A Thesis Submitted in Partial Fulfillment of the requirements for the degree of bachelor of Computer Science

Asterisk-Rasa Connector

Natural language processing using IP telephony

by

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Abstract

Currently, chatbots represent a novel business strategy in customer service and process optimization in which customer-company interactions are implemented, so their study as well as implementation and improvement represent a great software development opportunity. Unfortunately, several tools related to the implementation of chatbots are under proprietary licenses, so the open-source community requires an implementation that is easy to implement as well as useful. This work will address the design and implementation of an open source connector between the Asterisk and Rasa projects, which involves natural language processing, IP telephony and an interactive voice response through a chatbot.

Contents

1 Introduction

From a software development perspective, more specifically a web perspective, a chatbot is an application that interacts with users through natural language text and/or voice to transmit information or perform actions in other applications; when we mention natural language we mean the typical language used in human conversations. In itself, a chatbot is another interface for the software, since it depends on the chatbot to convert natural language into a structure that the internal logic of its purpose can take advantage of.

As an example, suppose that a chatbot asks the user a series of questions to later fill out a form with the answers that the user provides. In this way, the chatbot itself interprets the conversation and turns it into a structure that can be used for the stated purpose. The same information that the chatbot extracts from the natural language responses is converted into structured data that the application's business logic can process. Similarly, structured data that emerges from business logic can be formulated in a natural language response.

As a result, a chatbot has the complexity of understanding natural language to obtain the data, producing natural language responses that read as well as if they were written by a human, and then interacting with the systems that perform the business logic. This is why chatbots are becoming one of the main tools for companies, mainly for customer service tasks and information inquiries. Among the tools to create one, there is Rasa [1], open source [2], cross-platform as it is written in Python and with constant updates from the developers. These characteristics make it one of the favorites.

One of the topics that has generated the most interest in the community lately is communication through voice with the chatbot. Connectors for web page interfaces already exist. The other area of great interest is telephony, so a way to use chatbots is needed in this area. For integration with telephony, Asterisk [3], also open source [4], is available, one of the most widespread tools in the world and integrated in communication projects such as FreePBX and Elastix.

2 Problem statement

As mentioned previously, chatbots have become a fairly popular interface in recent times, as they provide an intuitive and easy-to-use human-computer interface for handling natural language. However, its use in the business sector is not very widespread and those chatbots with great potential for its implementation are managed through proprietary licenses; furthermore, corresponding application areas for collaboration in digital workplaces are lacking, and previous research contributions on this topic are limited.

3 Justification

As mentioned previously, there is great interest in using voice chatbots. In particular, its use in telephony to replace interactive voice response systems (menus based on recordings and navigated by pressing keys) by an intelligent chatbot.

4 Objectives

General

- Create a connector, and a tutorial that explains its use, that allows communication between rasa and asterisk, through the use of stt and "text to speach (tts)" algorithms, text to speech.

Specific

- Create a demo chatbot for the user to follow a script and measure precision using the Levenshtein distance to compare strings.
- Post the code on github.com or similar.

5 Literature review

5.1 Web connector

This connector establishes an interface in an internet browser through which you can have voice conversations with the chatbot. This tutorial uses the free mozilla tools for speech generation and conversion.

5.2 Alexa integration

This project integrates a chatbot with Alexa, to make use of Amazon's voice conversion tools.

6 Hypothesis

It is possible to create a connector that is easy to implement and understand by the community by using interfaces based on the Python programming language. For this purpose the "Asterisk Gateway Interface (AGI)" will be used, which allows us to easily integrate Python.

7 Design and implementation

Bibliography

[1] J. Jacoby. *Rasa Docs*. 2020. URL: https://rasa.com/docs/ (visited on Dec. 13, 2020).

A Appendix

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