

Answering queries via ChatGPT: Le Moyne Case

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Abstract

This paper demonstrates the applications of ChatGPT in answering inquiries from students interested in Le Moyne College. Initially, the contents of multiple webpages related to the college were consolidated into a single file. Subsequently, a personalized ChatGPT interface was developed using this file. This customized ChatGPT system proves sufficient in addressing various queries such as application procedures, annual costs, course registration, and available courses for a finance major. Furthermore, the paper outlines a method for leveraging a provided PDF document¹ to respond to questions. Additionally, the authors present a practical example of course selection for the fall semester of 2023. The outcomes of this study are remarkable, as this personalized ChatGPT implementation significantly streamlines processes for both students and staff members. It is important to note that while Le Moyne College serves as the exemplar institution, the proposed approach can be readily adapted to other universities. The paper also includes Python and R programs as supplementary resources.

JEL classifications: G00, G19, G14

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1 Introduction

ChatGPT, powered by the GPT-3.5 architecture, has a wide range of applications across various industries and fields. Its natural language processing capabilities and vast knowledge base make it a versatile tool for both businesses and individuals. One prominent application of ChatGPT is in customer service and support. Many companies employ ChatGPT to handle customer inquiries and provide instant assistance. With its ability to understand and generate human-like responses, ChatGPT can handle a wide array of customer queries, help to resolve issues, and provide relevant information in a timely manner. This application not only improves customer satisfaction but also reduces the workload on human support agents, allowing them to focus on more complex or specialized tasks.

Another significant application of ChatGPT is in content generation and writing assistance. Writers, journalists, and content creators can utilize ChatGPT to generate ideas, receive suggestions, and overcome writer's block. ChatGPT can provide coherent and contextually appropriate responses, helping users refine their writing, improve sentence structure, and generate new perspectives. Additionally, ChatGPT can be utilized for proofreading and grammar checks, as well as ensuring the quality and accuracy of written content. ChatGPT also finds applications in education and learning. It can serve as a virtual tutor, assisting students with their homework, providing explanations of complex concepts, and offering guidance in various subjects. Furthermore, ChatGPT can be used in language learning to practice conversations, improve vocabulary, and gain language proficiency through interactive dialogue.

In addition to these applications, ChatGPT can be utilized for information retrieval and research purposes. It can provide quick and accurate answers to factual questions, summarize articles or documents, and assist in data analysis. Researchers, analysts, and professionals from different domains can benefit from ChatGPT's ability to process and interpret vast amounts of information efficiently. Overall, ChatGPT's applications are diverse and far-reaching, spanning customer service, content generation, education, and research. Its natural language understanding and generation capabilities make it an invaluable tool for assisting humans with various tasks, enhancing productivity, and enriching the user experience in numerous domains.

ChatGPT can utilize an inputted PDF file to answer questions by employing a two-step process: PDF parsing and question-answering. First, the PDF file needs to be parsed or converted into a machine-readable format. This involves extracting the text and structural information from the PDF document. Various libraries and tools can be used to perform this task, such as `PyPDF2` (see Appendix G for all the functions contained in the Python module), `PDFMiner`, or `pdftotext`. The extracted text is then preprocessed to remove unnecessary formatting and ensure the content is in a suitable format for further analysis.

Once the PDF file is converted into text, ChatGPT can process the input and answer questions based on the content. When a question is asked, it, along with the preprocessed text from the PDF file, is passed as input to the ChatGPT model. The model then produces a response by understanding the question, contextualizing it with the provided information, and generating an appropriate answer based on its training. The effectiveness of this process depends on the quality of the PDF parsing, the accuracy of the extracted text, and the language understanding capabilities of the ChatGPT model. It's important to note that ChatGPT's responses are generated based on patterns and knowledge learned during training and may not always reflect the most up-to-date or accurate information. Therefore, it's advisable to validate the answers obtained from ChatGPT with additional sources or expertise, especially when dealing with critical or sensitive information. By the way, multiple PDF files can be combined into one (see Appendix F for the Python program to combine files).

ChatGPT is used in many research areas such as finance, accounting and marketing. ChatGPT, a generative AI tool, has the potential to disrupt industries and revolutionize information processing. Kim, Muhn, and Nikolaev (2023) investigate its economic usefulness by utilizing the GPT language model to summarize complex corporate disclosures found in annual reports (MD&A) and conference calls. The resulting summaries are significantly shorter but contain amplified information. They also align with the sentiment of the original disclosures. These summaries better explain stock market reactions to the disclosed information. Inspired by these findings, they introduce a novel measure of disclosure "bloat" and find that bloated disclosure leads to negative market consequences, including reduced price efficiency and increased information asymmetry.

Hofert (2023) investigates the extent to which ChatGPT can grasp concepts from the realm of risk, risk measures, time series, extremes and dependence. Non-technical aspects of risk (such as explanations of various types of financial risk, the driving factors underlying the financial crisis of 2007 to 2009, or a basic introduction to the Basel Framework) are well grasped. He finds that more technical aspects (such as mathematical facts) are often inaccurate or wrong, sometimes in rather subtle ways.

Kok (2023) discusses the growing significance of Generative Large Language Models. The author highlights various applications of GLLMs in accounting research and compares them to traditional textual analysis methods. Additionally, the paper presents a framework for researchers to effectively incorporate GLLMs into their work, covering important considerations such as model selection, prompt engineering, and construct validity. The author emphasizes the need to address concerns related to bias, replicability, data privacy, and attributability when utilizing GLLMs. Lopez-Lira and Tang (2023) explore ChatGPT and other large language models' potential in predicting stock market returns through sentiment analysis of news headlines. ChatGPT outperforms traditional methods, indicating emerging capacity for return predictability. Incorporating advanced language models improves predictions and enhances quantitative trading strategies.

Rao (2023) reports that 47% of U.S. adults reported using ChatGPT for advice on stock market picks based on the Motley Fool survey. In the survey, 45% said that they would be comfortable with only using the AI model for stock picking and 50% of Millennials and 53% of Gen Zers used the AI LLM to unearth stock picks. Meanwhile, only 25% of Baby Boomers -- a cohort that still remembers how fax machines and floppy discs work -- felt comfortable doing so. This illustrates the importance of new technology in our university education.

Blomkvist, Qiu, and Zhao (2023) examine the impact of ChatGPT's introduction on stock prices. They find that following the introduction, firms operating in industries with workforces more substitutable to AI techniques are associated with significantly negative stock returns. They attribute the negative share price reaction to the increased competition from new technology.

The paper is organized in the following way. The next section discusses our methodology and the sources of data. There are two types of data: websites and PDF files related to Le Moyne College. Section 3 demonstrates how the ChatGPT interface works by offering several examples. Section 4 shows another ChatGPT interface by uploading a PDF file. The PDF file for the History of Le Moyne College is used as an example. The next section discusses how to choose courses for the Fall 2023 semester by using ChatGPT. The input text files are from the related websites. Another alternative way is to choose courses by searching instructors. The last section concludes the paper and points out a few potential extensions.

2 Methodology and data

The program used in this paper is Python. To be more specific, the Python module used is `langchain` (see its documentation in the references). Appendix A lists all the functions contained in the package. The underlying functions contained in the module are coming from OpenAI. Thus, users must use a personal API key. Interested researchers can request their personal API keys at <https://platform.openai.com/account/api-keys>. To produce a good interface (between the underlying Python programs and potential users), we use the Python module `streamlit` (see its documentation at <https://docs.streamlit.io/library/get-started>). One typical example is "Mortgage Calculator" by Yan (2023). After clicking the link at <https://paulxy-mortgage-calculator-app-5y1trx.streamlit.app/>, users can input the price of a house, percentage of down payment, annual mortgage rate and the duration (number of years). For the image of the interface (see Appendix B and Appendix C for all the related Python code and its GitHub link).

For this paper, we use Le Moyne College as an example. In the first step, we collect the text contents from 20 websites. To collect the text data, we manually copy the contents of each website and generate its text file. Then an R program is used to combine them into just one text input file (see Appendix D for this R program). The following table lists the links of those websites.

Table 1: List of websites

Name	Website
Admission	https://www.lemoyne.edu/Admission/First-Year-Admission/Applying-for-Admission
Register acc	https://connect.lemoyne.edu/account/register?r=https%3a%2f%2fconnect.lemoyne.edu%2fapply%2f
Apply	https://connect.lemoyne.edu/apply/
Cost	https://www.lemoyne.edu/Admission/First-Year-Admission/Tuition-Costs
Loans	https://www.lemoyne.edu/Admission/Financial-Aid/Types-of-Aid/Loans
scholarships	https://www.lemoyne.edu/Admission/Financial-Aid/Types-of-Aid/Scholarships
Endowed	https://www.lemoyne.edu/Admission/Financial-Aid/Types-of-Aid/Endowed-Scholarships
About	https://www.lemoyne.edu/Values/About-Us
Fin. courses	http://collegecatalog.lemoyne.edu/courses-az/fin/
Data faculty	https://www.lemoyne.edu/Academics/Our-Faculty/Business-Analytics
Data courses	http://collegecatalog.lemoyne.edu/madden-business/business-analytics/#coursestext
General info	http://collegecatalog.lemoyne.edu/general-information/
AcademicInfo	http://collegecatalog.lemoyne.edu/general-information/academic/
studentService	https://lemoyne.edu/Student-Life/Supporting-Our-Students
coCurricular	http://collegecatalog.lemoyne.edu/general-information/cocurricular-activities/
Business School	http://collegecatalog.lemoyne.edu/madden-business/
Accounting	http://collegecatalog.lemoyne.edu/madden-business/accounting/
Bus. Analytics	http://collegecatalog.lemoyne.edu/madden-business/business-analytics/
finance	http://collegecatalog.lemoyne.edu/madden-business/finance/
BS finance	http://collegecatalog.lemoyne.edu/madden-business/finance/finance-bs/
Dual/Fin/Data	http://collegecatalog.lemoyne.edu/madden-business/finance/dual-major-finance-business-analytics-bs/
Dual/FinInfo	http://collegecatalog.lemoyne.edu/madden-business/finance/dual-major-finance-information-systems-bs/
Fin. Minor	http://collegecatalog.lemoyne.edu/madden-business/finance/finance-minor/

The R program (in Appendix D) is used to combine the text files based on the above websites.

The next table shows a few PDF files used in this study.

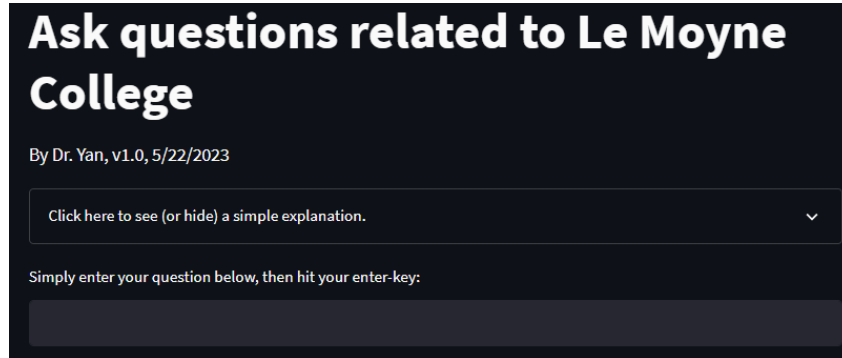
Table 3: List of PDF used

Name	Links
History	https://www.thefire.org/sites/default/files/pdfs/66515b86cbab0541b7d8b057abea1208.pdf
2020-2021 catalog	http://collegecatalog.lemoyne.edu/pdf/2020-2021%20Catalog.pdf
Student athletes 2022-2023 handbook	https://lemoynedolphins.com/documents/2022/9/2/Le_Moyne_College_Student-Athlete_Handbook_-_2022.pdf
Academic calendar 2023-2024	https://www.lemoyne.edu/Portals/0/2023-2024%20Approved%20academic%20calendar%20_1.pdf

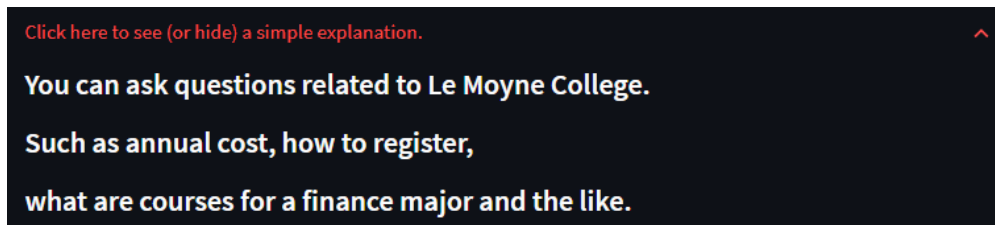
The Python program (in Appendix E) can be used to combine different PDF files.

3 Illustrations with a few examples

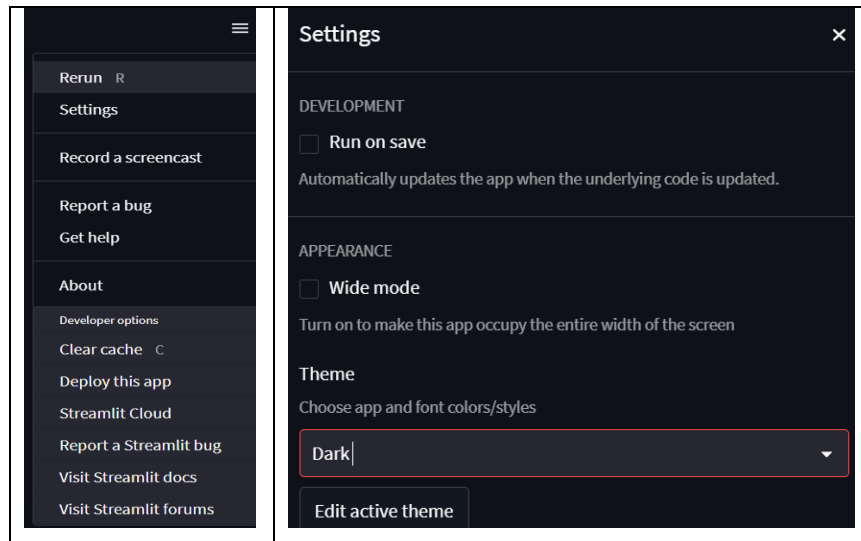
After combining the text files discussed in Section 2 as one text file, we generate a ChatGPT interface by using this big text input file. Its interface is shown below.



The interface is very simple. Users can click “Click here” to see a simple explanation, shown below.



Click it again to hide it. Any users such as students, staff or faculty could simply enter questions. On the far right on top, there is a menu, shown below on the left.



Users could ignore most entries, except for one or two. For example, under “Settings”, we can change the theme from “Dark” to “Light”. The new interface is shown below.

Ask questions related to Le Moyne College

By Dr. Yan, v1.0, 5/22/2023

Click here to see (or hide) a simple explanation. ▾

Simply enter your question below, then hit your enter-key:

For example, we can ask “How to apply to Le Moyne?”. The answer is shown below.

Simply enter your question below:

How to apply to Le Moyne?

Prospective First Year and Transfer students can submit the Common Application, the Le Moyne Application, or the Coalition Application (powered by Scoir). Applications and accompanying pieces may be submitted either electronically or by hard copy, or a combination of both.

The second question is the annual cost to attend Le Moyne. Our ChatGPT offers several values, shown below.

Simply enter your question below:

What is the annual cost?

The estimated expenses for the average undergraduate student for the academic year are **37,770** *fortuition*, **1,200** for the comprehensive fee, **9,760** *for room*, **5,900** for board, and \$2,690 for personal expenses.

On the other hand, if we enter a question related to our input file, the interface will give a negative answer, shown below.

Simply enter your question below, then hit your enter-key:

What is the annual cost to attend SUNY Geneseo?

I don't know.

The third question is related to finance major: “What courses should a student take for a finance major?”, the output is shown below.

What courses should a student take for a finance major?

A student should take COR 100, WRT 101, PHL 110, HST 110, HST 111, ENG 210, PHL 210, Theology, EAC, ENG 310, Mathematics 2, Social Science 3, Natural Science, IDS, Religion, COR 400, VPA, DIV, ACT 201 or ACT 203, ACT 202 or ACT 204, ANL 301, BUS 101, FIN 301, FIN 401, FIN 405, and two of the following: FIN 365, FIN 450, FIN 455, FIN 460, FIN 465, FIN 467, FIN 481, and FIN 491.

The following table shows 6 extra questions and their related answers.

Table 2: Questions and answers by ChatGPT

<p>Q: Could you explain the contents of COR100</p> <p>A: COR100 is a first year seminar class at Le Moyne that is designed to introduce students to college. The course is taught by a long-standing professor at Le Moyne who has experience teaching and mentoring first year students. The class is intended to cover topics such as learning, meaning, calling, and career and help students refine their interests, values, and skills in order to discern a career pathway that would appeal to their “whole self.”</p>
<p>Q: why study finance</p> <p>A: Studying finance provides students with a comprehensive introduction to multiple business disciplines, a strong foundation in core financial areas, and the opportunity to prepare for financial management and decision-making positions in corporate institutions, government, and nonprofit organizations. It also provides the opportunity to gain real world investment experience and manage their own personal mock investment portfolio.</p>
<p>Q: what are dual majors for finance major students</p> <p>A: Dual major options for finance major students include a Bachelor of Science in Business: Finance with a concentration in Corporate Finance or Investment Management, a Bachelor of Science in Finance and Business Analytics, and a Bachelor of Science in Finance and Information Systems.</p>
<p>Q: Please use one or two paragraphs describing Madden School of Business</p> <p>A: The Madden School of Business at Le Moyne College offers a Bachelor of Science degree in business with eight majors: accounting; business analytics; finance; human resource management; information systems; management & leadership; marketing; and risk management and insurance. Students have the opportunity to pursue two concurrent majors within the school, or supplement their major in business with a minor in a different field. The school also offers a master’s in business administration (MBA) and a five-year accounting/MBA program, a master’s of science in information systems (MSIS) and a five-year accounting/MSIS program.</p>
<p>Q: How to get an email account</p> <p>A: To get an email account at Le Moyne College, go to the college's home page and click on the "Create an Account" link under the Heights Alert tab.</p>
<p>Q: who are the faculty for the music majors</p> <p>A: The faculty for the music majors at Le Moyne College are Martha Grabowski (chair), Mary K. Collins, Mitchell Franklin, Joan K. Myers, Benjamin Huegel, William Barrett, Karen Kukla, and Michael J. Krause.</p>

4 ChatGPT with PDF files

In the previous section, we discussed ChatGPT based on a set of text files. In this section, we try to use PDF files instead. The following table shows the list of PDF files we plan to use. The first PDF file is related the history of Le Moyne College; its link is at <https://www.thefire.org/sites/default/files/pdfs/66515b86cbab0541b7d8b057abea1208.pdf>. Its top part is shown below.

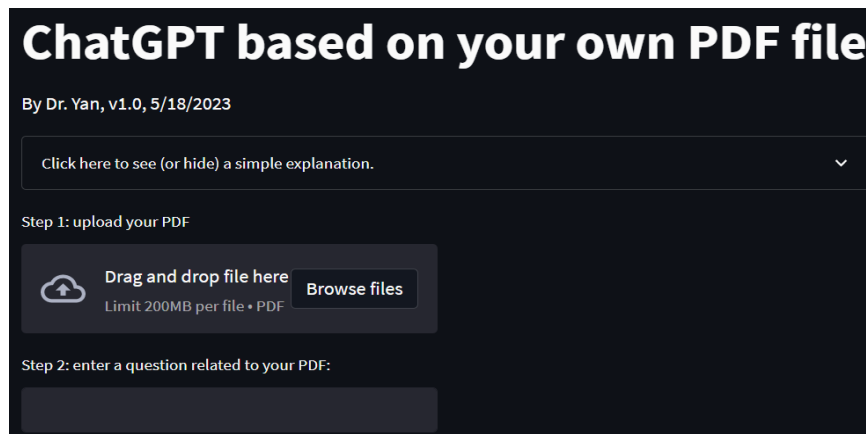
The History of Le Moyne College

Le Moyne College, the Catholic College in Syracuse, N.Y., was founded in 1946 by the Society of Jesus. The institution offers higher education in a 450-year-old intellectual and religious tradition. The more than 300 Jesuit schools, colleges and universities throughout the world stress academic excellence, preparation for life in the professions or workplace, education of the whole person, respect for the integrity and freedom of all persons, the formation of clear goals in life based on solid religious or philosophic principles, an emphasis on ethics and values, the development of a concern for others, especially for those most in need, and service to the local and regional community.

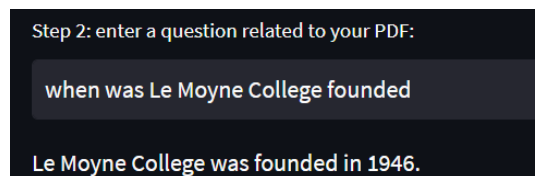
to assist them in acquiring the skills, knowledge, attitudes and values that form the basis of a liberal arts education in the Jesuit tradition. More than 700 courses are offered, leading to Bachelor of Science or Bachelor of Arts degrees in 24 different majors, or to graduate degrees in nursing, physician assistant studies, business administration or education.



The image shows our ChatGPT interface by uploading individual PDF files. Any questions should be related to this specific PDF file.



From the above image, we can see that there are two steps involved: uploading your given PDF file and asking related questions.



For multiple PDF files, we can write a program to combine them (see the related Python program in Appendix C).

5 Searching the course schedule for fall 2023

In this section, we show how to use ChatGPT to search the Fall 2023 Course schedule. The web site is at <https://echo.lemoyne.edu/courseavail/COURSE-23-FA.htm>. There are different categories, shown in the following table.

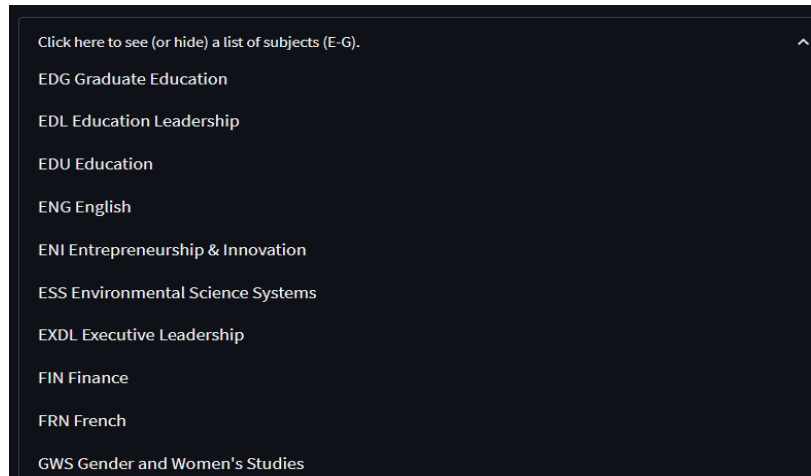
Table 4: List of subjects

AAD Arts Administration	EDL Education Leadership	MUS Music
ACT Accounting	EDU Education	NSG Nursing
ANL Business Analytics	ENG English	OTM Occupational Therapy
ANT Anthropology	ENI Entrepreneurship & Innovation	PAS Physician Assistant
ARA Arabic	ESS Environmental Science Systems	PCON Pomeroy College of Nursing
ART Visual Arts	EXDL Executive Leadership	PGS Peace and Global Studies
ASL Sign Language	FIN Finance	PHL Philosophy
AST Astronomy	FRN French	PHY Physics
BIO Biology	GWS Gender and Women's Studies	PSC Political Science
BSC Biological Sciences	HON Honors	PSF Professional Studies
BUS Business Administ	HRM Human Resource Mgmt	PSY Psychology
CHM Chemistry	HST History	RAS Race in American Society
CHN Chinese	ITL Italian	REL Religious Studies
CHS Chemical Science	JPN Japanese	RMI Risk Management and Insurance
CJS Criminology	JVC Jesuit Values Core	SOC Sociology
CMM Communications	LAT Latin	SPN Spanish
COR Core	LAW Law	SYRE SU Pre-Engineering
CRW Creative Writing	LDR Leadership	THE Theology
CSC Computer Science	LGS Legal Studies	THR Theatre Arts
CTS Computing Technologies	MGT Management	WLC World Lang., Lit., and Cult.
CYS Cybersecurity	MIS Management Info Sys	WRT Writing
ECO Economics	MKT Marketing	
EDG Graduate Education	MTH Mathematics	

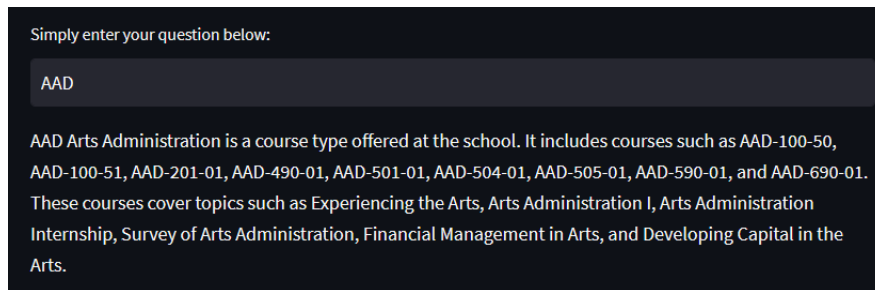
When searching a category, students might need to know all the available categories. Our ChatGPT will offer such information, shown below.



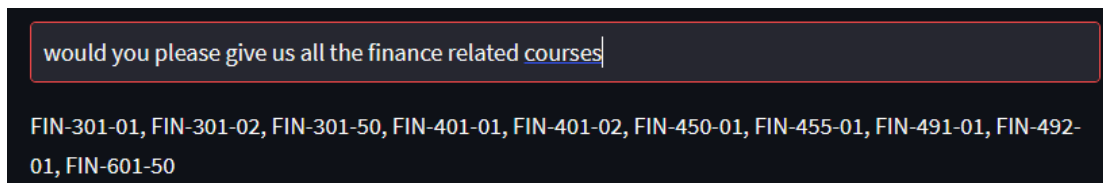
For example, we know that finance should be between E and F.



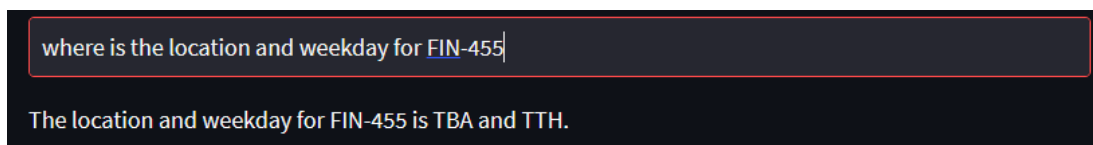
Below is the result when we enter “AAD” for Arts Administration.



Next let's look at whether the platform could give us course names related to finance. The question is “Would you please give us all the finance related courses?” In total, the interface gives us 10 courses starting with FIN.



Assume that we are interested in FIN-455 and want to know the location and the classroom, shown below. Obviously, the location is not determined so far (TBA) and the weekdays are Tuesday and Thursday (TTH).



To get more information for a specific course, we have the following question.

would you please give me more detailed information related to FIN-455

FIN-455 is a course entitled "International Financial Mgmt", taught by H. Wang. It is a 3-credit course that runs from 8/28/23 to 12/16/23 and is held on Tuesdays and Thursdays from 11:30AM to 12:45PM.

To choose courses, students could have another option: by choosing a specific professor. The related website is at <https://echo.lemoyne.edu/courseavail/TEACHER-23-FA.htm>. The top part is shown below.

Course schedule for the Fall 2023 semester by professors

By Dr. Yan, v1.0, 5/20/2023

Click here to see (or hide) a list of professors last names starting A or B. ▼

Click here to see (or hide) a list of subjects (L - M). ▼

Click here to see (or hide) a list of subjects (C-D). ▼

Click here to see (or hide) a list of subjects (N - Q). ▼

Click here to see (or hide) a list of subjects (E-G). ▼

Click here to see (or hide) a list of subjects (R - S). ▼

Click here to see (or hide) a list of subjects (H-K). ▼

Click here to see (or hide) a list of subjects (T - Z). ▼

Simply enter your question below:

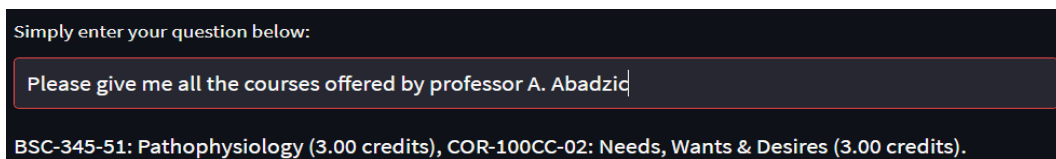
The following image shows all the instructors.

	A	B	C	D	E	F	G	H	I
	Professors								
1	A. Abadzic	J. Enwright	S. Lin	H. Rine		D. Caterine	J. Herrick	J. Nixon	F. Ternikar
2	A. Acharya	B. Erickson	J. Liu	A. Robertson	S. Ceci	V. Hevern	D. Norton	D. Tooker	D. Tooker
3	S. Affeldt	C. Esposito	D. Lloyd	R. Robertson	K. Cervantes	K. Hirschman	P. Novak	M. Traudt	M. Traudt
4	J. Alvarez	J. Evener	S. Loner	C. Robinson	N. Champoux	T. Hobin	K. Nyman	J. Tumajvan	J. Tumajvan
5	R. Anderson	S. Fahev	L. Losito	D. Roche	J. Chin	W. Holmes	A. O'Brien	V. Valle	V. Valle
6	S. Angrisano	M. Fee	M. Loveland	F. Rodriguez-Guridi	M. Chiorini	B. Huegel	S. O'Reilly	L. Viefhues-Bailey	L. Viefhues-Bailey
7	R. Arena	A. Ferraiolo	R. Lund	F. Ruchalski	S. Choi	J. Hunter	G. Odhiambo	A. Vinciguerra	A. Vinciguerra
8	D. Arno	C. Fisher	T. Luong	A. Ryan	G. Clark	M. Ierlan	P. Okafor	M. Vinciguerra	M. Vinciguerra
9	J. Arnone	J. Flaver	J. Lusnier	M. Saenz	C. Cobb	T. Jackson	J. Olin-Ammentorp	M. Vinciguerra	M. Vinciguerra
10	B. Arozvaswamy	M. Fledderjohann	D. Lynch	S. Sassone	K. Compagni	C. Jacobe	A. Orr	D. Voorhees	D. Voorhees
11	S. Aversa	L. Foughs	K. Mackendrick	L. Satherly	B. Connor	R. Jannetti	F. Oztanriseven	L. Voorhees	L. Voorhees
12	O. Barrett	M. Franklin	D. Makuia	S. Scharoun	J. Conopla	A. Jarvis	C. Pace	M. Wafer	M. Wafer
13	J. Bartholomew	M. Gardiner	D. Mamelouk	W. Scherer	C. Corcoran	C. Jha	B. Page	H. Wang	H. Wang
14	C. Bass	J. Ginestro	A. Marganski	D. Schnellinger	T. Couto	M. Jia	C. Pardee	L. Wang	L. Wang
15	K. Batcho	M. Giordano	K. Marilinsky	M. Schramm	D. Cromley	F. Jordan	J. Parent	S. Ward	S. Ward
16	F. Bazzano	J. Glancy	F. Marullo	R. Scully	V. Cronin	J. Joseph	L. Parkington	N. Weaver	N. Weaver
17	T. Beaty	S. Gleasman-DeSimone	M. Mastroleo	H. Sharifi	C. Cunningham	M. Kagan	M. Patel	E. Weagbreit	E. Weagbreit
18	R. Belhachemi	F. Glennon	P. Mazza	A. Shaver	D. Cunningham	D. Kane	C. Patterson	M. Wehrer	M. Wehrer
19	N. Berg	J. Goldberg	L. McCaffrey	J. Shomar	M. D'Eredita	D. Keeney	M. Patterson	S. Weiss-Russell	S. Weiss-Russell
20	G. Beritela	K. Goss	D. McCrimmon	B. Simon	J. Dahlinger	A. Kennedy	L. Pennisi	M. Wheelock	M. Wheelock
21	M. Birkett-Greene	M. Grabowski	D. McGork	T. Singh	J. Damiani	M. Killinc	J. Pierce	T. White	T. White
22	B. Blaine	J. Graham	E. Mercer	A. Smith	J. Daprano	B. Kirby	M. Pisk	R. Williams	R. Williams
23	L. Rousquet	K. Gray-Siracusa	B. Mettelman	S. Smith	A. Das	E. Kirch	J. Planas	S. Williams	S. Williams
24	M. Brady	M. Grener	C. Michaelson	J. Snyder	M. Davis	S. Kirst	D. Popescu	K. Wolfe	K. Wolfe
25	J. Bridge	J. Grossman	M. Miller	M. Sozen	M. Davis	K. Krause	B. Porter	W. Wood	W. Wood
26	R. Bridge	W. Grove	D. Moore	J. Spaine	W. Dav	K. Krenina	B. Pritts	J. Hi	J. Hi
27	T. Brockelman	K. Gruninger	J. Moran	M. Springston	S. DeTore-Wilsev	J. Krisher	W. Pruitt	E. Young	E. Young
28	C. Brownell	M. Guzik	E. Mullally	L. Streissguth	G. Dettori	J. Kurt	J. Qian	M. Younis	M. Younis
29	C. Burkett	F. Harcourt	J. Mullins	M. Streisseuth	D. DiFabio	S. Kyrkos	D. Rai	P. Yurco	P. Yurco
30	J. Burrell	C. Harper	G. Myers	D. Sullivan	M. DiTullio	F. LaRocca	J. Rancv	M. Zampini	M. Zampini
31	J. Carello	D. Hart	J. Myers	K. Sullivan	T. Doane	M. Larche	R. Rapoza	R. Zens	R. Zens
32	K. Carny	P. Hawkins	P. Nappi	S. Sureshkumar	M. Doolittle	J. Law-Penrose	M. Read	J. Zhang	J. Zhang
33	B. Carranti	T. Hayden	M. Narrigan	M. Sylvia	R. Downey	P. Lawler	J. Reardon	T. Zino	T. Zino
34	A. Carroll	M. Healy-Rodriguez	J. Needleman	L. Tanner	J. Ebner	E. Lawless	C. Rewakowski	M. Zuppano	M. Zuppano
35	M. Caslin	M. Heintz	T. Newton	M. Taylor	N. Edwards	J. Lawson	F. Ridzi		

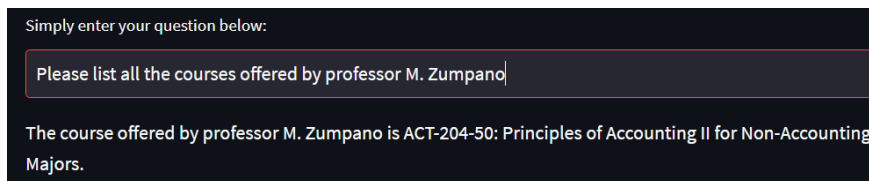
Like the previous ChatGPT interface, this one has two parts as well. The first eight “entries” arranged by four rows are the names of professors sorted by their last names. The professors with their last names starting with “A” or “B” are shown below on the left. The name of the first professor is A. Abadzic. The list of professors with their first names starting with T to Z is shown below on the right. The name of the last professor is M. Zumpano.



We can now search courses offered by individual instructors with the following prompt: “Please give me all the courses offered by professor A. Abadzic”. The related answer is shown below



The name of the last professor (sorted by last name) is M. Zumpano. The following result shows the courses offered by this professor.



6 Conclusions and potential extension

This research paper showcases the practical implementation of ChatGPT to cater to inquiries from students interested in Le Moyne College. Initially, an amalgamation of various college webpages into a

consolidated file was executed. Subsequently, an individualized ChatGPT interface was meticulously crafted utilizing this compiled data. The resulting custom-made ChatGPT system demonstrated remarkable proficiency in addressing an array of queries encompassing application procedures, annual costs, course enrollment, and course offerings within the finance major. Moreover, the paper presents a comprehensive methodology for effectively utilizing PDF documents to generate informed responses. Additionally, the authors provide a tangible illustration by exemplifying course selection for the forthcoming fall semester of 2023. The study's outcomes are undeniably noteworthy, as the implementation of this personalized ChatGPT system significantly streamlines operational procedures for both students and staff members. It is noteworthy that while Le Moyne College serves as the primary exemplar, the proposed approach can be seamlessly adapted to other academic institutions. The supplementary resources accompanying this paper encompass a range of Python and R programs.

Expanding on the aforementioned article, there are several directions in which the research and application of ChatGPT can be further extended. Enhancement of ChatGPT's Natural Language Understanding: Future work can focus on improving ChatGPT's comprehension of complex and nuanced queries. This could involve training the model on more diverse and specialized datasets specific to Le Moyne College or other educational institutions. Additionally, incorporating domain-specific knowledge and contextual understanding can help ChatGPT provide more accurate and tailored responses.

Integration of Multi-modal Capabilities: To enhance the user experience, future research can explore integrating multi-modal capabilities into ChatGPT. By incorporating images, videos, or audio files related to Le Moyne College, ChatGPT can provide visual or auditory information in addition to textual responses. This would allow students to have a more immersive and comprehensive interaction with the system.

Personalized Recommendations: Going beyond question-answering, ChatGPT can be extended to offer personalized recommendations to students based on their interests, academic goals, and historical data. By analyzing past interactions and user preferences, ChatGPT can suggest suitable courses, extracurricular activities, and resources that align with each student's unique profile. This personalized recommendation system can assist students in making informed decisions and further enhance their educational journey.

Integration with Student Information Systems: Integrating ChatGPT with existing student information systems can facilitate seamless access to personalized information. By connecting to databases containing student records, schedules, and academic resources, ChatGPT can provide real-time updates on course availability, registration deadlines, and academic policies. This integration would create a unified and efficient information ecosystem, benefiting both students and administrative staff.

Collaboration and Group Interaction: Expanding ChatGPT's capabilities to facilitate group interactions and collaboration can be an intriguing avenue for further research. Enabling features such as

group chat, project coordination, or study group formation can enhance student engagement and foster collaborative learning environments. This would transform ChatGPT into a valuable tool for facilitating social and academic interactions among students within the Le Moyne College community.

By exploring these directions, researchers and developers can continue to harness the potential of ChatGPT in revolutionizing student support, academic guidance, and overall educational experiences.

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Appendix A: The contents of the Python langchain module

```
import langchain
print(dir(langchain))
Output from spyder call 'get_cwd':
['Anthropic', 'ArxivAPIWrapper', 'Banana', 'BaseCache', 'BasePromptTemplate',
'CerebrumAI', 'Cohere', 'ConversationChain', 'ElasticVectorSearch', 'FAISS',
'FewShotPromptTemplate', 'ForefrontAI', 'GoogleSearchAPIWrapper',
'GoogleSerperAPIWrapper', 'GooseAI', 'HuggingFaceHub', 'HuggingFacePipeline',
'InMemoryDocstore', 'LLMBashChain', 'LLMChain', 'LLMCheckerChain',
'LLMMathChain', 'LlamaCpp', 'MRKLChain', 'Modal', 'OpenAI', 'Optional',
'PALChain', 'Petals', 'PipelineAI', 'PowerBIDataset', 'Prompt',
'PromptTemplate', 'QAWithSourcesChain', 'ReActChain', 'SQLDatabase',
'SQLDatabaseChain', 'SagemakerEndpoint', 'SearxSearchWrapper',
'SelfAskWithSearchChain', 'SerpAPIChain', 'SerpAPIWrapper', 'StochasticAI',
'VectorDBQA', 'VectorDBQAWithSourcesChain', 'Wikipedia', 'WikipediaAPIWrapper',
'WolframAlphaAPIWrapper', 'writer', '__all__', '__annotations__',
'__builtins__', '__cached__', '__doc__', '__file__', '__loader__', '__name__',
'__package__', '__path__', '__spec__', '__version__', 'agents',
'base_language', 'cache', 'callbacks', 'chains', 'chat_models', 'docstore',
'document_loaders', 'embeddings', 'formatting', 'graphs', 'input', 'llm_cache',
'llms', 'math_utils', 'memory', 'output_parsers', 'prompts', 'requests',
'schema', 'sql_database', 'text_splitter', 'tools', 'utilities', 'utils',
'vectorstores', 'verbose']
```

Appendix B: Mortgage Calculator (Yan, 2023)

Mortgage calculator
By Dr. Yan, v1.0, 2/18/2023

Click here to see (or hide) a simple explanation.

Step 1: Input the price of a house (the default value is \$100,000):
100000

Step 2: Input % of the house price as a down payment (the default value is 0.2, i.e., 20%):
0.20

Step 3: Input an annual interest rate (the default value is 0.056, i.e., 5.6%):
0.05600

Step 4: Choose a loan term, i.e., the number of years (the default value is 30):
30

Step 5: Click here to see the Effective Monthly Rate

Step 6: Click here to see the loan amount.

Step 7: Click here to see the monthly mortgage payment:

Step 8 (optional): enter the property tax (monthly payment)
150

Step 9 (optional): insurance (monthly payment)
100

Step 10 (optional): HOA (Home Owner Association) monthly payment
200

Step 11: Click here to see the total monthly payment:

Step 12: show (or hide) a nice pie chart

Streamlit link, <https://paulyxy-mortgage-calculator-app-5y1trx.streamlit.app/>

Appendix C: Python code for Mortgage Calculator (Python code)

```
import numpy as np
import streamlit as st
from matplotlib import pyplot as plt
st.set_page_config(layout="wide")
st.title("Mortgage calculator")
st.write("By Dr. Yan, v1.0, 2/18/2023")
a1=f" ##### Input a set of values: house price, % down payment, mortgage rate, and loan term (the number of years). "
a2=f" ##### this mortgage calculator will calculate 1) the monthly payment, and 2) draw a nice pie chart."
a3=f" ##### Buy a house in Costa Rica? https://www.youtube.com/@TropicalGlowCostaRica"
with st.expander("Click here to see (or hide) a simple explanation."):
    st.write(a1)
    st.write(a2)
    st.write(a3)
col1, col2, col3 = st.columns([1.2,1,1])
price=col1.number_input("Step 1: Input the price of a house (the default value is $100,000):",value=100_000)
pct= col1.number_input("Step 2: Input % of the house price as a down payment (the default value is 0.2, i.e., 20%):",value=0.20)
with col1.expander("Step 2B: Click here to see (or hide) the down payment"):
    downpayment=pct*price
    st.write(round(downpayment,2))
rate= col1.number_input("Step 3: Input an annual interest rate (the default value is 0.056, i.e., 5.6%):",value=0.056,format="%0.5f")
year = col1.selectbox(
    "Step 4: Choose a loan term, i.e., the number of years (the default value is 30):", (30, 20, 15, 10,5))
R_monthly=rate/12
loan=(1-pct)*price
with col2.expander("Step 5: Click here to see the Effective Monthly Rate"):
    st.write(round(R_monthly,6))
with col2.expander("Step 6: Click here to see the Loan amount."):
    st.write(loan)
monthlyPayment=loan*rate/12/(1-1/(1+rate/12)**(year*12))
with col2.expander("Step 7: Click here to see the monthly mortgage payment."):
    st.write(round(monthlyPayment,2))
tax= col2.number_input("Step 8 (optional): enter the property tax (monthly payment)",value=150)
insurance= col2.number_input("Step 9 (optional): insurance (monthly payment)",value=100)
HOAmonthlyFee=col2.number_input("Step 10 (optional): HOA (Home Owner Association) monthly payment",value=200)
total=monthlyPayment+tax+insurance+HOAmonthlyFee
with col3.expander("Step 11: Click here to see the total monthly payment."):
    st.write(round(total,2))
with col3.expander("Step 12: show (or hide) a nice pie chart"):
    labels = 'Tax (monthly)', 'Monthly Mortgage Payment', 'Insurance (monthly)', 'HOA (monthly)'
    sizes= [tax, monthlyPayment, insurance, HOAmonthlyFee]
    explode = (0, 0.1, 0, 0) # only "explode" the 2nd slice (i.e. 'Hogs')
    fig1, ax1 = plt.subplots()
    ax1.pie(sizes, explode=explode, labels=labels, autopct='%1.1f%%', shadow=True, startangle=90)
    ax1.axis('equal') # Equal aspect ratio ensures that pie is drawn as a circle.
    st.pyplot(fig1)
```

Github location: <https://github.com/paulyxy/mortgage-calculator>

Appendix D: R program to merge a set of text files

```
setwd('c://yan/LeMoynecollege/data/')
x<-dir(pattern=".txt")
outfile<-"final.txt"
n<-length(x)
for(i in 1:n){
    a<-readLines(x[i])
    if(i==1){
        write(a, file=outfile)
    }else{
        write(a, file=outfile, append=T)
    }
}
```

Appendix E: Python code to convert a PDF file to a text file

```
from tabula import read_pdf
infile="c://yan/data/finalExam2023s.pdf"
df = read_pdf(infile)
with open("c://temp/test.txt", "w") as f:
    f.write(str(df))
```

Appendix F: Python code merging different PDF files

```
from PyPDF2 import PdfMerger
infile1="c://temp/pdf1.pdf"
infile2="c://temp/pdf2.pdf"
infile3="c://temp/pdf3.pdf"
infile4="c://temp/pdf4.pdf"
outfile="c://temp/final.pdf"
#
pdfs = [infile1, infile2, infile2,infile4]
#
merger = PdfMerger()
for pdf in pdfs:
    merger.append(pdf)
#
merger.write(outfile)
merger.close()
```

Appendix G: All functions contained in the Python PyPDF2 module

```
import PyPDF2
print(dir(PyPDF2))
['DocumentInformation', 'PageObject', 'PageRange', 'PaperSize', 'PasswordType',
'PdfFileMerger', 'PdfFileReader', 'PdfFileWriter', 'PdfMerger', 'PdfReader',
'PdfWriter', 'Transformation', '__all__', '__builtins__', '__cached__',
'__doc__', '__file__', '__loader__', '__name__', '__package__', '__path__',
'__spec__', '__version__', '__warningregistry__', '_cmap', '_codecs',
'_encryption', '_merger', '_page', '_protocols', '_reader', '_security',
'_utils', '_version', '_writer', 'constants', 'errors', 'filters', 'generic',
'pagerange', 'papersizes', 'parse_filename_page_ranges', 'types', 'warnings',
'xmp']
```