Web-Based Department Focused Framework using Angular and Google Cloud Firestore

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ABSTRACT:

In today's scenario of Technology and Advancement, as everything is pacing up and new ideas and inventions are always appreciated, our web-based Angular application is additionally one among them. This web application has a well-organized design and is time-saving to manage the department's and students' information as compared to traditional manual methods. The app presents a smooth and interactive GUI for student information management and has its database using the Google Firestore platform. Firestore is known to be a scalable, flexible database for web, server, and mobile development from Google Cloud Platform and Firebase. Users will then log in to the website with a correct access key to make use of the services provided, to view or upload the necessary information. This is an eco-friendly application because no paper is required in maintaining the records. This comes with enhanced features like role-based authentication using JWT JSON Web tokens.

KEYWORDS: *Website development, AngularJS Framework, Google Firestore, Role-based Authentication*

I. INTRODUCTION:

The Web-Based Department focused framework is a website developed for providing a platform that provides comprehensive information about the IT department. This multi-purpose project is designed to provide a more comfortable user interface. It is an effective replacement of the current informal system and provides a better outlook about the department. This project facilitates us in exploring all the activities happening in the department. The website can be accessed by both students/faculty through internet-connected computers with the aid of username and password. The website provides in-detail information about the department like staff details, student strength, number of students placed with company details, alumni details, and Newsletter module for the website administrator to circulate news & events details.

This system provides us with different role-based authentications. First, the Admin module where Admin can upload and maintain the website with the required information, day to day assignments, upload documents, results and mark attendance of students and answer any queries. He is given

access permissions of all the users. Secondly, Students can log in to the system to check the information about the department, HODs, faculty details, student attendance, examination results, academic schedules and holidays, ask queries, etc. Drive schedule information is also available in the student section, students can view the records of previous drives and number of placements in each drive. The Teacher and Staff modules are given permissions to manage the student's marks, assignments, student's details, information about classes, tutorials, etc. Parent Authentication gives parents the rights to login and sees their child marks and other information regarding the department. Thus, all the information is contained in a structured manner that makes it easy to access and use.

II. LITERATURE SURVEY:

Title: **Web-Based Student Information Management Website using MEAN Stack**

Authors: Ayazahmed Patel, Namita Naik, Tasleem Nabiwale, Suraj Patil

Year : 2018

Description : This web application aims at providing a guileless interface for the management of student Information. The generation and maintaining of precise, up-to-date information and logs about a students' academic career are much significant within the university. The web application utilizes user authentication, displaying only the required information for user duties. The Application is developed using the MEAN stack, which is a completely open-source stack written in JavaScript.

Title : **Improvised Smart Application for Student Information Management System**

Authors: A. Srinivasan, S.Manikandan, J.Sivasankar, S. Rajasekar

Year : 2017

Description : This project aims at 2 things ie: to add mobility and automating the management process of student information in an institute. Considering a real-world scenario, like a college campus, the information is likely to be in the form of notice, hand-written manual, a verbal message is being spread among the scholars. At the same time, searching for any information is too difficult to access and takes a lot of time to search for a particular website. Hence, so as to beat this problem, a smartphone-based application using Android is made to make this process easier, secure and less error-prone.

III. TECHNOLOGIES USED :

3.1 FRONT-END: ANGULAR 9.0.0

Angular 9 is the latest version of Angular series. It comes with a new value-adding feature, where the applications are Ivy compiled by default.

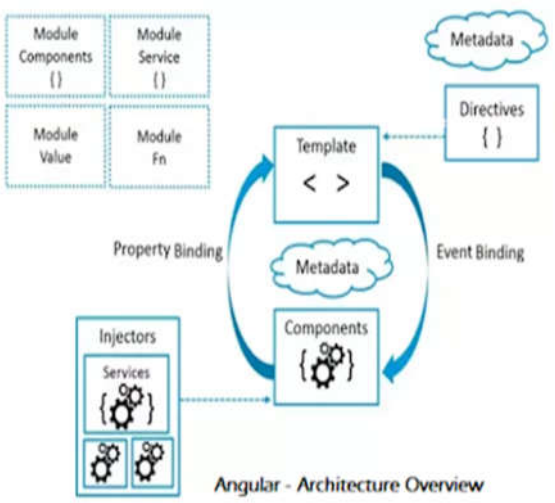

Fig 3.1 *Architecture Overview of Angular Application*

The applications are compiled Ahead-Of-Time i.e. before the browser downloads and runs it. Ivy engine is very helpful when it comes to debugging. The bundle size is reduced to an incredible extent. Also, the faster compilation is achieved. The AOT compiler comes with the following benefits :

1. Rendering becomes faster.
2. AOT inlines all the external HTML and CSS.
3. It helps in reducing the size of Angular Framework
4. Reduction in Injection Attacks.

3.2 BACK-END: GOOGLE CLOUD FIRESTORE

Cloud Firestore is a document database. It stores the user's data in a tree-like structure, similar to the original Realtime Database. But everything is placed into documents and collections.

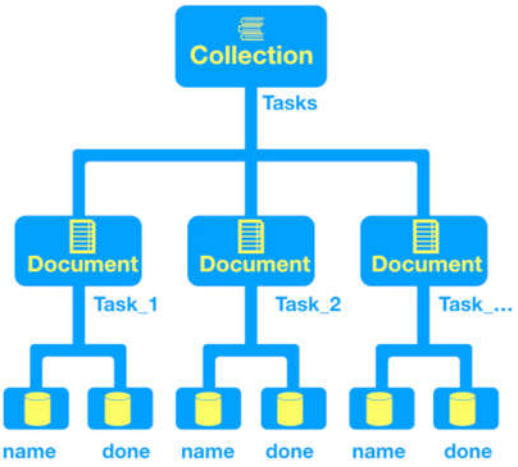

Fig 3.2 *Representation of how data is being stored in Firestore*

For explanation, a document can be thought of as a Javascript Object. It has key-value pairs called fields. The values of these fields can vary from strings, binary values, numbers, to JSON objects, etc. Collections refer to the collection of all documents only. They do not contain any other aspects like strings, objects, etc. Documents cannot contain other documents but can have sub-collections that point to other documents.

IV. EXISTING SYSTEM :

1. The existing system does not focus on departmental activities in particular.
2. Sharing of information i.e. documents and queries is done in an unofficial platform.

3. The information sent via Shareit, WhatsApp, Bluetooth, etc. can be lost.
4. There will be a lot of manual work in the existing system.
5. Lack of information about the upcoming drives and event.
6. The previously developed websites are not attractive.

V. PROPOSED SYSTEM:

1. Role-based Authentication based on given roles like Student, Parents, Teacher and College Management
2. Instant password/role reset for all users
3. Provides a Complete College Management Application for storing Students Records, Marks, Fees, Attendance and a great deal more.
4. Live Notifications in real-time as the data is being updated (Marks, Fees, Online Homework posting etc)
5. Paperless Online Application based Education features
6. Social Authentication
7. Online and/or Offline (delayed capture) Application
8. Unlimited Storage (only limited to server/database hosting)

VI. RESULTS:

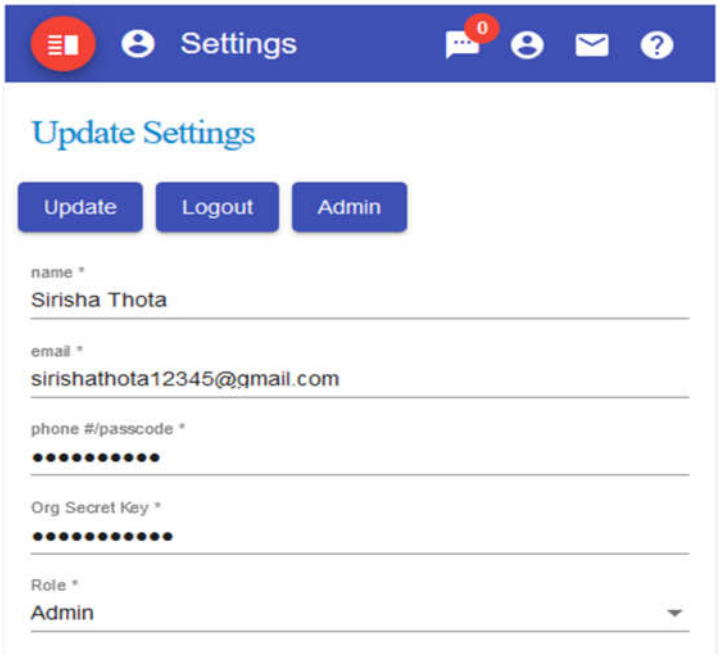

Fig 6.1: *Initial Settings Page for User to Access data using Keys*

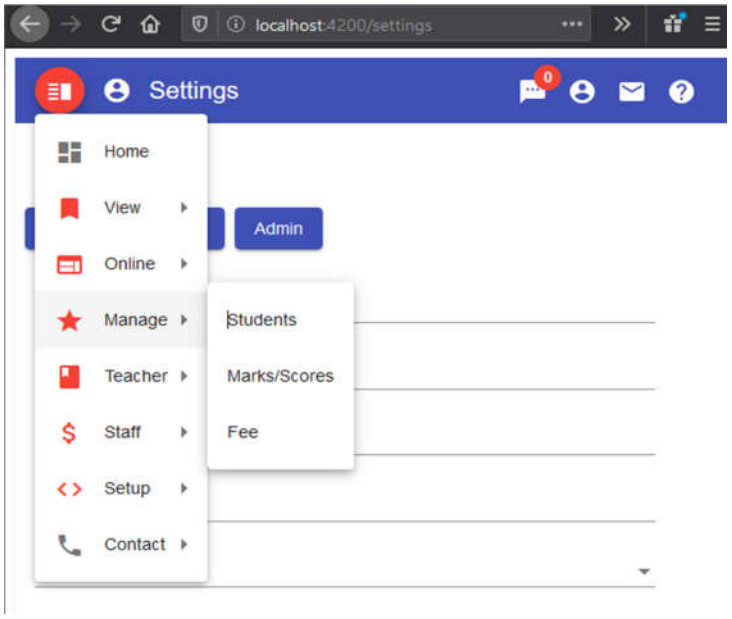

Fig 6.2: *Functionalities provided in the Application*

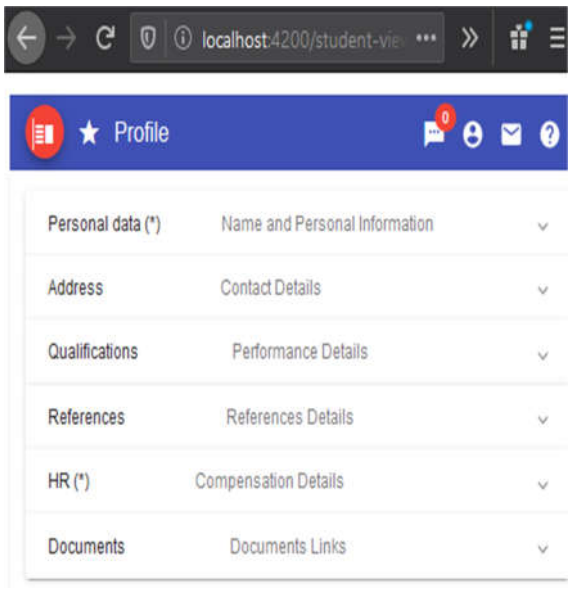

Fig 6.3: *Detailed Information of the User Page*

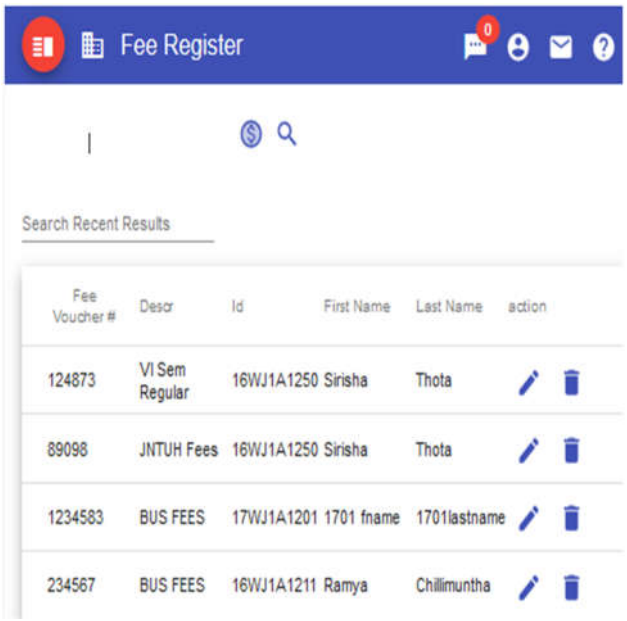

Fig 6.4: *Logs of Information is stored as it is updated*

CONCLUSION :

The Angular website was successfully created with perfect functionality. The requirement specifications were carefully studied and enhancements were made to get the desired features and functionalities of the website. The system was then designed in accordance with specifications to satisfy the requirements. The Angular project was connected to the Google Cloud Firestore providing backend services. Thus, an effectively functioning interactive and content management system was created.

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