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Automation of Message Sending Processes Using Specialized Software

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***Abstract*— The article discusses a method for automating the sending congratulatory messages and images to relatives in the Whatsapp messenger using its web version "WhatsApp Web" due to the lack of an official api for creating bots. Also, a chat bot, which was written with python and can recognize and respond to commands, was implemented.**

Keywords—bot; whatsapp; python; selenium; automation.

I. INTRODUCTION

In the modern world, we often face the problem of lack of time. Each person has to do many different things every day. Therefore, sometimes people forget about the important thing: about maintaining a connection with their relatives. Indeed, it takes a significant amount of time to pay attention to everyone. Because of this, people rarely write to each other, and sometimes they completely forget to congratulate a loved one on an important holiday for him. To get rid of the daily time spent, it was decided to create a program that would send cards to relatives on holidays and could also interact with them using commands.

Within the framework of the article, the chatbot technology will be discussed in detail. A chatbot is a virtual interlocutor, a program designed to imitate human behavior when communicating with one or more interlocutors. To a greater extent, this trend is now being formed abroad - there are a huge number of bots for "WhatsApp", "FaceBook" or "Telegram", capable of solving a variety of tasks. Chriss Messina in article [1] called 2016 the year of dialogue or colloquial commerce. He believes there is a tendency to use instant messengers as a link between the user and large companies, with the result that business will be conducted through chats and instant messengers. Therefore, it is relevant to use a bot on Whatsapp. Also, according to data from article [2], most people over 36 do not use social networks, but use instant messengers to keep in touch with relatives and friends. The most popular social network "Ok.ru" among people of this age category has 22% of all users, while in the messenger "WhatsApp" this figure is 40%.

Bots in the WhatsApp messenger are nothing new. Although they are used less frequently than in other applications, they are convenient tools for business. BotCreators' articles say that bots on WhatsApp are different from other bots. Because of this, their implementation is more difficult, but bots turn out to be complete with the right approach [3].

When analyzing already existing user projects on the Github.com site, it was discovered that there are bots that perform various functions. But no bots were found to send messages based on date and time.

II. RESEARCH MATERIALS AND METHODS

Since the messenger does not have an official api for writing bots, such as "VK Api" or "Telegram Api", it was impossible to work with "Whatsapp" itself, so it was decided to manage its web version. There are different tools for managing "Whatsapp" web. The most popular of these are "Twilio" and "selenium". "Twilio" is a platform that, with a paid subscription, provides the user with access to the "WhatsApp Business API", which has ready-made implementations of basic tasks for working with the messenger. It was decided that the cost of a paid subscription was unacceptable as the bot would be used for private use rather than running a business that would justify the cost. Therefore, selenium was chosen as a tool for implementing the bot. It can be used to automate a web browser by imitating human actions on a web page. This tool reads the page code, finds elements, and interacts with them in a specific way. The principle of dividing a page into objects and managing them became the main principle in creating a bot. Thanks to this approach, it became possible to write a program that would be fully automated and controlled by the user through the input line, without the need to correct the program code.

First, the basic functions necessary for the bot were implemented, such as: sending messages, sending images, adding a new chat, reading the latest messages. Let us consider the principle of work on the implementation of one of the simplest functions - sending a message.

```
message_box = driver.find_element_by_xpath('//div[@class="_3uMse"]')
message_box.send_keys(mesname)
send_button = driver.find_element_by_xpath('//button[@class="_2Ujuu"]')
send_button.click()
```

Fig 1. The code of sending a message

With the help of selenium, the program Fig. 1 finds the message_box element at a special address called xpath and enters the message text in the misname parameter, then searches for the button at its unique xpath address and simulates the button click.

Based on the basic functions, many others were subsequently written that were used to write the bot program. To do so, the algorithm below was developed, allowing you to understand how the program works.

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1. First, the program launches the Google Chrome browser, opens a tab with WhatsApp Web in it, then it waits for the final page to load. Along with this, a new Thread is also created, which allows several tasks to be performed simultaneously in one program. This stream every minute writes the current time to a certain object, and if it coincides with the time for sending congratulations, then it writes a certain value to a special counter. Thus, it acts as a clock.

2. After loading the page, the program starts the main cycle, consisting of several checks, the algorithm of which is presented below in the form of a block diagram Fig. 2.

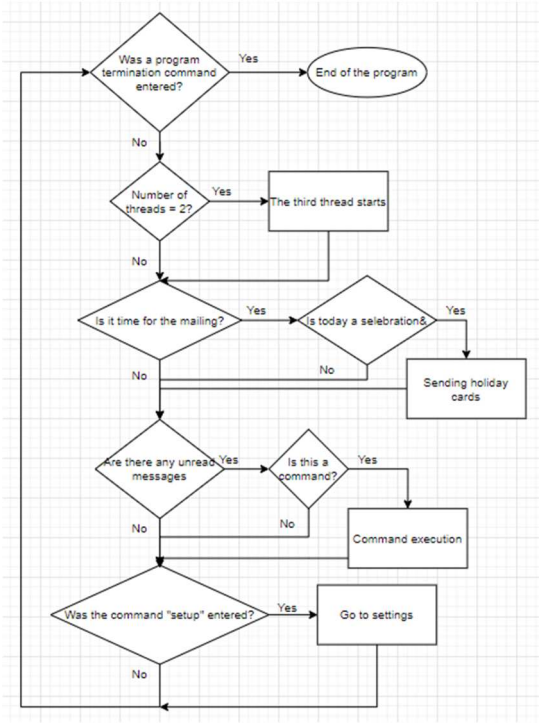

Fig 2. Block diagram

3. At the beginning of the cycle, it checks how many threads are running at that moment. If their number is 2, then a third thread is launched, which checks whether the setup command has been entered. If it was entered, then the program fills the counter, which is then checked in step 6, then the flow ceases to exist. Otherwise, the program will continue to wait for the command. In this case, there will be 3 threads in the program, and the loop will not start new threads.

4. Then the counter is checked, which is described in point 1. If the value matches a certain one, then the program searches the database for a holiday on that day. If there is a holiday, then greeting cards are sent. In all other cases, the program proceeds to the next stage. Since the holidays are different, it is worth considering who the program will congratulate on this day, because it is incorrect to send a postcard of a women's holiday to a man. To do this, it was decided to add to the program the ability to send a picture only to a specific group specified in the group column of a special file, in which the user manually assigns each holiday a corresponding group for which there is a ".txt" file that lists contacts for sending a postcard.

TABLE 1. CELEBRATIONS

number	*date*	*name*	*group*
0	01-01	Friday	all_users
1	01-02	Weekends	all_users
2	01-03	Commemoration day of saint Peter	group1
3	01-06	Christmas eve	group1
4	01-07	Christmas	all_users
5	01-08	Cathedral of the Holy Bagaroditsa	group1
6	01-11	International Day of "thank you"	group1
7	01-12	Day of the employee of the prosecutor's office of Russia	group2

5. The program checks the code of the web page for special objects that appear only when the user has unread messages. If there are such objects, the program opens a chat with this user and reads the text of the unread message. If this text is a command, then it is executed. In any other cases, the program proceeds to the next stage in the algorithm.

6. The program checks if the counter mentioned in point 3 is full. If the counter takes a certain value, then the program goes to the settings, where the user can change and add some program components.

Thus, the main loop runs until the user manually completes the execution of the program. To do this, he must enter setup in the command line, go to the settings and select the appropriate item there.

Since one of the main goals of the bot is to maintain contact with relatives by sending congratulations, it was decided to add as many holidays as possible to the database in order to pay attention to relatives almost every day. This requires a large database of holidays. It would be very difficult to search and process so much data manually. Moreover, some holidays do not have a specific date, and therefore it may change every year. Because of all this, it was decided to write parser programs that would automatically record all holidays in a certain file, and also download pictures for each of them. Among the many parsing tools, a Python package for parsing html documents called Beautiful Soup was chosen. It breaks the html file into objects and knows how to process them and get information from them. It is convenient to work with web pages with its help. A website specializing in greeting cards was selected to expand the database. Thanks to this feature, the site had an easy-to-use structure, as well as a calendar of all holidays. Also, each of them was necessarily accompanied by images with congratulations, which could be downloaded from the same page. The written parser program allows you to get a complete list of all holidays for the year and download a greeting card for each of them in just one execution of the program.

In addition to automatic congratulations, it was decided to add a command recognition function to realize the huge potential

of the bot. A function was written that recognizes the command "meme" and sends the sender of the command a funny picture or anecdote in the form of a picture. Here, just like with the holidays, a large database of funny pictures was required. But choosing funny pictures is a serious task, because there is too much adult humor on specialized sites that does not fit the criterion "for the whole family." Therefore, each of the pictures must go through censorship in order to weed out indecent or inappropriate pictures and not disgrace themselves in front of relatives. Manual verification of each image would take a lot of time, so it was decided to parse images not from specialized sites, but from the “Ok.ru” social network. However, when working with it, difficulties arose, since the site was constantly changing the html code, and Beautiful Soup only works with static codes. The problem was fixed with the help of selenium, which first scrolled the “Ok.ru” feed, making objects that were not visible before appeared, and then copied the html code of the page and sent it to Beautiful Soup for processing. After that, the parsing of the site did not bring unforeseen difficulties.

III. Results

As a result, the whatsapp bot was implemented in the form of several files: the whatsappbot.py file containing the main bot program, the parsedays.py file containing the holiday parsing program, the parsememes.py file for parsing sites into funny pictures. To start working with the bot, you should run both parsers so that they create the folders necessary for the bot to work, and the user is also required to correctly use the files created by the program in order to prevent errors in work. The bot works using the methods given above and is able to automatically send congratulations to specific chats, as well as recognize commands and execute them, moreover, it supports the ability to go to the bot settings by entering setup in the command line, where you can configure the mailing time, edit new lists, and also exit the program

So that the user does not have to make changes to the code when working with the bot, it was decided to use the file system. Thanks to this, it was possible to make it so that the user can create as many different groups as he wants. This feature is implemented as follows. First, the user must manually assign each holiday a group in table 1, he can choose any name. Then he must create a text file with the same name and enter the names of the contacts, each with a new line. When the program performs this function, it will perform actions presented in the algorithm in the form of a block diagram Fig. 4.

Thus, all user-dependent parameters were written to a file, which made it possible to change the data directly while the program was running. With this approach, the probability of an error in the program when trying to update the data is greatly reduced. In addition, with competent writing of files during parsing, you can conveniently use all the data received

At this stage, the developed program is complete. So, it can be used in its current form and correctly perform the assigned tasks. In addition, the functions described in it can become the basis for creating other bots. Thus, the program can be viewed as a library of functions for working with “WhatsApp Web”.

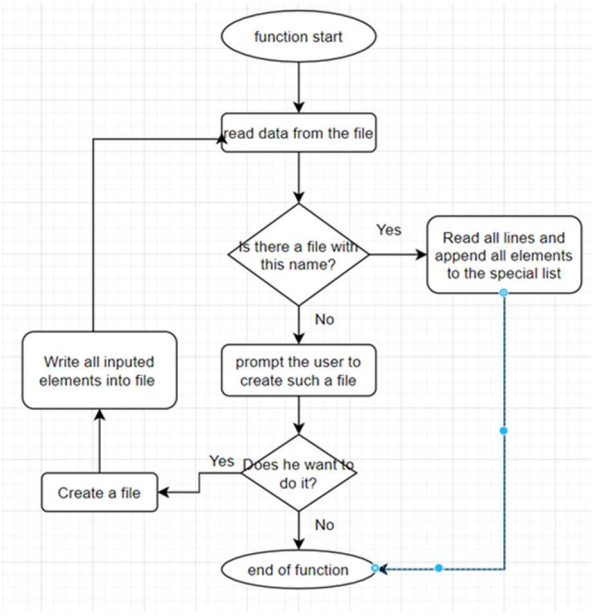

Fig. 4 – Choose users

You can get acquainted with the code at the link on github: https://github.com/RachUwU/Project-practice

IV. Discussion And Conclusions

Based on the analysis and the results of the experiment, a number of conclusions were drawn, including further areas of research.

1. Nowadays, the popularity of messengers is growing, so it is important to automate processes and create bots.
2. Using the web version of the messenger does not limit the bot's capabilities, so this method is working for creating bots created for private use.
3. The file system used in the program works more stable, since the main code does not change.
4. At the moment, the bot has great potential, since the main functions were written. You can make almost anything out of them. As the next task, you can add the number of commands to the bot, for example, display the weather forecast, or display the schedule of a TV channel.

Thus, a bot was developed that allows you to automate the process of sending congratulations to relatives, and also has good potential for further work with WhatsApp.

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