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| Good afternoon , everyone! I’m Serene.  It is honor to introduce our work here . |
| There are many students who perform well in high school ,but they failed the exam in the university. Most of them don’t study hard in their daily life. We could know that from their daily behavior.This paper is about the correlation between students behavior and their performance. |
| University is a miniature community, as the main range of students’ life, it provides learning environment and basic living facilities, such as canteens, dormitories and shops. With the rapid construction of information based education, the digital campus becomes a new mode.  There are rich data contained in campus,including pay records and scores on courses. |
| Academic performance is one of the key indicators to evaluate the level of education. Furthermore, discovering students with poor academic performance early and effectively is very important ,it is helpful to supervision and help students developing good study habits. |
| Therefore, we now give the summarize of our objective. The purpose of our work is to discover college students with poor performance , and analyze the correlation between students behavior and their performance. |
| In our work, we first obtain students behavior pattern.After that we extract features from two perspectives.A regularized multi-task model is fitted for performance on each course simultaneously. |
| We firstly obtain behavior sequences.Then we build  corresponding behavior pattern from raw records. |
| Students behavior pattern reflects their state of life and learning to some degree . Students behavior pattern have important impact on their study performance.  We choose a behavior set as this table. The behavior set is named H. |
| Besides behaviors in H ,we add two common behaviors, meal at school and meal on weekends.  Specially, with regard to the behavior dorm access, we use the leaving before a time and backing after a time instead. The time can be set as the peak of distribution, like 8 a.m. in Figure 2a and 10 p.m in Figure 2b. |
| We use entropy to measure. Entropy of transition  is the uncertainty between the transition of different behaviors. Entropy of observation is the various activities a behavior exhibits. |
| One approach is predicting performance on all courses as a whole, predicting in this way is coarse,because no distinction between courses.Another is training model for each course independently. While the samples of each course are small, learning for each course independently is too weak and cost high. |
| According to the drawbacks of the two single-task approaches, we use the multi-task model to improve. For the different student groups of every course, we treat a course as a task naturally. |
| We conduct experiments on the datasets.This dataset consists of students performance on 12 courses. There are three hundred and two (302) students in total and more than two hundred thousands records.  We employ SMOTE on data in advance.It could assure the ratio of minority class samples not less than zero point five (0.5). |
| Finally,we use five-fold cross validation to select parameters.  We partition the datasets into two sets randomly: train set and test set. We train the models using the train set, Then we evaluate on the test set with several metrics. |
| According to the ROC and AUC, three models show a good performance. The single-task models achieve a good outcome, especially SVM. The precision of Random Forest is very high, while the recall is not good enough.All these results demonstrate the efficiency of behavior features. |
| Here we see a table showing comparison between single task models and multi-task model.As shown in the table, all metrics of the multi-task learning are pretty high. This shows that multi-task model is more accurate than single task models.  In reality, discovering students of poor performance exactly and truly is more important.It means that the multi-task learning with a higher recall is appropriate. |
| To further explore the feasibility of early warning, we keep our model not changed , then input students behavior features of 6, 12 and 18 weeks.  The accuracy,precision, recall, and f1-score of three groups are shown in Figure. These metrics almost get higher with the end time. That indicates that our framework is workable. |
| In conclusion, we propose a general framework to discover students with poor academic performance . |
| We analyze the correlation between students behavior and their performance.We firstly build users behavior pattern. Then we extract behavior features. Then we use a regularized multi-task model. |
| Our experiments show a high recall of poor performance discovery and early warning. Early warning is helpful to early supervision and healthy study habits developing. |
| In the future,we would try to find the relationship between behavior and scholarshipThank you. Are there any questions? |