ANN in Intelligent Attendance System

Subjects: Computer Science, Artificial Intelligence
Contributor: Ajit Singh

Determining the rate of student attendance is an important task in determining the completion of the courses. Despite the success of the technology, it is unfortunate that in many academic institutions, the current systems used to detect student absences. Furthermore, one of the crucial problems in the attendance system does not count student background for continuing in the courses. In this paper, we propose an intelligent approach for calculating student attendance based on their Grade Point Average (GPA) and their activities, this approach uses Artificial Neural Network (ANN) for calculating the attendance rating accurately, meaning the system provide a new rating for each student based on their background. The aim of this research is developing an attendance system for motivation students taking attendance or taking high grade in the class. The result of this approach helps the instructor to allow students who have more activities with more absents to continue in the courses if not the students have low activity should taking high attendance. This system will more efficient for monitoring students for replacing absent to activity.

Intelligent Education Sys   ANN   Attendance Syste   Student GPA

1. Introduction

Education and science in countries are the keys to the success of nations. Therefore, many of the leading science institutes are trying to gather complete information about the daily behavior of students at the university, internal and external research center assessment, daily activates. All of the teaching methods mentioned a set of data that is related to the progress of students in the field of academics, students grades and student absence and if that data is not properly analyzed then all the collected data is going to be wasted and no further use of that data happens (Kumar and Salal 2019).

The development of information and technology in the field of education has led to better management of information. A lot of design and technique is the best way to get information so that we can anticipate changes and analyzes. For example, in many Thai universities, they have developed an advanced system for students who want to master a subject so that they can achieve a good grade in the end. In other words, they are trying to figure out what kind of topic is appropriate for the student. The neural network technique is a great way to help students complete their assignments with excellent grades. In other words, the neural network does the work for them (Jusoff, Samah et al. 2009) .

On the other hand, due to the availability of job opportunities, parents more likely motivated by their choice of courses and pressures on their children. The problem may arise the student is not interested in the subject, or if a

student could not understand this course in a good way and this will make it easier for the student to be more absent to course and there is less participation in their lessons (Ahmed, Gamage et al. 2008).

The system of student attendance is very important in determining the amount of student participation in their lectures. One of the most important situations isthe student's readiness for the faculty member to be able to determine the student's activities, and universities use the necessary metrics to reduce student absenteeism. For instance, using the bar -codes to take a decision the arrival of students to bring down excessive absenteeism (Al Sheikh, Al-Assami et al. 2019).

Furthermore, there are several technologies have been developed by researchers. As well as their absences caused problems when they came into their classes to take more time and their numbers were due to the lack of any tools and had to be entered classically by hand (Sawhney, Kacker et al. 2019).

In addition, Systems such as Android and Apple sometimes collaborate on the advancement of technologies. They have also been very influential in terms of serving students, especially in determining the number of absences and creating QR codes that have been placed on mobile systems. The only thing that mattered was the students when they entered the classrooms, the only capture his/her face then they showed were the QR codes by using his/her smartphone. (Sunaryono, Siswantoro et al. 2019) . Moreover, another study in (Pathan 2019) proposed an attendance system by using facial recognition with Artificial intelligence (AI).

Both intrinsic and extrinsic motivations may explain why students come to class. Some factors can affect students' performance and knowledge, the most important of these factors is the amount of participation or absent in the study class, and the course will be difficult with the ability of the student (Chou and Kuo 2012).

However a lot of study proposed for managing attendance systems by using different techniques, but a big gap in this system is student background for continuing in the courses such as student GPA from previous semesters or current marks in same course or any factor that shows student can pass when less ready in the class. In this paper, we solve this issue by using Artificial Neural Network (ANN) for current systems. The contribution of this work is how students less participate in class and pass in the course with remain the quality of learning.

This paper is organized as follows: Section 2 explains the background work on attendance system with different techniques as well as improving using artificial Intelligence. The Section 3 prepared research process for proposing attendance system using ANN. In the section 4 presents the result of the new attendance system. Section 5 presents some concluding remarks and points to future works.

2. History

Various studies have established that there is a correlation between students' attendance and their academic performance and identified that attendance has an encouraging effect on the GPA of students in exams. It was also found that as compare to the students who were not attending all lectures, the students who attended the lectures

scored 9.4% to 18% better in their exams Relationship Between Students' Performance and Class Attendance in a Programming Language Subject in a Computer Course (Chen and Lin 2008). In this section, we reviews the most important works on attendances system and their effect on maximum learning.

Widely believed that attendance has a positive effect on student performance in terms of grades achieved. While the empirical evidence generally supports this belief, some studies do not, and the size of the effect varies across disciplines. Interestingly, Durden and Ellis (1995) find that attendance (absence) only has a positive (negative) and significant impact on student performance below (above) a certain threshold using intercept shift dummies (Durden and Ellis 1995). Gendron and Pieper (2005) as well as Westerman et al (2011) have confirmed a similar non-linear relationship using a quadratic function of attendance and logistic regressions based on 3 different quartiles of performance, respectively (Gendron and Pieper 2005, O'Dwyer 2011, Stewart 2020).

Lukas et. al., 2016, proposed a method for a student attendance system in the classroom using face recognition technique by combining Discrete Wavelet Transforms (DWT) and Discrete Cosine Transform (DCT) to extract the features of student's face which are followed by applying Radial Basis Function (RBF) for classifying the facial objects. From the experiments which are conducted by involving 16 students situated in the classroom setting, it results in 121 out of 148 successful faces recognition (Lukas, Mitra et al. 2016).

On the other hand, new systems such as android technology are important for ensuring student absenteeism. Here are some suggestions on how to look or get an appointment for student attendance, the teacher of the lesson can easily get the number of students by using the mobile application they designed, storing the data and then sending it to the server can then extract the percentage of students and also can be used as the hard copy. In like manner, the stored information is used attendance percentage calculations (Islam, Hasan et al. 2017).

A large number of studies have been performed using the bimodal biometrics system, biometrics to improve the number to better identify automatic student attendance system, then the system uses the face and fingerprint to take students' attendance. In the same way, fingerprint templates and facial images can be combined by used logical technique (OR) algorithm and then stored in the database (Charity, Okokpujie et al. 2017).

Nevertheless, Tung, Wee Shen (2017) proposed a new Student Attendance System Using Radio Frequency Identification Device (RFID) in the Tunku Abdul Rahman University College. This system has a very low cost and is very accurate in recognizing the readiness of the lessons (Tung 2017).

The usual way to do this is in most scientific institutions, meaning that some of them use the name or signature of the student to know the number of participants. To make the data more accurate, there are many ways to test it, especially Face Recognition technology, which is a technique that is used to expose the number of students in absent and to reduce the waste of time (Bhattacharya, Nainala et al. 2018).

3. Methodology

In this section we define a methodology for intelligence attendance system, the methodology consists of several steps. In the first step, we define the attendance system in the university. The second step prepares an artificial neural network for the system, the third step implementing the neural network in the system, the fourth step is evaluation effect of ANN on the result as shown in Fig.1.

1. First step: Classic Attendance System allows students absent in class by rating %15, if the student's absence more than %15 will fail in the course.

2. Second Step: in step we use ANN for intelligence attendee system with the following formula in the hidden layer. We use the criteria for changing the rate of absence. The craters are previous GPA, current GPA, and Activity.

3. Third Step: We implement ANN technique to classic attendance system.

4. Fourth Step: we will compare classic attendance system and intelligence attendance system then we evaluate the effectiveness of the result

4. Result and Discussion

 At the beginning of this research, we will mention several goals that we have identified in the below table. The standard rate that is set absence for universities is the %15 of students who can't be more than that, If a student absence higher than this rate, the student will be counted fail according to some university standards, and if we get higher than that, we will highlight a few of the students' positive points such as daily activities in the classroom, GPA this semester and current marks in the last semester, to reduce the number of attendance students so that they can continue to study without falling into disrepair. This means that we will increase the absenteeism rate of this student, which means that if this student has a high GPA or a lot of activity, he or she will be able to ignore absenteeism rate this student more. But we have used the equation to be able to increase the student absenteeism rate to a certain extent, which means that we ignore the student absenteeism until we have a certain amount of self-determination. In other words, only those students can be targeted, and the rate of absenteeism is between per cent 5 to 25. In general, here is an eliminated of students who have been able to succeed at GPA, Marks and Activities, which means that they have grade above %50.

5. Future work

In this paper, we proposed an intelligent approach for calculating student attendance based on their Grade Point Average (GPA) and their activities, this approach uses Artificial Neural Network (ANN) for calculating the attendance rating accurately, meaning the system provide a new rating for each student based on their background. The result of this approach helps the instructor to allow students who have more activities with more absents to continue in the courses if not the students have low activity should taking high attendance. This system will more efficient for monitoring students for replacing absent to activity compare with the classic system because students can take an extra 10% absent rate when he completed all activities. We recommend to researcher

improve this system through different techniques like data mining conventional neural network, moreover mixed with fingerprint and any image processing techniques to present accurate and high result.

Retrieved from https://encyclopedia.pub/entry/history/show/7652