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PWA based solution for college management

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Abstract

PWA-based College Management System is an essential digital platform for a university or an institution to make the process digital and also reduce manpower. The main objective of this study is and step towards a seamless process to develop a framework and to understand the properties that a secure online platform must satisfy to reduce redundancy. DMCE-TechniQ is a bridge between teachers and students. It is a progressive web application that is the new technical way to manage all the college activities related to teachers and students. In the existing systems, all the activities are done manually by a person and it is costly and time-consuming. In our proposed system, students can view results, view events, viewing attendance for students while the teachers can mark the attendance for students, using Android/iOS phones and the attendance sheet will get generated automatically. The data will be stored with the help of the firebase database. The Teacher or the student should be a registered user. The faculty can log in to their college account through the app itself and can update the academic result like internal exam marks obtained by the students. In this system, students have easy access to all the activities of the application through authentication. Students are not permitted to add or delete any data. Admin module maintains the student's marks in internal college exams. Any new notice for a particular semester will be uploaded by teachers through an application notifying respective semester students. Student attendance is also monitored by the teachers through the application.

Keywords: PWA, timetable, result, attendance, events, placement

1. Introduction

DMCE Technique is the proposed system that mainly connects the students, and staff with the college using mobile phones (Android/iOS). It will be integrated with all of the daily operations of the department like attendance, event notice, seminars daily schedule, results, etc. The design and implementation of the proposed system are to provide service in institutes and colleges. The system will provide all data to be stored in the Firebase which will act as a database for the application. All data is stored securely on firebase servers managed by the college Administration. College staff uploads attendance, and results and share subject notes through a secure, online interface using their mobile phone devices. It can be used by educational institutes and universities to maintain records and reduce workloads. The information which is needed by the application is scattered and collecting every resource of information will be time-consuming and will increase the workload on departments. Our proposed system ensures to overcome of these limitations of the existing system.

Existing System

The system which is used nowadays has some drawbacks which need to be improved for better performance of the existing system. Due to the evolution of technology, we can get an efficient result by designing a framework. All work is done on paper for attendance in the presently existing system. It increases the workload on teachers. The whole session attendance is stored in a register and at the end of the session the reports are generated using the existing system. At the end of the session, the students who don't have 75% attendance get a notice about attendance. This is a very time-consuming process. In the present system, the result is viewed on the notice board of the college. College cannot even provide urgent notifications to students in case of emergency using the existing system.

2. Literature survey

1. College Department Management

In this paper we get to know about the features they are offering to the students and how they have integrated many features like voting, giving feedback to the management, receiving feedback from the students activating registration links, etc. Here 2 categories have been defined

1. Admin and
2. Students who have access and can access the app. All of the data is stored in a database and access is given to the admin only.

2. Smart Collage Management System

In this paper, the system proposed should be all automated as it will help in less usage of paper. In this system, there will be 2 main users 1. Student and 2. Teachers where the student can view the result, their attendance, timetable, notices, etc. In this paper, the enhanced feature is the notification that will be received by students about various activities held by the college.

3. Android application for college website

The proposed system is an application that is designed to manage and handle the operation of an institution. It is a handy application that can be used by all users to facilitate communication. The application introduces portability as it is used on a mobile device and can be carried anywhere. Since the application is used on a mobile device with Android OS, it improves connectivity between all users, thus helping the institution to provide a more transparent system altogether. It is a useful tool that can be used by all members from anywhere, at any time on an Android mobile device.

4. Android application for college management system

This paper proposes a new app for the existing application. This app proposes a student-staff interaction, it tends to be a beneficiary application to everyone involved in the institution. i.e.; attendance, Schedule changes or alteration, Latest updates, Marks of the students, Photos, information, and videos related to the subject, internal marks of the students, etc.

5. Android application campus solution for college management system

In this paper, they proposed this app is helpful for teachers, students, parents, and alumni. This app ensures smooth communication between the college and students. The parents are also included as special members in the app so that they can get aware of the happenings in college as well as they can have track their child's performance. This app helps the administrative staff in issuing different certificates to the student. This feature is a digital certificate feature that eases the task of getting a certificate. This is very helpful for students as they don't need to run for the certificates and apply for the same by using this app.

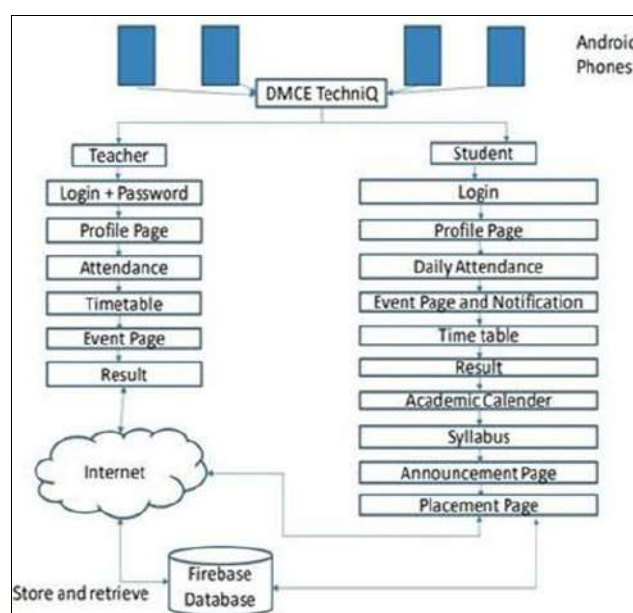
Disadvantages of the existing system

1. Existing system is mainly concerned with only students or only teachers there is no common system for communication between teachers and students.
2. It requires more time and paper to generate attendance. Hence it is a time-consuming task for the existing system.

3. In this existing system the papers can miss placed and documents can be lost and which will create a workload on staff.

3. Proposed methodology

The system architecture has a smartphone (android/ios) OS and also has 3G, and 4G internet connection within the smartphone. Users mean teachers and students can use the DMCE-TECHNIQ application using smartphones. All the application activities are connected to the internet through which all users' related data will store and retrieve from the firebase database. The system architecture has a smartphone with android/ios OS, a database server, and the user as its components. The smartphone or tablet must use 3G, 4G, or Wi-Fi network for internet connectivity to ensure better performance the user will log in to the application through a smartphone. The user type is verified with the database server and access is given to the appropriate user.



Framework proposed system

3.1 Workflow

The detailed workflow of the proposed system is as follows:

1. Teacher/ Teaching Staff

- **Take Attendance:** Teachers can take attendance of students during the lecture. The attendance data will be stored in the college database according to the subject name. And it will generate attendance sheets automatically.
- **Upload Result:** Teachers can upload the results of the students hence the students can directly check their results through the app.
- **Check notifications:** Faculty can receive important announcements and information regarding events and lectures through these notifications.
- **Add Placement details:** Company name, criteria, and registration date for filling the form are mentioned on this page.
- **Add events:** This page provides the event name, date, time of the event, and also event information.
- **Add Timetable:** Faculty can add a timetable that will create one calendar which gives notifications about the lecture to students.

2. Student

- **View Attendance:** Students can view attendance uploaded by the teachers. They can check attendance at any time but they cannot change or manipulate the data.
- **View Results:** Students can even view results uploaded by the teachers. They can check the marks at any time.
- **View Placement Page:** The company name, criteria, and registration date for filling out the form are mentioned on this page.
- **View events:** This page provides the event name, date, time of the event, and also information about the event.

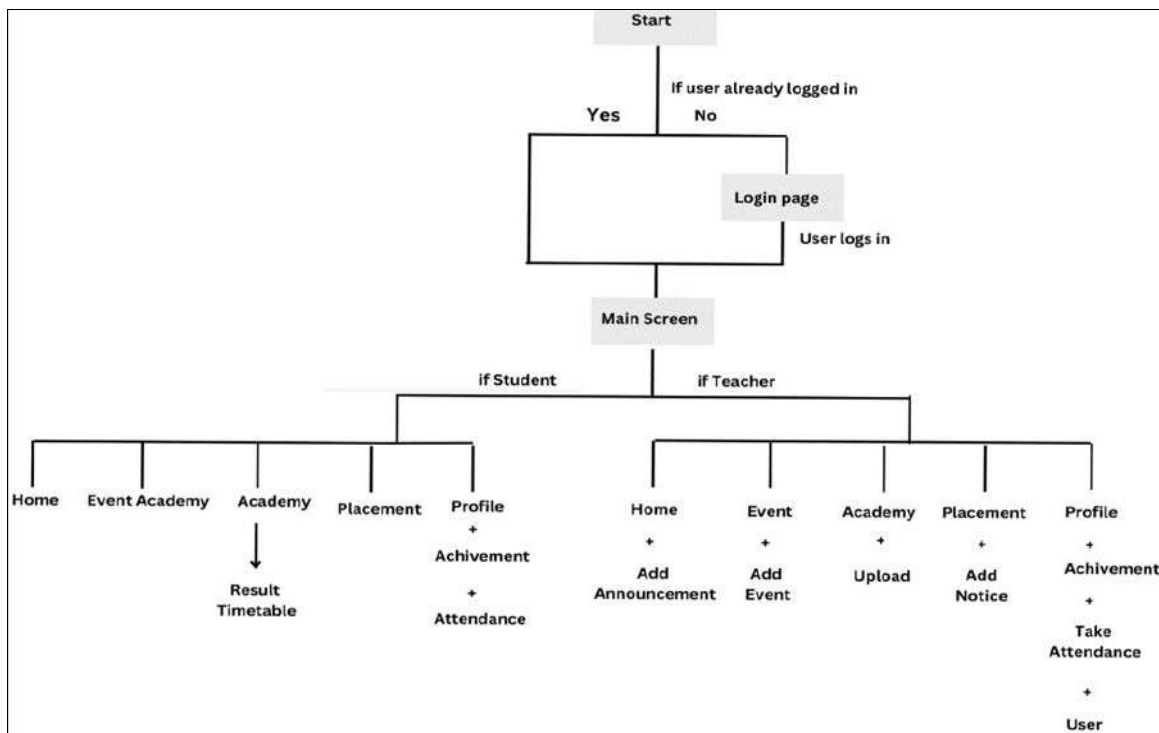
- **View Timetable:** Students can view the timetable which also gives notifications about lectures to students.

3.1.1 Frontend

The front end is made with the React JS JavaScript library.

3.1.2 Backend

The backend is made with Flask, written in python. Handle all the frontend requests and are connected with the Firebase Real-time Database.



3.1.3 Database

The database used in this system is the Firebase Real-time Database, which is used to handle the both frontend and backend server.

4. Benefits of the proposed system

1. The proposed system or application is very simple to use and handy for users.
2. An application will make college level one level up.
3. As the existing system is manual it is required to give training to the user but as the newly developed system doesn't require any training user can automatically learn how to use the system by using it.
4. It will take less time to perform all tasks. So that this is a time-saving and easy-to-use system.
5. As the proposed system acts as a bridge between teacher and student so that it ends the gap between both them.
6. The system reduces paperwork and also provides sufficient access to the students.
7. Proposed system reduces the workload on staff.

5. Conclusion

This Progressive web-based mobile application will end the gap between students and teachers and will also help the teachers and staff to reduce their workload. This android-based application will be a step closer to the safety of the environment as it will lead to the reduction of paper usage

by different colleges/ universities/ institutes etc. This will help us to tackle the environmental problems and pollution etc. This app will also integrate many tasks into one application, which will definitely save the time of the users and also will reduce the work of the staff which is time-consuming. The app is the newer version of the existing system as it offers various types of features for both the students and the teachers.

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