



# WisdomWave

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## Abstract

Revolutionizing Knowledge Acquisition in Education. **WisdomWave**, an AI-powered educational tool designed to facilitate students' learning journeys. The platform's primary objective is to address the challenges encountered by students in effectively extracting knowledge from textbooks and previous examination materials, particularly in preparation for "O" and "A" level examinations. WisdomWave will leverage advanced Large Language Models to intelligently categorize student queries based on their educational level and deliver tailored responses aligned with the Cambridge syllabus. This approach ensures that students receive precise and level-appropriate information, enhancing their comprehension and exam preparation strategies. The project encompasses the development of NLP techniques for query classification, the curation of a comprehensive knowledge base reflecting the Cambridge curriculum, and the seamless integration of these components into an AI bot featuring a user-friendly interface.

## 1. Introduction

Knowledge gathering is paramount in education, particularly at the O and A levels, where students are tested on their knowledge and understanding of concepts. Unfortunately, many students often struggle to locate the content or knowledge they require in textbooks or past exam papers. This can be attributed to several factors, such as the vastness of the syllabus, the complexity of the subjects, and the lack of readily available resources. Current search methods often yield generic results, leaving students overwhelmed and unsure of the relevance to their specific educational level. Nevertheless, effective knowledge gathering techniques can help students overcome these challenges.

Effective knowledge gathering techniques can help students overcome these challenges. To address this, WisdomWave seeks to revolutionize this process by harnessing the capabilities of Large Language Models. By intelligently identifying the educational level behind each query, WisdomWave will provide tailored responses that align seamlessly with the Cambridge syllabus requirements. Our project will use natural language processing techniques to classify queries accurately, develop machine learning models for level detection, and curate a knowledge base that reflects the appropriate depth and coverage of Cambridge curriculum content for each level. Our platform fosters a collaborative learning environment by enabling students to share their findings and insights with their peers. Furthermore, by analyzing past papers, WisdomWave can provide valuable insights into recurring topics and question patterns, allowing students to prioritize their study efforts. This approach aims to ensure that students receive answers that match their educational level and adhere closely to Cambridge syllabus standards.

## 2. Goals and Objectives

The goal of the project is to develop an AI bot that can accurately differentiate between the education levels of students' queries and provide tailored responses aligned with the Cambridge syllabus. The project aims to enhance the learning experience by ensuring that the AI bot delivers answers that are both accurate and appropriate for the student's level of understanding. Our main objectives are:

- Implement natural language processing (NLP) techniques to analyze and classify student queries based on their educational level.
- Ensure that the knowledge base is structured to provide depth and coverage appropriate for each level, from basic concepts to advanced topics.
- Develop algorithms that generate or retrieve responses tailored to the detected

educational level of the student, ensuring that the complexity and detail match the student's understanding.

- Regularly update the knowledge base to reflect any changes or updates in the Cambridge curriculum.

### 3. Scope of the Project

The project consists of three main phases. In the first phase, we will develop and train NLP models to classify student queries based on their educational level, using data aligned with the Cambridge syllabus. This involves analyzing and categorizing queries to ensure accurate detection of the student's knowledge level. In the second phase, we will build a knowledge base that reflects the Cambridge curriculum across different educational stages, organizing content to provide level-appropriate responses. The final phase will focus on integrating these models and the knowledge base into an AI bot, ensuring that the responses generated are tailored to the detected educational level and adhere to curriculum standards. Additionally, we will design a user-friendly interface that facilitates effective interaction between students and the AI bot.

### 4. Initial Study and Work Done so Far

In our initial study, we explored various methods for classifying educational content and tailoring responses based on student levels. We reviewed approaches to NLP-based query classification, particularly focusing on how existing models differentiate between different educational levels in text. We found that most work has been done in general-purpose NLP, with limited focus on education-specific applications. However, several machine learning models, including support vector machines and neural networks, have been successfully employed for text classification in similar contexts.

We have gained expertise in data extraction and model training, and have explored numerous algorithms relevant to our project. Specifically, we are working on data extraction from textbooks and other educational resources to build our knowledge base. We are also familiar with various Python libraries, such as NLTK, spaCy, and TensorFlow, which are essential for natural language processing and machine learning tasks.

Our goal is to develop an AI bot that can accurately identify the educational level of student queries and provide appropriate responses aligned with the Cambridge syllabus. So far, we have made significant progress in extracting relevant data and are refining our classification models to improve their accuracy and relevance.

### References

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