

Adaptive Chatbots Acting Like Tutor: Understanding and Support Learning

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1 INTRODUCTION

In recent years, digital technology has been evolving in various applications, and the interest in research on intelligent systems has become prominent. Design and implementation of Chatbots are one of most popular kinds of digital technologies.

The purpose of this research is to design and implement an educational framework to provide a learning pathway for learners independently from the content of the subject. The goal of this Chatbot lies mainly in the separation between educational content in a strict sense (learning objects, videos, text) and conversation.

2 STATE OF THE ART

Various studies developed artificial intelligence systems to support educational interaction in a human-like manner. Pedagogical agents, Educational agents, Learning companions, Virtual Teaching Assistants, Intelligent Tutoring Systems, etc. have thus been created. Not all of these can be considered "Chatbots" in a strict sense, but all of them testify the effort to provide learners with the interactivity that pedagogical theories consider a key element of success [4]. Intelligent Tutoring Systems (ITs) are computer-based tutoring systems that tailored to the needs of individuals learners [1]. Pedagogical agents (PAs), also called Educational Agents, are "facilitate learning through social interactions and the virtual real relationships with the learners" [3]. Virtual Teaching Assistants are meant to share the workload of a teacher and integrate machine intelligence with human intelligence: for example, Chou et al presented a VTA that tutors students and requests teachers to tutor those students whom the VTA cannot help [2].

3 PROPOSED APPROACH

So far, our recent Chatbot fully supports the two courses (MOOCs) developed by Politecnico di Milano. Learning pathways, currently, are defined taking into account the following criteria: Level of the difficulty, selecting a piece of the course. The conversation

is profiled according to two criteria: the available time and the background of the learner. The both sides criteria are limited and should be more detailed to bring high adaptivity. The purpose of this paper is to consider conversations as a potential adaptive way in the learning process rather than just an answering machine. In this regards, we used the iCHAT approach that lies mainly in the separation between educational contents and conversation: the Chatbot engages in a conversation with the user leading it as a teacher would do, allowing the user to express the intents that are relevant to bot to decide on the next action to bring high level of understanding and adaptivity in the learning process.

Dialog policies are crucial to control conversation here and now they are static and predefined. This study aims to make these rules dynamic. These policies will choose from previous dialogs to be more proactive. This Chatbot aims to improve the adaptive learning process by adding non-linear learning paths by deriving intents from conversation. An important aspect of our vision is that we think that Chatbots can help into adapting a learning process to the specific needs of a learner in a specific situation. Adaptation is specifically important for less traditional situations. Examples could be a) a learner accessing a MOOC for a specific goal, and not wanting everything from beginning to end; b) a professional learner on the job, having a specific need, to be answered fast; c) a traditional student wishing to go again through the material in order to refresh specific points; d) a learner with specific cognitive or emotional problems; etc.

4 CONCLUSIONS AND FUTURE WORK

Better understanding and an adaptive support in a learning process are main goals here. A separate line of future research might be to look more at what the Chatbot could bring to the virtual world. Chatbot with the ability to individualize a service might go beyond in just education context (e.g. eTourism and Healthcare). To validate the overall approach and provide some useful feedback about Chatbot, there is a team of expert The hat working on it (Summer 2019). After pre-evaluation, in the Fall of 2019, it will be evaluated by students of the recommended course at Polimi.

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