

ABSTRACT

Online learning is an educational activity that takes place through internet-connected networks. Online learning is new for students and requires adaptation when doing so. This learning method can affect students in understanding learning because each student has a different level of understanding to understanding learning material..

The De La Salle Catholic University Manado is a higher education institution tasked with educating students. During the pandemic, the institution also implemented online learning. To find out the level of student understanding of learning material, it is necessary to conduct a survey on this matter, however, this has not been done. Therefore, an application was built to determine the level of student understanding of online learning materials using the C5.0 algorithm method so that obstacles or student supporters can be known in the learning understanding process. The process and workings of the C5.0 algorithm in the application that is built, namely by calculating the entropy value, information gain and gain ratio of each attribute, then from the results of the calculation will produce a decision tree and rules that will be used to classify the level of understanding of students who are categorized into very understanding, quite understanding and not understanding online learning.

The The CRISP-DM (Cross-Industry Standard Process Model for Data Mining) methodology is employed for data mining and software development in this process. Programming languages employed are Python, CSS, and HTML. To illustrate the steps and decisions within the application model, a flowchart is utilized, along with Data Flow Diagrams (DFD) to depict data flow. The data source for this research is obtained from distributing questionnaires to 198 students.

This research concludes that the implementation of the C5.0 algorithm within the application to determine students' understanding levels of online learning material during the COVID-19 pandemic has been successfully implemented and runs quite well. The decision tree formed in the application makes the communication attribute the root of the decision tree and provides the highest accuracy results from test results of 70% test data and 30% training data, which is 65%, while the highest recall value is obtained from test results of 60 test data and 40% of training data with a value of 65%, and the highest precision value is obtained from test results of 90% test data and 10% of training data with a value of 62.25%.

~~Comprehension is a person's ability to understand or understand something after something is known and remembered. Understanding also means a process or act of understanding, thinking and learning. Therefore, understanding is the goal and essence of learning itself. In this pandemic era, the learning process underwent significant changes, where the learning process changed from offline (outside the network) to online (in the network) which had an impact on the condition of students who had to adapt to these changes.~~

~~The process of adapting online learning methods does little to influence students in the process of understanding learning. Therefore, it is necessary to analyze the level of student understanding in online learning so that obstacles or~~

~~student supporters can be identified in the process of understanding learning. As for this study, the authors implemented the C5.0 Algorithm as a method for carrying out the analysis, which Algorithm C5.0 is a development of Algorithm C4.5 which is more refined in the calculation process.~~

~~The data source in this study was taken from distributing questionnaires to 198 samples, which were obtained through the Isaac and Michael method by utilizing a 5% margin of error. Then the data were tested for validity and reliability using the Cronbach's Alpha and Pearson methods so that the validity and relationships of each variable could be accounted for. After classification, a decision tree is formed, where the communication attribute is the root of the decision tree. The highest accuracy was obtained from the 30:70 test results with a value of 65%, while the highest recall value was obtained from the 40:60 test results with a value of 65%, and the highest precision value was obtained from the 10:90 test results with a value of 62.25%.~~

~~Keywords: Online learning, Student Understanding, C5.0 Algorithm, Data Mining~~

ABSTRAK

~~Pemahaman adalah kemampuan seseorang untuk mengerti atau memahami sesuatu setelah sesuatu itu diketahui dan diingat. Pemahaman juga mempunyai arti suatu proses atau perbuatan cara memahami, proses berpikir dan belajar. Oleh karena itu, pemahaman merupakan tujuan dan esensi dari belajar itu sendiri. Pada era pandemi ini, proses belajar mengalami perubahan yang signifikan, dimana proses belajar berubah dari luring (luar jaringan) menjadi daring (dalam jaringan) yang efeknya berimbas pada keadaan mahasiswa yang harus menyesuaikan diri dengan perubahan tersebut.~~

~~Pembelajaran daring merupakan kegiatan proses belajar mengajar yang terhubung melalui jaringan internet. Pembelajaran daring menjadi hal yang baru bagi para mahasiswa dan memerlukan adaptasi ketika melakukannya. Metode pembelajaran ini dapat mempengaruhi mahasiswa dalam memahami pembelajaran karena setiap mahasiswa mempunyai tingkat pemahaman yang berbeda dalam memahami materi pembelajaran.~~

~~Universitas Katolik De La Salle Manado merupakan lembaga pendidikan tinggi yang bertugas untuk mendidik para mahasiswa. Selama pandemi, lembaga ini juga melaksanakan pembelajaran daring. Untuk mengetahui tingkat pemahaman mahasiswa terhadap materi pembelajaran, maka perlu dilakukan survey mengenai hal ini namun, hal ini belum dilakukan. Oleh karena itu, dibangun aplikasi untuk menentukan tingkat pemahaman mahasiswa terhadap materi pembelajaran secara daring menggunakan metode algoritma C5.0 agar dapat diketahui hambatan ataupun pendukung mahasiswa dalam proses~~

pemahaman pembelajaran. Proses dan cara kerja dari algoritma C5.0 pada aplikasi yang dibangun, yaitu dengan menghitung nilai *entropy*, *information gain* dan *gain ratio* dari setiap atribut, kemudian dari hasil perhitungan tersebut akan menghasilkan pohon keputusan dan aturan yang akan dipakai untuk klasifikasi tingkat pemahaman mahasiswa yang dikategorikan menjadi sangat paham, cukup paham dan tidak paham terhadap pembelajaran secara daring.

Metodologi yang digunakan dalam pembuatan aplikasi ini menggunakan *CRISP-DM* atau *Cross-Industry Standard Process Model for Data Mining*. Bahasa pemrograman yang digunakan, yaitu *Python*, *CSS* dan *HTML*. Untuk penggambaran langkah-langkah pembuatan aplikasi dan penerapan algoritma menggunakan *Flowchart* dan penggambaran aliran data digunakan *DFD*. Sumber data pada Tugas Akhir ini diambil dari hasil kuesioner yang dibagikan kepada 198 mahasiswa.

Tugas Akhir ini memberikan hasil bahwa aplikasi implementasi algoritma C5.0 untuk menentukan tingkat pemahaman mahasiswa terhadap materi pembelajaran secara daring di masa pandemi *covid-19* berhasil diimplementasikan dan berjalan cukup baik. Pohon keputusan yang terbentuk pada aplikasi menjadikan atribut komunikasi sebagai *root* dari pohon keputusan dan memberikan hasil akurasi tertinggi dari hasil pengujian 70% data uji dan 30% data latih, yaitu 65%, sedangkan nilai *recall* tertinggi diperoleh dari hasil pengujian 60 data uji dan 40% data latih dengan nilai 65%, dan nilai *precision* tertinggi diperoleh dari hasil pengujian 90% data uji dan 10 % data latih dengan nilai 62,25%.

Kata Kunci: Pembelajaran Daring, Pemahaman Mahasiswa, Algoritma C5.0, *Data Mining*.