

Developing a Web Based Student Information Management System and Predicting Students' Performance

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Abstract:

Web based Student Information Management System is a very necessary tool for keeping track of students' academic, personal, emergency information. This system can provide a common platform where all the information regarding course curriculum, syllabus, class routines, examination schedules, assignments, grades, academic records, transcripts can be recorded easily, and all the information can be updated regularly using a simple interface. Moreover, by utilizing the records and mining the data from the website, a machine learning based classification model can be implemented to predict students' performance. This will help students easily reach the information they need during their college life. Also, this classification based on students' performance will help the instructor, especially in a large class, to identify students that are at the risk of dropout at an early stage and take measures to assist them with proper care in a timely manner.

Keywords: HTML, CSS, DBMS, KNN

Introduction:

In this new era of information and technology, it has become so obvious to introduce automated online student information management systems that replaces the pen and paper-based system. In the past, pen and paper were the only medium to serve these purposes. This way all the personal and academic information of a student have been documented manually in some record books. However, there are several drawbacks to this method. First, it is a very time-consuming procedure to write and manage all the records manually by a human. Also, as there is human involved in all procedures, it is very prone to human error. Moreover, it is hard to make the interaction between this information system with the students and students must make schedule with the authority concerned to get access to the information. Thus, it becomes difficult to track, manage and update this information.

Our proposed system provides a simple interface that can be easily maintained, updated by the administration and more interactive and accessible to the students.

The key objectives of this system are as follows:

1. To provide a simple web interface to keep record of information regarding academia, curriculum, grading etc. where these will also be updated regularly.
2. To provide faculty information as well so that the students can easily reach them.
3. To keep the track of students' attendance so that the instructors can get aware of the students' regularity and notice if any student is getting irregular to take measures accordingly.
4. To mine students' academic record from website and predict students' performance on the upcoming semesters using machine learning classification model e.g., KNN (K Nearest Neighbor)
5. To assist the instructor with the prediction model and help them figure out which students are on the verge of failure so that they can take measure accordingly before it is too late.

Related Works:

To assist students and faculties with a common platform, a lot of research works has been done previously. Among them, SR Bharamagoudar et al and S Lubanga et al proposed a common database management system that contains all the students and faculty records, placement information that is accessible by the concerning people [1] [2]. Some other work predicted the performance of the students based on their previous records [3][4]. There were some studies that investigated if online learning is being effective on the students or if some courses are being too critical for some students [5] [6]. But all these works performed the database management and prediction tasks mutually exclusively. In our work, we tried to integrate both the DBMS and prediction part in a common and interactive platform.

Methodology:

The proposed system consists of three parts: 1. The Website, 2. The database that consists of student and faculty information, 3. The prediction model that predicts students' performance in the upcoming semesters. The website starts with a homepage and students, faculties or administrators

can enter website using separate login portal. Students can view the course updates i.e., uploaded slides, class recordings, assignments etc.; view the exam updates like assignment grades, midterm, and finals grades etc. and they can also view their personal information such as any bills, holds, address updates etc. The faculties can update the gradings

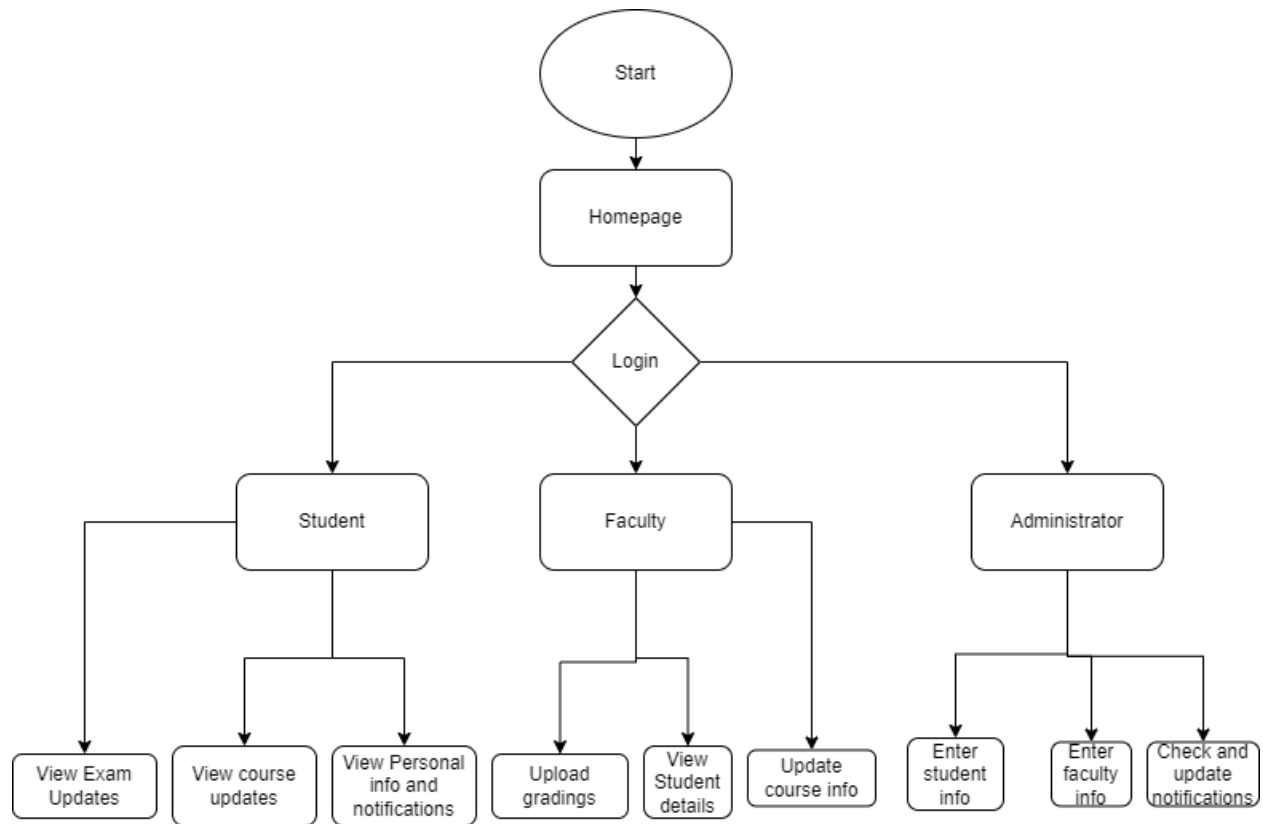


Figure 1: Flowchart for the Web interface for student information management system

of the assignments, midterms, and finals, can view student details like their assignments and previous gradings, and can update course information and announcements like exam schedules, assignments etc. The administrators can enter the student and faculty information into the database, manage it and access and update all administrative information. Finally, using KNN, we can classify the students based on their performance, attendance etc. and predict the vulnerable students who need special care and guidance. This will help the professors to provide proper guideline based on each students' capability.

Results:

KNN (K nearest neighbor) which is a machine learning algorithm, classifies the given data based on the previous data input, get trained on it and predicts the output by dividing it into some given classes. We propose to deploy it in our dataset that contains students' attendance, gradings and class performance information in a supervised manner and predict the set of students who should be particularly taken care of. The predictions are presented using accuracy, precision, f1 score etc. measures.

Discussion:

This methodological approach will certainly outperform the traditional manual monitoring of students' performance. It will also be free from the human biases and will provide a more neutral judgement.

Conclusion:

In conclusion, we can say that the integration of students' information and prediction of the performance in a same platform will certainly provide more precise and detailed view on every academic performance of a student and provide the students a more accessible and interactive way to be updated about their academic information.

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