Student Academic Management System UsingCloud Environment

Amareshwari Patil[1], Asim Wasim Siddiqui[2], Fardeen Khan[3], Mohammed Furkhan[4]

[1,2,3,4] *Dept. of Computer Science and EngineeringPoojya Doddappa Appa College of Engineering Kalaburagi, Karnataka, India.*

Abstract—Student Academic Management System is a cloud- based web application which is developed for student attendance and performance in schools, colleges, and institutions. It makesit easier to evaluate a student's academic performance (results) and get information about their attendance in a certain course. The database tables are used to sort the information provided by the staff of the course(s) assigned to them. The system alsoaids in assessing a student's attendance and grade requirements. The system is deployed on a cloud environment, namely, AmazonWeb Services (AWS). The limitations of the current system are met by the suggested system. There are many benefits to the proposed system, including the fact that it is a full package,ensuring accuracy in the statistics on student attendance andtest scores. Additionally, it eliminates duplication and makes it simple to obtain information from a single source. There is no latency when looking up statistics and status of the students.

Index Terms—student academic management system, cloud computing, web application, attendance, results, send messages, amazon web services

I. INTRODUCTION

The number of educational institutions, students andstudent-related content all grow together with the expansionof educational institutions worldwide. The cloud-based web application named Student Academic Management Systemis intended to function with secure information interchange between students, faculty, parents, and the management ofthe institution (Fig. 1). The system contains data regarding information of the student such as date-of-birth, courses, attendance, assessment marks etc. Moreover, it is possible to effectively modify student information through the application. The faculty/staff input the student data such as attendance. These statistics are stored in the database. This application takes advantage of cloud computing infrastructure and can be easily implemented in any educational institution.

Cloud computing has the potential to significantly change the IT sector by increasing the appeal of software as a service and influencing the creation and acquisition of IT hardware. Innovative developers with ideas for new internet services no longer need to invest significant sums of money in expensive hardware or require a huge human resource to operate it. They need not worry about under-provisioning for a service that be-comes incredibly successful, missing out on potential users and revenue, or over-provisioning for one whose popularity does not match their forecasts, squandering expensive resources. Due to these advantages, cloud computing has been selectedas a preferred means to deploy the application. Businesses canpurchase web services from Amazon Web Services (AWS) fortheir IT infrastructure needs. AWS offers a highly dependable,scalable, affordable cloud infrastructure platform to support hundreds of thousands of enterprises in 190 different nations around the globe.
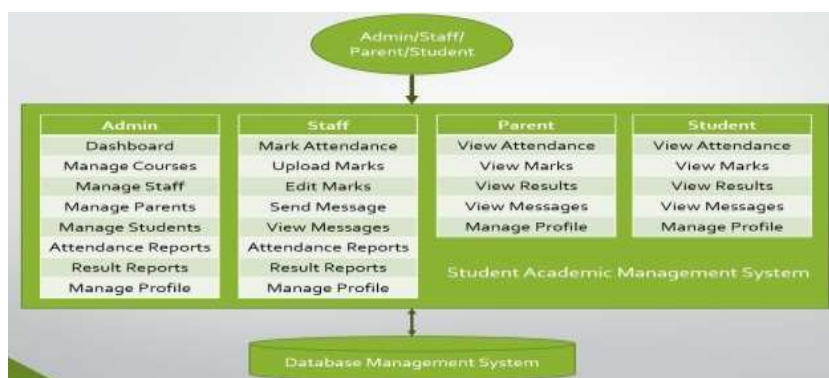

Fig. 1. Structural Design of Student Academic Management System

II. LITERATURE REVIEW

Due to cloud computing's importance as a tributary of virtual education, particularly mobile education, Duha explainshow a cloud computing system plays a vital role in the fieldof remote education. [1]

The latest pandemic epidemic has had a significant impact on nearly all countries, drastically altering how education is delivered worldwide. Somya explains how improving the ef- fectiveness of educational institutions' virtual teaching service delivery has become crucial. [2]

Dipin discusses the ease with which users can edit the shared and stored data in the cloud. Each user who accesses the data in the cloud is given a signature in order to prevent this data tampering. [3]

Chittaranjan describes the service-oriented idea that cloud computing has created. It describes an overall perspective on cloud evaluation criteria. It also presents different major factors in cloud computing performance along with various scenarios. [4]

Krithi describes how cloud computing is largely associated with businesses and how it can be leveraged to improve our education institutions. The system utilizes a layer-based approach. [5]

Liangqiu describes a model in the paper which utilizes computer aided system. The system is developed with four layers based on a hierarchy of the end users. The project has comprehensive and robust student information system and it allows users based on their categories. [6]

For students, HODs, teachers, staff, and administration, Mruna outlines an integrated information technology environ- ment. The described application is designed for students and staff which facilitates a web-based self-service environment. For reporting, data extraction, and information analysis, the system uses an informative environment for academics and staff at all levels. [7]

Niloofar describes Student Management System as an ap- plication programme that is intended to start with information interchange in a safe manner to affiliate with students, faculty,parents, and the institution. The system is deployed as software rather than a web application. [8]

Pranay outlines the design of a web-based course manage- ment application that IIT, Kharagpur researchers created to oversee assignment submission. [9]

III. OVERVIEW

A. Problem Definition

In the existing system, maintaining student records requires a significant quantity of paperwork, and maintaining the nec- essary records takes additional time. This method is widely utilised, however maintaining the records involves a lot of human contact and work. Moreover, finding out information about former students who have graduated is really challeng- ing. In the event of physical damage or a natural disaster, thereis a danger that data might be lost. There are high levels of data threat and poor levels of data security. Until and unless the parents visit the institution, they are unable to establish the student's status. The current system does not provide simple access to student information.

B. Objective

The Student Academic Management System is concerned with tracking the student's performance (marks evaluation) and attendance information. The web application keeps track of information about students enrolled in different courses, their grades, and attendance. The conventional methods oftaking attendance and recording results are computerised as part of the development of the student academic management system. Furthermore, the application has the ability to produce digital reports. System administrators and end users are the system's intended target audience. It is a project developed as a web application and it works over the web through hostingit on a cloud computing environment. The result preparation, attendance and administration processes are substantially spedup and simplified by the application.

IV.METHODOLOGY

In Student Academic Management System, PHP is used for front-end development and MySQL database is used for back-end querying and data storage. The web application is divided into four modules: Admin, Staff, Parent and Student. Eachof the users have their unique username along with password (Fig. 2).
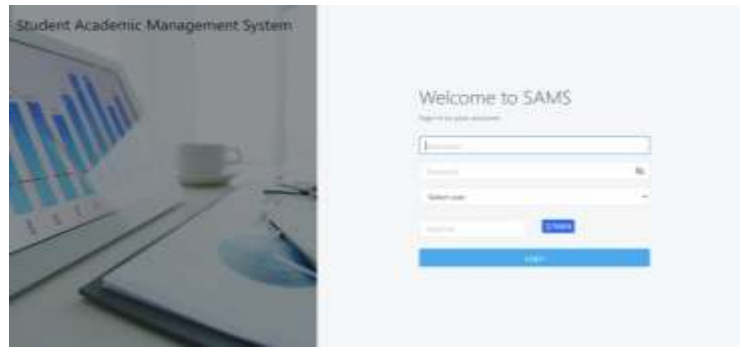
Fig. 2. The Login Portal

The admin module has various sections and a main dash- board (Fig. 3). The Dashboard can view brief information such as total registered students, total registered parents, total registered staff, and total courses listed. The admin also has the capability of managing users on the application, for example, creating new users. There is also a feature of adding or removing various courses. The admin can add, update, ordelete data on the application. The admin can also generate various types of reports based on attendance and marks data.

Fig. 3. Admin Dashboard

The staff module allows the faculty/staff to mark attendanceof the students with respect to the courses they are assigned to.Moreover, the staff can upload or update assessment marks of their course. The application also allows the staff to generate various reports pertaining to their course (Fig. 4 and Fig. 5).Staff can also send messages to either parents or students (Fig.6). Finally, they can manage their profile and are also capable of changing their password.
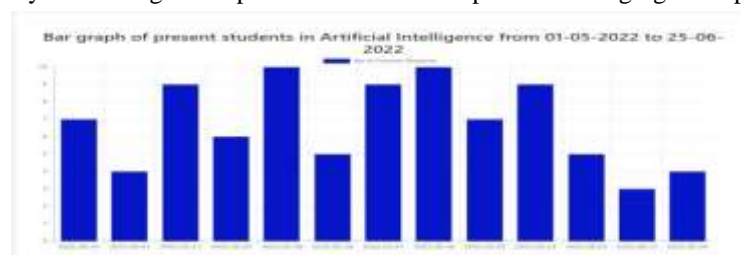

Fig. 4. Attendance Graph Report

Fig. 5. Result Table Generated by Staff Module

Fig. 6. Message Passing System

The parent and student module have the data viewing privilege. The students can view their attendance and marks of the course in which they are enrolled in (Fig. 7). The parent module is also capable of viewing the attendance and marksof their child. The separation of user modules for parents and students is implemented because it helps in keeping both the parties up to date with the progress in the institution.

The entire system is deployed on a cloud computing en- vironment to allow for easy access of the application from anywhere around the globe. The cloud platform is capableof scaling itself according to the changes in user activity. This allows for the easy provisioning of resources allocatedto the application. On a cloud virtual machine instance, the application is deployed. The AWS EC2 instance allows for thecreation of virtual instance upon which the system is deployed. The data generated by the application is stored on the AWS S3 or the Amazon Simple Storage Service which providesa scalable storage infrastructure. Finally, the system can be accessed by a public IP provided by Amazon Web Services.

Fig. 7. Individual Result Report Generated by Student Module

V. CONCLUSION

The web application provides a cloud-based version of student academic management system which helps in the monitoring of student performance. The entire process is doneonline, and reports can be produced. It has a facility of user's login where either parent or student can view theirinformation. The following conclusions can be deduced from the development of the application:

The project provides a dynamic graphical user interfacethat performs better than a static one. Depending on their permissions, it grants the permitted users the proper access.It also effectively overcomes the delay in communications between teachers and parents. Updating of the informationbecomes easier. The application's distinctive qualities are de-pendability, data security and system security. The applicationis implemented using a modular approach to make systemmaintenance simpler. The system includes enough scope forfuture improvements or modifications, should they be required.The base and the backdrop provided by the application opens the scope for more advanced development of cloud-based web applications. Since the concept of compartmental-ization is employed in the development of the application, newfeatures can easily be added according to user needs. The workdone in the application could as well be expanded to covermore sophisticated techniques such as implementing machinelearning to automatically mark attendance of students throughbio-metric system. The same concept could also be used todeploy data mining algorithms in the data generated by theapplication to understand interesting underlying data patterns.

References

[1] Duha K., Ibtisam A., Haider A., and Hussain M. (2021). *Cloud Computing and its Impact on Online Education.[Online]. Available: https://iopscience.iop.org/article/10.1088/1757- 899X/1094/1/012024/meta*

[2] Somya A. (2021). *A Survey on Recent Applications of CloudComputing in Education: COVID-19 Perspective. [Online]. Available: https://iopscience.iop.org/article/10.1088/1742-6596/1828/1/012076*

[3] Dipin B., Vivek M., and Yugchhaya G. (2018). *Student Information Management System. [Online]. Available: https://www.ijedr.org/papers/IJEDR1801002.pdf*

[4] Chittaranjan M., and Vijaylaxmi S. (2014). *Web-Based Course Management and Web Services. [Online]. Available: https://files.eric.ed.gov/fulltext/EJ1099173.pdf*

[5] Krithi P. (2017). *Student Management System – A Survey. [Online]. Available: http://irjcs.com/volumes/vol4/iss05/46.MYCSSP10083.pdf*

[6] Liangqiu Meng. (2015). *College Student Management System Design Using Computer Aided System. [Online]. Available: http://ieeexplore.ieee.org/document/7384005/*

[7] Mrunal R., Supriya G., Supriya C., and Bhawana D. (2017). *Main- taining Data Integrity For Shared Data In Cloud. [Online]. Available: http://aircconline.com/acij/V8N2/8217acij01.pdf*

[8] Niloofar K., and Reza R. (2013). *Cloud Computing Perfor- mance Evaluation: Issues And Challenges. [Online]. Available: https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1090.9511& rep=rep1&type=pdf*

[9] Pranay K., Sumitha K., and N. Uma R. (2013). *Effective Ways Cloud Computing Can Contribute To Education Success. [Online]. Available: http://airccse.org/journal/acij/papers/4413acij02.pdf*