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International Journal of Computer Applications

Foundation of Computer Science (FCS), NY, USA

[Volume 176](#)

-  
[Number 7](#)

Year of Publication: 2017

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10.5120/ijca2017915644

{bibtex}2017915644.bib{/bibtex}

## **Abstract**

Education is reinforced by identifying new students' attitudes to understand the learning process. Learning analysis is one of the most useful tools to achieve this purpose. Therefore, the present study aims to provide a Recommender System (RS) to distinguish between different students' attitudes (cognitive, emotional, and practical) by creating a dictionary to automatically group common features. In this study, freestyle comments data were collected after each lecture then were analyzed to extract words and sentences' parts (noun, verb, adjective and adverb) for extracting the most common and frequently words and phrases. Thus, a predictive and understandable model was created for the students' estimates. In this paper two types of machine learning techniques were used which are: Support Vector Machine (SVM) and Random Forest (SVM-RF). These techniques are used to extract general rules that distinguish each class of students and providing appropriate automatic feedback that helps student level

performance enhancement. Precision, Recall, F-Measure and Accuracy were calculated after each lecture to verify the validity of the results. The experimental results indicated the validity of the automatic feature dictionary; SVM-RF exceeded other techniques to extract general rules.

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### Index Terms

Computer Science

Information Systems

### Keywords

Freestyle Comment Data, Rule Extraction, Recommender System, Machine Techniques