**Predict assignment submission using Deep Learning**

During the last decade, an increasing number of studies has been making use of educational data for the identification of factors that affect or predict students’ performance. Until recently the approach of these studies employed traditional methods such as regression or covariance analysis. For example, **Ke and Xie (2009)**, applied variations of covariance analysis to quantitative data gathered through surveys, concluding that there is evidence that age itself does not **predict adult students'** **learning satisfaction or performance** in online courses.

The availability of data, including datasets that are produced through digital measurements, has recently made possible the use of novel, machine learning approaches for their analysis. **Smith et al (2015)**, introduce a deep-learning-based diagrammatic student model, which employs artificial neural networks to analyze student drawings. They **predict student’s understanding and performance. They show that this model** is most accurate, and outperforms other competitive baseline diagrammatic student models on both convergence rate and convergence point. **Okubo et al (2017)**, provided evidence supporting the effectiveness of Recurrent Neural Networks as a method for **predicting final grades of students**, when compared with multiple regression analysis. Experimental results provided by **Zhao et al (2018)**, showed that a **drowsy student state detection** method integrating a deep convolutional neural network is more efficient and effective than traditional methods. **Qiu et al (2018)**, show that a student dropout prediction model based on two-dimensional convolutional neural networks (DP-CNN) applied on clickstream data of students learning behaviors can achieve better results than the related baseline methods in **predicting students’ dropouts in MOOCs**. A deep neural network which is a combination of Convolutional Neural Networks (CNN) and Recurrent Neural Networks (RNN), **was** proposed by **Wang, Yu and Miao (2017)**, for **the solution of** **dropout prediction problems in MOOCs**. The key advantage of their model is that features used in the model are automatically extracted from the raw records. **Chunqiao, Xiaoning, and Qingyou (2018)**, showed that a neural network model is a reliable tool to predict student study failure risk. **Fok et al (2018)**, focus on how to **use Tensorflow artificial intelligence engine for classifying students’ performance** and forecasting their future universities degree program. The results showed that it is not always true that the accuracy of the result increases along with the number of hidden layers of a neural network, but that there is an optimal point.

The potential of machine learning in educational studies is also supported by the fact that apart from studies which apply data analysis tools for the derivation of insights concerning students’ performance, other studies aim to develop novel machine learning based tools which can be used in future research. For example **Ara, Simul, and Islam (2017)** integrate and develop a student **face recognition system** using Convolutional Neural Networks (CNN) to generate a low dimensional representation called embeddings, which are used to classify the person’s facial image. Results showed system accuracy greater than 95%. By this system different types of applications such as a student attendance system can be developed. Convolutional Neural Networks (CNN)have been also employed by **Sun et al (2017)** **to detect emotions** by analyzing **facial expressions of e-learning students**.

Finally, **Wu et al (2018)**, propose a neural network-based classification technology to **classify the data from a data warehouse**. This method adopts a sampling method to construct the characteristics of the field and innovates a novel classification framework based on the database field on the basis of the Convolutional Neural Networks (CNN) network. This method was validated in the actual environments and achieved high-performance indicators.