A Project report on

Get Certified

A report submitted in partial fulfillment of the Academic requirements for the award of the degree.

Bachelor of Technology

in

Computer Science & Engineering

By

Jagan Mohan Nikhil Ponduru (18H51A05D8)

Pranay Kumar Voruganti (18H51A05E9)

Kaushik Veligatla (18H51A05G7)

Under the esteemed Guidance of

Mr. B Tulasidasu
Assistant Professor

Department of Computer Science and Engineering
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CMR COLLEGE OF ENGINEERING & TECHNOLOGY

KANDLAKOYA, MEDCHAL ROAD, HYDERABAD-501401.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the project report entitled "**Get Certified"** is a bonafide work done by **Jagan Mohan Nikhil Ponduru (18H51A05D8), Pranay Kumar Voruganti (18H51A05E9), Kaushik Veligatla (18H51A05G7)** in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology in Computer science and Engineering, submitted to the Department of Computer science and Engineering, CMR College of Engineering & Technology, Hyderabad during the Academic Year 2020-21.

Mr. B Tulasidasu
Assistant Professor
Project Guide

Dr. K Vijaya Kumar
Professor & HOD
CSE Department

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Ultimately, we own all our success to our beloved parents, whose vision, love and inspiration has made us to reach out for these glories.

SIGNATURE

Jagan Mohan Nikhil Ponduru (18H51A05D8)

Pranay Kumar Voruganti (18H51A05E9)

Kaushik Veligatla (18H51A05G7)

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ABSTRACT

Competitive programming is a mind sport usually held over the Internet or a local network, involving participants trying to program according to provided specifications. Contestants are referred to as sport programmers. Competitive programming is recognized and supported by several multinational software and Internet companies, such as Google and Facebook. There are several organizations who host programming competitions on a regular basis.

A programming competition generally involves the host presenting a set of logical or mathematical problems, also known as puzzles, to the contestants (who can vary in number from tens to several thousands), and contestants are required to write computer programs capable of solving each problem. Judging is based mostly upon number of problems solved and time spent for writing successful solutions, but may also include other factors (quality of output produced, execution time, program size, etc.) At the end, all these sport programmers get certification based on their performance and excellence. It is practically difficult to certify each programmer individually.

So, “Get-Certified” is the web application which issues certification to all sport participants through online at a time, directly to their mail ID’s.

CHAPTER – 1

INTRODUCTION

1.1 INTRODUCTION:

The web services these days are being used on almost every sector and aspect of our day – to – day life. Educational Sector is also one such major aspect where Internet and Web Services can impact the lives of students on a larger scale.

The web application has become a public square, a library, a doctor's office, a shop, a school, a design studio, an office, a cinema, a bank, and so much more. With proper design and implementation, we have built a web application where:

- The web application works as an automatic distributor for distributing the certificates regarding the contests hosted by that particular User or Organizer.
- It is delivered to the end user through the use of computers using standard Internet technology.
- It focuses on simpler work process than the traditional distribution/assignment paradigms.

This project is aimed to give a platform to the end user overcome the difficulty of certifying each and every participant/contestant. Sometimes, the result of participants may vary from one participant to another based on their performance in a particular contest. In such cases, the certifying process may become even more difficult. In such scenarios, this project would more helpful in terms of reducing work load.

The main features that are provided by the application include:

1) Easy Work Flow.
2) Accessible from any type of device such as Mobile, Laptop.
3) User Data is secured and consistent.
4) Simple UI.
5) Saves time and effort.

1.2 OBJECTIVE:

As the Project – "Get Certified" is aimed to deliver an efficient way of certifying and sending the certificate to the participant, the Objectives of the project rely upon the factors that abide to give the best User experience and immense pleasure to the user of the web application.

The main objectives of Get Certified are:

1. Support the contest organizers to enhance the level of hosting.
2. Track all the information and details of contests.
3. Track all the information of the participants of a particular contests.
4. Ensures better distribution of results or outputs.
5. Providing all the functionality related to events and tracks all the information and details of events.
6. Providing Quality-based features to the users.

1.3 SCOPE:

The potential for the growth of technology in the market is high as universities and bigger institutes have started exploring this area and thought of using this type of applications as an ideal medium for long- distance education programs. This system makes certification easier as there's an availability of simple sources alongside textual materials for the contestants and the hosts. This makes hosting fun and engaging thereby making a progressive distribution of certificates.

Apart from students, even those who have been placed can get certificate in specialized areas related to their field by consulting an organization. It's easier as well as an economical way to acquire certification. Flexibility in terms of time makes it easier to multitask and still get the best results.

The Scope of Certifying Web application is now only under technical contests, but sooner we expand our horizons to next aspects of the Educational or certification courses field.

1.4 REQUIREMENTS:

The web application that is to be deployed and made few software requirements. The basic requirements, we used to develop the Learning Management System are:

Git hub Repository

GitHub, Inc. is a provider of Internet hosting for software development and version control using Git. It offers the distributed version control and source code management (SCM) functionality of Git, plus its own features. It provides access control and several collaboration features such as bug tracking, feature requests, task management, continuous integration and wikis for every project.

GitHub offers its basic services free of charge. Its more advanced professional and enterprise services are commercial. Free GitHub accounts are commonly used to host open-source projects. Projects on GitHub.com can be accessed and managed using the standard Git command -line interface; all standard Git commands work with it. GitHub.com also allows users to browse public repositories on the site. Multiple desktop clients and Git plugins are also available. The site provides social networking-like functions such as feeds, followers, wikis (using wiki software called Gollum) and a social network graph to display how developers work on their versions ("forks") of a repository and what fork (and branch within that fork) is newest.

Anyone can browse and download public repositories but only registered users can contribute content to repositories. With a registered user account, users are able to have discussions, manage repositories, submit contributions to others' repositories, and review changes to code.

Heroku app

Heroku is a cloud platform as a service (PaaS) supporting several programming languages. One of the first cloud platforms, Heroku has been in development since June 2007, when it supported only the Ruby programming language, but now supports Java, Node.js, Scala, Clojure, Python, PHP, and Go. For this reason, Heroku is said to be a polyglot platform as it has features for a developer to build, run and scale applications in a similar manner across most languages.

The applications that are run on Heroku typically have a unique domain used to route HTTP requests to the correct application container or dyno. Each of the dynos are spread across a "dyno grid" which consists of several servers. Heroku's Git server handles application repository pushes from permitted users.

Heroku also provides custom build packs with which the developer can deploy apps in any other language. Heroku lets the developer scale the app instantly just by either increasing the number of dynos or by changing the type of dyno the app runs in.

Mongo DB

MongoDB is a source-available cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with optional schemas. MongoDB is developed by MongoDB Inc. and licensed under the Server Side Public License (SSPL).

MongoDB supports field, range query, and regular-expression searches. Queries can return specific fields of documents and also include user-defined JavaScript functions. Queries can also be configured to return a random sample of results of a given size.

Fields in a MongoDB document can be indexed with primary and secondary indices. MongoDB provides high availability with replica sets. MongoDB can be used as a file system, called Grid-FS, with load balancing and data replication features over multiple machines for storing files. This function, called grid file system, is included with MongoDB drivers.

MongoDB exposes functions for file manipulation and content to developers. GridFS can be accessed using mongofiles utility or plugins for Nginx and lighttpd. GridFS divides a file into parts, or chunks, and stores each of those chunks as a separate document. JavaScript can be used in queries, aggregation functions (such as MapReduce), and sent directly to the database to be executed.

Visual Studio Code

Visual Studio Code is a freeware source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Users can change the theme, keyboard shortcuts, preferences, and install extensions that add additional functionality.

Visual Studio Code is a source-code editor that can be used with a variety of programming languages, including Java, JavaScript, Go, Node.js, Python and C++. It is based on the Electron framework, which is used to develop Node.js Web applications that run on the Blink layout engine. Visual Studio Code employs the same editor component (codenamed "Monaco") used in Azure DevOps (formerly called Visual Studio Online and Visual Studio Team Services).

Instead of a project system, it allows users to open one or more directories, which can then be saved in workspaces for future reuse. This allows it to operate as a language-agnostic code editor for any language. It supports a number of programming languages and a set of features that differs per language.

NODE JS

Node.js is an open-source, cross-platform, back-end JavaScript runtime environment that runs on the V8 engine and executes JavaScript code outside a web browser. Node.js lets developers use JavaScript to write command line tools and for server-side scripting—running scripts server-side to produce dynamic web page content before the page is sent to the user's web browser.

Consequently, Node.js represents a "JavaScript everywhere" paradigm, unifying web-application development around a single programming language, rather than different languages for server-side and client-side scripts.

Though .js is the standard filename extension for JavaScript code, the name "Node.js" doesn't refer to a particular file in this context and is merely the name of the product. Node.js has an event-driven architecture capable of asynchronous I/O. These design choices aim to optimize throughput and scalability in web applications with many input/output operations, as well as for real-time Web applications (e.g., real-time communication programs and browser games).

Node.js is a JavaScript runtime environment that processes incoming requests in a loop, called the event loop. Node.js operates on a single-thread event loop, using non-blocking I/O calls, allowing it to support tens of thousands of concurrent connections without incurring the cost of thread context switching. The design of sharing a single thread among all the requests that use the observer pattern is intended for building highly concurrent applications, where any function performing I/O must use a callback.

CHAPTER-2

EXISTING SYSTEM

2.1 Online Certificate Generator

2.1.1 Overview

Now-a-days there are many web applications across the Internet for generating a certificate for a person regarding any event. They provide an instant result for the user's data. But, using these type of application, the User may not have promising result or output from these applications. The services or features provided by these applications might not always be efficient from an end user point of view.

Most of these applications provide a good helping hand to the user but fail to reach the end user expectations. Like, most of the times, the application is not an Open source project, so the user cannot save or own their work and effort as they might have to pay the application provider for access to its features. And sometimes, there are not enough features or designs which the user wished for. In most of the times, user actually needs more than a single certificate, and he have to create the certificate over and over again for each and every participant. There many such cases which might not fulfill the end user's choice.

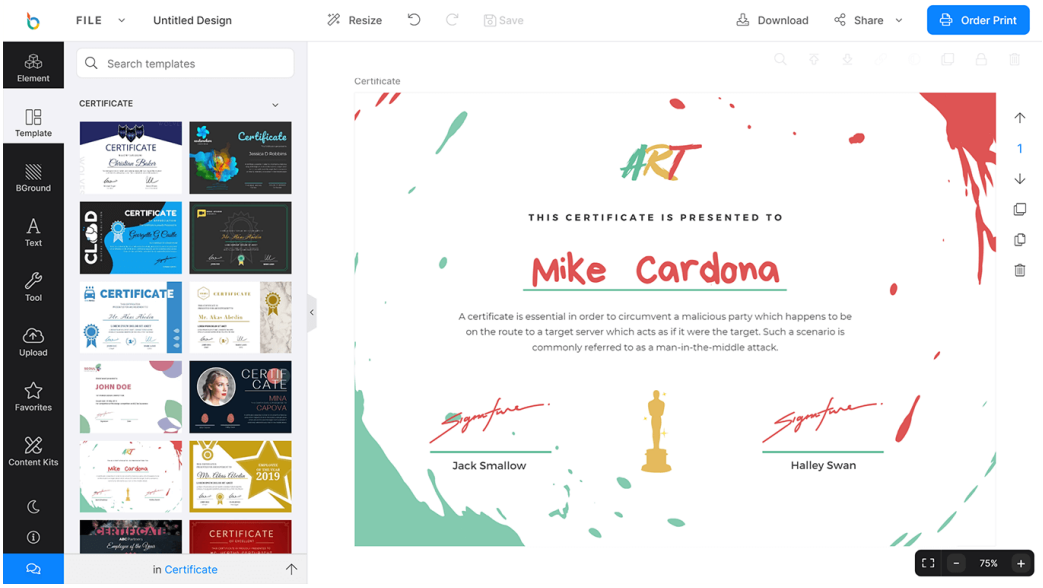

Fig 2.1 Online certificate generator

Domain and Audience:

Many certificate generator applications also enable you to restrict feature visibility to people within an audience. For example, someone in sales may see a different design of template offerings than someone in a different application. Some products enable a single user to have multiple roles. Other systems allow only one role per user.

2.1.2 Features

The Features included in Online Certificate Generators are as follows:

1) Instant processing of data after completion of user inputs.
2) Various designs or templates available for certificate.
3) Few Open source applications would help a lot to the user.

2.1.3 Drawbacks

Along with the features, there a couple of drawbacks which are slowing down the trend of online certificate generators. They are:

1. The result or output is not always matching to the user's vision or expectation.
2. Limited services or add-on features are provided in the applications.
3. Not all applications are Open source. Most of them are paid applications.
4. Fails to generate multiple certificates simultaneously which increases user work load and stress.

CHAPTER – 3

PROPOSED SYSTEM

3.1 Overview

The web application acts as a platform where a user can provide the details for a contest hosted by the user or the user's organization. The user data may consist of the details of the contest like the contest name, contest host, organization, and other details. The user can further add the details of the contestants of that particular contest. The data entered by the user is secured in the database and cannot be altered or tampered by anyone.

Based on the data the user had provided to the application, the data is then processed by the application accurately as all the work is done by the application alone so there is no chance of error or discrepancy in the process. The application is designed in such a way that it only considers the necessary information that is required for generating a certificate which helps in avoiding the chance of redundant data.

The platform has user specific content where the user can choose his template from the available templates provided by the application and start the process of generation of certificate. Since, in a contest there would be more than a single contestant. So, here we are dealing with data of more than a single candidate. Instead of generating the certificate again and again, the application had provided a way to overcome this situation. The application enables the user to generate the certificates of all the contestants at once which helps in reducing time.

The Platform also provides a statistical data format based on the performance of the contestants in that particular contest. This helps in better visualization of the data and helps to gain insights through it.

For distribution phase, the application provides an automatic process, where by enabling a single function will send the URL of the certificate to the contestant's email ID. By accessing this link, the user can view and save the certificate for themselves.

3.2 UML DIAGRAM

The following is the Validation check process of the User login – Credentials. The values entered in the label are exported as JSON file. The JSON file is used to authenticate the user registered in the Database that is linked with the Get Certified Web Application.

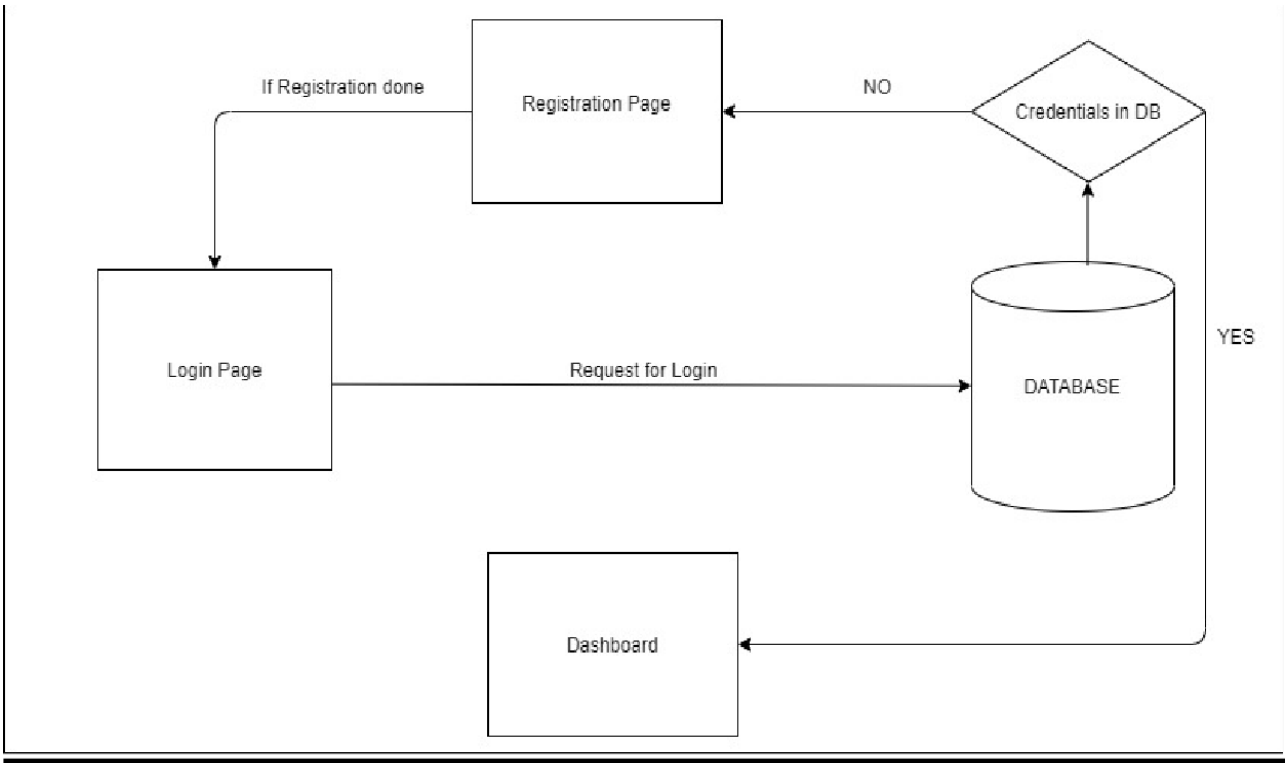

Fig. 3.1 Validation Check for Login Credentials

The rough sketch of the login functionality is shown below, The User login credentials are crossed verified against the Database JSON Objects as shown above and the flow of execution is shown below.

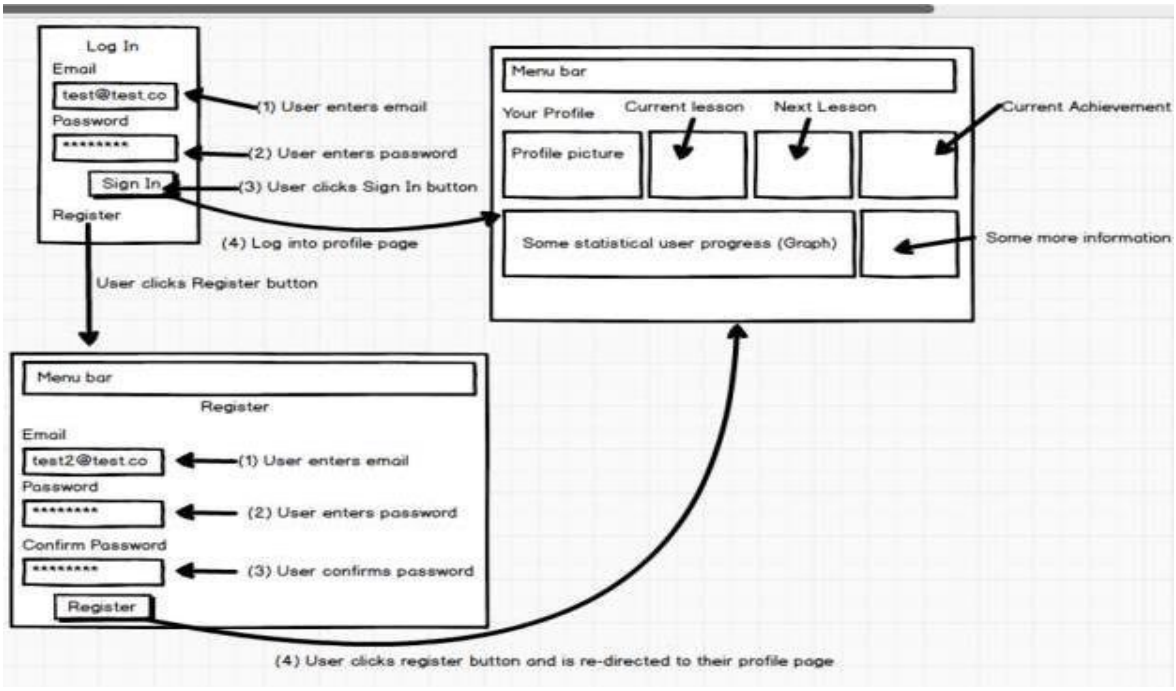

Fig. No. 3.2 A rough sketch of the login procedure.

Dashboard Page is the home page, which consists of the list of contests which were added by the user.

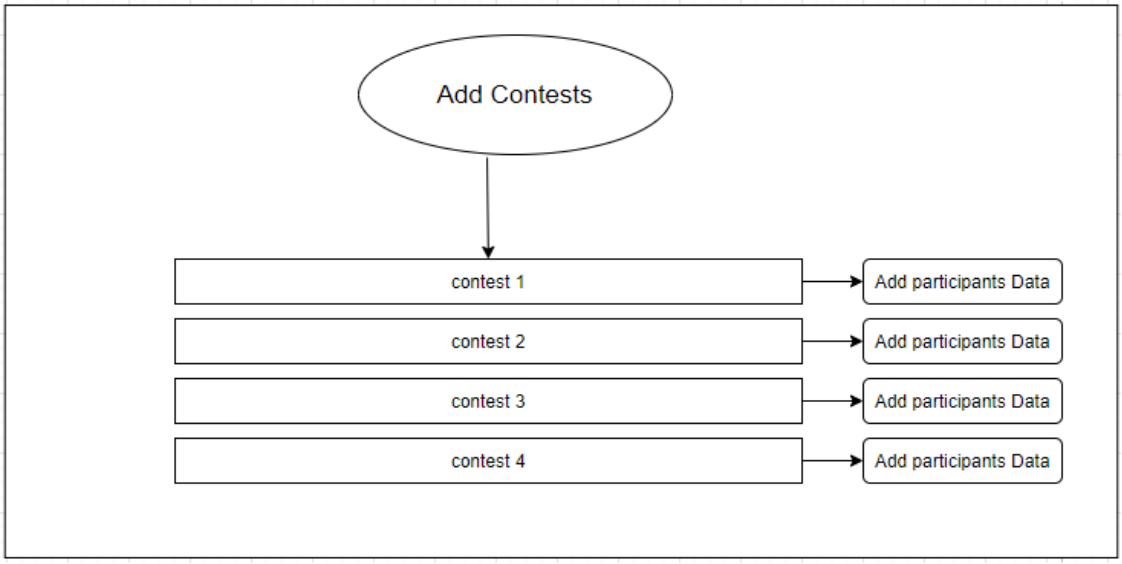

Fig 3.3 UML Diagram of Dashboard Page

Then comes the Contest page when the Add participants' data button is clicked in the dashboard. In Contests page, we can add the contestants' data for generation of the certificate.

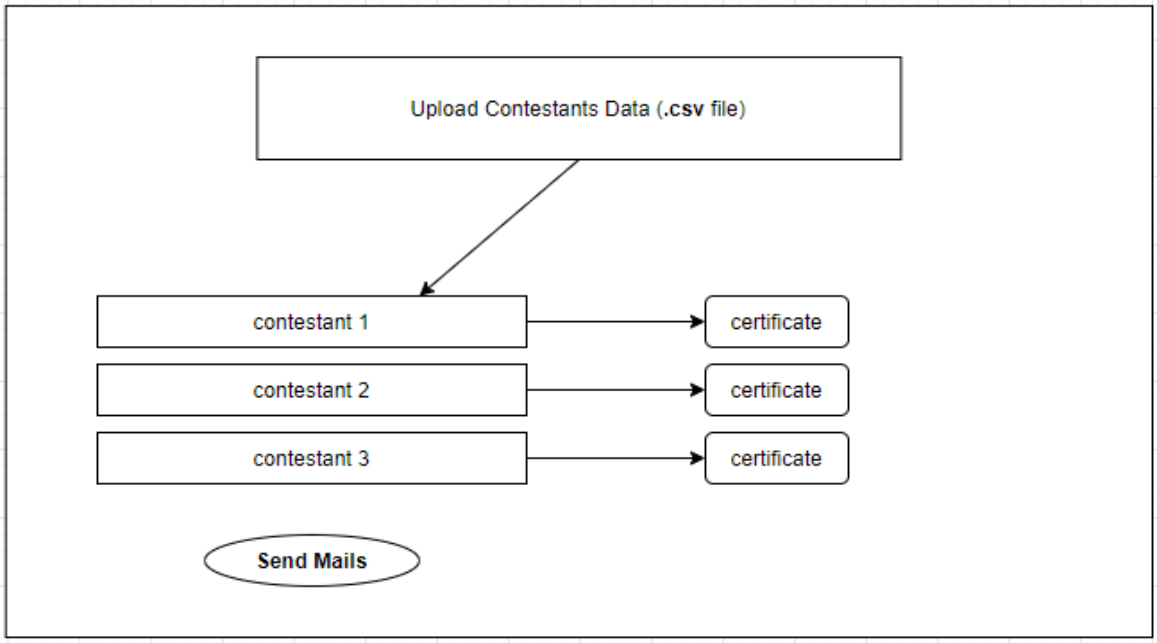

Fig 3.4 UML Diagram of Participants Page

Upon clicking the certificate button a sample certificate can be viewed. And by clicking Send Emails button, a link is sent to the contestant's email by which he can save or download the certificate.

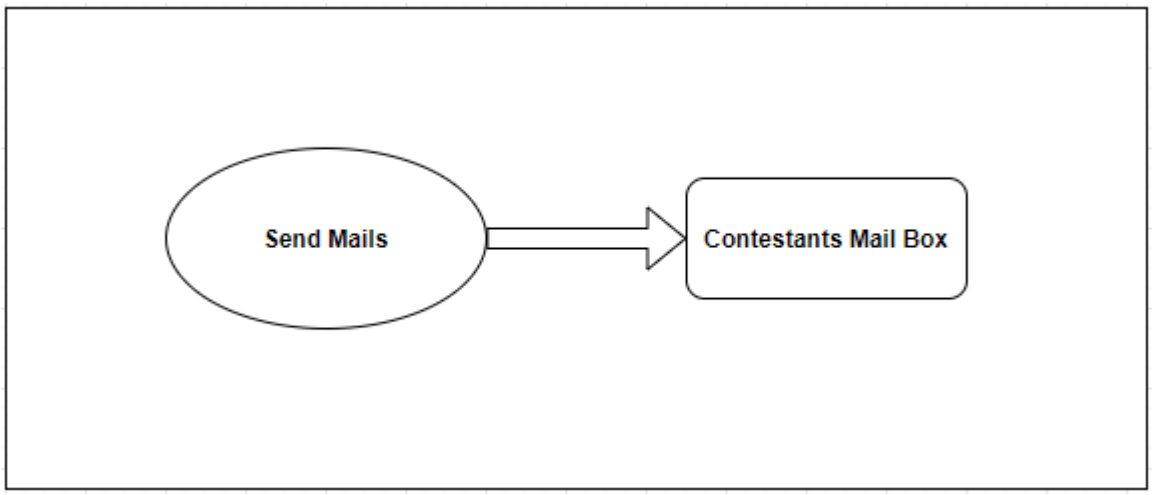

Fig 3.5 Sending emails

3.3 IMPLEMENTATION

The successful implementation of this type of application requires solid support and scrupulous planning especially considering the wide range of impact the system is going to have, not just on your organization, but its management too. With a little bit of groundwork and a proper plan in place, implementing such a web application can be one of the most beneficial and profitable moves for your organization.

MEAN Stack:

MEAN Stack is one of the most popular Technology Stack. It is used to develop a Full Stack Web Application. Although it is a Stack of different technologies, all of these are based on JavaScript language.

MEAN Stands for:

1. **M** – MongoDB
2. **E** – Express
3. **A** – Angular
4. **N** – Node.js

This stack leads to faster development as well as the deployment of the Web Application. Angular is Frontend Development Framework whereas Node.js, Express, and MongoDB are used for Backend development.

Fig 3.6 MEAN Stack

Here, each module communicates with the others in order to have a flow of the data from Server/Backend to Client/Frontend.

Additionally, the MEAN stack has a concrete three-tier separation which, if used with best

practices and correct network isolation, should prevent your end users from having access to the business logic and moreover to your database layer. Therefore, your application is by default designed to avoid malicious user interaction from putting your application at risk (Query injection, code manipulation, port spoofing etc.).

MongoDB

MongoDB is a NoSQL database program that uses JSON-like BSON (binary JSON) documents with schema.

The role of the database in the MEAN stack is very commonly filled by MongoDB because its use of JSON-like documents for interacting with data as opposed to the row/column model allows it to integrate well with the other (JavaScript-based) components of the stack.

Express.js

Express.js (also referred to as Express) is a modular web application framework package for Node.js.

While Express is capable of acting as an internet-facing web server, even supporting SSL/TLS out of the box, it is often used in conjunction with a reverse proxy such as NGINX or Apache for performance reasons.

Angular and alternatives

Typically data is fetched using Ajax techniques and rendered in the browser on the client-side by a client-side application framework, however as the stack is commonly entirely JavaScript-based, in some implementations of the stack, server-side rendering where the rendering of the initial page can be offloaded to a server is used so that the initial data can be pre-fetched before it is loaded in the user's browser.

Angular (MEAN), React (MERN) and Vue.js (MEVN) are the most popular amongst other web application frameworks used in the stack and a number of variations on the traditional MEAN stack are available by replacing the web application framework with similar frameworks, or even by removing this component of the stack altogether (MEN).

Express.js and Node.js Server Tier

The next level down is Express.js, running on a Node.js server. Express.js calls itself a “fast, un-opinionated, minimalist web framework for Node.js,” and that is indeed exactly what it is.

Express.js has powerful models for URL routing (matching an incoming URL with a server function), and handling HTTP requests and responses. By making XML HTTP requests (XHRs), GETs, or POSTs from your Angular.js front end, you can connect to Express.js functions that power your application.

Those functions in turn use MongoDB’s Node.js drivers, either via call-backs or using Promises, to access and update data in your MongoDB database.

Advantages of the MEAN Stack

MEAN applications can be used in many ways with a cross platform write once approach. While MEAN is particularly suited to real-time applications, particularly those running natively in the cloud and single-page (dynamic) web applications built in Angular.js, it can be used for other use cases such as:

- Workflow management tools.
- News aggregation sites.
- Todo and calendar applications.
- Interactive forums.

And much more. Since all the components are based on JavaScript and JSON, the integration between the components of the stack is intuitive and straightforward.

Additionally, the E and A of MEAN (Express and Angular) are two of the most popular and well-supported JavaScript frameworks for back-end and front-end development, respectively. Express makes routing and managing HTTP requests and responses super easy, and includes great support for

middleware to handle JSON endpoints and form posts. Angular is a powerful tool for building dynamic HTML pages that communicate with a back-end server.

Whether you're building a high-throughput API, a simple web application, or a micro-service, MEAN is the ideal stack for building Node.js applications. All of the MEAN stack components are open source in nature and therefore allow a generous, free-of-charge opportunity for developers.

Disadvantages of the MEAN Stack

JavaScript is a great modern language, but it wasn't initially designed to build back-end servers. Since the foundation of the MEAN stack is JavaScript, including the back-end server, it might come with concurrency and performance problems at scale due to JavaScript nature.

Additionally, since the development opportunity is so rapid, business and server logic might suffer from poor isolation, making potential spaghetti code and bad practices a reality along the way.

Finally, although there are many guides and tutorials out there, they generally will not include concrete JS coding guidelines appropriate for this stack. Therefore, something that worked really well for one application might surface issues for another.

CHAPTER-4

RESULTS

4.1 RESULTS:

The Web application has a Host Page, where a brief description is given about the services provided in Get Certified Application. The User can navigate to Login/ Sign up page using the "Get Started" Button.

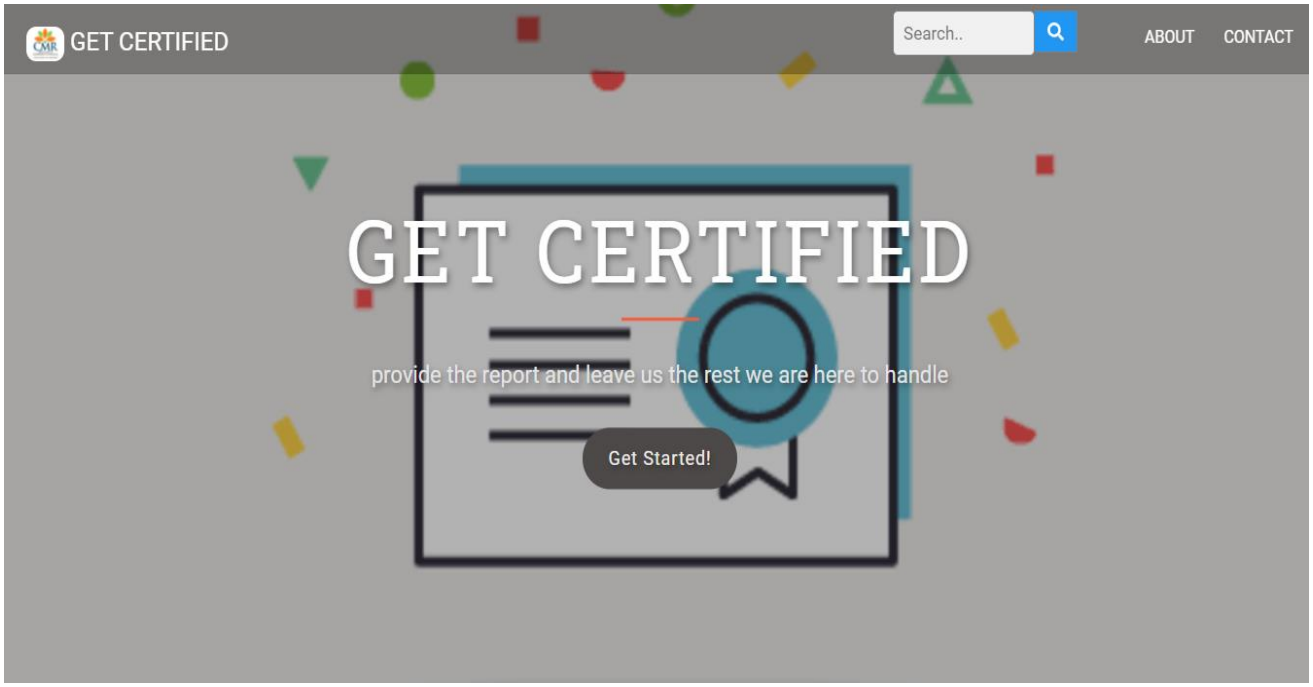

Fig. No 4.1 Welcome Page

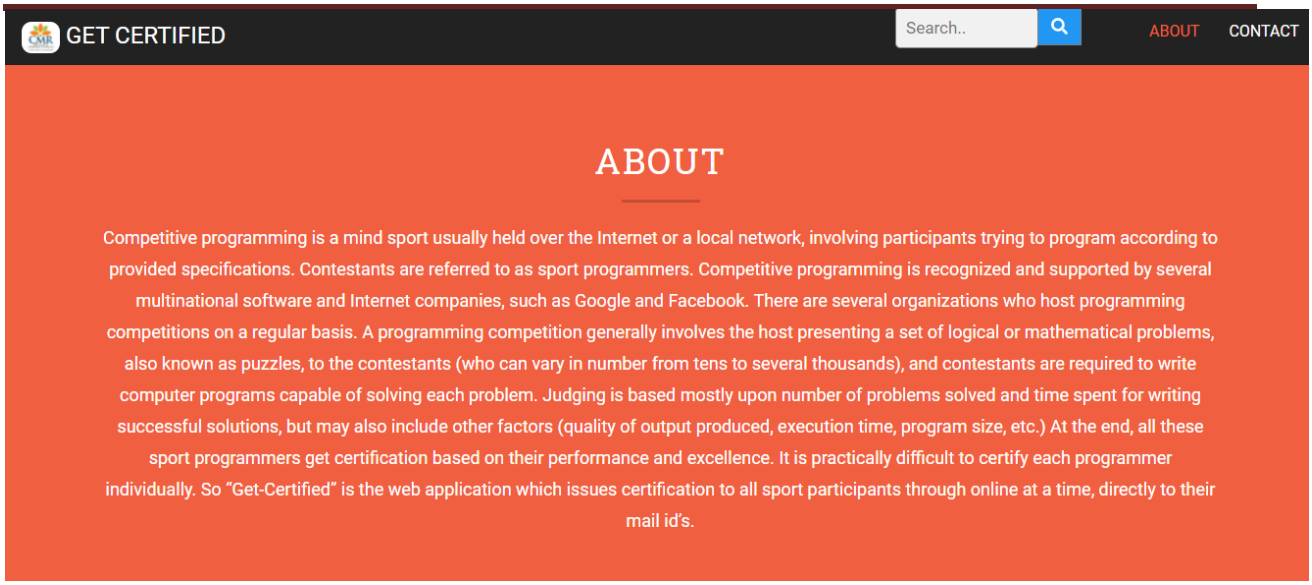

Fig. No 4.2 Description about the Web Application

Then, to enter into the web application, the user must have an account in it. If he/she is new to the website, he/she can create an account instantly.

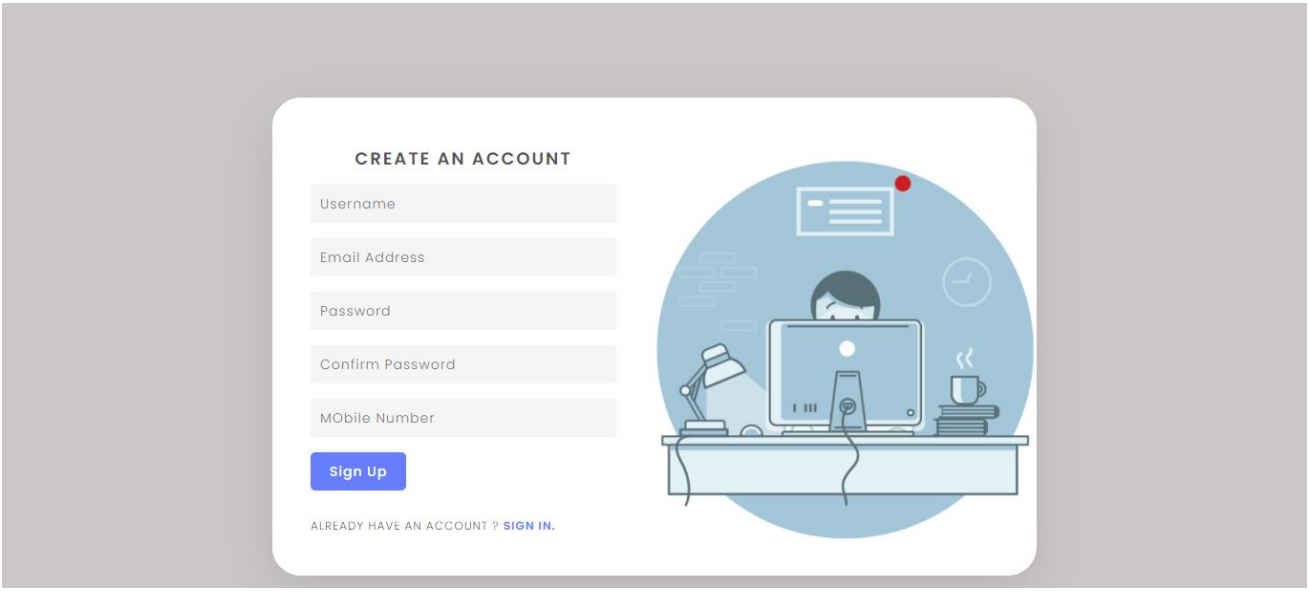

Fig. No. 4.3 Creating Account

After creating an account in the application, an email is sent to registered email ID, for verification purposes. Once the verification is done successfully, the user can login into the application.

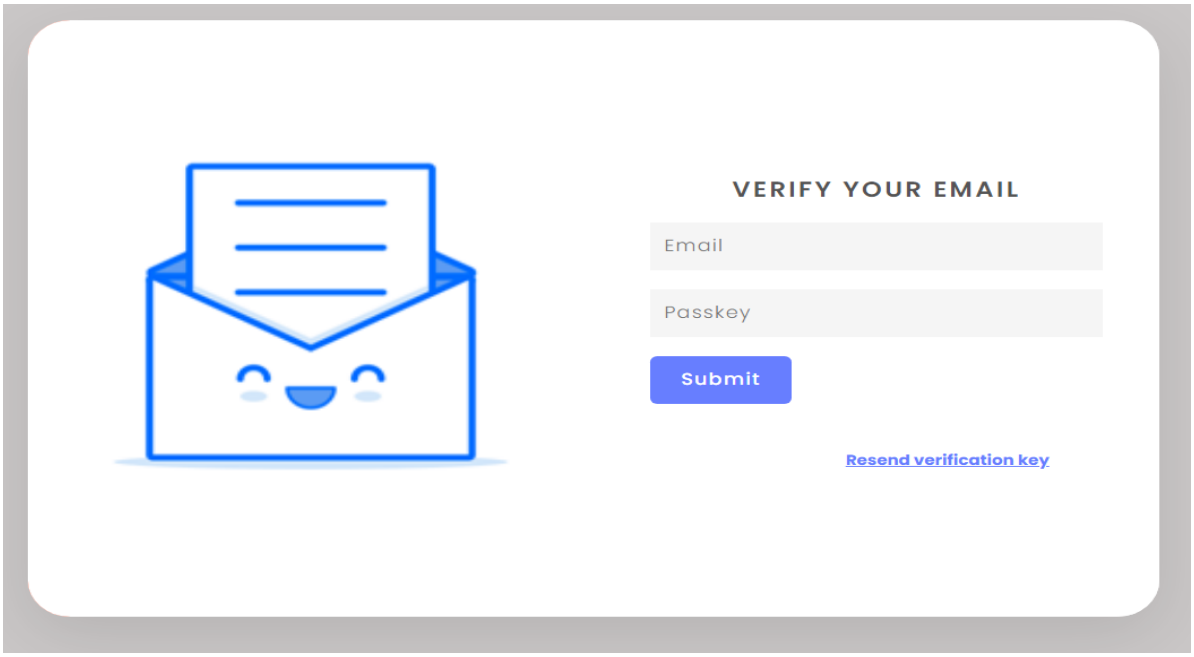

Fig. No. 4.4 Account Verification

If you possess an account in the web application, you can directly Sign – In to the web application.

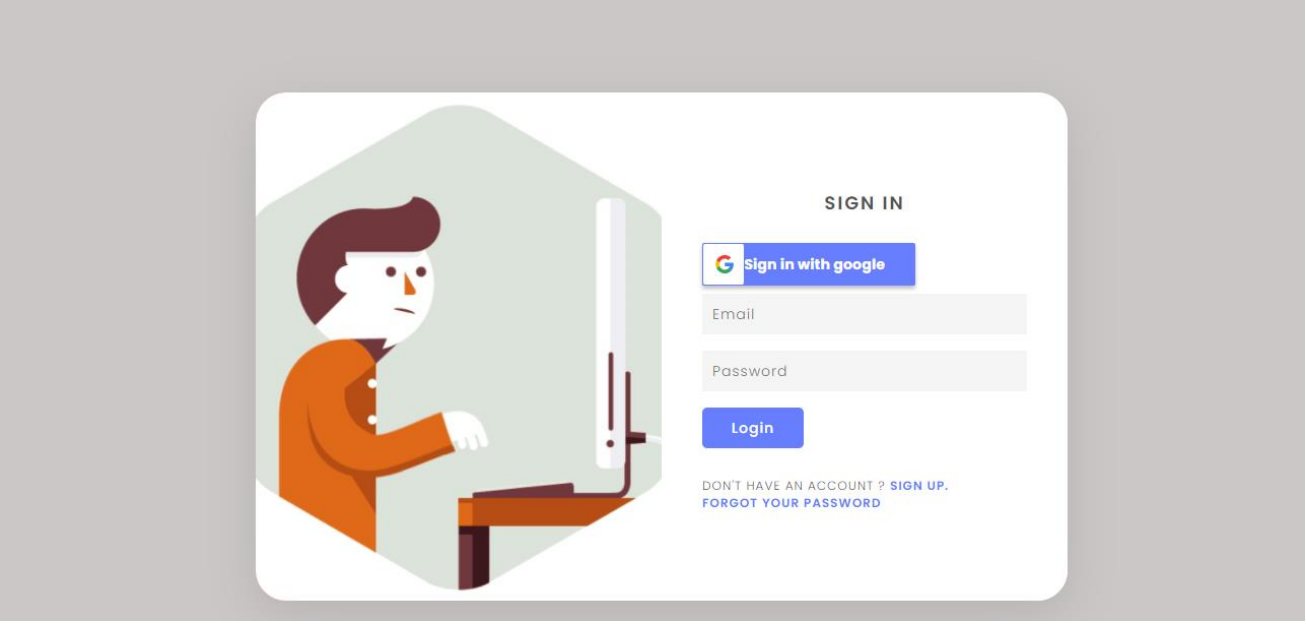

Fig. No. 4.5 Signing - In

After entering into the web application, the user will find a dashboard with the services provided by the web application.

The User will be able to create contests in the dashboard where the user can specify few main details regarding the contest like contest name, organization which is hosting the contest, date of contest being hosted etc.

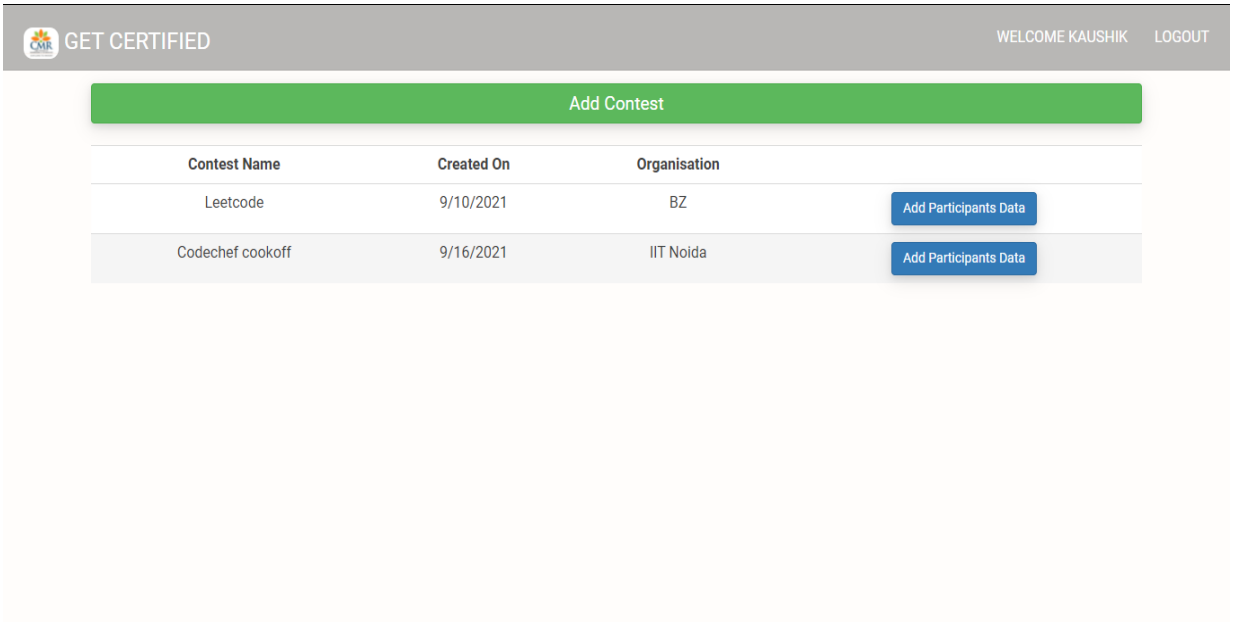

Fig. No. 4.6 Contests Dashboard

An option is enabled after creating a contest which is named as “Add Participants Data”. This option helps the user to add the list of all the participants of that contest in a given file format. In our case, the web application will accept **.csv** file format.

A modal box will be popped out to upload the .csv file.

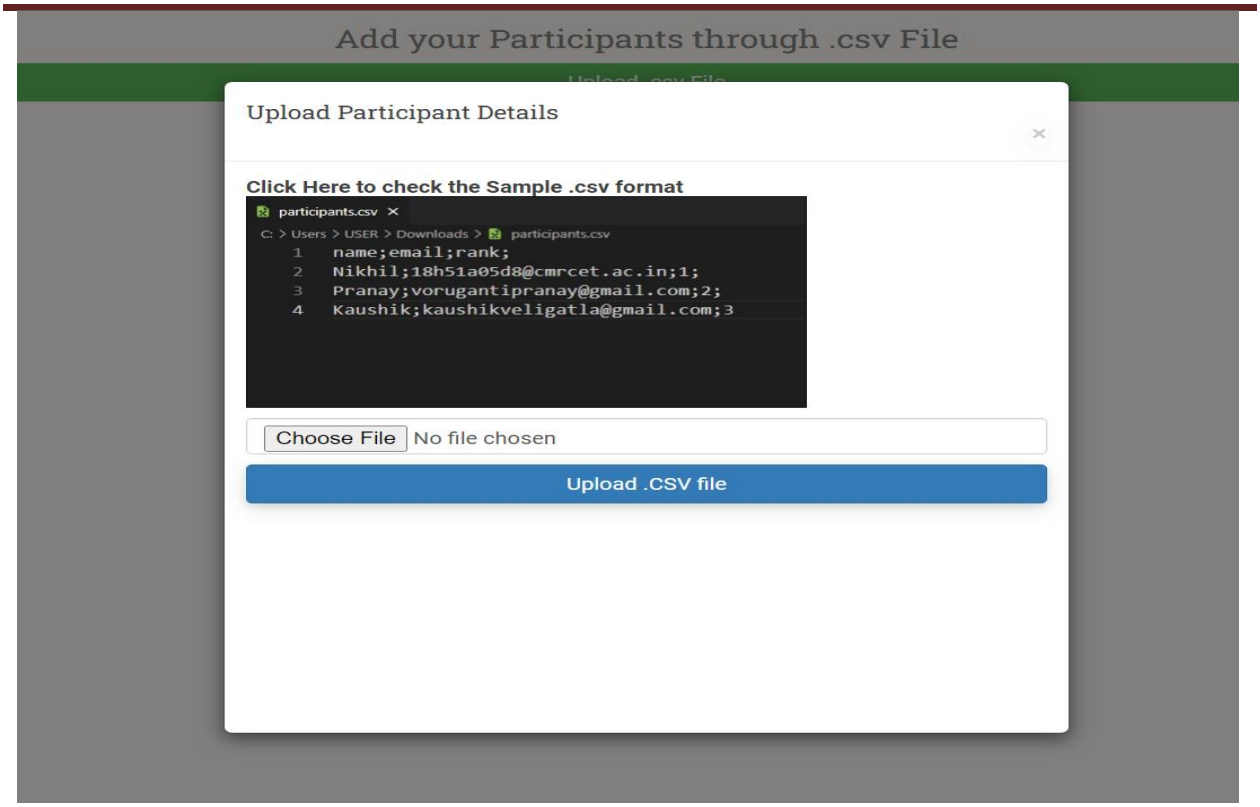

Fig. No. 4.7 Modal box for file upload

After uploading the list of participants i.e. .csv file, the data is being processed and the application will be able to display the statistical visual gained from the data.

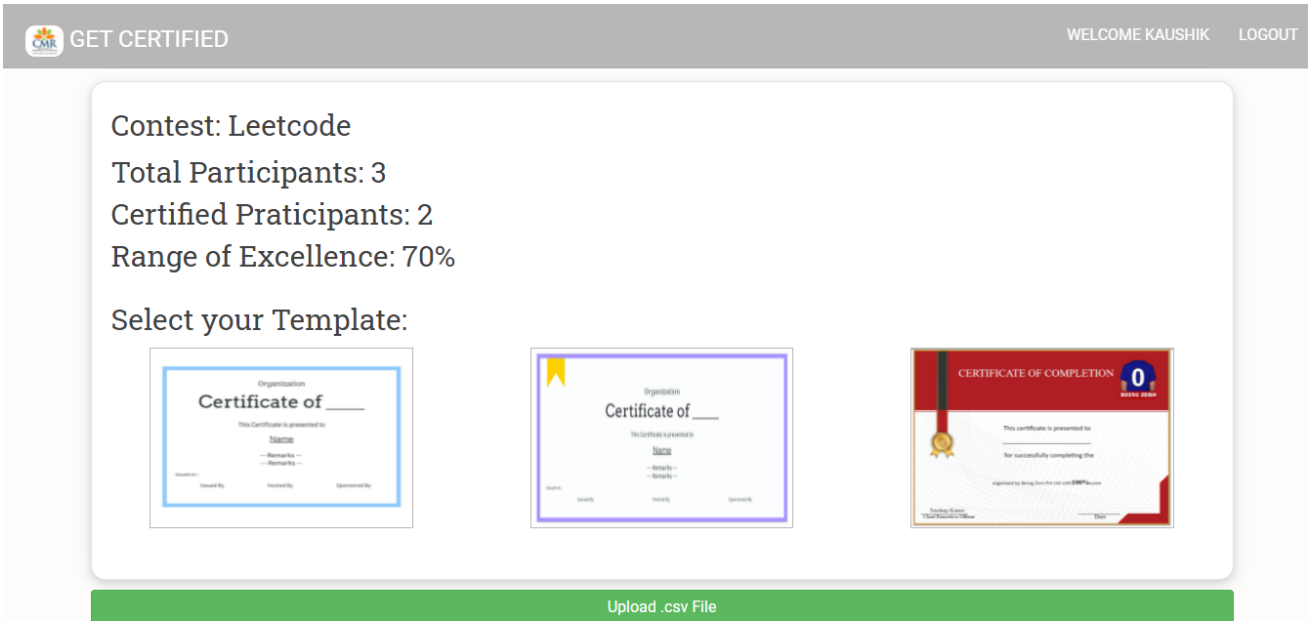

Fig. No. 4.8 Participants Data

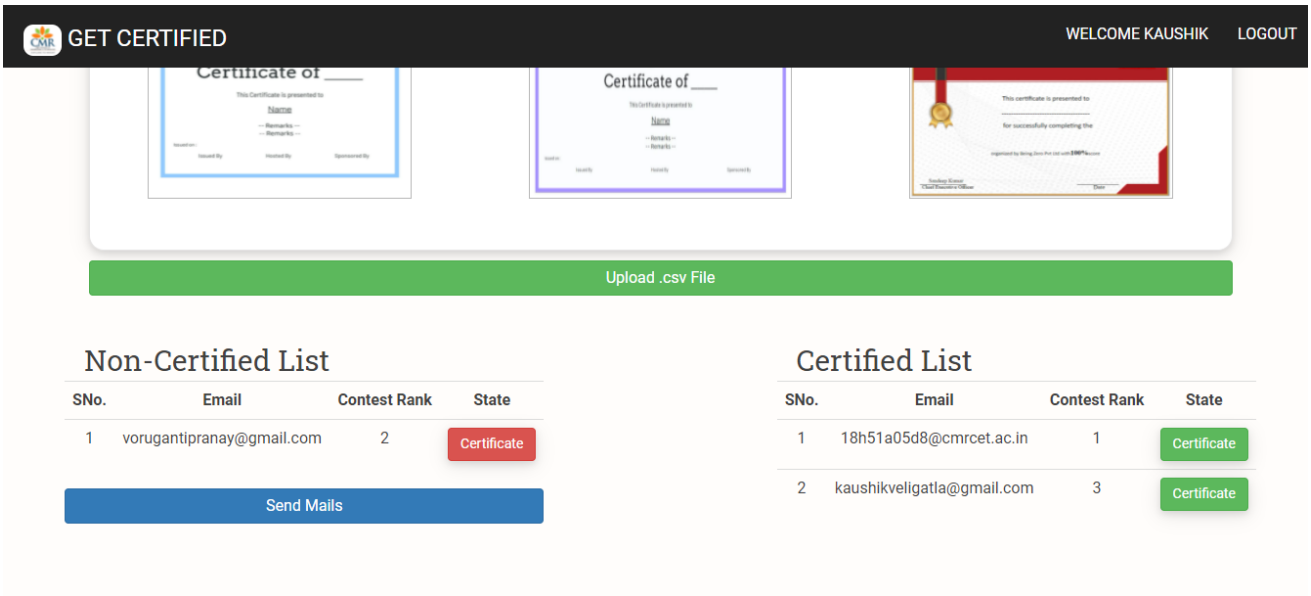

Fig. No. 4.9 Participants Data – Certified / Non-Certified List of participants

By clicking the Send mails option, the certificate link is being to the respective email ID available in the database. When the participant is clicking the link, he would be redirected to the certificate page and can view or save the certificate for themselves.

Fig. No. 4.10 Certificate of a participant

CHAPTER – 5

CONCLUSION

5.1 CONCLUSION:

The Web Application serves an online Virtual Platform for the organizers to generate certificates for the contests being hosted and also supports in distribution of their results in the form of certificate to the contestants instantly.

In the present web application, we are only providing automatic processing and generation of the certificate to the user who then sends or distributes among the contestants with less effort. But in the coming days, we could add little more features by enhancing the present model or version.

Finally, the web portal helps to bridge the gap between Contest organizers and participants using an online virtual platform. The Features included now are instant generation of certificate and distribution of them, providing statistics of the participants data using different types of modules available in the framework.

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