Chatbots: Automating Reference in Public Libraries

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ABSTRACT
The authors discuss their experience with using artificial intelligence and chatbots to enhance their existing web sites and information services in public library settings. The chapter describes their budget driven motivations for embarking on this project and outlines the development and implementation of the bots in their library settings. They show how the bots are positioned to enhance existing services and describe the various reactions to the bots from their patron base, and staff. Different implementations of the bots are highlighted (text only, animated talking avatar, mobile site, desktop help icon) as well as the differing levels of complexity of these different implementations. They address the oft posed question “Does AI spell the end of Reference?” and describe the InfoTabby code sharing project.

CHATBOTS TO EXTEND LIBRARY INFORMATION SERVICES

History
Our journey toward the implementation of AI chatbots began at the Mentor Public Library (MPL), following then Ohio Governor Ted Strickland’s June 19, 2009 proposal to cut state funding for public libraries (Office of the Governor, State of Ohio, 2009). At that time the proposal included cuts which would have removed about 50 percent of the Ohio’s funding for public libraries between 2010 and 2012. This was on top of a 20 percent reduction already faced by Ohio’s public libraries due to decline in the state’s General Revenue Fund (Sun News, 2009). As the Sun News (2009) reported, “Nearly 70 percent of the state’s more than 250 public libraries rely solely on state funding. A reduction of this magnitude could mean many will close branches or reduce hours and services.”
Mentor Library’s Board of Trustees responded to Governor Strickland’s proposal with a resolution directing the library administration to seek and implement technology to make up for the budget shortfall (Mentor Public Library Board of Trustees, 2009, p. 2). To this end, self checkout stations were installed in the Main Library during the summer of 2009. As he watched the installation of these stations, and faced with the potential of unstaffed reference desk time, it occurred to David Newyear (at that time Manager of Adult Information Services at MPL) that there might be a way to create self-serve information stations as well.

Having seen successful implementations of AI Chatbots in corporate and public sectors, David did some research and began creating a chatbot using SitePal (a company which provides animated avatars) in June of 2009. Emma, the Mentor Public Library’s virtual agent, made her debut on the library’s website on November 19, 2009. This first iteration of Emma provided answers to a list of twelve “frequently asked questions” or about the library’s services and policies. In January 2010, Sitepal’s artificial intelligence component was enabled allowing Emma’s programming to begin to evolve to address more and more complex questions. During the month of February, Emma answered nearly 10,000 questions posed by patrons.

From March to May of 2010, Emma’s “brain” was migrated from SitePal to the Pandorabots website, and Emma was rebuilt to take advantage of Pandorabot’s Superbot 2.0 base AIML files. At this point Emma was answering approximately 300 questions each week with a correct response average of 60%. In July 2010, David invited Michele McNeal, the Web Specialist for the Akron-Summit County Public Library, to collaborate on the project and they began to work together to expand the scope of the bot’s capabilities and improve the correct answer ratio.

Measuring Correct or Meaningful Responses

User conversations may be divided into three general categories:

1. Questions about the library.
2. Catalog or information searches.
3. Chat.

Determining the accuracy of responses in each of these categories is based on an examination of the conversation logs. This is fairly straightforward in the first category, which accounts for around 40% of user questions. For example, if a user asks how to renew their eBooks, the bot responds that eBooks cannot be renewed. This is counted as a correct or meaningful response. Ideally, every question should be answered in a single response. This is not always the case, so Emma will guide or prompt users to clarify their questions. If Emma can lead the user to the answer through this guidance, the response is counted as correct. If users abandon the conversation before arriving at the answer, the response is counted as incorrect.

Passing queries to the catalog or to other online resources is the second category and accounts for approximately 40% of user queries. In this case, sending the query to the appropriate resource and returning the result is counted as a correct response. In these searches, the lack of follow through on the user’s part becomes more of an issue. About half of catalog or database searches are abandoned before completion.

General chat makes up the remainder of conversations. Since the primary purpose of the bot is to provide information about the library and to assist with its use, correct or meaningful responses to general chat have not been tracked. The majority of the bot’s chat capacity comes from the SuperBot 2.0 AIML files, which have been edited to remove categories in conflict with