Accurate and Personalized Academic Advising

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November 5, 2018

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Keywords: machine learning, decision-making systems

1 Introduction

Suitable academic advising is an essential activity for the mission of any university and institution of higher education. Due to its important role in academic success, universities and educational institutions count on a consulting board to help students make decisions about their academic career. This includes, for instance, the planning of class schedules or the pursue of a specializations or curricular activities. This consulting is always carried out by an advisor who is familiar with the university study programs and has *learned* the formulas for *success* based on past experiences. Nevertheless, building such expertise may take time and the process must be carried out for every new academic advisor.

2 The project

In this internship we propose the design of a system for automatic academic advising. Much like human advisers, the system will provide personalized counsel to help students decide the more suitable subjects to take at a given time of their academic career. In this spirit, a student could ask the system, for example, which are the lectures that, given her academic history and background, may lead to a successful academic term (e.g., year, semester). The system's expertise will be built from the university's entire academic history—a dataset containing the academic records of previous students, the classes they took, and the grades they got.

The internship will focus only on the advising task (and not on deploying a full academic advising software or system). For this purpose, we will apply machine learning algorithms (e.g., neural networks, gradient boosting trees, etc.) on a real academic history dataset to build models that can predict the probability of success of a student given her academic history. Previous research [1]

has analyzed academic histories to investigate, among other aspects, course difficulty estimation, dropout paths, and trade-offs between academic load and performance. The goal of this internship is to know at which extent we can accurately predict academic success from historical data.

3 Requirements

The student should be familiar with training and testing machine learning algorithms. We will encourage the use of libraries such as Scikit-learn (Python)[1] and TensorFlow[2] for this purpose. Knowledge in relational database design is also appreciated. The internship is a collaboration between the IRISA/Inria research center in Rennes and the University of Calgary, however it will take place in Rennes. Candidates should send their CV as well as a motivation letter to the aforementioned contact email addresses. We accept applications in English and French, however the work language will be mainly English.

References

[1] Gonzalo Méndez, Xavier Ochoa, and Katherine Chiluiza. 2014. Techniques for Data-driven Curriculum Analysis. In *Proceedings of the Fourth International Conference on Learning Analytics And Knowledge (LAK '14)*. ACM, New York, NY, USA, 148–157. DOI:http://dx.doi.org/10.1145/2567574.2567591

[1] http://scikit-learn.org
[2] https://www.tensorflow.org/