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ENHANCED MODEL OF STUDENT INFORMATION MANAGEMENT SYSTEM

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Abstract—Student Information Management System (SIMS) provides a simple interface for maintenance of student information. Mobile software application designed with consideration for the demands and constraints allows easy access to data at all times. Students as users can register with mobile application to view academic records which are uploaded by faculty. A new algorithm named RS²A is proposed and implemented along with md5 algorithm which uses its cryptographic hash functions to make data highly secure.

Keywords— Student Information Management System, Stuple, password encryption, RS²A

I. INTRODUCTION

The mobile revolution and the surge in Smartphone usage is driving the market for mobile applications. Student information system has always been a difficult task, where administrators use the traditional way of filing records. The emerging needs in most educational institutions for accurate, relevant data and reliable information leads to mobile app development where academic data can be stored and retrieved easily. Student information system as an app makes it easy for students to check and verify their marks and attendance anytime and from anywhere. This also allows the faculty to send the progress report of the students to their parents in a paperless way.

Student information system is widely used in educational institutions to bring all aspects of a student's academic life under a single roof. Student information system manages data related to students' academic life like marks, attendance etc. Different institutions have employed different versions of student information system, but all the present solutions are deployed as web applications. While web application is one solution, the increasing number of smartphones has given way

to android apps. Implementing student information system as an android app not only increases the portability but also makes it easier to access.

Student information management system application will generate a unique username and password for individual user while registration. Users can view their academic records such as subject scores and attendance information updated by respective faculties. This app will provide a new platform and opportunity to enhance communication and engagement between the college, students and lecturers. The app has been designed to meet the needs of the college and allows students to connect to resources and contents that will help and support them.

This application is centered on updating and recording information. The main objectives of this application are:

- To give an online interface for students.
- To expand the effectiveness of college record administration.
- To reduce the time needed to access and convey students' records

II. ARCHITECTURAL DESIGN

Architectural design represents the structure of the data and program components that are required to build a system. Fig.1 shows that the student can view marks and attendance of all the subjects, update his/her details and the faculty can update marks, attendance, and view details updated by students through the mobile. Admin will have a web interface through which he can register faculties and maintain the overall system. Gathered information will be stored in the database and can be accessed at any time.

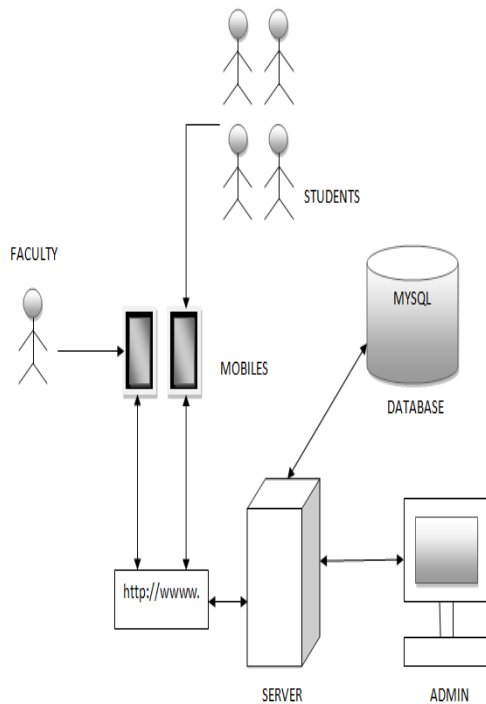


Fig.1. Architectural Design

III. SYSTEM DESIGN

- **Homepage:** The user enters the homepage of the Stugle app, if he already has a username and password then he can easily login. If he is a new user, then he should register himself by clicking onto the new registration button.
- **Registration page:** Student can register himself to the Stugle app by filling all the mandatory details like name, email and password.
- **Login page:** User enters his/her valid email-id and password which will then be encrypted using the Stugle algorithm. It will be compared with the previously maintained database, if it matches redirect to the student or faculty page accordingly.
- **Student page:** When student logs in using his username and password, he will be redirected to this page. It will have following features:
 - **View marks:** When the student enters his usn, the marks obtained by him in all the subjects will be displayed.
 - **View attendance:** When the student enters his usn, his attendance in all the subjects will be displayed.
 - **Update details:** Students can update and view their details like name, usn, branch, semester, address, email-id and mobile number.

➤ **Faculty page:** When student logs in using his username and password, he will be redirected to this page. It will have following features:

- **Update marks:** The faculty is required to select the respective semester and subject after which he/she can update the marks of the students accordingly.
- **Update attendance:** The faculty is required to select the respective semester and subject after which he/she can update the attendance of the students accordingly.
- **View details:** The faculty can view all the details updated by the students.

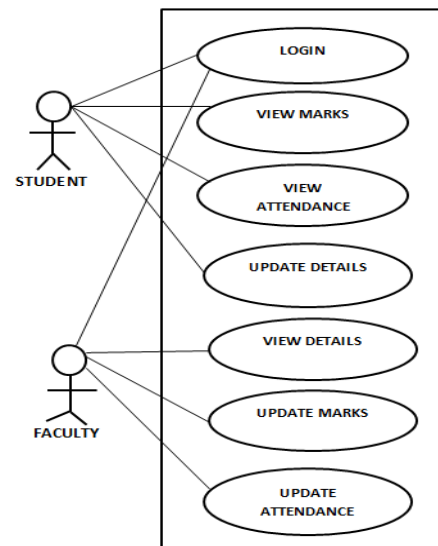


Fig2. Use case diagram

IV. METHODOLOGY

RS²A (Rakshanda, Sadhana, Sharada, Adhira) algorithm is applied to passwords therefore it's efficient and it doesn't restrict the usage of special characters.

Firstly a password having less than or equal to 16 characters is taken, its padded with * till its length becomes 16.

Example: password

After padding password*****

Then its converted to a 4x4 matrix.

Data after converting to 4x4 matrix

p	a	s	s
w	o	r	d
*	*	*	*
*	*	*	*

Matrix transposition is applied to this matrix. [3]

Transposition

p	w	*	*
a	o	*	*



```
s      r      *      *
s      d      *      *
```

Then the matrix is folded horizontally, vertically and diagonally. [4]

Folding

```
*      d      *      s
*      *      r      a
*      *      o      s
*      w      *      p
```

Then each element of the matrix is concatenated with two matrices, one at the beginning and other at the end.

```
key1={{ "aA", "ge", "s", "." }, { "1", "P2", "13", "js" }, { "3W", "2X", "jY", "ld" }, { "w6", "ql", "o8", "j9" }};
```

```
key2={{ "l", "pk", "f", ".4" }, { "he", "mg", "nY", "aZ" }, { "r", "qs", "ow", "ir" }, { "ne", "pc", "f", "lf" }};
```

Concatenation

```
aA*,l gedpk )s*/f ,.s.4
```

```
[1*he P2*mg l3rnY jsaaZ
```

```
3W*=r 2X*qs jYooow ldsir
```

```
w6*ne qlwpc o8*,f ]9plf
```

Then the matrix is converted back to string format.

```
aA*,lgedpk)s*/f,.s.4[1*heP2*mg13rnYjsaaZ3W*=r2X*qsjYooowldsirw6*
```

Apply md5 algorithm to this before storing it in database. The MD5 message-digest algorithm is a widely used cryptographic hash function producing a 128-bit (16-byte) hash value, typically expressed in text format as a 32-digit hexadecimal number. MD5 is a one-way function; it is neither encryption nor encoding. It cannot be reversed other than by brute-force attack.

After applying md5 algorithm to the above string the encrypted password is:

```
5f4dcc3b5aa765d61d8327deb882cf99
```

V. CONCLUSION

Stugle app assists in automating the existing manual system. It will bring all the aspects of a student's college life under one roof through a secure app. This promotes paperless work. It can be accessed remotely at any time and from any location. The students will be able to easily check their marks and attendance details. The faculty will be able to update student marks and attendance, regularly monitor and guide his/her students. It includes generation of marks and attendance reports for students for all subjects. These reports are mailed to parents. It provides accurate information always. Malpractice will be reduced.

This app can also include library details and placement details. It can be implemented at the university level where the colleges affiliated to that university can be grouped together.

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