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Editor-in-Chief:
Zenon J. Pudlowski
World Institute for Engineering and Technology Education (WIETE)
Melbourne, Australia

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Editorial

The World Transactions on Engineering and Technology Education (WTE&TE) is now in its eleventh year of operation. The WTE&TE was not published in 2008, due to the closure of the UNESCO International Centre for Engineering Education (UICEE), the then publisher. The WTE&TE was established in 2002 with the intention of being an alternative forum for the exchange of information on engineering and technology education for those colleagues unable to attend international conferences due to financial or other constraints.

This issue of the WTE&TE, Vol.11, No.4, includes eight articles from authors based in eight countries. Three articles originated from authors based in the People's Republic of China (PRC), three articles come from individual authors representing Australia, Slovenia and the USA, one joint article was written by three academics based in Indonesia and one article comes from three co-authors based in Canada, Cuba and Pakistan.

We are delighted by the contributions from authors based in the PRC and, indeed, cordially welcome their contribution to this journal. Their willingness to share their research and development experiences with our international readers is of particular interest and relevance, and we would be very pleased to receive their future contributions to this journal.

An interesting observation can be made that since the re-incarnation of the WTE&TE in 2009, we have published a considerable number of articles that originated from authors in Taiwan, with almost no articles coming from the PRC. Therefore, we are particularly happy to be able to report on the development of engineering and technology education on the other side of the Taiwan Strait. This is very important for our readers because over the last few years, engineering and technology education in the PRC has undergone tremendous changes and modernisation, and it would be interesting to know more about it, in order to develop collaborative ventures between Chinese academics and our international colleagues. The WIETE would be more than happy to create a platform for such collaborative ventures if the opportunity arises, and to initiate useful exchanges of information and experiences for the benefit of all the parties involved.

In presenting this issue to our readers, I would like to thank the authors for their article contributions, the referees for their willingness to assess the articles, and our Associate Editors, Dr Dianne Q. Nguyen and Ms Krystyna B. Wareing, for their assistance in the preparation of this issue for publication.

Zenon J. Pudlowski

Predicting students' final passing results using the Classification and Regression Trees (CART) algorithm

Julianti Kasih†, Mewati Ayub† & Sani Susanto‡

Maranatha Christian University, Bandung, Indonesia†
Parahyangan Catholic University, Bandung, Indonesia‡

ABSTRACT: The aim of this research shares that of a previous research programme that involved a lecturer as an academic advisor helping students to predict their final passing results based on their performance in several subjects in early semesters of their study period [1]. Previous research used discriminant analysis, which is considered to be impractical in this instance. In this research, a more practical method is introduced and applied, based upon the classification of functions of data mining. The classification was performed using software based upon the Classification and Regression Trees (CART) algorithm.

INTRODUCTION

Ideally, this work is the fulfilment of the authors' promise to undertake research to provide academic advisors with a more practical way of predicting the final passing results of a student [1]. The passing results in the Indonesian education system are classified into three grades: Extraordinary (*Cum Laude*), Very Satisfactory and Satisfactory.

The arguments for making this kind of prediction are as follows:

- First, one of the important aims of higher education in the Republic of Indonesia is to prepare the academic participants (students) to become members of society with the academic and/or professional abilities to enable them to apply/develop/enrich the foundations of knowledge in the sciences, technology and the arts.
- Second, to achieve this aim, undergraduate students are assigned to several academic advisors (an informal translation of the Indonesian term *Dosen Wali*) throughout their years of higher educational studies.
- Third, academic advisors, who are lecturers, have as their main task the fostering of students' academic and non-academic activities. With regard to students' academic activities, one of the duties of the academic advisor is to help students in setting up their study plans for each semester.
- Fourth, setting up a study plan includes providing guidance for students regarding how many subjects, and which subjects, to undertake.
- Fifth, through this guidance, students are expected to obtain the best passing results at the end of their undergraduate study [1][2].

In the previous research, it was demonstrated that discriminant analysis helped academic advisors in the Faculty of Information Technology, University X in Bandung, West Java, Indonesia, to predict the final passing results of a student based on his/her performance in some subjects in the early stage, i.e. the first four semesters, of a higher education study programme. (Please note that for reasons of confidentiality, the full name of the institution has not been included). This facility enables academic advisors to assist students to set up their study plans for each semester, so that the students perform to their full potential [1].

This work aims to help the academic advisors with a more practical way of predicting the final passing results of a student. In this research, a data mining task called *classification* was employed. Classification is performed through a technique called Classification and Regression Trees (CART), which diagrammatically is presented in the form of *decision trees*. This kind of diagram tree serves in a more practical manner compared to the territorial map employed in the previous research [1].