



APPLICATIONS OF MACHINE LEARNING IN EDUCATION AND HEALTH: AN EMPIRICAL STUDY

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ABSTRACT

In today's world, machine learning is built into almost every system/application/algorithm, be it a hospital management system or a learning management system. This paper focuses on the role of machine learning in everyday life, understanding the many ways to choose the right ML technique for your system/application, and discussing the different social networking applications that have machine learning in their back- Use End Algorithm. The purpose of this research is to understand machine learning alongside its uses in education and health.

Keywords: machine learning; health sector; education, empirical study, algorithms.

INTRODUCTION:

Briefly defined as ML, it is the subset of artificial intelligence that teaches a machine to learn. It is the field of study that gives the computer the ability to learn automatically without being explicitly programmed [1]. Developed through machine learning, the program focuses on accessing the data and using it to learn, recognize patterns, and make decisions without human intervention [2]. Almost every aspect of our lives has been influenced in some way by machine learning. Many people are familiar with machine learning from shopping websites like Amazon. They (Amazon) use a recommendation engine to show customers more things based on their previous purchases [31].

When someone books a taxi through Uber/Careem, he/she gets the details of everything including distance from current location, estimated time of arrival, vehicle information, driver information, etc. The application provides this information to the user through machine learning. Facebook's news feed also uses machine learning algorithms to personalize everyone's news feed. If a user frequently likes photos and posts from a specific friend, the news feed will show the user more posts from that friend. To do this, Facebook uses simple predictive analytics and statistical analysis to identify patterns in user data and uses those patterns to customize the news feed

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predictive analytics and statistical analysis to identify patterns in user data and uses those patterns to customize the news feed.

In the healthcare sector, machine learning plays an important role in the development of new medical procedures, the handling of patient records and the treatment of chronic diseases. Today, machine learning helps update hospital administrative procedures, detect and treat infectious diseases, and provide personalized medical treatment. Many companies are developing sensors, applications and wearable devices that use data to monitor patient health in real time [22] [23]. Despite doctors' warnings, progress keeps accumulating. There are many applications of machine learning in education and healthcare for teachers/students and patients/doctors. The next section explains some popular applications with examples.

2. LITERATURE REVIEW

In today's world, the use of machine learning is becoming more common every day. One of the leading countries with the fastest development in AI/ML is Japan with its futuristic technology consisting of human-like robots and even intelligent vending machines, where AI is part of any solution to a problem that may require more human interaction. Machine learning has two main branches: supervised learning and unsupervised learning.

In supervised learning, the machine or system you want to train is given specific instructions that the system uses to educate itself. This leads to learning from a series of instructions and gaining experience through help [32] [33] [34]. While unsupervised learning is the complete opposite of supervised learning. In the case of unsupervised learning, the machine or the system does not receive any instructions or is not already programmed in the manual, but the machine has to gain experience and further educate itself through independent steps. This leads to learning based on mistakes and experience gained. Machine learning can also be used to create predictions [27] [37] [38] [35]. Machine learning is not lagging behind on the way to our main focus areas of education and health in these sectors either. For example, in the medical field, intelligent applications/systems are flexible, and a systematic description of the many medical functions of the system or application. Such information about ML can be presented in the form of decision trees or simple rules. Cardio (for interpretation of ECGs) is an example of such a scenario [28][29][30]. There are also various tools and applications in the education sector, such as exam preparation tools, search engines or the like.

3. MACHINE LEARNING IN EDUCATION

Currently, our educational system focuses on providing students with various information. A student's intelligence is assessed by their ability to recall or memorize previously taught information. The main problem with this approach is that it does not examine how well the student understands the information and how they can apply this concept in their life. In recent years, this model has proven to be uncomfortable or incorrect. Education changes over time and in recent years this model has proved pathetic [5]. In addition, there are many other problems emanating from the administration, academic staff and students [6]. In recent years, machine learning and other technologies have been used in education to solve the above problem. Today's education does not follow a traditional way of education and pursues measurable goals and results. More and more institutes are using machine learning applications to make their work more efficient and faster. Teachers use machine learning to reduce their workload by automating various tasks. A common example of machine learning used by teachers is turn-it-in for plagiarism assessment and detection. This software just applies a

machine learning algorithm and displays the result of the copied content in the document. To support students, there are many online learning websites like Udacity that apply machine learning algorithms to provide targeted courses for students. Since machine learning is new...

4. MACHINE LEARNING APPLICATIONS FOR TEACHING

The introduction of machine learning makes lessons more efficient and adaptable to the needs of the students. Routine tasks and communication with students can also be handled with machine learning. Choosing a machine learning algorithm for a specific task is difficult as several questions need to be considered, e.g. B. amount of information, data types and amount of data attributes. Some applications of machine learning algorithms in the classroom are described below:

In gifted education: Some students need additional support for their education and it is sometimes difficult to identify these types of students. Machine learning can do this using classification algorithms. Machine learning has the potential to make advances in the field of gifted education [8].

Predictive Analytics: Predictive Analytics is a new machine learning tool that helps both the teacher and the institution to review the student's performance in order to make predictions about his/her academic outcome. It is used to identify students at risk of failing online courses using a support vector machine [8].

The placement prediction system uses student scores at various study levels and predicts the student's chances of placement at upcoming recruitment events. Predictive models based on neural networks, linear regression, decision trees and Bayesian networks are used to predict academic performance of students from different programs at different levels [9].

Learning Style: Each student has a different learning style and prefers to use different types of resources to learn. A website called "Your First Aid" uses the Nave-Bayes algorithm to determine the student's learning style [10] [9].

Grading: Assessing and grading thousands of papers is not an easy task for any teacher, but thanks to the software based on it uses machine learning to make this hectic task easier. Teachers now use software such as Grade-Scope and Turn-it-in...

5. MACHINE LEARNING APPLICATIONS FOR LEARNING

Advances in artificial intelligence supported the use of machine learning in education. The use of machine learning in learning tools became increasingly important and engineers developed platforms that provide real-time feedback to students. Below are some machine learning applications for students.

Online Learning: Now learning isn't just limited to textbooks and classrooms. There are many digital platforms like udacity, udemy and edx, coursera that offer short courses and nano degree programs online in various fields. They use machine learning algorithms to target their audience and improve their services [5].

Test prep tools: Many test prep apps and websites available on the internet, such as Quizlet and Kaplan, use machine learning algorithms to help students learn better. Guide: The popular employment and talent platform LinkedIn uses a machine learning algorithm to match available jobs to potential candidates.

Search engine: Google Chrome uses machine learning algorithms to provide users with better

search results. The search engine detection pattern is based on your recent searches and will show you relevant results. IEEE and Google Scholar also use machine learning algorithms to find specific articles and essays based on the keyword entered by the user [6].

Personalized Learning: Machine learning algorithms are able to learn about the ability of students to capture information. These algorithms allow students to progress only when the student has fully grasped the prior knowledge. This process ensures that not a single student is left behind in their learning. The learning systems Edtec and Magic Box use this personalized learning approach [5] [7]

6.MACHINE LEARNING IN HEALTH CARE

Many patients die every year due to errors in health technology, and this problem is not limited to rare diseases. Chest pain, tuberculosis, dysentery, and birth complications often go undetected in developing countries, even when there is adequate access to physicians [12]. Medical education needs to include more intelligence and information tools like robotics and machine learning. Data collected during routine examinations can be used with the help of machine learning to predict later-onset conditions [12]. Machine learning applications in the medical field have increased in recent years. Currently, MLi offers numerous tools and techniques that can help with diagnostic problems in numerous medical fields. A decision tree and nested analysis structure can help the physician to extract the minimum data needed for diagnosis [13]. For example, a feature selection algorithm can reduce the number of items required to diagnose ASD (autism spectrum disorder) with 100% accuracy in 612 ASD patients [14]. In recent years, scientists have conducted several researches into diagnosing and curing cancer. They used different methods to determine the type of cancer, its causes and possible symptoms. In imaging, image recognition algorithms have discovered new features of cancer that are important for diagnosis [14].

ANN and DTS are the main machine learning techniques used to detect cancer for almost three decades [15]. All this contributes significantly to the knowledge of pathology. This is possible thanks to the global use of smart phones and wearable devices that upload large amounts of personal data. People want to wear these devices because they can improve people's quality of life. The Smartphone is no longer a device used only for making phone calls and sending messages, although it can also be used as a sensor to monitor the patient's health in real time. Athletes also use wearable devices to measure their distance in terms of running, calories burned, heart rate and body temperature [16]. Smartphone's also enable everyday natural language processing and mood tracking [14]. Chronic diseases (asthma, diabetes, hypertension, etc.) can be easily predicted by uploading the user-provided chronic disease data to the software using a back propagation algorithm. It is solely based on the quality of the data: the better the data, the better the prediction. ML is also used in the analysis of continuous data in intensive care units and in intelligent alarm systems for effective monitoring of patients [17] [15]

The rapid growth of computer science in recent decades has been followed by similar advances in molecular biology. Machine learning turned out to be a powerful tool for the biologist to identify biological sequences. These sequences are a large body of biological data that require computational tools to analyze. Neural networks, decision trees and support vector machines serve as tools for analyzing biological sequences [18] [36]. Recently, machine learning has been able to distinguish between images of benign and malignant birthmarks. This can be very

helpful to dermatologists in diagnosing various skin diseases that can lead to death [19]. ML has been used to interpret complex eye scans and to detect more than fifty eye diseases [20]. The machine learning-based doctor Ellie also cares for patients with depression and other illnesses. By analyzing her facial expressions, verbal responses, and vocal tone, Ellie may be able to identify depression and illness. In China, millions of people use Microsoft Xiaoice when they need a sympathetic ear. It is based on an emotion computing framework and adjusts his/her response according to human response [14]. According to a report, machine learning and big data in medicine and pharmaceuticals could generate revenue of up to \$100 billion per year due to its rapid decision-making and optimized innovation. Many big companies like Google and Med-Aware have introduced.

7. CONCLUSION

Research papers with discussions or information on the various applications of machine learning in healthcare and education were examined and reviewed. The applications that obey machine learning rules or have machine learning algorithms have also been highlighted in this research in health and education (for both). People who work in companies/organizations, in educational institutions and in the medical field can benefit from this work; in terms of understanding what machine learning is, where machine learning can be applied, how and what kind of tools/systems/applications in healthcare and education are based on machine learning, and moreover, how people working in computing do this Science can develop new or improved versions of the tools/applications presented in this paper so that people who are unaware of the rise of technology even in health and education can learn about, use and benefit from it.

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