

# Course-Specific Chatbot

## INTRODUCTION

Finding help with class topics and assignments can be challenging for students. They might not have time to go to office hours, their assignment might be due in a few hours before a deadline, or they might just need a question answered quickly. This paper proposes a potential solution to this problem through the use of a chatbot that uses artificial intelligence to tailor itself to the course. By leveraging course materials, this chatbot can answer questions about specific topics covered in class during lecture, labs, or discussions, offering a quick way for University of Michigan students to get immediate support when and where they need it the most. This paper begins with a brief introduction of the problem in section 1, an outline of the proposed solution in section 2, and an insight into next steps in section 3.

## DISCUSSION

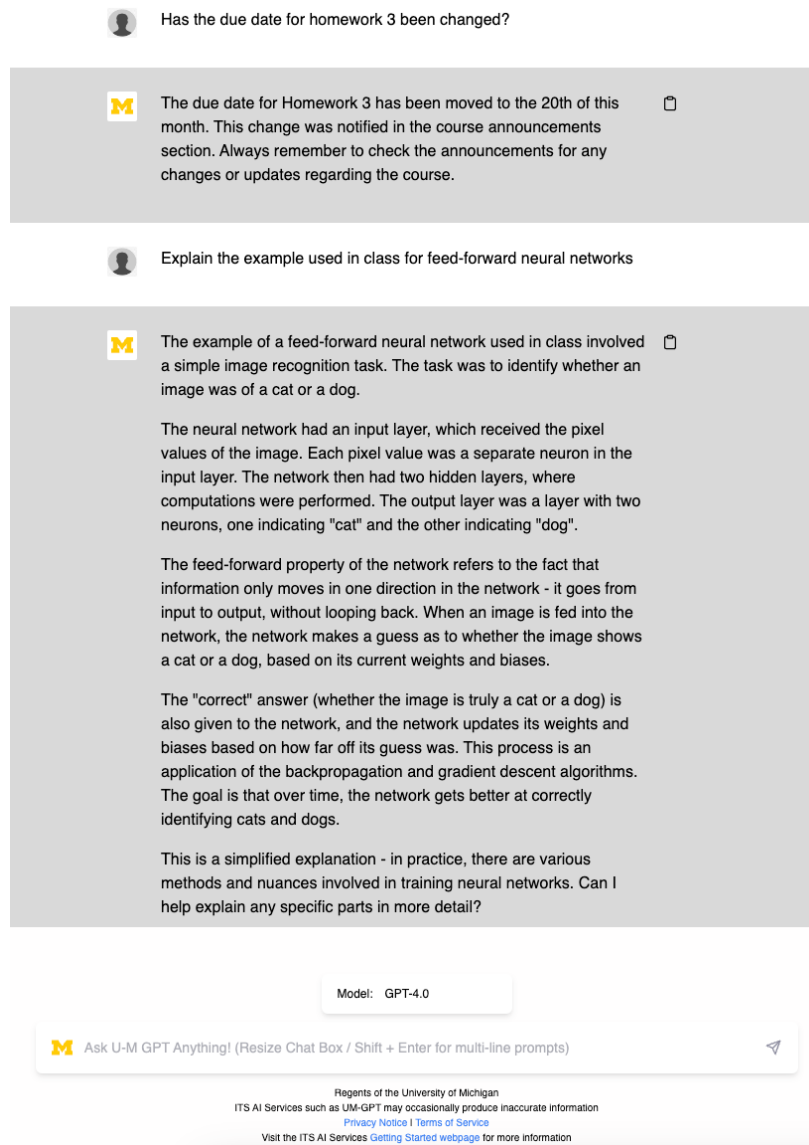
### Rationale for Project

The need for a dynamic, on-demand support system for students at the University of Michigan is easily apparent. A majority of EECS students have experienced the overwhelmingly crowded state of office hours days leading up to a homework assignment, project, or exam, where professors, and GSIs are often unable to help each student for longer than a few minutes. This can be extremely stressful for students, as they need to choose which questions they need answered the most, and are likely to leave with unsolved problems. Students are also often unable to make it to office hours due to time conflicts with their schedule [1]. This issue is also present on Piazza, due to the limited number of instructors available to answer questions at any given time. By providing a system for immediate answers to course related questions, the University can help to alleviate students' stress while working on assignments, as well as ease the burden on instructors by reducing the number of questions from students.

### Proposed Solution

In response to the challenges faced by students seeking help with class topics and assignments, we propose the development of a Course-Specific AI Chatbot, uniquely and automatically tailored to each course, that utilizes lecture and lab capture transcripts, course Piazza boards, and textbooks. This solution aims to ease the learning experience at the University of Michigan by providing real-time and course-specific assistance to students.

A chatbot is a computer program designed to simulate human conversation and interact with users in a conversational manner. The chatbot is specifically tailored to educational environments and courses at the University of Michigan. It serves as a virtual assistant that can answer students' questions, provide information, and engage in real-time conversations regarding course topics, assignments, and related inquiries. Below is an example of how this proposed chatbot would work using UMGPT as a stand-in.



*Figure 1: Student asking questions about their class to the chatbot*

This example illustrates an interaction between a student and the course-specific AI chatbot. In this scenario, a student has questions related to their class, and they turn to the chatbot for assistance. This interaction highlights the speed and effectiveness with which students can obtain answers to their questions regarding lecture content and the course in general.

Transcripts from lecture captures are automatically generated by the University's lecture capture system. They provide specific information that might not be posted on Canvas or in the class's textbooks. This could include explanations, examples, and elaborations on key topics. With the chatbot's access to these transcripts, students can pose questions about specific lecture segments, seek clarifications on complex concepts discussed during class, or request additional context. This ensures that the chatbot's responses are not only accurate but also aligned with the course's instructional progression, offering students valuable insights into the exact content

they need to grasp. The chatbot's use of lecture capture transcripts minimizes the risk of misunderstandings and misconceptions, enhancing the quality of assistance provided and supporting students in achieving a deeper comprehension of course materials.

Piazza serves as a platform for students to post questions, engage in discussions, and seek clarification on course-related topics. Incorporating these discussions into the chatbot's knowledge base would greatly help it to answer common questions that students may have. This approach ensures that the chatbot can offer students timely and helpful responses, utilizing the collaborative efforts and insights shared on the Piazza platform to assist in their understanding of course materials and concepts.

Textbooks are often the primary reference materials for courses and contain authoritative information and explanations of course topics. Since textbooks typically cover a wide range of topics and concepts in a comprehensive manner, extracting information from textbooks allows the chatbot to provide in-depth explanations and examples, ensuring that students receive a holistic understanding of the subject matter. Students often prefer to know which portions of the textbook are important to read for the class [2], which is why the chatbot's extraction of information can improve the efficiency of their learning. The chatbot's integration with the course textbooks simplifies the process of locating and retrieving relevant information, further enhancing students' access to essential course materials.

The implementation of this chatbot would be relatively simple. Lecture transcripts would be fed into the AI's knowledge base through a simple API call scheduled to take place after every lecture. The chatbot would also use Piazza's API to retrieve discussions, questions and answers, and could be made to only extract answers from instructors. The course textbooks would be fed to the chatbot to update its knowledge base at the beginning of the semester, and would stay there until the textbook is updated or no longer used in the course. The instructors could also indicate which sections the course will cover in order to better train the AI. This specialized knowledge base would serve to tailor the chatbot to best fit each course. The chatbot could then be integrated into Canvas on the course's sidebar, or could be a standalone web page, depending on the preference of the instructor.

## **CONCLUSION**

In response to the pressing need for dynamic, on-demand support for students at the University of Michigan, we propose the development of a course-specific AI chatbot, specifically tailored to each course, utilizing lecture and lab capture transcripts, course Piazza boards, and textbooks. This innovative solution has the potential to significantly enhance the learning experience for students, providing real-time, course-specific assistance that aligns with their academic needs. We recommend the implementation of this chatbot across a range of courses at the University of Michigan, allowing instructors the flexibility to integrate it into Canvas or offer it as a standalone web page. However, it is essential to acknowledge its limitations, as its effectiveness depends on the quality of its knowledge base and may have constraints in handling creative or complex queries. Suggestions for future work include improving natural language processing, gathering user feedback for continuous improvement, incorporating multimedia content, and ensuring privacy and security measures. The course-specific AI chatbot is a promising step

towards making education more accessible and support readily available to University of Michigan students.

## REFERENCES

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- [2] Baier, K., Hendricks, C., Gorden, K. W., Hendricks, J. E., & Cochran, L. (2011, July). College students' textbook reading, or not. In *American reading forum annual yearbook* (Vol. 31, No. 31, pp. 385-402). Boone, NC, USA: Amer. Reading Forum Appalachian State Univ.