

# Conversational agents for seniors, the Guardian platform

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## ABSTRACT

With increasing of life expectancy innovative solutions that ensure well-being of the seniors become most needed. In this context, in order to deny the main difficulties reported by the senior public with the use of mobile devices, we propose a technology entirely based on voice interactions and we name this project of Guardian. The essence of the project is to provide, through a mobile application, a platform with a set of intelligent agents focused on the well-being of the older adults. In this work the main objectives to analyze and evaluate the usability of the Guardian and the cultural impacts of the technology. For the data collection, video recordings were used, a questionnaire that identifies the socio-technological profile of the research participants and the system usability scale (SUS).

## Author Keywords

Seniors; Voice interaction; Conversational agent; Natural language processing; Mobile application

## INTRODUCTION

With increasing life expectancy, longevity has come to be seen not only as a gain, but also as a concern. In this context conversational assistants might be a promising solution to alleviate the problem of a greater demand for care services for the seniors and contributing to recovering of their independence. This text reports an initial acceptance study on the use of conversational assistants among a that population.

Our technology consists of a set of conversational assistants focused on helping healthy aging available in a single application embedded on a mobile device. However, there are several

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questions to be explored: 1) Are personal assistants like Amazon's Alexa or Google's assistant offer any help for third world country seniors? 2) How does such population receive and interact with such technology? 3) Which culture related issues might arise from the introduction of the technology in their daily lives? 4) Which possible positive impacts can be foreseen with the use of conversational assistants? 5) Which design guidelines can be drawn from this exploratory study? The purpose of the study reported in this article is to answer these questions by conducting a user evaluation.

## RELATED WORK

In Reis et al. [2] the authors assess the main problems related to social relations among the senior population, as well as the acceptance and introduction of intelligent assistants to stimulate such interaction. It was noted that voice communication with electronic devices showed considerable utility to increase confidence and subsequently strengthen the social bonds of the seniors. In Cheng et al. [1] the authors aim to assist self-management for seniors patients with diabetes by proposing an application that uses the Google Home voice interface, by means of a conversational bot. After a test conducted with ten seniors, the general acceptance was noticed. As discussed in the works the use of voice interfaces has been shown to be well accepted by senior users.

## THE CONVERSATIONAL AGENTS AND THE APPLICATION

With our proposal we make available, access to a set of agents implemented in Dialogflow. The DialogFlow tool is an api.ai upgrade developed by Google. This tool allows the construction of conversation interfaces for bots, applications and devices. Two conversational agents were tested, both developed based on Brazilian culture. The Lady Laura, name of a popular song and represents a careful mother and Ana Maria, a popular TV presenter of a culinary show.

To use the application just say: "Hi Lady Laura". The application, installed on a smartphone, is started and Lady Laura

initiates the dialog guiding the user through the conversation flow presented in the online document <sup>1</sup>.

The conversational flow was elaborated in order to analyze the behavior of the user before the agent about different contexts, a context involving an exchange of personal information, a context of interruption and a context in which the older adult waits for a recipe.

## METHODOLOGY

This work is an exploratory study aimed to understand how the older adults perceives conversational agents when introduced to them in their houses. We let them interact with the technology with free time. For this initial study, we had the following recruiting criteria: 1) Older than 60; 2) Didn't have caregivers and 4) Receive us at your house. Once in their homes, research team read the study protocol to the subjects and collected their signatures on inform consent. Eight individuals aging between 61 and 70 helped us in this study. Most participants did not have a smartphone. After the socio-technological profile questionnaire completion, we set up the our equipment: a android smartphone with 4G connection (the internet connection is necessary since Guardian uses Google Technology, Dialogflow, to process conversation) and a bluetooth sound box was used for decrease misunderstandings.

Such equipment configuration was also designed to simulate tools like Amazon's Alexa and Google Home and provide similar set of affordances.

All data collection were videotaped with the camera aimed at the participant's face. With this, the research team has all it is needed to perform a situated analysis, as proposed by Suchman [3]. All ambient stimuli, artifacts and subjects reaction to them are assessed in tandem to help the research team to make sense of what is truly happening in a deeper and more complete way.

## DISCUSSION AND RESULTS

After use, subjects answers system usability scale questionnaire which yielded a final mean score of 83.125. The scenarios can be divided into three main parts: information exchange, waiting for a culinary recipe and interruption of the system. The change of personal information, so that the agent knew his user better, was well accepted by the eight interviewees. In the interruption one of the users was annoyed to have his dialogue with the researcher ceased by the agent. The other participants weren't offended by the interruption, some even found it funny.

Concerning the wait for a culinary recipe two of the eight users were bored while waiting for the exchange of agents and the recipe provided after this. In the other users the main reactions noted were happiness, they loved the idea of one agent calling another. An important point to mention was that all users reported that they had never used an entirely voice-based application like ours.

Other point is that six of the eight seniors interviewed did not have a smartphone, but still managed to use the Guardian. One highlight was the request for friendship by Lady Laura at the end of her conversation flow. All eight users answered yes. This fact strengthens users acceptance of technology.

## CONCLUSION AND FUTURE WORK

In the Introduction section we raised several questions. The first was: Are personal assistants like Amazon's Alexa or Google's assistant offer any help for third world country seniors? The answer seems to be Yes. Despite the limitations of this study, one can appreciate the early signs of acceptance of the technology among this population. The second and third question were: How does such population receive and interact with such technology and Which culture related issues might arise from the introduction of the technology in their daily lives? Subjects were both surprised and annoyed. Surprised because most them had never talked to a computer. Annoyed, some of them, because they felt that this new friend does interrupt somebody else's conversation. Question four: Which possible positive impacts can be foreseen with the use of conversational assistants? We actually think that with more studies these technologies will be able to blend into people's lives. A careful choice of words and interaction scenarios might the way to persuade them to do what is relevant for healthy aging. Fifth and final question was: Which design guidelines can be drawn from this exploratory study? We argue that smalltalk approach seems to be a way to gain people's trust. The horoscope agent and the recipe guru, both agents, were well received as they create an illusion of several different people doing things for them.

In our next phase we will focus on long-term involvement, which is still an open question. Will the Guardian technology the able to deliver relevant habit building/transforming strategies? That require long term use.

## REFERENCES

1. A. Cheng, V. Raghavaraju, J. Kanugo, Y. P. Handrianto, and Y. Shang. 2018. Development and evaluation of a healthy coping voice interface application using the Google home for elderly patients with type 2 diabetes. In *2018 15th IEEE Annual Consumer Communications Networking Conference (CCNC)*. 1–5. DOI : <http://dx.doi.org/10.1109/CCNC.2018.8319283>
2. Arsénio Reis, Dennis Paulino, Hugo Paredes, and João Barroso. 2017. Using intelligent personal assistants to strengthen the elderlies' social bonds. In *International Conference on Universal Access in Human-Computer Interaction*. Springer, 593–602.
3. Lucy Suchman. 2007. *Human-machine reconfigurations: Plans and situated actions*. Cambridge University Press.

<sup>1</sup><https://drive.google.com/file/d/1r2KLHy7W10XSVRYBKeCOGaYg40dEkf6R/view?usp=sharing>