# Applications of NLP in the field of Online Teaching

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**Fall 2021**
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**Introduction**

Natural language processing (NLP) is a scientific discipline with wide applications in various domains. In this age of internet, the world has come to fit inside our computers and phones. We have applications(apps) to do just about anything on our phones and PCs. Cooking, gardening, music, news, education etc. are all readily available at a click. Language should not be a barrier in our use of technology in this scenario. I have reviewed two papers that have researched on NLP and its applications in the field of education.

Given that I am writing this review for a MOOC myself, the topic just seemed too interesting to not explore further. Could NLP be useful to make MOOCs easier for the teachers as well as the students? I am writing this review to find answer to this burning question in my head. I will be reading the two referenced papers and would be summarizing my understanding of the subject as part of this review.

**Applications of NLP in education (Body)**

1. Developing effective coursework by using scientific methods to increase the consumption of the course materials without any language barriers.
2. Monitoring and enhancing student progress by applying NLP in auto-grading homework assignments, quizzes, forum posts etc.
3. Supporting role in teaching. For example, NLP might aid in the use of computers and internet. Or it may assist the MOOC instructor in identifying relevant forum posts from an ocean of posts that need their expertise.
4. Globalizing education by helping teach the material in any language across the globe.

NLP specially shines when the teaching subject is a language. We can use NLP to identify and correct grammatical errors and word usage. Students can use NLP for proofreading their submissions and teachers can use the same concept for grading these submissions quickly and with high precision. Not only this, a feedback can also be provided automatically after the auto-grading has completed. NLP can not only identify errors in student submissions but also suggest corrections hence aiding the students to grasp the material effectively by learning from their mistakes and with assurance that their mistakes will be identified and corrected. Constructive feedback from an auto-scoring system may prove to be very

beneficial for students specially in the MOOCs where the student-teacher ratio can be extremely high and individual interactions become rare if not impossible.

NLP can also be applied to develop and enhance computerized tutoring which can give an extra edge to the teaching of any subject. The program may use dialogs based on student input or student's understanding level so the student can gradually absorb the course material at their own pace without struggling. Not only this but the dialogs can actually be possibly translated to a student's native language irrespective of the language of the actual course material. Sometimes, students learn quicker in their native language than they would in another language.

Teachers can benefit immensely if they start using NLP as their teaching assistant. Imagine a MOOC that might have thousands of students. What if the instructor asked a specific lecture related question at the end of a certain lecture and all students replied to it? NLP can process all of the student responses and produces a summary with statistics for the instructor to measure the efficacy of that particular lecture. Instructor can put the feedback to a good use by using student responses to make the lectures/assignments/exams better and easier for the learners to benefit from. Even a simple question such as "What was the easiest or the most confusing point in this lecture", can give some brilliant insights to the lecturer that can help improve the course. NLP can also generate automated tests for students based on their level of understanding so the students do not struggle with the test yet the teacher can still effectively evaluate the student performance.

Students can benefit from NLP by using it to retrieve relevant information from the internet. Internet is full of information which can be good or bad. NLP can assist finding the right source for course related topics and filter out the wrong information provided by unreliable sources.

**Application of NLP in CS 410-TIS (Conclusion)**

It is interesting to explore the possibility of NLP application in the course that I am writing the review for. NLP can work a lot of magic in this MOOC:

1. Lecture videos can collect feedback from students by putting up a question at the end of each module. Student feedback can then be summarized to set the right pace for the lectures, deep dive into interesting topics, spend more time on difficult topics etc.
2. The instructors can use NLP to browse through Coursera, Slack and Campuswire posts to identify where their intervention is necessary. The same method can also be used to identify any misleading information being posted in the forums so the instructors can correct it in time.
3. Based on a student's average performance, dynamic practice quizzes can be generated which change themselves each time they are taken so they cover all topics covered in the module, so the student can ensure they have covered all parts of the modules and understand it all.
4. Written assignments like this technical review, project proposal documents etc. can be auto-graded or semi-graded using NLP to reduce the grading time and effort.
5. NLP can assist students in learning the material in their preferred language, although this class is being taught in English.
6. Lastly, NLP can be used to develop a FAQ documentation for each module based on the forum posts and Office hours recordings. The FAQ documentation will be evry helpful for the teachers

to pre-answer all the questions they run into frequently. Students can benefit from it as well. They can just browse through the document to study things they did not even imagine they did not know. Some students are also full-time professionals and cannot attend office hours or read posts on forums, they can use the FAQ document to get the summary of all the discussions going around among the other students and instructors.

**References**


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