MOOCBuddy: a chatbot for personalized learning with MOOCs

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ABSTRACT
With the proliferation of MOOCs (Massive Open Online Courses) providers, like Coursera, edX, FutureLearn, UniCampus.ro, NOVAMOOC.uvt.ro or MOOC.ro, it's a real challenge to find the best learning resource. MOOCBuddy – a MOOC recommender system as a chatbot for Facebook Messenger, based on user's social media profile and interests, could be a solution. MOOCBuddy is looking like the big trend of 2016, based on the Messenger Platform launched by Facebook in the mid of April 2016.

Author Keywords
MOOCs; chatbot; Messenger platform; personalized learning; recommender system.

ACM Classification Keywords
Information interfaces and presentation. Miscellaneous.

General Terms
Design.

INTRODUCTION

Started in 2008, the new Massive Open Online Courses (MOOCs) paradigm has brought innovations at all levels of education, aiming to respond to the most pressing learning needs, generated by the new development policies and rapid evolution of the technology. With hundreds of new MOOCs which appear monthly, it is a real challenge to find the best resource fitting learner's personal profile, interests, background, and learning and development needs.

The paper reports on the development and features of a chatbot named MOOCBuddy, acting as a MOOC Recommender System based on user's social media profile and interests. The chatbot is based on the Facebook Messenger Platform launched by Facebook in the middle of April 2016, the philosophy of this platform and its potential for educational uses being also presented.

CHATBOTS TREND AND FACEBOOK MESSENGER PLATFORM

Chatbots definition

Chatbots can be considered artificial narrow intelligent (ANI) programs designed to interact with users in a human-like way, answering questions and performing tasks, in a specific area (Chase, 2016).

Developed by different companies, the existing chatbots constitute a paradigm shift in how we interact with technology, being specialized in areas such as (Sharma, 2016): customer support, transactions and helpdesks (Kasisto, Amazon Echo, Google Home, Microsoft's Cortana); smart wallets (wallet.AI); (advanced) data analytics; repetitive tasks; automated virtual assistants.

Facebook Messenger Platform

During the last years, being represented by chat-based applications like WhatsApp, WeChat, Telegram and Facebook Messenger, messaging has become the most widely used communication layer on the mobile platforms.

Combining the trends of artificial narrow intelligence (ANI) and messaging applications, on April 12, during the F8 conference, Facebook has launched the Messenger Platform (Beta) with chatbots and the Send/Receive API (Facebook, 2016a).

In the vision of Facebook, for the 900 million people and 50 million businesses that use Messenger monthly, the chatbots are seen as massive opportunities: by interacting directly with the people, the chatbots can provide automated subscription content (weather, news, traffic updates, sport scores), but also customized communications (receipts, shipping notifications, bookings, e-commerce guidance, interactive experiences).

For building chatbots, the Messenger Send/Receive API offers support for: defining a welcome screen for setting the context and different controls; sending and receiving text, images and interactive rich bubbles containing multiple calls-to-action; integration with the Wit.ai's Bot Engine for interpreting intent from natural language.

As Facebook has stated, people are putting first in the platform philosophy, meaning that users have the possibility to block the communication with the chatbots found unuseful, also each chatbot is reviewed by the company before becoming functional.

At less than a month from the Messenger Platform launch, Facebook estimated that tens of thousands of developers are building chatbots, being supported by the platform guidelines section (Facebook, 2016b). Also there are wizard tools to create (simple) chatbots such as botsify.com.

Meanwhile Facebook is working to implement a specific analytics system, in order to monitor chatbots and to prevent spam, bulk delivery or annoying messages (Matney, 2016).

It is not an easy task to discover new chatbots, even if the Messenger searching feature displays the results in two

different categories: More People, and Bots and Businesses. Also there were created directories for bots, such as botarena.co, botlist.co, botpages.com or chatbots.org. Bot hunter bot (@bothunterbot) is a bot curator chatbot, sending a list of new bots each week.

Chatbots for education

Exploring the above directories for chatbots and studying the current articles on this technology, one can note that education is seldom discussed as a domain for which chatbots could be built.

Interesting exceptions are the chatbots for UNESCO UReport project (@ureportglobal) or for displaying a product marketer's resume (@helloestherbot) (Crawford, 2016).

It's worth to mention also Jane Hart's blog note written in May, about how chatbots can be incorporated in Professional Ecosystems, with features for relevant or customized information such as (Hart, 2016): search for content or courses on YouTube, Wikipedia or Coursera; receive news from news sources, blogs feeds or Twitter accounts; receive productivity support, such as alerts or reminders; have an intelligent personal assistant.

MOOCS SEARCHING CHALLENGES

Started in 2008, the new Massive Open Online Courses (MOOCs) paradigm has brought innovations at all levels of education, aiming to respond to the most pressing learning needs, generated by the new development policies and rapid evolution of the technology. Each month hundreds of new MOOCs hosted on different platforms, addressing a large category of topics and with varying durations, are developed and offered to participants worldwide, some of them counting for university credits or verified certificates. Also some of the MOOCs could be packed in nanodegrees (Udacity), specializations (Coursera), xseries (Edx) or sequences (FutureLearn).

In Romania there are many initiatives related to MOOCs, the most of them being monitored and curated by the author (Holotescu, 2012): platforms and MOOCs were implemented (unicampus.ro, novamooc.uvt.ro, mooc.ro, unibuc-virtual.net, estudent.ro, eliada.ubbcluj.ro/proiect, udemy.com/management-ong); experiments for integrating MOOCs in blended academic courses can be found at University Politehnica Timisoara and University „Ioan Slavici" of Timisoara (Holotescu et al., 2014; Vasiu and Andone, 2014); workshops and national conferences related to opening education, many of them being organized by the members of the Romanian Coalition for OERs.

With the MOOCs rapid developments worldwide, it is a real challenge to find the best resource fitting learner's personal profile, interests, background, and learning and development needs.

The existing MOOCs directories or portals such as MOOC List (mooc-list.com), Class Central (class-central.com) or Open Education Europa (openeducationeuropa.eu) include features for searching based on different criteria. We should mention that the Romanian projects are not indexed by them.

The Class Central portal provides the possibility to follow a specific MOOCs platform or topic, the information being sent as a monthly e-mail.

Also there are studies related to MOOCs recommender systems design: Rădoiu (2014) argues that to be effective such a system must focus on MOOCs specific type of items (learning items) and user behavior in MOOCs context. MOOC-Rec desktop application was designed by Bousbahia and Chorfia (2015), the most appropriate MOOCs being proposed using the Case Based Reasoning (CBR) approach. The cognitive level, knowledge background, personal expectation, learning interest, learning motivation and learning style of students are considered in the undergraduate-oriented recommender system of MOOCs analyzed by Fu et al. (2015).

MOOCBUDDY CHATBOT

Design

In March 2016, the idea to build a chatbot as a MOOC recommender system was sent by the author to the HackTM organizers, for the education category, the proposal being published on the event website (Figure 1). At that moment there were only rumors about Facebook M and about future publishing of the Messenger Chat SDK (API), and a reduced number of chatbots exist, such as Assist (Constine, 2016).

Figure 1. MOOCBuddy idea on the HackTM event website (hacktm.ro/#!/categories).

The alpha version of MOOCBuddy was implemented in May, for the HackTM contest. During the next weeks, the chatbot was improved and tested. New developments are already specified as a result of the chatbot interaction with users and following the received feedback.

Based on our research, having the proposal published in March and the implementation in May, MOOCBuddy seems to be the first educational chatbot related to MOOCs.

One of the main aim of the chatbot is to promote the Romanian MOOCs initiatives, which were stored in an updated database. Thus the chatbot recommendations consist in items of this database and in links to specific searches in MOOCs directories presented above.

MOOCBuddy can assist anyone to discover (news about) MOOCs, individual learners to find MOOCs for their personal and professional development, but also teachers who intent to integrate MOOCs in their courses.

Features

MOOCBuddy is designed to be interactive, friendly and to facilitate the discovery of the MOOC paradigm, and the connections with MOOCs and platforms.

The dialogues with the users are modelled as structured messages with multiple bubbles rendered as a horizontal list. Bubbles containing information, images, buttons that open a URL or receive a choice are provided to users.

Based on the user's choice, the chatbot displays an introduction to MOOCs and hosting platforms, further information and platforms browsing being accessible by clicking URL buttons (Figure 2).

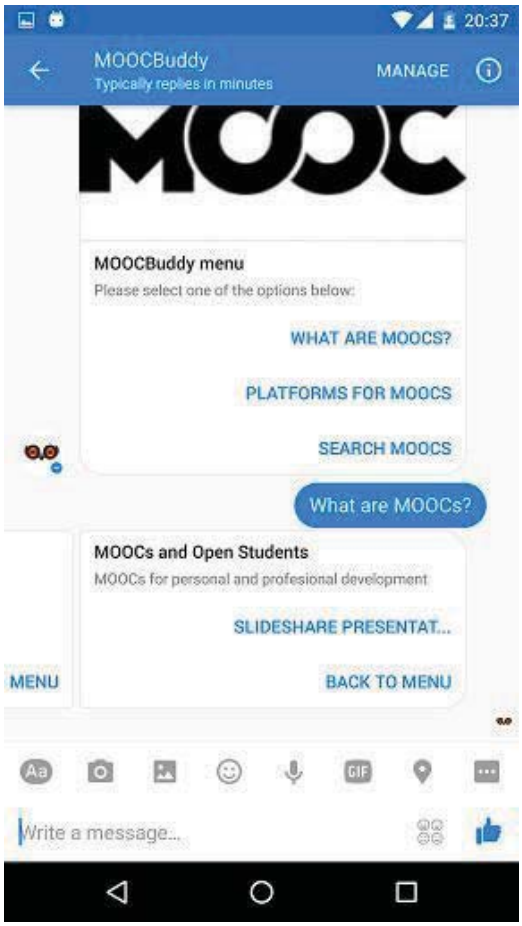

Figure 2. Screenshot with MOOCBuddy interaction.

MOOCBuddy offers MOOCs search by a large category of characteristics such as topics, language, start date, duration, accreditation, facilitators and university running the MOOC.

The findings can be shared by user on other social media platforms, commented and recommended to friends, this way MOOCBuddy and also the MOOC paradigm are disseminated.

Weekly alerts about new interesting MOOCs and news about the domain are sent. If these are considered intrusive, a user can block such messages.

Tests

Similar with all the other chatbots, MOOCBuddy has a dedicated Facebook page (facebook.com/mymoocbuddy), customized by the developer and there are more options for a user to enter in communication with it: by clicking on Send Message on the page; by entering the address m.me/MOOCBuddy in a (mobile) browser; by scanning the corresponding Messenger Code.

MOOCBuddy was tested by students at University Politehnica Timisoara and University „Ioan Slavici" of Timisoara, who have participated in the courses facilitated by the author and are already familiar with MOOCs. Also members of the Romanian Coalition for Open Educational Resources have interacted with the chatbot.

There are other users who liked the Facebook page and have communicated with the chatbot, MOOCBuddy having almost one hundred users after four weeks from its development.

MOOCBuddy learns continuously together with its users, improving its scenarios and assessing users' needs and satisfaction: it rates user experience, displaying values to be clicked, also registers proposals for new features as open messages sent by users which are stored in the developer panel or as comments in the associated Facebook page.

CONCLUSIONS AND FUTURE WORK

Implemented a month after the Messenger Platform launch, MOOCBuddy seems to be the first educational chatbot related to MOOCs, assisting users to discover news about MOOCs, to find MOOCs for personal and professional development, but also teachers to integrate MOOCs in their courses. Moreover, MOOCBuddy is an innovative project aiming to make known the Romanian initiatives related to MOOCs.

The chatbot creates an informal bond with its users, facilitates ubiquity learning and a storytelling interaction. As Crawford (2016) noted: "The desire to chat creates an opportunity for interactive storytelling. Use it to your advantage".

A future research direction will be the improvement of the recommender algorithm based on a larger category of user's characteristics (background including the recommended MOOCs previously followed and the participation rates, learning expectation and style, profiles

on different social networks), also on the user's history and interaction with the application. We intent to build a standalone recommender system with a specific API, which will be used by MOOCBuddy, but also by other web or mobile applications.

As possible business models or partnerships, MOOCBuddy could implement recommendations for specific platforms and MOOCs, and also personalized alerts for MOOCs to be followed for new knowledge/competencies needed for jobs/internships.

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