

## Research and Development Plan of the Chatbot-Psychologist

### Stage 1. Building of free form dialogs to establish a contact with the interlocutor.

An approximate dialog body size is 250-1000 pairs of questions and answers.

A dialog body contains:

questions and answers in a free form, which people usually use when making acquaintance.

For example:

Hi

Hi

How are you doing?

Thanks. Good. And you?

etc.

### Stage 2. Building of contextual dialogs between the interlocutor and the chatbot.

An expected number of contextual dialogs is 10-20, while the variability of answers to each question may be 2-4, average 3. An average number of questions in a dialog is 10-20, average 15.

Thus, the resulting body of questions and answers in the contextual dialogs will be  $15 * 15^3$ , that is 50 thousand of pairs.

It is supposed that most part of reactions will be repeated.

### **The upper limit will amount up to 5000-10000 pairs.**

This stage is very important as logical and relevant answers will create the feeling of communication with a human being.

### Stage 3. Building of the model of the the obtained results calculation and digitalizing with the help of the ParaPhraser processor for determining of the tone, mood, word repetition of the interlocutor.

The mathematical model must represent the full information about the dialog and features of the interlocutor, that is, to perform a linguistic analysis of the text and dialogs.

The result of the communication in general will be evaluated because it is difficult to evaluate one phrase or statement for the reason of repetition and monosyllabism of some answers.

On the basis of the pronounced phrases and thoughts the interlocutor's character and mood will be determined.

#### **Stage 4. Search and generation of possible non-programmed reactions.**

This stage is important because the chatbot should be able to quit the frames of the programmed reactions and give answers taken from open sources. Thus, moving along the tree of questions and answers, it will be able to quit the tree and search for answers in open sources, such as: books, social media, Google answers, etc., in case the basis of its knowledge is not enough to keep the dialog going. Using open sources by the chatbot will allow the dialog break the limits of the downloaded scenarios and sound more natural. Social media is the most suitable source of the information for the chatbot, as it contains dialogs of real people.

#### **Stage 5. Building of recommendations for the interlocutor.**

This is the stage of the chatbot core building.

At first recommendations are formed manually by an operator, psychologist or a psychiatrist, and all the variants are written down for the chatbot to choose among them automatically.

At this stage a specialist gives recommendations to the interlocutor on the basis of the communication result, but when the algorithm of the recommendations choice is completely developed, the chatbot will be able to do it independently.

#### **Stage 6. Validation of the dialogs and the tree of questions and answers.**

Volunteers are welcome to participate in chatbot tests. They will ask questions and mark what answers of the chatbot they like and what they dislike.

At an incorrect answer of the chatbot the participant can make three more attempts to get from the Chatbot the right answer. If they are also unsuccessful, the participant can offer his own answer, which will be saved in the chatbot's memory.

This stage will allow avoiding wrong answers and reactions of the chatbot and checking if it has knowledge gaps.

#### **Stage 7. Addition of logical functions to the chatbot's operation.**

At this stage it is necessary to add logical functions to the chatbot's operation.

Such as: count, tell the time, the date, what is the capital of... and the like, and also the possibility of connection with the relatives, dear ones, the doctor, etc.

This kind of functions are easy to be built into the system work and can essentially widen the chatbot's abilities, making it not just a companion but also a smart assistant.

Additionally, logical functions can have a more complicated structure: e.g. pronounce this word backwards or give this statement the opposite meaning.

The given functions will probably require connection with third-party libraries.

### **Stage 8. Work with the memory.**

An important stage of the chatbot's work is its ability to ask questions and get answers in real time. Thus, to the questions about the time or date, it should give the correct answer. Besides, if the interlocutor told about his plans for today, the chatbot must speak about them tomorrow in the Past Tense. That is, memorizing of the information given by a certain user should be correlated with this particular user and real time. It is important for the chatbot's correct reaction during conversations. Realization of this setting will not take much time unlike configuration and calibration, which might turn out to be rather complicated and painstaking.

### **Stage 9. Bot-external memory to remind of things to do.**

It is possible to build in the chatbot the reminder function to remind the user of things to do. This function is already developed and needed configuration and implementation. Reminder is one of the most helpful functions for senior people who need assistance and support. Apart from the remind function, the chatbot will be also able to check if the user performed the required action. For instance: did you take the pills?

Actually, the chatbot will act as an alarm-clock and a calendar, monitoring the list of things to do, certain dates, events, etc.

E.g.

Bot: Don't forget to take the pill at 12:00

*User: Okay.*

(some time later)

Bot: *Did you take the pill at 12:00?*

*User: I did.*

Bot: Great.

*User: Thanks for reminding.*

In this way the information about the performed action will be stored in the chatbot's memory.

This functions will allow raising the modern therapeutic methods on a new level - online support of Alzheimer's patients and people with various forms of dementia and schizophrenia.

### **Stage 10. Final testing and output of the product to the mass field.**

In the process of the chatbot's operation additional materials will be accumulated that will allow to analyze the logs and results of the chatbot's interaction with the user. The chatbot in its first version will not give medical or psychological consultations; its recommendations and advice will be mostly general and will have the aim to psychologically support the interlocutor and improve his/her mood.

The final testing of the product and its start run will go under the specialist's surveillance.