Case Study

Predicting Student Dropout

The Client’s Challenge

Many colleges and universities are trying to improve their retention rate. More students are dropping out than ever before, and many students do not complete the program they started in, either. Instead, they drop out, transfer to another university, or graduate with a different major.

When a student drops out, it lowers their self-esteem, disperses the family’s financial investment, and damages the university’s reputation. Moreover, retention has a financial effect on the institution. Therefore, it is essential for education professionals to identify student issues early on and know if—and why—a student is likely to leave. This is exactly what one university asked us to figure out.

Our Solution

Using our software, the university was able to get conditional rules describing how many heterogeneous attributes have an impact on a student’s choice of dropping out. The university wasn’t just interested in forecasting dropout rate, however: they wanted to use those rules to implement effective actions that could remove the main obstacles to graduation, and thus minimize the dropout phenomenon.

The university developed an automatic dropout detection system that applied the Rulex outcomes (rules) to each active student. Then, specific tasks were implemented to focus on dropout candidates in order to convince them to stay before they even claimed their intention to leave.

How it worked

Rulex automatically aggregated student information across multiple channels to focus on several key attributes that flagged propensity to drop out or to graduate.

Real Results:

- Reduced Dropout Rate
- Focused on the investment in dropout prevention
- Increased financial income
- Improved reputation
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Input: Student’s key attributes

20,000,000 units of elementary data were loaded, cleansed, processed, and aggregated to produce the final dataset for model generation. The dataset photographed 140,000 academic careers engaged by 116,000 students between the years of 2001 and 2010. Each student was characterized by 90 key attributes. This included information like major, age, sex, location, professional background, credits, exams, and grades.

Output: Will the student drop out?

Students were divided into three main categories: graduates, interrupted, or active members. The attribute DROPOUT (yes or no) was the outcome to be modeled or forecasted. Classifying students correctly according to the attribute DROPOUT and understanding how the rules of classification worked helped to answer the questions the university asked: who is going to drop out and why?

Model: Rules of dropping out and relevant attributes

Rulex automatically inferred 38 multi-conditional rules that described how the input attributes were bonded together in determining whether a student dropped out. The model was then applied to active students, and for each of them, Rulex predicted their evolution. The model also measured the relevance of each rule, each condition in the rules, the critical thresholds of input attributes, and their ranking. Our model fit with 84% accuracy.

Academic Results

Knowing why each student might drop out, the university could take action with an individual student or group of students. In the educational sphere, they might recommend individual tutoring or create activities like networking events to foster integration among students. In the administrative sphere, the university could examine its management, better understand the dropouts’ assessments, or plan specific actions to support a student’s residence in a critical location or income bracket. Ultimately, the university can run Rulex periodically on the student data pool in order to adapt the dropout model: in fact, effective actions are supposed to change student behavior, with a subsequent change in the model itself.

Rulex Analytics®

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