# A Review of Implementation and Obstacles in Predictive Machine Learning Model at Educational Institutions

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**Abstract**. Machine learning is a system that can learn by itself by using training data and testing data testing. In a variety of machine learning research has various obstacles in implementation especially in education institution, in its application, many things need to considered for more information to enrich research in the area of machine learning by way of comparing various obstacles in implementation in similar research. So that in this study is to find similarities and anticipations made in the initial stages of pre-processing to visualisation, as well as the contribution that can give in this study explains the best alternative for researching following the experience of several researchers in conducting machine learning research.

## 1. Background

In the rapid advancement of information and computer technology, including the development of Artificial Intelligence technology, which has become one of the branches of application, namely "Machine Learning," where basically from the time the computer created humans have thought about how to make the computer learn from experience. "Machine learning (or data mining) is an artificial branch of intelligence [1] that focuses on algorithms that identify and learn relationships between data." From the data that is processed by the computer, and added algorithms about predictions, the computer can make the right decision on the completion of the task it receives; for example, an automatic control car, the application knows the nutritional value of food just by photographing the object, and many more. Machine learning techniques generally focus on finding connections in the observed data and mining those relationships [2]. Talking about Machine learning and its relation to the world of Education and Education Institutions, in particular, it must be pursued to implement Machine learning in Educational institutions optimally and well in order to advance science and improve the quality of human resources so that they can compete in the international arena because the institution of education is a place where studying, understanding, researching, and applying various sciences for the benefit of better and quality human life. The implementation of machine learning in educational institutions is believed to improve much better the quality of education for science and contribution in all sectors, both economics, industry, politics, trade, and many more. Also, of course, it can answer the challenges of the 4th industrial revolution that launched. Therefore in this case we will review a number of journals from

researchers and scientists related to the implementation of machine learning in educational institutions, where the objectives are; first, In order to better understand machine learning and its implementation in educational institutions. Second, In order to get a proper description of machine learning. Third, Getting lessons from the efforts of various researchers in the framework of implementing machine learning in educational institutions. Fourth, Getting inspired in the future if we will want to take part in implementing machine learning. The contribution of this research is to explain the implementation and obstacle in machine learning, as an additional reference for other researchers in developing similar research, especially in the field of education.

## 2. Machine Learning

Machine learning is the ability the computers to do learning without having to explain explicitly to the computer [3]. Machine learning is how to provide the ability for computers to do learning activities to solve problems independently. Machine learning algorithms can be grouped based on the expected input and output of the algorithm. The types of machine learning algorithms include supervised learning, unsupervised learning, semi-supervised learning, reinforcement learning, developmental learning algorithm, transduction, and learning to learn. The supervised learning algorithm is learning based on a set of examples of the desired input and output pairs. This algorithm observes these examples and then produces a model that can map the new input into the right output[4], while unsupervised learning aims to learn and look for unusual patterns in the input provided [5]. Although not explicitly provided the right output. One of the most commonly used unsupervised learning algorithms is clustering or grouping [4]. This semi-supervised learning combines supervised with unsupervised to produce a function. In his book entitled "Artificial Intelligence A Modern Approach," [4]mentions that the semi-directed learning algorithm given examples of inputs and outputs that are appropriate in small amounts and a set of inputs whose output is unknown. This algorithm must create a series of units between two types of algorithms to be able to cover weaknesses in each algorithm. Another type is reinforcement learning. This type teaches how to act to deal with a problem, for which action has an impact. While developmental learning algorithm or developing learning is a field that aims to learn the development mechanisms, architecture, and boundaries that allow the making of learning methods that apply for life, and are open to the ability and knowledge to be attached to the machine. Furthermore, transduction, this type is almost similar to supervised learning, but not clearly to build a function but instead to try to predict the output. Meanwhile, the last type of machine learning is learning to learn, which is a type of machine learning that uses algorithms to learn from before.

## 3. Result and discussion

This section explains the results of a brief review of the implementation and obstacle in 5 studies related to machine learning. Here, objectively summarizing the implementation and the constraints faced, and the research that reviewed randomly can see in table 1.

**Table 1.** ReviewResult

| Authors | Implementation | Obstacles |
|---|---|---|
| S. B. Kotsiantis [6] | Classification and Regression algorithm for a distance learning system | Compare some appropriate algorithms |
| Sarah E. Petersen and Mari Ostendorf [7] | Classification and Support Vector Machine to produce a better method of assessing readinglevel | Combining method SVM to combine featuresfrom n-gram language models then was finding an appropriate corpus |
| Authors | Implementation | Obstacles |

| Vijaya B. Kolachalama and Priya S. Garg [8] | Artificial Intelligence combined with a healthcare ecosystem and curriculum | Lack of direct access to Machine Learning education that is appropriate for biomedical doctors and researchers. |
|---|---|---|
| NiklasLavesson [9] | Students given the opportunity to participate in self-assessment tests where they gave the task of ranking their level of perception from prior knowledge of statistics, mathematics, and programming as well as the results used for analysis in the documentation system | the results seem to match, but the low number of participants with the self-assessment tests used in this study may be too limited to reach accurate predictions |
| Alexander J. Stimpson and Mary L. Cummings [10] | To use an environment that includes traditional features, such as 'summative assessment' checks, in addition to technology-driven features that include temporal information and process levels. In this way, machine learning prediction models can built with or without additional features | determining the impact of temporal and process-level information on machine learning predictions |

First research from Kotsianti's [6] explained the application of algorithms encountered obstacles in making comparisons to the appropriate algorithm because the algorithm used intended as a supporting tool for tutors to minimize the number of students who failed by giving them extra teaching, because students have little motivation, and writers can find corrective actions for students and can minimize the number of dropouts and can predict student success. Second research, Sarah E. Petersen and Mari Ostendorf's [7] explained learning for international students and teachers to find topical texts at the reading level. By using text classification on machine learning can determine the accurate reading automatically for bilingual students. Third research from Vijaya B. Kolachalama and Priya S. Garg's [8] explained that medical schools need to implement machine learning based on artificial intelligence as part of a useful curriculum for healthcare and to simulate Artificial Intelligence, which focuses on disease prediction, the health of a population, risk of stratification, and health management. Fourth research from Niklas Lavesson's [9]explained to determine the level of student understanding of learning at Blekinge Institute of Technology, Sweden, by providing a diagnostic test of prerequisite subjects. With this test intended to determine the success of learning in machine learning in this educational institution. Fifth research from Alexander J. Stimpson and Mary L. Cummings's [10] explained Machine learning research has not yet considered the impact of the nature of describing the development of temporal learning and process levels. Process level information is not useful in post hoc predictions but contributes significantly to enabling accurate predictions made earlier in the course. Process-level information provides predictive features that are useful for the development of targeted intervention techniques.

## 4. Summary

If seen from the results of the review obtained in the research conducted needs to be assessed to identify the impact first before carrying out the implementation. All research discussed on machine learning is taught at various levels of education. However, they seem to be mostly given at the advanced level or the level of research in computer science programs only, so the proposal that can give is to study more deeply machine learning research in the field of education to be used in specific majors and can include in the learning curriculum. This research has a lack of research information in seeing the relationship, so it needs to be studied more reference sources that might use in the next review.

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