

Metode Machine Learning Dalam Pendidikan

Machine Learning Methods in Education

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Abstract

Education is the right of all citizens and the state guarantees to get it and the quality of education is supported by facilities and infrastructure. However, it all depends on educators and students how to see the process and be able to accept this knowledge in order to produce a product from the knowledge gained. It is recognized that there are problems when learning and absorbing knowledge, therefore machine learning is needed which aims to see and solve problems from existing data. The method in this research looks at the previous paper, looks at the methods used and the results sought are then used as a guideline for which models are widely used in finding solutions in the world of education.

Keywords: Machine Learning, Education, Models

Abstrak

Pendidikan merupakan hak semua warga negara dan negara menjamin untuk mendapatkannya dan kualitas pendidikan didukung sarana dan prasarana. Namun itu semua tergantung dari pendidik dan peserta didik bagaimana melihat proses dan bisa menerima ilmu tersebut agar bisa menghasilkan suatu produk dari ilmu yang didapat. Memang diakui ada masalah yang didapat ketika proses belajar dan penyerapan ilmu maka dari itu dibutuhkan machine learning yang bertujuan melihat dan memecahkan masalah dari data yang ada. Metode dalam penelitian melihat paper yang terdahulu melihat metode yang dipakai dan hasil yang dicari kemudian dijadikan pedoman model mana yang banyak dipakai dalam mencari solusi dalam dunia Pendidikan.

Kata kunci: Machine Learning, Pendidikan, Model

Pendahuluan

Pendidikan merupakan hak setiap warga negara dan wajib mengikutinya terutama di Negara Republik Indonesia [1] dan pemerintah wajib membiayainya [2]. Juga merupakan pondasi dalam setiap kemajuan negara dari teknologi, kesehatan hingga meningkatnya PDP dan terutama menjadi negara maju [3], namun hal tersebut ditopang dengan pendidik yang berkualitas dan sarana prasana yang sangat baik karena tanpa itu semua maka tidak mungkin akan terlaksana [4]. Namun jika sudah terpenuhi tergantung dari peserta didik bagaimana untuk menerima dan menyerap ilmu tersebut dengan baik agar bisa menghasilkan dalam bentuk karya dan bermanfaat bagi diri sendiri dan negara. Memang diakui ilmu tidak semua bisa diserap untuk semua orang maka dari itu dibutuhkan metode untuk melihat minat dan prediksi akan kemampuannya peserta didik, salah satu cara yaitu dibutuhkan machine learning untuk menganalisis masalah dan mencari solusi dalam bidang pendidikan, namun dalam penelitian ini melihat penelitian terdahulu dengan mereview dari objek, model dan hasil yang didapat yang diteliti dalam pendidikan di bidang machine learning, diharapkan dijadikan pedoman dalam mencari solusi dalam bidang pendidikan untuk para pengajar maupun pencari peserta didik dalam menyerap ilmu yang didapat dan diharapkan bisa menghasilkan hasil produk dari ilmu yang didapat.

Method

Metode penelitian yang digunakan adalah sistematis review dan menggunakan data sekunder berupa artikel yang didapat dari sumber terpercaya yaitu IEEEExplore dan Science Direct, menggunakan kata kunci, yaitu pendidikan dalam machine learning. Jika sudah maka terlihat topik apa yang diteliti atau dicari dan metode apa yang dipakai dalam penelitian tersebut dan paper yang diunduh dari tahun 2020 hingga sekarang dan berbahasa Inggris.

Pembahasan

Berdasarkan kata kunci yang digunakan maka didapat beberapa artikel yang ditemukan di jurnal IEEEExplore dan Science Direct, dibawah ini paper yang berhubungan dengan pendidikan di machine learning.

Table 1. Keyword dan Jumlah Paper Yang Didapat

| No | Keywords | Sumber |
|----|---|------------------------------|
| 1 | Prediction Student | IEEEExplore ScienceDirect |
| 2 | Student Performance | IEEEExplore ScienceDirect |
| 3 | Machine Learning in Education Engineering | IEEEExplore ScienceDirect |

Dari paper tersebut maka dijabarkan dari topik, metode, bagian dan hasil namun hanya yang dipakai pada tabel dibawah ini, mengingat banyak paper yang berhubungan dengan Pendidikan namun hanya saja dilihat dari model yang sering dipakai dan hasil dari pengujiannya.

| No | Keywords | Judul | Model | Result |
|----|--------------------|---|---|---|
| 1. | Prediction Student | Using Data Mining Techniques to Predict Student Performance to Support Decision Making in University Admission Systems [5]. | Decision Trees, SVM, and Naïve Bayes | Accuracy |
| | | Predicting student final performance using artificial neural networks in online learning environments [6]. | ANN | Accuracy, Recall, Precision, and F1 Score |
| | | Early Prediction of Dropout and Final Exam Performance in an Online Statistics Course [7]. | Conditional Tree | Recall |
| | | Using machine learning to predict student difficulties from learning session data [8]. | ANN, SVM, logistic regression, Naïve bayes classifiers dan decision trees | Accuracy, Recall, Precision, and F1 Score |
| | | Predicting academic performance of students from VLE big data using deep learning models [9]. | ANN, logistic regression dan SVM | Accuracy |
| | | Application of machine learning and data mining in predicting the performance of intermediate and secondary education level student [10]. | decision tree dan regression model | Accuracy |

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|---|---|--|---|---|
| | | Transfer Learning from Deep Neural Networks for Predicting Student Performance [11]. | Deep Neural Networks | Accuracy |
| | | An Ensemble Prediction Model for Potential Student Recommendation Using Machine Learning [12]. | SVM, random forest, dan AdaBoost | Accuracy, Recall, Precision, and F1 Score |
| 2 | Student Performance | Hybridization of Cluster-Based LDA and ANN for Student Performance Prediction and Comments Evaluation [13]. | Linear Discriminant Analysis (CLDA) and Artificial Neural Network (ANN) | Accuracy |
| | | Academic Performance Prediction Based on Multisource, Multifeature Behavioral Data [14]. | RF (random forest), GBRT (gradient boost regression tree), KNN, SVM, and XGBoost Long short-term memory dan LSTM. | Cross Validation |
| | | Student Performance Prediction Model Based on Discriminative Feature Selection [15]. | Model SVM dengan Feature selection mRMR, Relief, SVM-RFE dan AVC | Accuracy |
| | | The potential for student performance prediction in small cohorts with minimal available attributes [16]. | Decision Tree, KNN dan Random Forest | Accuracy |
| | | Student Academic Performance Prediction using Supervised Learning Techniques [17]. | J48, NNge and MLP | Accuracy |
| | | Linear Support Vector Machines for Prediction of Student Performance in School-Based Education [18]. | Decision Tree, logistic regression, Naïve Bayes dan SVM | ROC |
| | | Enhanced Harris Hawks Optimization as a feature selection for the prediction of student performance [19]. | kNN, LRNN, Naïve Bayes, and ANN | Accuracy |
| 3 | Machine Learning in Education Engineering | Predicting Engineering Student Attrition Risk Using a Probabilistic Neural Network and Comparing Results with a Backpropagation Neural Network and Logistic Regression [20]. | Probabilistic Neural Network (PNN) | Accuracy, Recall, Precision, and F1 Score |
| | | Modern Artificial Intelligence Model Development for Undergraduate Student Performance Prediction: An Investigation on Engineering Mathematics Courses [21]. | ELM, RF and Volterra | Accuracy |
| | | Using Machine Learning Methods to Understand Students' Performance in an Engineering Course [22]. | Model Classification | Accuracy |

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|--|--|--|---|----------|
| | | The Investigation of Logistic Regression Methods Applied to Engineering Education using Project Based Learning for Airport Systems Design [23]. | Logistic Regression | Accuracy |
| | | Classification of Students' Misconceptions in Individualised Learning Environments (C-SMILE): An Innovative Assessment Tool for Engineering Education Settings [24]. | Classification of Students Misconceptions in Individualised Learning Environment (C-SMILE). | Accuracy |

Kesimpulan

Jika dilihat pada pembahasan diatas maka dilihat model machine learning yaitu Classification dan menggunakan algoritma yang banyak dipakai yaitu Decision Tree, Naïve Bayes, NN, ANN, SVM hingga Logistic Regression namun ada model terbaru yang dipakai yaitu C-SMILE, feature selection ELM, RF dan Volterra. Namun pada penelitian juga sedikit sekali dijabarkan dengan perbandingan paper yang lebih banyak namun jika dilihat maka akan kelihatan sekali model yang sering dipakai dalam machine learning dalam bidang Kesehatan.

Daftar Rujukan

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