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## data mining erpe.docx - 7/28/2025

Hamdika Putra

Prediksi Performa Akademik Mahasiswa Berdasarkan Gaya Hidup dan Dukungan Sosial Menggunakan Random Forest

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### Abstraksi

Performa akademik mahasiswa dipengaruhi oleh berbagai faktor, termasuk gaya hidup dan dukungan sosial yang diterima selama proses studi. Penelitian ini bertujuan untuk memprediksi performa akademik mahasiswa dengan memanfaatkan metode data mining, khususnya algoritma Random Forest, yang terbukti efektif dalam menghasilkan prediksi yang akurat. Data yang digunakan merupakan hasil survei terkait kebiasaan hidup mahasiswa dan tingkat dukungan sosial yang diperoleh. Proses penelitian meliputi tahap preprocessing data, pemberian label pada atribut non-numerik, dan validasi model menggunakan teknik cross-validation. Model dievaluasi menggunakan metrik Confusion Matrix, termasuk accuracy, precision, recall, dan F1-score. Hasil eksperimen menunjukkan bahwa algoritma Random Forest mampu mengklasifikasikan performa akademik mahasiswa dengan akurasi yang tinggi, serta memberikan informasi yang berguna bagi pihak kampus dalam pengambilan keputusan strategis untuk meningkatkan kualitas pembelajaran dan dukungan terhadap mahasiswa.

### Kata Kunci:

performa akademik, gaya hidup, dukungan sosial, data mining, Random Forest

### Abstract

Student academic performance is influenced by various factors, including lifestyle and the social support received during their studies. This research aims to predict student academic performance using data mining methods, specifically the Random Forest algorithm, which has proven effective in generating accurate predictions. The data used is derived from surveys regarding student lifestyle habits and the level of social support obtained. The research process includes data preprocessing, labeling non-numeric attributes, and model validation using cross-validation techniques. The model is evaluated using Confusion Matrix metrics, including accuracy, precision, recall, and F1-score. Experimental results indicate that the Random Forest algorithm can classify student academic performance with high accuracy, providing valuable information for the campus in making strategic decisions to improve the quality of learning and support for students.

Keywords:

Academic performance, Lifestyle, Social support, Data mining, Random Forest

## Pendahuluan

Tingkat kelulusan atau graduation rate merupakan salah satu indikator utama dalam mengukur kinerja sebuah lembaga akademik [1]. Di berbagai negara, termasuk Indonesia, angka putus kuliah masih menjadi tantangan serius yang berdampak pada masa depan generasi muda. Studi menunjukkan bahwa lebih dari 15% mahasiswa di negara-negara maju seperti Amerika Serikat, Jerman, dan Inggris mengalami dropout selama masa studi mereka [1]. Di Indonesia sendiri, tingkat mahasiswa yang melanjutkan ke jenjang perguruan tinggi masih rendah, yaitu hanya sekitar 6% dari total lulusan SMA, dengan tingkat putus kuliah yang cukup tinggi di berbagai provinsi, seperti Bengkulu dan Jawa Timur [3].

Penelitian sebelumnya telah menunjukkan bahwa rendahnya performa akademik merupakan salah satu indikator utama dari tingginya angka putus kuliah [1][2]. Oleh karena itu, penting bagi institusi pendidikan untuk memahami faktor-faktor yang memengaruhi keberhasilan akademik mahasiswa guna merumuskan strategi pencegahan yang efektif. Faktor-faktor tersebut mencakup kondisi sosial ekonomi, gaya hidup, dukungan sosial, hingga variabel personal seperti stres, kebiasaan belajar, dan kesehatan [1][3].

Seiring berkembangnya teknologi, pendekatan berbasis Educational Data Mining (EDM) dan algoritma machine learning seperti Decision Tree, Naïve Bayes, Random Forest, dan K-Nearest Neighbor telah banyak digunakan untuk memprediksi performa akademik mahasiswa [2][3]. Di antara algoritma tersebut, Random Forest memiliki keunggulan dalam hal akurasi dan stabilitas prediksi pada data pendidikan yang kompleks [3]. Berbagai penelitian menunjukkan bahwa Random Forest mampu menghasilkan akurasi hingga 91% dalam memprediksi keberhasilan akademik [3], menjadikannya salah satu algoritma yang efektif untuk digunakan dalam sistem pendukung keputusan pendidikan.

Namun demikian, sebagian besar penelitian sebelumnya lebih banyak menitikberatkan pada variabel akademik seperti IPK dan absensi, tanpa memasukkan faktor gaya hidup dan dukungan sosial secara menyeluruh sebagai variabel penting dalam model prediksi [1][3]. Padahal, aspek-aspek tersebut memiliki peran signifikan dalam menentukan keberhasilan studi mahasiswa.

Berdasarkan latar belakang tersebut, penelitian ini bertujuan untuk mengembangkan model prediksi performa akademik mahasiswa dengan mempertimbangkan faktor gaya hidup dan dukungan sosial menggunakan algoritma Random Forest. Dengan pendekatan ini, diharapkan institusi pendidikan dapat memperoleh wawasan yang lebih luas dalam memahami karakteristik mahasiswa dan menyusun kebijakan yang

■ Sentences that are likely AI-generated.

## FAQs

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### What is GPTZero?

GPTZero is the leading AI detector for checking whether a document was written by a large language model such as ChatGPT. GPTZero detects AI on sentence, paragraph, and document level. Our model was trained on a large, diverse corpus of human-written and AI-generated text, with a focus on English prose. To date, GPTZero has served over 10 million users around the world, and works with over 100 organizations in education, hiring, publishing, legal, and more.

### When should I use GPTZero?

Our users have seen the use of AI-generated text proliferate into education, certification, hiring and recruitment, social writing platforms, disinformation, and beyond. We've created GPTZero as a tool to highlight the possible use of AI in writing text. In particular, we focus on classifying AI use in prose. Overall, our classifier is intended to be used to flag situations in which a conversation can be started (for example, between educators and students) to drive further inquiry and spread awareness of the risks of using AI in written work.

### Does GPTZero only detect ChatGPT outputs?

No, GPTZero works robustly across a range of AI language models, including but not limited to ChatGPT, GPT-4, GPT-3, GPT-2, LLaMA, and AI services based on those models.

### What are the limitations of the classifier?

The nature of AI-generated content is changing constantly. As such, these results should not be used to punish students. We recommend educators to use our behind-the-scenes [Writing Reports](#) as part of a holistic assessment of student work. There always exist edge cases with both instances where AI is classified as human, and human is classified as AI. Instead, we recommend educators take approaches that give students the opportunity to demonstrate their understanding in a controlled environment and craft assignments that cannot be solved with AI. Our classifier is not trained to identify AI-generated text after it has been heavily modified after generation (although we estimate this is a minority of the uses for AI-generation at the moment). Currently, our classifier can sometimes flag other machine-generated or highly procedural text as AI-generated, and as such, should be used on more descriptive portions of text.

### I'm an educator who has found AI-generated text by my students. What do I do?

Firstly, at GPTZero, we don't believe that any AI detector is perfect. There always exist edge cases with both instances where AI is classified as human, and human is classified as AI. Nonetheless, we recommend that educators can do the following when they get a positive detection: Ask students to demonstrate their understanding in a controlled environment, whether that is through an in-person assessment, or through an editor that can track their edit history (for instance, using our [Writing Reports](#) through Google Docs). Check out our list of [several recommendations](#) on types of assignments that are difficult to solve with AI.

Ask the student if they can produce artifacts of their writing process, whether it is drafts, revision histories, or brainstorming notes. For example, if the editor they used to write the text has an edit history (such as Google Docs), and it was typed out with several edits over a reasonable period of time, it is likely the student work is authentic. You can use GPTZero's Writing Reports to replay the student's writing process, and view signals that indicate the authenticity of the work.

See if there is a history of AI-generated text in the student's work. We recommend looking for a long-term pattern of AI use, as opposed to a single instance, in order to determine whether the student is using AI.