

# INTEGRATION OF ARTIFICIAL INTELLIGENCE BASED TECHNOLOGIES IN DEVELOPMENT OF OER

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## Abstract

The objective of the paper is to demonstrate the application of Artificial Intelligence (AI) for development of Open Educational Resources (OER). The paper includes a flow chart for the development of OER on a specific topic. The following are some of the phases in OER development : (i) Exploring the large number of existing OERs that are relevant to the OER to be developed (ii) Remixing the right OERs to generate the target OER (iii) Finalizing the target OER by removing subtle errors (iv) Translation of target OER into different languages (vii) Making it available to the World at large by uploading (viii) Being OER, there may be large number of updates with time. So, needs to check vandalism to keep OER always up to date. For each phase in OER development mentioned above, AI shall be applied for achieving the corresponding task. In each case, appropriate AI tool shall be used. Also, a handout consisting of different AI tools along with necessary details to download shall be circulated during presentation. Interaction during presentation shall be ensured by circulating a small survey which throws some light on the awareness about AI among the audience. The work done as part of the paper in integrating AI based technologies in development of OER is towards fulfillment of goals 4 (Quality Education), 8 (Good Jobs and Economic Growth) and 10 (Reduced Inequalities) of Sustainable Development Goals (SDGs)

Keywords: Artificial Intelligence, Open Educational Resources, Sustainable Development Goals

## Introduction

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Artificial Intelligence (AI) is also called Machine Intelligence. It refers to the capabilities of Machines behaving in the same way as Humans do with respect to learning and problem solving. Though machines are built by humans, it was proved that it is possible for them to outperform humans. For example, World Champions in Chess were defeated when they played with Machine rather than with other Humans. It shows that it is possible to build machines which are intelligent. Some areas where AI is in action are in understanding human speech, self driven cars, and content delivery networks. Though AI is part of curriculum since decades, it evolved enough that it can be

applied in several areas. With the evolution of AI, it also got divided into various sub areas , namely, Machine Learning, Neural Networks, Expert Systems, Evolutionary Computing, Soft Computing, Blockchain, Computational Thinking, Deep Learning as well as Weak AI. Each and every sub area of AI is having large number of applications.

Open Education Resources (OER) are resources that are freely accessible. Its also possible to work on them under specific licenses. A OER can be anything, though , media and text are most commonly found. Some of the advantages of OER are that they can be accessed by any person, can be modified without prior permissions, higher versions can be released, increased information dissemination, saving of costs, reaching the disadvantaged, as well as leads to improved literacy rates. OERs also have their own disadvantages. Some of them are concerns with quality and unknown degrees of concern about their compliance with underlying OER licenses. Before using OER, its essential to know the underlying license mechanism as any work done on the OER at hand should conform to the underlying OER Licensing policy. Another challenge is to ensure the correctness of content of OER.

## **Literature Review**

The benefits of AI in OER are immense, in particular for areas such as translation, personalization of resources and identification of resources for sharing, re-mixing [1]. Blockchain has been used to support recognition and is rewarding in other areas of education, and holds great potential for tracking the mix and remix of OER[2]. Wikidata is the biggest OER that humanity has ever been created. AI is currently used by Wikidata to meet the three main challenges of it faces: updating of data, querying of specific questions, and the maintenance of a central database for libraries and museums worldwide [3]. AI and frontier technologies can play a revolutionary role in mainstreaming OER and fostering inclusive Knowledge Societies [4]. Artificial Intelligence is a booming technological domain capable of altering every aspect of our social interactions. In education, AI has begun producing new teaching and learning solutions that are now undergoing testing in different contexts. AI can be used to improve learning outcomes, AI technology helps education systems by using data to improve educational equity and quality in the developing world [5]. It's possible to improve search for educational material through machine learning methods. AI allows automated development of customized educational content adapted to each child's class and learning level. Assessing time spent by a student on each part / page of the learning material, for example, would allow real-time feedback on student performance to help the teacher appropriately tailor her guidance to the child. This concept can be extended to automatic grading of tests, as well. Intelligent Tutoring Systems can provide great benefit to students through delivery of learning materials adapted to the child's proficiency level, learning style, and pace of learning. In-built pop-up questions tailored to students, for example, can help increase interactivity, and catch student's attention and interest. It can also help in assessment of student's level of attention or comprehension to appropriately design remedial instruction. Analysis of test results and attendance records using AI can be used to predict probable student activities and inform pre-emptive action. For instance, in a recent preliminary experiment conducted in Andhra Pradesh, India, AI applications processed data on all students based on parameters such as gender, socioeconomic factors, academic performance, school infrastructure, teacher skills, etc., with the objective of helping the government identify students likely to drop out. Test results could inform suggestions to enroll students in vocational studies[6]. In mid-September 2017, IBM announced its Watson AI engine is available to teachers to help create lesson plans which are rich in open educational resources that support learning. When teachers search a concept, such as fractions or place value, they get a targeted lesson, relevant learning resources, recommended activities and a teaching strategy. From there, they can adjust variables such as ability level while keeping search terms the same, which may assist teachers whose students have different math proficiencies [7].

## **Application and Integration of AI in the development of OER**

The following are steps of the process for development of OER on a specific topic. Though , a flow chart is appropriate, it will occupy multiple pages that may not render it as readable. Hence, step wise process is given.

1. Decide the topic on which OER needs to be developed. Let the topic be “Introduction to AI”
2. Browse to Google Advanced Search ( [http://www.google.com/advanced\\_search](http://www.google.com/advanced_search) )
3. Key in the topic
4. Select appropriate OER license from “usage rights” in the search engine and submit
5. The URLs are listed that are assumed to be relevant for our search. All the URLs point to OER on the specific topic for which search has been performed.
6. Open each URL until all the content that is relevant to our topic is found. Download the content to a specific directory on your machine.
7. Study the content
8. Update wherever errors are found.
9. Remove redundancy between the content under various URLs by copying them to a document file
10. Study the flow of the final content and fill in the gaps, if any
11. Provide attributions as needed for appropriate OER License
12. Release the OER

After deciding the topic , search for OER using a AI powered search engine. Google and Bing are among the search engines that use AI. Now , tools such as GradeGuardian , ReadEx , WriteToLearn , IBM Watson AI Engine can be used to further refine and update OER. Also, AI tools such as Objective Revision Evaluation Service (ORES) can be used to find edits of bad-faith nature.

## **ORES**

It’s a service that associates scoring using AI for revisions. Based on the score, it is possible for us to classify a revision as vandalism. The results of API are useful for tools than humans. Using ORES, it’s possible to ensure quality content to the readers. Wikidata integrated ORES predictions with new *RecentChanges* and *Watchlist* filters. Wikidata also uses predictive strategy to improve accuracy [8].

## **IBM Watson AI Engine**

Basically, Watson is a Computer System which is capable of giving answers to the questions in natural language. Its part of IBM’s DeepQA project. It’s a computer system which applies natural language processing, information retrieval, knowledge representation, automated reasoning, and machine learning. [9].

## **Conclusion**

From the above , it can be concluded that AI based technologies can be integrated for the development of OER in less time, of high quality thus making them available to the World at large at the earliest possible time.

## **References**

1. Mr Mitja Jemrol, UNESCO OER Chair from Jozef Stefan Institute underscored that the benefits of AI in OER are immense, in particular for areas such as translation, personalization of resources and identification of resources for sharing, re-mixing.: Mobile Learning Week, 2019
2. Ms Perrine de Coëtlogon, Chargée de mission Blockchain & Education, University of Lille outlined how blockchain has been used to support recognition and rewarding in other areas of education, and holds great potential for tracking the mix and remix of OER.
3. Ms Shani Evenstein Chairperson, Wikipedia & Education User Group highlighted that Wikidata is the biggest OER that humanity has ever been created. Ms Evenstein outlined how AI is currently used by Wikidata to meet the three main challenges of it faces: updating of data, querying of specific questions, and the maintenance of a central database for libraries and museums worldwide.

4. <https://en.unesco.org/news/artificial-intelligence-and-frontier-technologies-open-educational-resources>
5. Artificial Intelligence in Education:Challenges and Opportunities for Sustainable Development, Working paper on Education Policy, 2019, UNESCO
6. National Strategy for Artificial Intelligence, a Discussion Paper by Niti Ayog, Government of India, June, 2018
7. Open Educational Resources(OER), contactnorth.ca , October, 2017
8. <http://www.wikidata.org>
9. <http://en.wikipedia.org>