Chapter 10
Deep Learning in Engineering Education:
Implementing a Deep Learning Approach for the Performance Prediction in Educational Information Systems

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ABSTRACT

The goodness measure of any institute lies in minimising the dropouts and targeting good placements. So, predicting students' performance is very interesting and an important task for educational information systems. Machine learning and deep learning are the emerging areas that truly entice more research practices. This research focuses on applying the deep learning methods to educational data for classification and prediction. The educational data of students from engineering domain with cognitive and non-cognitive parameters is considered. The hybrid model with support vector machine (SVM) and deep belief network (DBN) is devised. The SVM predicts class labels from preprocessed data. These class labels and actual class labels act as input to the DBN to perform final classification. The hybrid model is further optimised using cuckoo search with levy flight. The results clearly show that the proposed model SVM-LCDBN gives better performance as compared to simple hybrid model and hybrid model with traditional cuckoo search.

INTRODUCTION

Educational Information System lies at the heart of any educational institute to monitor the educational goals. One important goal of the educational system among many is tracking the performance of the student. Many techniques and algorithms are used to track the progress of students. This domain has gained importance with the increase in data volume and the development of new algorithms. (Vora & Iyer, 2018)

Data generated from various educational sources is explored using different methods and techniques in EDM. The multidisciplinary research that deals with the development of such methods and techniques are the focus of EDM. Analysis of educational data could provide information about student's behaviours, based on which education policies could be enhanced further (Sukhija, Jindal, & Aggarwal, 2015, October). EDM discusses the techniques, tools, and research intended for automatically extracting the meaning from large repositories of educational systems' data.

According to Davies (Davis, 1998), "Education has become a commodity in which people seek to invest for their own personal gain, to ensure equality of opportunity and as a route to a better life." Because of this Higher education providers are competing mainly for students, funding, research and recognition within the wider society. It seems important to study data of students studying professional courses as for the growth of any nation producing better professionals is the key to success. Higher education system faces two main challenges: finding placements and students dropping out. Analysis of educational data

Figure 1. Predictive Modelling
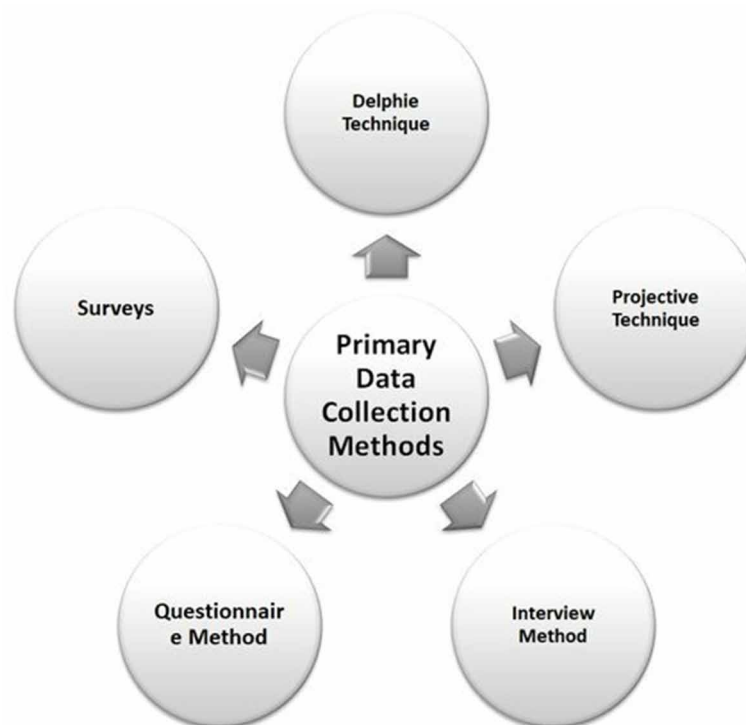
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