Design and Implementation of Students’ Information System for Tertiary Institutions Using Neural Networks: An Open Source Approach

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ABSTRACT
This paper identifies the causes associated with delays in processing and releasing results in tertiary institutions. An enhanced computer program for result computation integrated with a database for storage of processed results simplifies a university grading system and overcomes the shortcomings of existing packages. The system takes interdepartmental collaboration and alliances into consideration, over a network that speeds up collection of processed results from designated departments through an improved centralized database system. An empirical evaluation of the system shows that it expedites processing of results and transcripts at various levels and management of and access to student results on-line. The technological approach for the implementation of the proposed system is based on open source solutions. Apache is used as Web server extended with PHP for server side processing. In recognition of the confidentiality of data contained in the system, communication networks are protected with open-ssl library for data encryption and role-based authentication. This system increases efficient service delivery and benefits both administration and students.

Keywords: Database, Neural Network, Record, Result Computation, Tertiary Institution

INTRODUCTION
Student enrolment in tertiary institutions is increasing at a very alarming rate. The increase in students’ population over the years has made the work of administrative officer in charge of processing students’ result a very tiresome exercise to deal with. In Ahmadu Bello University which records large number of students turnout and yet admit more on yearly basis, processing of students’ academic record represents very significant challenge as it tends to require a great deal of human involvement thereby increasing the cost and delay associated with it.

Students’ academic record refers to the vital information relating to a student admission, and
academic performance at the host university. Students’ record can be described in terms of their contents such as student bio-data which includes full name, matriculation number, gender, local government and state of origin. Then on performance references we have the courses registered, grade point average and the general academic performance history of the student.

The academic records of students are the property of the university, thus it is the sole responsibility of the school to constitute policies regarding consistency in the kind of information collected and recorded. Students’ academic record usually provides both student and staff with numerous services designed to assist them in attaining their academic goals and management objectives respectively. These may include generation of individual students result, transcripts and, publishing academic timetable for each semester.

The proposed system for academic record and grades processing is arranged and designed to simplify the work in students’ academic record system, due to its complexities. This paper demonstrates a model and implementation of students’ information system for tertiary institutions using neural network with open source approach.

The paper is organized as follows: the course evaluation is presented and the technological approach to the proposed system is then discussed in detail. The implementation case of the new system is also discussed, and conclusions are presented.

### EVALUATION OF COURSE GRADING SYSTEM

The course credit system is a system in which the syllabus of a subject in a degree program is divided into courses arranged in progressive order of difficulty or in levels of academic progress that is 100 to 400 levels for faculty of sciences. The course credit system is flexible enough to accommodate both strong and weak students. It minimizes duplication of courses as it encourages inter-departmental collaboration in curriculum planning, formulation and syllabus review. It is also possible for a student to defer a semester or session for a genuine reason either on medical or financial grounds. This is because a credit earned is never lost.

In the ideal system, all courses are supposed to be mounted every semester with the dual purpose of allowing the exceptional students to graduate before time and the weaker one progress at their own pace. This, however, may be difficult here as a result of the staffing situation.

### Credit Units and Credit Load

In the course credit system, courses are assigned weights called credit units depending on how many contact hours are required to complete the course in a semester, for example, a one credit course requires fifteen hours of lecture per semester. A credit load is the total number of credit units registered per semester by the student. In faculty of science, the minimum credit unit per semester is twelve and maximum is twenty four.

### Categorization of Courses

The courses within the faculty are categorized as follows:

a. **Core Courses:** Courses that are fundamental to the degree in view and usually offered by the department constitutes not less than sixty percent of all credit units that the student must earn in fulfillment of the requirements for graduation. In computer science section of Mathematics Department, for example, these courses include among others COSC201, COSC203, COSC207, COSC305, COSC401, and COSC405.

b. **Cognate Courses:** Courses from related fields that is necessary for an understanding and appreciation of the student’s major field. A computer science student, for example, takes course like MATH205, is a cognate course.
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