Integrated Model for Identifying the Learning Style of the Students using Machine Learning Techniques: An Approach of Felder Silverman Learning Style Model

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Abstract

Identifying students' learning behaviours in learning environments is an essential factor in the success of the lifelong learning process. The intention of the research is to propose a methodology for identifying the learning style of the students in the online learning environment using machine learning techniques. The Felder Silverman learning style model (FSLSM) was used as the learning style identification model, and Moodle was used as the online learning platform. Data was collected for two modules each module consisting of 150 students who are following a BSc, Information Technology Degree at General Sir John Kotelawala Defence University. Once the students enrolled in the courses, their behaviours in the online learning environment were traced using Moodle logs and the time spent on each activity according to the FSLSM and applied machine. Then the machine learning classification techniques such as Decision Tree, Logistic Regression, Random Forest, Support Vector Machine, and K-Nearest Neighbors were applied to train the several models covering each main four dimensions of the FSLSM. The results show that each dimension of the FSLSM Decision Tree Classifier performed well with an accuracy of 95% for Input, 80% for Perception, 90% for Processing, and 95% for Understanding dimensions. The models were evaluated using k-fold cross-validation and Grid search methods and Hyper Parameter Tuning was done accordingly. Moreover, the validity of the models was evaluated by considering the Mean Squared Error, BIAS, and the values of the variance.

Keywords: *Machine learning, Felder Silverman learning style model, Learning style*