

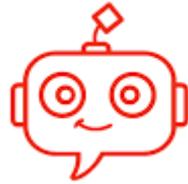
Leveraging traditional Chatbots with MDE

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Project Description

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V.1.0



Context:

A chatbot is a computer program that understands customer questions and automates responses, simulating human conversation.

There are several kinds of chatbots nowadays: menu or button-based; Linguistic Based; Keyword Recognition-based, Machine Learning; Hybrid; and Voice bots.

The linguistic-based (or rule-based), very common, are those that are programmed to reply to a limited set of simple queries with pre-written answers. They operate like an interactive FAQ.

If you can predict the types of questions your customers may ask, a linguistic chatbot might be your solution. Linguistic or rules-based chatbots create conversational automation flows using if/then logic. First, you have to define the language conditions of your chatbots. Conditions can be created to assess the words, the order of the words, synonyms, and more. If the incoming query matches the conditions defined by your chatbot, your customers can receive the appropriate help in no time.

However, it's your job to ensure that each permutation and combination of each question is defined. Otherwise, the chatbot will not understand your customer's input. This is why a linguistic model, while incredibly common, can be slow to develop. These chatbots demand rigidity and specificity.

The Goals:

In this project, you will build an MDE solution to program a Chatbot. You will:

1. Choose a specific application domain for the kinds of chatbots you want to derive as products. Their control logic should be complex enough to involve non-trivial state machines for interesting dialogues. complex guards in transitions. State changes can be based on the user input, context information of the dialogue, coming events, conditions on previous data, and parameters of the conversation, making it more complex conversation logic (if not sure, talk to the professor). Information should be captured and provided by the bot to trigger different threads of dialogue. A configurable internal psychological state machine of the bot (e.g. happy, curious, sad, upset) can be used to enlarge the variability of the possible answers (and, in the limit, no answers) to the same questions.
2. Build a Domain Model for the Concepts essential to be captured to design the dialogue (metamodel in **Ecore**)
3. Implement Well-formedness rules to validate the quality of the models with adequate fixes that might involve user intervention (**EVL**)
4. Implement a Visual Editor to design the state-transition-like models (**Sirius**)
5. Implement the transformation from Spreadsheet to Models of complementary information (**EOL**)
6. Generation (Synthesis) of the java code in the Xatkit platform (**EGL**).
7. Analysis of the result of Model-to-Model transformation to a simplified model that needs to be used for generating the specification(s) in NuSMV Model Checker with specific properties (**ETL, EGL, CTL or LTL**)

Deliverables:

Source code - Zipped version of the Eclipse project's source code and the eventual extensions to xatkit (including a readme.txt on how to use the tools and specific model instances for testing the features of the implemented tools).

Report - Pdf with at most eight pages, using the IEEE template, describing your solution. You can use the same content (figures etc.) as your presentation at the workshop.

Slides - of the talk in the seminar in pdf or ppt format

Demo - movie showing the use of your tools

Dates:

9/11/2022 (until 23h59) - Project submission in moodle.

9/11/2022 (9h-13h) - Workshop

Workshop:

Each group will present the corresponding work during the workshop. Please take note of the following instructions:

1) There is an upper limit of 20 minutes of oral presentation

2) As an example, the presentation can take the following structure:

- Intro
- Description of the chosen application domain of the chatbots
- The Domain Model (the metamodel)
- Validation rules
- Editor and Spreadsheet
- model-to-code
- Analysis (model checking)
- Online Demo showing the workflow to use the implemented tools
- Conclusions (what could be evolved in the future and retrospective analysis of the project)

3)* Everyone will be asked to fill in a form in google forms, commenting on the colleagues' presentations (one form per group):

4)* Everyone will be asked to rank their personal perception of the group's performance

* 3) and 4) will not be used by the teaching staff for grading purposes, so please give your honest opinion. These two topics are meant to exercise critical thinking.

Relevant Links:

Xatkit: <https://github.com/xatkit-bot-platform/xatkit>
<https://xatkit.com/chatbot-dsl-state-machines-xatkit-language/>

Overleaf: <https://www.overleaf.com/>