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Introduction:

"I really like the Game of Thrones books. Do you have another series like that?" This innocent question jumpstarted a multi-year project at the University of California, Irvine (UCI) campus library (UCI Libraries), culminating in a book recommending chatbot, bANTerbot. UCI is a public university in southern California, notable for being a Hispanic Serving Institution with a significant international student population. UCI Libraries also functions as a public library for some patrons and has responded to this usage by subscribing to leisure reading titles via Overdrive. Reflecting on experiences providing reference on desk and via chat, a pattern emerged. Patrons were approaching the desk with readers' advisory requests that were difficult to fill on the fly. Conversations with the student assistants staffing the desk confirmed requests such as "I'm trying to read more Black authors, who do you recommend?" were not possible to answer with simple subject or keyword searches.

The idea of bANTerbot, began in Fall 2019 as a class project for Kelsey's MLIS course on emerging technologies. She wanted to leverage an existing library technology, ANTswers, to address patrons' desire for readers' advisory and ease the workload for her student assistants and colleagues. After developing desired outcomes, Kelsey met with Danielle. This initial meeting focused on determining the feasibility of the idea within the scope of the class project. Danielle modified the existing ANTswers code, tested it with a sample book list, and determined the project was possible to attempt on a larger scale.

Background - ANTswers Chatbot

Libraries have been slow to adopt AI; while some have implemented chatbots and/or are using machine learning for analysis projects it has not reached full adoption. There was even less research or information on creating a library chatbot back in 2013 when the ANTswers project was first started. ANTswers provides 24/7 unrestricted access to answer simple and directional questions about library resources and services. ANTswers is an .AIML (Artificial Intelligence Markup Language) chatbot using Program-O, an open source AIML interpreter written in PHP. ANTswers logs are monitored to continue to improve and refine the service. From March 2014 – December 2022, ANTswers has been asked 16,678 questions, of which 10,636 of those were library related. No personal information, beyond the chat logs, is kept by the system unless provided by the chatter. The chatbot was created by a librarian with reference, instruction, and collections experience. ANTswers uses natural language processing (NLP) and pattern matching to return a

response that is the best match. Currently ANTswers is not set up to learn from library patrons but is instead modified by the botmaster.

The bANTerbot code is a subset of code belonging to the ANTswers chatbot. The bANTerbot code consists of 29 .AIML files organized by subject along with a pick-up line file which contains the sentences that library patrons can use to ask for book recommendations. While the bANTerbot code could be a fully functional standalone bot it was decided to integrate the code into the already existing ANTswers chatbot. This required careful consideration of the pickup lines for book recommendations and how the language needed to be distinct from the language used as pickups for book searches.

Project Workflow

As the Reference department student supervisor, Kelsey organized a team of five student assistants trained to serve on the desk who were skilled in catalog searching, familiar with UCI patrons, and confident in locating information outside of their area of expertise. She then divided the bANTerbot project into two distinct phases.

The first was a spreadsheet of popular books matched to recommendations for similar titles. These recommendations were primarily young adult titles - a reflection of the most common requests. While the overall goal of bANTerbot was to recommend items available in the collection, this specific section was broadened to name books that patrons could request through InterLibrary Loan. This "If you like" list was fully curated by a student assistant with a passion for young adult literature and the expertise to search for titles and assess their similarity. The result was a list of 16 popular titles with a minimum of three alternative recommendations for each.

The second phase was a spreadsheet of titles for requests related to genre and author demographics. Locating and adding titles needed to be a standardized task suitable for student assistants. Kelsey established the initial genre tags, created a controlled vocabulary of genre tags and appropriate synonyms, and approved suggestions based on relevant titles and anticipated usage. Within the genre or tag list, there were two distinct workflows. If a genre was easily discoverable through a subject search, students would review the list of results, pull out titles that appeared interesting to a leisure reading audience, and search for additional information to fill in tags related to author demographics before filling in the spreadsheet. As noted through reference desk and chat interactions, tags were not discoverable via a simple subject or keyword search. A few examples include books with movie adaptations and books by an author of color. In these cases, students searched book recommendation websites for appropriate titles and then searched the title in the UCI Libraries catalog and Overdrive collection. If the review process required a judgment call that students were uncomfortable making, they flagged

the title for review by their supervisor. The bANTerbot module launched after 32 titles were coded.

Keeping bANTerbot Up-To-Date

The original 450 titles in the Excel spreadsheet was instrumental in creating the beta code for the bANTerbot module quickly and efficiently. The students spent approximately one year adding titles to the Excel spreadsheet, along with their other work. The layout/design of the spreadsheet made it an ideal project to work on at the end of a shift and while waiting for patrons at a service desk. When COVID occurred in March 2020, finding titles for bANTerbot was an easy task for students transitioning to an online, asynchronous work environment. The project was also supported by a library school intern who worked on the project from January - June of 2020. The intern developed a set of initial code files that could be tested against the ANTswers code and were the basis for the fully completed bANTerbot code.

Once the bANTerbot code was integrated into ANTswers and was working correctly a research guide was created to highlight how library patrons could ask for book recommendations. The bANTerbot code updates were based on both the recommendations library patrons asked for that might not have been coded and also the discretion of the botmaster. New code was added for UCI authors, tabletop games, and a concentrated effort was placed on increasing the number of DEIA titles.

Moving from the original project to maintaining and updating the code, the Excel spreadsheet has been retired and titles are now added directly to the .AIML files. Methods for finding new titles include popular book lists, award winners, and book collections made by librarians. New categories are added based on requested book recommendations by the campus community and the collection. Some requests were not coded due to the academic library not having that type of collection, for example Christian fiction recommendations would be more appropriate for a public than an academic library. In those cases, code was added that no book recommendations are available for that topic.

Replicating bANTerbot

The bANTerbot code can be used in any system that accepts .AIML code. The titles and URLs can be updated to work with other libraries' OPACs and systems. If using chatbot software that does not accept .AIML code, the spreadsheet can be used to adapt the book recommendations. The bANTerbot code can be downloaded and used on its own or with other chatbot code. To successfully use both the spreadsheet and the bANTerbot code begin by reviewing the types of book recommendations requested and use the spreadsheet to develop a title list, including URLs. Prior to coding, think about the chatbot back-end to be used to

ensure the correct programming language is used and consider if it will be a full chatbot or a chatbot solely focused on book recommendations.

Chatbot Limitations

Through the planning and implementation phases, there were several limitations to consider. First, the current back-end of ANTswers is at end-of-life and no longer updated. Program-O has been replaced with the Lemur engine, another .aiml chatbot backend. At this time ANTswers has not been updated to work with a new backend. Additionally, ANTswers and bANTerbot are not set up to learn on their own or from the patrons using it and require a botmaster to review and update. Although this takes more staff time, it also removes the worry that patrons may teach the chatbot inappropriate responses.

During the initial book list creation, granting students a high level of autonomy resulted in recommendations skewed to their interests or niche book lists they found online. This led to interesting categories where book recommendations have yet to be requested. Also, as the title and tag list grew students needed to revisit previously coded titles to apply new tags. Another limitation of the bANTerbot code is that it can only pull recommendations from a single category, if patrons add multiple keywords then a book recommendation can not be supplied.

Marketing:

With a unique technology like bANTerbot, targeted marketing is key to reach users. Unfortunately, COVID-19 disrupted initial marketing opportunities for bANTerbot. Original plans for outreach included creating fun swag, attaching bANTerbot to information literacy programming, and piquing student interest via cryptic marketing across campus.

Undergraduate students love kitschy swag, especially buttons. Marketing efforts for bANTerbot can take advantage of the many depictions of the university's mascot, Peter the Anteater, to highlight the fun experience of the chatbot. An image of Peter asking "Looking for your next beach read? Chat with bANTerbot to explore books available through UCI Libraries." could be featured on buttons, stickers, bookmarks, and informational postcards. These materials can be distributed during tabling events and workshops in conjunction with a live demonstration and used as passive marketing at the reference and circulation desks. A recent series of UCI Libraries videos featuring a puppet mascot using library resources and services have been incredibly popular among students. A short video of the mascot engaging with the chatbot would deliver a demonstration in an engaging package.

One advantage of bANTerbot is that it is easily incorporated into a LibWizard tutorial or quiz, making it an ideal question for a library scavenger hunt. These questions can be open-ended and low stakes, emphasizing fun and discoverability, by offering

students several genres to explore. Depending on intended usage, questions could describe reading a catalog record, saving a record to a library account, and locating permalinks.

In addition to traditional marketing methods, there is also an opportunity to connect directly with students across campus by posting flyers and stickers with the QR code and a caption about finding a new favorite book. This could help students connect bANTerbot to leisure, rather than continuously associating it with the library as an academic space.

Conclusion:

With the addition of the bANTerbot code to ANTswers we have seen an increase in patrons requesting book recommendations. A guide was created with information about requesting recommendations and the categories available. Utilizing student assistants to create the initial book recommendation list was incredibly useful, especially early in the pandemic when we needed online work for the students. After the book recommendation support was localized to one person, the process was streamlined by adding the code directly to the appropriate file. Currently, there are 1,711 individual monograph titles across over 68 genres. Recommendations have been added for 144 books with movie adaptations and 137 tabletop games. With the increasing popularity of AI, libraries and academia will need to decide on an approach to utilizing it in the future. This will require evaluating AI back-end systems, working with library IT to implement a solution, server space, and programming support.

Resources:

ANTswers Chatbot: https://www.lib.uci.edu/antswers
ANTswers Library Chatbot Research Guide: https://guides.lib.uci.edu/antswers
ANTswers Usage & Chat Log Data: https://tinyurl.com/yzywb27m
bANTerbot & ANTswers code: https://tinyurl.com/ywauc95j
Fillable Book List for bANTerbot: https://tinyurl.com/2j24jbt
Lemur Engine: https://lemurengine.com/

Bios:

Kelsey Brown is a Student Success Librarian and liaison to the Women's, Gender, and Sexuality Studies program at the University of Connecticut. Kelsey's work is student-centered, focusing on information literacy programming, outreach events, research support, and collaborating with campus partners. Prior to joining UConn Library, she was a Library Assistant at the UC Irvine Libraries, where she taught

workshops, provided in-person and online reference assistance, created student assistant training, and curated displays.

Danielle Kane is the Computational Research Librarian at the University of California, Irvine. Danielle's work focuses on open science, teaching coding and programming workshops to undergraduate and graduate students, providing assistance with GIS, and maintaining the ANTswers chatbot. Created by Danielle in 2014 the ANTswers chatbot answers questions about the library and provides automated Readers Advisory.