to continue dialogue with the operator;
- informing support operators when it is impossible to process the request;
- distribution of requests for operators;
- collection of statistics on the processing of requests.

To implement a software tool that allows you to automate part of the processing of requests, you first need to solve the problem of recognizing the semantic load of queries. To do this, you can use the ready solution wit.ai it's the same Ducling [8]. Ducling allows you to identify entities from a message, for further processing. The selected entities are provided in JSON format, convenient for further processing. Duckling Distributed under the license of MIT, which allows it to be used in commercial projects.

After recognizing the semantic load, it is necessary to determine the response of the system to this query. To determine the necessary reaction, you can use the expert system Clips [9]. This expert system allows you to create a database of "facts" and rules, which will be the necessary reaction. Depending on the certain semantic load of the query, the search will be performed on the basis of facts, rules will be used to search for the necessary reaction to the request. Then make the request processing by the kernel of the system. For Clips, there are libraries that allow you to integrate the expert system into applications written with the help of most popular programming languages.

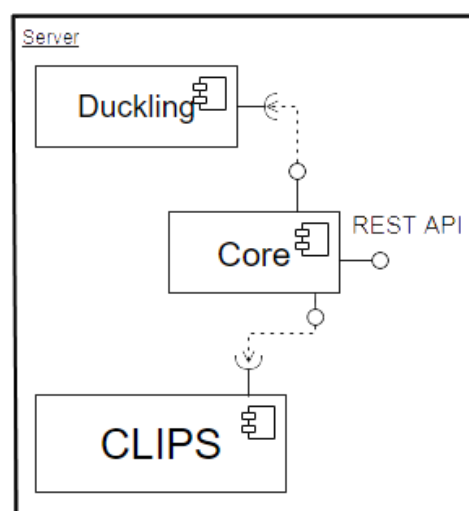


Fig. 2. Deployment diagram

To interact with other software, you need to implement the REST API, through which you will interact with chat rooms and other software. REST API will make the system independent of the implementation of chat bots, which will support the majority of popular chat rooms.

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