

# Going beyond the relapse peak on social networks smoking cessation programs: ChatBot opportunities

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# Abstract

## Research Question

A social network program called «J'arrête de fumer» has been set-up in 2016 in the 6 French-speaking cantons of Switzerland. It consists of Facebook groups where people synchronize on a date to quit smoking. A peak of relapse appears during the first three weeks of the program. This research aims to explore the feasibility to build a Chatbot to help people to overtake this peak in the future iterations of the program.

## Methods

It has been shown that the urge to smoke may be one of the reason of the smoking relapse. Being able to distract users from the idea of smoking during these phases would help them to overtake these three first weeks. Due to the large number of participants, a human intervention within the craving time frame is difficult to achieve, and such constraint would be easier to address with ChatBots.

## Result

A ChatBot for the Telegram platform has been developed. It offers five different modules to overtake the time frame where the urge to smoke is maximal. Some of these modules, such as motivating comments and informational facts, are already quite used but some others are less widely explored, like helping scientific research by classifying images or such as putting people in touch for distracting them from smoking urge.

## Conclusion

ChatBots offer interesting opportunities for helping smoking cessation communities, as they would help participants during craving time frames and would be able to handle the large number of participants.

**Keywords:** ChatBot, Smoking, Cessation, Social Network

## Introduction

The program «J'arrête de fumer» has been initially set-up by the *Cipret Valais*<sup>1</sup>. It consists of a Facebook group that people can join to quit smoking all together on a fixed day: such concept allows them to share their experiences and to mutually support themselves in this objective. A first pilot phase has been running from September 2015 to Mars 2016, which has then been extended in 2016 to the 6 French-speaking cantons of Switzerland (1). This kind of social network approach allows to reach more participants than traditional cessation programs. The «J'arrête de fumer» program of 2016 gathered more than 7000 participants over the 6 cantons. A study on the topic of social network cessation programs has been published recently (2) and supports the benefits of such approach for smoking reduction and cessation.

The administrators of the «J'arrête de fumer» program have noticed a peak of relapse during the three first weeks of cessation as shown in Figure 1. A lot of parameters may have an influence on this fact, such as the physiological addiction to Nicotine or the psychological impact of social smoking. These problems are already known (3–5) and are usually addressed by traditional cessation programs. It has been specifically noticed though that the urge of smoking is one of the cause of relapse (6,7) and that it can be addressed in this program. Helping the participants to overtake these urge phases in some way would help to reduce the relapse ratio, what would have a significant impact even with only a slight improvement due to the large number of participants.

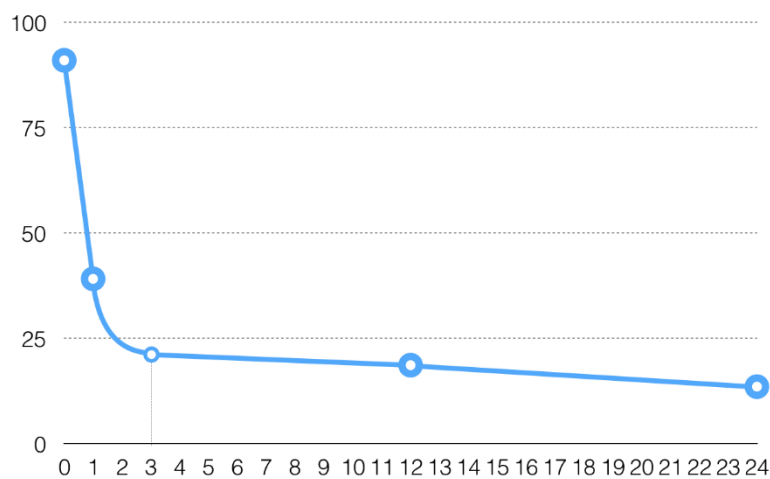


Figure 1 – Success ratio over weeks (J'arrête de fumer 2016)

The «J'arrête du fumer» 2016 team was composed of 22 people relaying 7/7 days from 6 AM to 23 PM. They had to deal with more than 13 400 messages during *the first week* of the program. Such large number of messages are almost impossible to deal with by the team, even with this team composed by 3 medical doctors, 11 specialists in smoking cessation and 8 community

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<sup>1</sup> <https://www.cipretvalais.ch>

managers. This is problematic because some participants may need direct support, especially for craving phases. Using ChatBots technologies may improve efficiency for addressing such issues.

The concept of ChatBot have gained interests in the last few years (8). By definition, they are algorithms that are able to discuss with people by understanding the natural language, and most of them take the form of contacts in messaging applications. In practice, most of the ChatBots are algorithms that are reachable through messaging application, whatever is the communication modality used, whether it is natural language, keywords, buttons, audio or even images. Also, ChatBots offer some advantages compared to standard mobile applications: 1) There is no need for participants to install another specialized application as they will use an existing messaging application on their phone; 2) Multi-platform support out of the box for Android, iPhone, Windows Mobile, Linux, Windows and Mac OS, because messaging applications already develop clients for most of them; and 3) Login, password reset, authentication or even scalability are taken care by the messaging application so it does not have to be managed by the ChatBot.

In this work, we explore opportunities for using ChatBots to overtake the relapse peak in social network cessation programs. We present a prototype implementation in Telegram<sup>2</sup> — a messaging application — and finally discuss issues and future possibilities of ChatBots.

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<sup>2</sup> <https://telegram.org/>

## Methods

To help the participants to overtake the urge to smoke time frame, a distraction should be proposed that would be interesting enough so they focus on it instead of thinking about smoking cigarettes. We explored several ways of distracting users. We limited the number to five techniques to not overload the interface, and we selected only techniques that may be implemented through ChatBots:

- **Motivating comments:**

The idea of this module is to provide the participants motivating comments from other users, what has for effect to distract as well as motivate them to hold on. A large quantity of positive comments has been left of the Facebook group during the first program, so they can be reused, anonymously, to motivate the next participants. For instance, it can be comments like this:

*« Since I stopped smoking, my children hug me a lot more because now I am a mommy that smells nice. »*

- **Multimedia contents:**

Audio, Video and Articles can be used to distract users. There are millions of videos available on streaming platform such as YouTube. Redirecting participants to watch a humoristic video, a musical clip or to read an article would be an option to distract them.

- **Games:**

Some messaging platforms such as Telegram offer the possibility to develop games within discussions directly. This permits to benefit of all the gamification theories that would help to maximize users' engagement and distract them from smoking. Participants may want to play in duel with their friends also in the program or to appear in the leaderboard of the game.

- **Putting people in touch:**

One important aspect of social network cessation programs is the notion of community, as reported in the final report of the program (1). This can be taken as an advantage: people can help each other to hold on, by engaging in a discussion for instance. Putting people in touch in a useful way requires careful preparation to ensure anonymity and to prevent excessive notifications.

- **Helping to classify medical images:**

Some types of personalities like doing tasks that make them feel useful, hence the idea of being useful to the society by classifying medical research pictures. This is a win-win

solution, as smokers are looking for a way of being distracted, and researchers are looking for a way of getting ground-truth of pictures.

The preferences for distractions probably vary between different groups in the population, and between personalities. A woman in her 30<sup>th</sup> would probably be more sensitive to distraction regarding motherhood and children than a man in his 20<sup>th</sup>, whom may be more interested to humorous content or games for instance. Profiling the participants will help to customize the distractions provided to maximize the success. To build profiles, some relevant data such as gender, age, centers of interest or location could be asked through the ChatBot directly. We do not have such data yet, but they can be acquired during the next program, or can be elaborated through a study on focus groups. The data can then be analyzed to extract clusters and information about profiles' preference to improve help to future participants. The personal preferences should also be asked individually to participants, as some people may not correspond to the profile they belong to.

The interactions with ChatBots can take several forms. First, interactions can be made through natural language: this offers a lot of liberties for the participant to formulate responses, but the interpretation of the meaning by an algorithm is complicated and error-prone. Second, keywords-based interactions have more restrained inputs, but the algorithms are simpler and more deterministic as they know exactly how to interpret responses. These two interactions are text-based modalities, meaning they require the participants to write responses on the keyboard of their phone, and this is only the text that is interpreted. The drawback of such text-based modality is the tiresome side of writing text messages on phones.

With advances in messaging applications, it is also possible to send other kind of contents to contacts, including ChatBots. This includes for instance emojis, pictures and sounds. These modalities may be interesting in some situations, like for instance if a participant want to ask a question about a prominence on their palate. But these modalities do not constitute a full way of interacting on their own. Finally, some platforms such as Facebook Messenger or Telegram offer possibilities to build interactive menus through buttons. This allows quicker interactions than text but is limited to keywords answers. We chose this last method for making the prototype, knowing that it is still possible to mix with other modalities in the future if needed.

## Results

A prototype of ChatBot helping people to quit smoking by distracting their focus from cigarettes during urge to smoke has been built on top of the Telegram platform. Telegram is a messaging Applications like Whats'app or Facebook Messenger. The choice of Telegram has been made for the openness of the protocol, the openness of the clients on phones and desktops, and because the supports for all previously cited modalities.

The developed ChatBot appears as a normal contact in Telegram, and people can see a description and can decide to start using it by pressing a «start» button (this is the standard for bots in Telegram) as shown on the left part of Figure 2. Once they start the conversation, the bot is asking them some information to build their profiles, such as gender and age. Participants can answer these questions with custom keyboards (like shown in the central part of Figure 2) or with text directly. Finally, the main interaction with the bot is done through an interactive menu as shown in the right part of Figure 2.

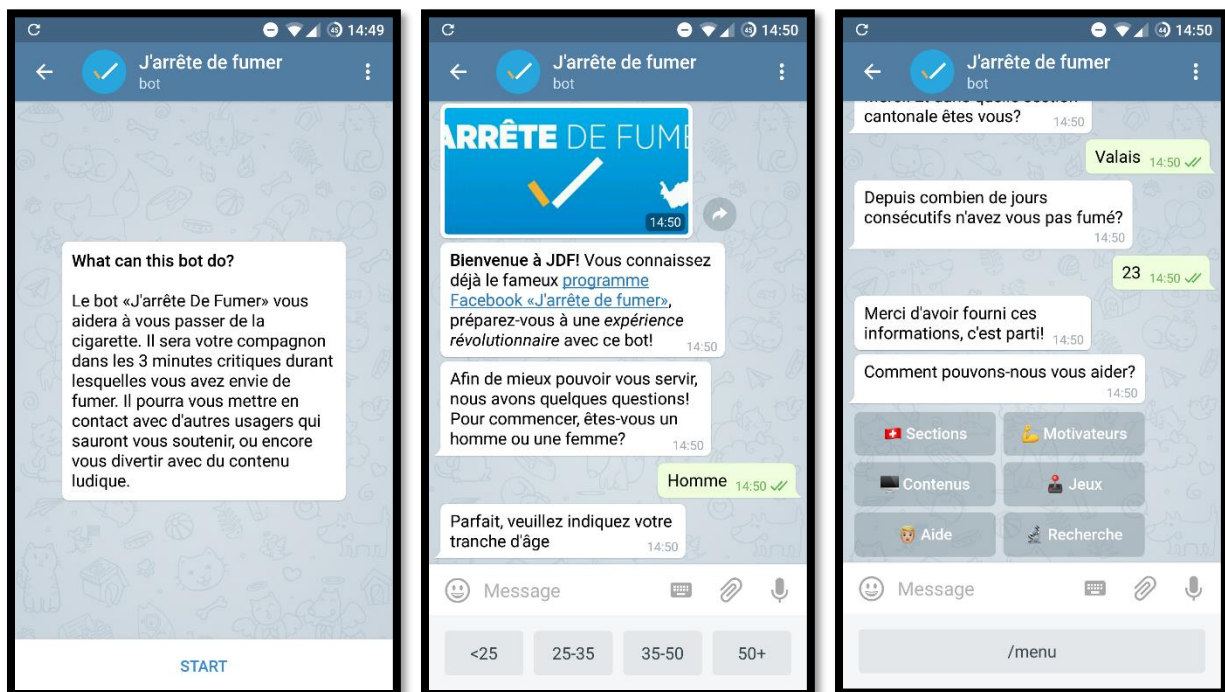


Figure 2 – Some screenshots of the ChatBot in action

The different modules to distract participants that have been proposed in the previous section have been implemented in the prototype. They are accessible through the main menu:

- «Sections» open a submenu that allows to access the Facebook groups of each canton.
- «Motivateurs» are showing motivating comments from other members of the community that would be gathered from previous programs.
- «Contenus» open a submenu to select a subcategory of Music, Videos or Articles, and then send a link to a random content of the given type. An example is shown in the central part of Figure 3.
- «Jeux» is opening a simple game that we developed in the context of this prototype: a button that should be clicked as most as possible in 30 seconds.
- «Aide» is sending a request for help to all other people from the same canton registered in the ChatBot. Other users receive a notification with a message as shown in the right part of Figure 3. They can either reply «yes» or «no» to help the applicant. Once someone accepted to help, all the «Oui / Non» buttons disappear from the chats of other participants and the applicant receives the Telegram username (no phone number included) of the person proposing his help. The selection may be fine-tuned with participants' profiles in the future.
- «Recherche» is starting classification tasks. The ChatBot sends images to the user asking them for annotating it by pressing buttons. The «Stop» button permits to stop processing images. This is shown in the left of Figure 3.

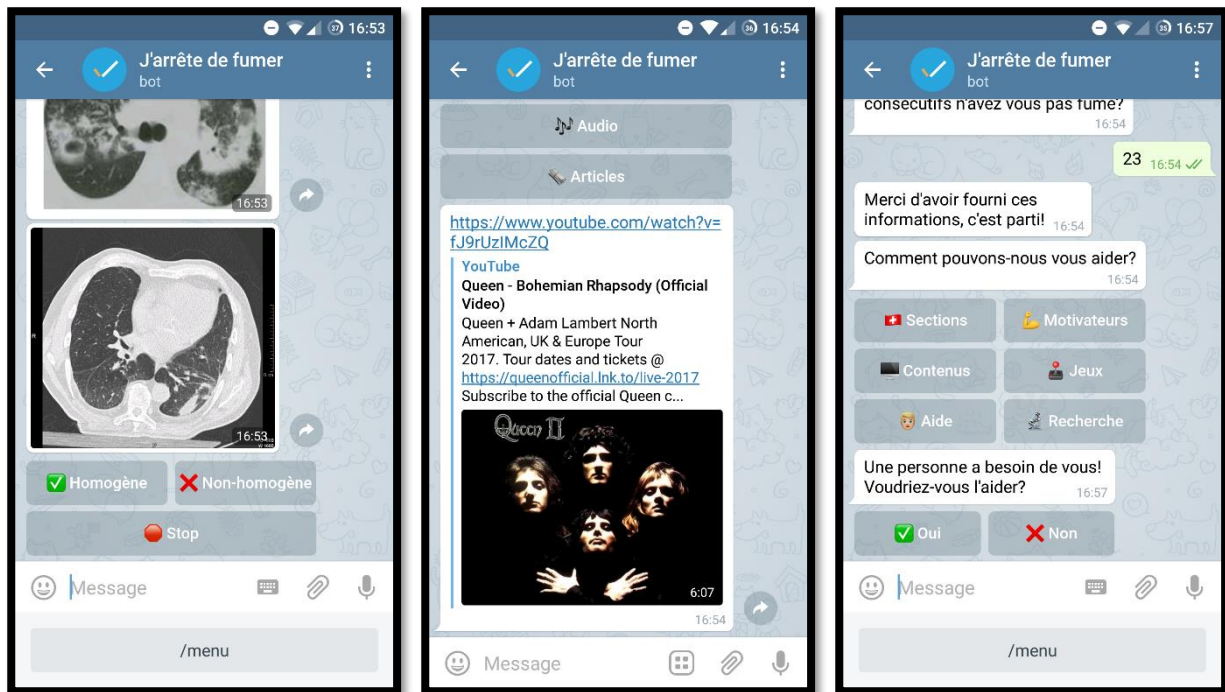


Figure 3 – Example of modules



## Discussion

The prototype has been deployed on Telegram a few weeks ago and is still running. This allowed us to show the developed idea to the administrators of the «J'arrête de fumer» program, who in turn have been able to test it on their side, as the ChatBot is public<sup>3</sup>.

Using ChatBots in the context of smoking cessation programs is interesting as it allows to easily set-up an application without having to directly deal with the burden of creating a multi-platform application, handling registration and authentication securely, taking scalability into consideration or having to deal with uptime. The development of modules has also shown a speed-up compared to traditional applications: videos and audios content are handled natively on all platforms and sending images for annotations does not requires to deal with storage and bandwidth for instance. There are of course some drawbacks, the main one being the limitation in the interactions: everything is going through a notion of messages sent back and forth between the participants and the ChatBot. Regarding the problematic addressed in this work though, this way of interaction is sufficient as illustrated by the developed functionalities.

The five modules that have been developed are showing a large range of technologies: video, audio and images contents, games, putting people in touch, or annotating pictures. This mean that probably other advanced functionalities can be developed on this platform, what let us expect some interesting opportunities regarding the usage of ChatBots in this domain.

The proof of concept that have been developed need further testing in real conditions, but the current status of the prototype let us except an easy deployment in production. The next step of this research is to use this ChatBot in the upcoming «J'arrête de fumer» program, what would allow to start the acquisition of participants' profile, as well as statistics about their modules usages. The ChatBot may have to be ported to Facebook to facilitate the usage and adhesion among the participants though: as it is already a Facebook group it would require less setup for them. Finally, some feedback mechanism about when people are smoking would be needed in the future to measure the success rate of the different modules. This would be needed to pursue the improvement of the ChatBot and its modules, to improve the program's overall success.

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<sup>3</sup> It is possible to try it live by installing Telegram and then searching for the contact «JDF\_CH\_bot». The bot should be running at least until the December 2017.

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