A Project Report on

Staff Appraisal System for Educational Institutes

Submitted in partial fulfillment of the requirements for the award
of the degree of

Bachelor of Engineering

in

Information Technology

by

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Approval Sheet

This Project Report entitled ***"Staff Appraisal System for Educational Institutes"*** Submitted by ***"Anagha Devade"(16104011),"Debashish Choudhury"(16104060),"U Naik"(15104048)***is approved for the partial fulfillment of the requirenment for the award of the degree of ***Bachelor of Engineering*** in ***Information Technology*** from ***University of Mumbai***.

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CERTIFICATE

This is to certify that the project entitled ***"Staff Appraisal System for Educational Institutes"*** submitted by ***"Ms. Anagha Devade" (16104011),"Mr. Debashish Choudhury" (16104060),"Mr. Utkarsh Naik" (15104048)*** for the partial fulfillment of the requirement for award of a degree ***Bachelor of Engineering*** in ***Information Technology***,to the University of Mumbai,is a bonafide work carried out during academic year 2019-2020 .

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Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, We have adequately cited and referenced the original sources. We also declare that We have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Abstract

Performance appraisal is a vital tool to measure the frameworks set by any organization to its employees. It is utilized to track individual contribution and performance against organizational goals and to identify individual strengths and opportunities for future improvements and assessed whether organizational goals are achieved or serves as basis for the company's future planning and development of the organization.

Appraisal system is required for various categories of organizations like Banks, IT companies, Hotels, Schools, Colleges, etc. The parameters considered for appraisal for each domain are different from those in other domains. Similarly, for educational institutes, the requirements, and parameters used for evaluation are different from the ones used in IT companies or other domains. A domain specific common appraisal system for Educational institutes is the need of the hour.

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Chapter 1

Introduction

Employee is the masses foundation and impetus for development and expansion of the organization. Rapid and sustainable development of the organization can be achieved by proper implementation of appraisal techniques. An appraisal system is an integral part of any organization having salaried employees like banks, IT companies, education institute, etc. It is utilized to track individual contribution and performance against organizational goals and to identify individual strengths and opportunities for future improvements and assessed whether organizational goals are achieved or serves as a basis for the company's future planning and development of the organization. The parameters considered for appraisal for each domain are different from those in other domains. Similarly, for educational institutes, the requirements, and parameters used for evaluation are different from the ones used in IT companies or other domains. A domain specific common appraisal system for Educational institutes is the need of the hour.

The assessment is mainly based on the progress of the pupils due to the current steps and planning and implementing new steps accordingly. At each of the three proficiency levels pupils can take a summative test to prove their proficiency. The components of the evaluation system comprise: a self-report form, a peer feedback form, and a summative skills test and summative assessment form. The evaluation system provides guidelines for building and keeping profiles and assessments of pupils, and a general assessment procedure that guides the start of the process. Evaluation is based on an inquiry approach that views inquiry as a scientific discovery process consisting of the following phases:
(1) Orientation
(2) Conceptualization
(3) Investigation
(4) Conclusion and Discussion

1.1 Objectives

The objectives of our project Appraisal System for Educational Institutes are are follows:

- To optimize the process of performance evaluation.
- To improve the overall teaching quality of the institute.
- To make the appraisal process hassle-free.
- To create a positive impact of the performance appraisal system towards the performance of the respondents in terms of commitment, skills and responsibilities.
- To make the process of appraisal economical
- To provide detailed analysis of the faculties' performance to both the faculty as well as higher authorities.

1.2 Problem Definition

Educational institutes traditionally rely on pen-paper method to manually get data, generate performance score or else use paid software.There is no common portal for staff appraisal as each institute may consider different parameters. Lack of documentation of problems becomes a problem itself. This means employers are open to wrongful termination claims if an employee has a record of good reviews but is later fired for poor performance seemingly out of nowhere. Having an official performance review process can actually hinder timely feedback the rest of the year if the process is carried out without proper planning.

Our system is flexible and versatile than the traditional pen-paper based system It identifies strengths and weaknesses of teachers on all those aspects which are important for the progress of students. This information and analysis may also be used by higher authorities of the institute to form proper teams of faculty members for different academic and administrative activities of the institute considering the domain and other skills of the faculty.

1.3 Scope

The scope of our project in terms of usage is limited to the teaching staff, senior authorities like HOD and the management of an educational institute. The appraisal system will not only evaluate employee's performance but also escalate the educational institute's growth and increase it's teaching and overall quality. Our appraisal system will also save cost of the educational institutes and the evaluation process can be changed according to criteria of different institutes. It also helps the professor's to track their growth on individual level. Our project can make a traditionally manual appraisal system online.

1.4 Technology Stack

Our project Appraisal System for Educational Institutes will be a web based application with the technology stack as follows:

1. Hardware
   Our project would be able to run on any device having browsing capabilities. Example: Laptop, PC, Tablet, etc.

2. Software

   - Frontend: Node Templates(handlebars), Materialize CSS
   - Backend: NodeJS, MongoDB.

Chapter 2

Literature Review

The papers referred to while developing the system are mentioned below.

- 720 Degree performance appraisals: An effective tool to efficiency of modern employees, J. George, IEEE International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT), 2016

  This paper tries to overcome some of of the shortcomings of 360 degree feedback by using 360 degree feedback twice. This is known as 720 degree feedback. While, 360 degree feedback is generally conducted once a year, 720 degree feedback is conducted at least twice a year, thus increasing the regularity of feedback. It works in two phases: Pre-Appraisal and Post Appraisal. In Pre-Appraisal phase, the first 360 degree feedback is conducted. In Post-Appraisal phase, the results are analyzed and the employee is made aware of his/her positives and shortcomings. A set of time bound goals are assigned accordingly. A second 360 degree feedback is conducted after a predefined time duration. The results of both the 360 degree appraisals are compared for the final appraisal score. No algorithm is mentioned here but as it uses 360 degree feedback twice, it can be compatible with any algorithm used for 360 degree feedback. Mainly classification or clustering algorithms are used for this method.

  Since completion of goals is also considered, it reduces the amount of bias due to prejudice or other personal reasons. This method is also more favorable from an employee point-of-view as it gives them a second chance to improve and perform better. It is ensured by regularity in feedback. This in turn creates a happy and productive work environment. The immediate seniors or supervisors are in a much better position to suggest improvements or take action by comparing the Pre-Appraisal and Post-Appraisal feedback. But it is a time consuming process compared to the 360 degree feedback which occurs once a year. It is also a more expensive process. In practice, it focuses more on the negatives rather than the positives. It requires commitment from top management and HR in terms of time, financial resources, etc. A main reason for the failure of this method is that feedback is given, but then swiftly forgotten. If no plan to implement the feedback is made; there is no change in behavior, and the feedback is redundant. Managers should therefore be included and actively involved in the process. Like 360 degree feedback, 720 degree feedback is not suitable for small datasets like those of small companies startups and educational institutes. Hence, this is useful only for large or established organizations.

- Educational data mining that supports quality teaching: How to create a culture of

data in educational policies, IEEE Global Engineering Education Conference (EDUCON), 2016.

This system uses Data Mining to implement a rating system for Performance Appraisal. There are three types of appraisal forms: Students, Peer and Seniors review. Students are important stakeholders for any educational institutes. The success of the institute and future admissions is dependent on the current students' results and reviews So, taking feedback from students is an important part of appraisal system inn an educational institute. Peer review is important mainly for behavioral analysis of the faculty. Seniors review form may be filled by an experienced faculty or the Head of Department. Multiple data mining algorithms including K star, Random Tree, KNN are used. The most accurate result is considered.

Actual classroom performance of the teacher matters in this appraisal system. The parameters used for student feedback mostly deal with the teaching quality, punctuality, behavior and other aspects related to classroom lectures. An unbiased feedback from students will help the teacher rectify mistakes and explore development opportunities which in turn may have a positive impact on the results as well as overall development of the students. Peer review will deal with the teacher's behavior outside the classroom while Seniors review may be more inclined towards completion of goals. All these factors may result in a well balanced score of the faculty considering all aspects like teaching, behavior, completion of syllabus, results, etc. But as in the earlier case, student feedback may be based on favoritism or grudges against the faculties. Also, a negative peer review might result in a negative work environment.

- HiSPEED: A System for Mining Performance Appraisal Data and Text, Girish Keshav Palshikar, Manoj Apte, Sachin Pawar, Nitin Ramrakhiyani., IEEE, International Conference on Data Science and Advanced Analytics, 2017.

  This system uses Data Mining to implement a rating system for Performance Appraisal. There are two types of appraisal forms: Self-appraisal and Supervisor-appraisal form. In Selfappraisal, the employee has to rate himself/herself on a scale of 1 to 5, with 5 being the highest, on various parameters pre-defined by the organization. For Supervisor appraisal, only the immediate seniors or supervisors are considered. Immediate supervisors are in a much better position to give an accurate rating on the employee. But along with the above parameters, another parameter called Supervisor reliability is considered. Like a junior employee, even a supervisor may be rated by his/her seniors. A higher supervisor rating may indicate more reliability while a low rating may indicate less reliability. These three parameters are used to generate the final score using classification algorithms like Naive Bayes classifier.

  The major advantage of this system is the supervisor reliability feature. A top level employee may not have much knowledge about a junior employee to give accurate feedback. An immediate supervisor may have more knowledge about the employee This is an attempt to reduce bias as the supervisor with low rating won't be considered reliable so the supervisor rating won't be given more weightage in such cases. On the other hand, a supervisor with higher rating would be considered more reliable so the supervisor's rating would be given more weightage in this case. Its accuracy will be more if the input dataset is large. So, it can be useful for large organizations. But on the contrary, small organizations, startups and educational institutes won't have a

large dataset which may have a negative impact on the accuracy and reliability of the system. Also, even if a supervisor has good ratings, natural bias on his/her part may come into picture.

- Employee Performance Assessment in Virtual Organization using Domain-Driven Data Mining and Sentiment Analysis,Tejshree D. Chungade and Prof. Shweta Kharat, IEEE, International Conference on Innovations in information Embedded and Communication Systems (ICIIECS), 2017.

  This paper describes the implementation of an Employee Appraisal system in a Virtual Organization. Virtual Organizations are those organizations having a team of freelancers or employees geographically apart. It becomes difficult to evaluate by traditional performance evaluation methods in such cases. A combination of 360 degrees feedback and Online Tests is used for performance evaluation in this case. A 360 degree feedback is a feedback collected from all people with whom the employee interacts with during working hours (including one-time clients). Here, online test may include Logical Reasoning, Technical, Aptitude, etc. K Means clustering, a data mining algorithm has been used to generate the score based on the above parameters. The appraisals are calculated based on that score.

  This method evaluates skills as well as behavior of the employees. It is useful for increasing self awareness among employees. It helps to identify development opportunities among them. But a major disadvantage is that it might create a negative work culture in case of negative reviews by peers. Although the feedback is anonymous, the low collective score might result in escalation of misunderstandings among employees and may have adverse effects on the work culture as well as quality of work. There is a possibility of bias in 360 degree feedback as the feedback may be based on personal relations rather than professional. Also, it may happen that experienced employees or employees with a high post won't be in a favor for an online test as an appraisal. Too often the priority for managers using a 360 program is to uncover their teams' weaknesses. While, this is intended to be a consequence of use, there should be more of an emphasis on praise and positive feedback. If 360 feedbacks are used only to highlight negative aspects of a team member's work, it is likely that they will foster a negative attitude towards the feedback culture, and then ultimately disengage from it. Also, data mining algorithms work more efficiently on large datasets. Hence, it is suitable for large organizations rather than startups and educational institutes.

- A Scrutiny of Teachers' Pursuance Using Classification Techniques, V. Shanmugarajeshwari, R Lawrence, IEEE International Conference on Intelligent Techniques in Control, Optimization and Signal Processing, 2017.

  This system is based on appraisal system for an Educational institute. It uses a combination of self-appraisal and students feedback. In Self-appraisal, the employee has to rate himself/herself on a scale of 1 to 5, with 5 being the highest, on various parameters pre-defined by the organization. Students are important stakeholders for any educational institutes. The success of the institute is dependent on the current students results. Also, the future admissions depends on the students' reviews. So, taking feedback from students is an important part of appraisal system inn an educational institute. Classification algorithms such as Naive Bayes, Decision Tree Classifier are

used on the above parameters. Naive Bayes helps to find the range of answers while Decision Tree is useful when we require to make decisions like affirmation or negation.

Since it includes students in the process, it affirms the students' (and therefore parents') faith in the institute as they are important elements of the educational system. Since students are the ones who attend lectures of the faculties, no one else, other than students, is in a better position to give an accurate feedback. An unbiased feedback will help the teacher rectify mistakes and explore development opportunities which in turn may have a positive impact on the results as well as overall development of the students. Also, it might help the institute in identifying and rewarding the faculties who are good at their job. The system works well for medium sized datasets too. A major disadvantage is that students feedback can also be based on favoritism or grudges on the faculties. This might lead to incorrect scores which in turn may reduce the importance of the system in the eyes of both faculties as well as students. Also, even in the case of unbiased feedback, if higher authorities are not taking action based on students feedback, it may reduce the faith of the students in the system and the institute.

- Anagha Vaidya, Rajashree Jain and Prafulla Bafna, "Influence of Staff Student Interaction on Student Engagement", IEEE International Conference on Power Control Signals and Instrumentation Engineering (ICPCSI-2017).

  In this research, the authors explain the importance of student-teacher interaction and student engagement and its impact on the overall performance and development of the students. Teachers are encouraged to design a plan for teaching, observe the outcomes and make changes accordingly. They also promote continuous evaluation rather than semester-end evaluation and focus on solving real world problems. A sample of 86 students was taken for comparison between traditional teaching and evaluation method and continuous evaluation method using project based learning. It was found that results were favourable for continuous evaluation method using project based learning.

- I-Ling Yen, Farokh Bastani, Yongtao Huang, Yuqun Zhang and Xin Yao, "SaaS for Automated Job Performance Appraisals using Service Technologies and Big Data Analytics", 2017 IEEE 24th International Conference on Web Services.

  In this paper, the author describes the implementation of an SaaS (Software-as-a-Service) based Job Performance Appraisal system. The system primarily focuses on automation of the appraisal process from collection of data to final decision making which is a time consuming task when done manually. Collection of data is done through mining of online records or other forms of data involving the work done by the employee. Various parameters like task completion, revenue generation, quality of work are considered while creating performance evaluation models. Big data analysis is used for performance metrics of related jobs for automation of decision making process.

- Amani A. Abed and Alaa M. El-Halees, "Detecting Subjectivity in Staff Perfomance Appraisals by Using Text Mining", 2017 Palestinian International Conference on Information and Communication Technology.

  Here, the authors attempt to study and detect the subjectivity faced by teachers in appraisal system due to managers' or higher authorities' bias, prejudice, mood swings or other reasons irrelevant to the actual job. This subjectivity might lead to biased or

improper decision making in turn affecting the institute, students as well as individual teachers. Text mining was conducted on dataset of answers to classify clues of subjectivity into categories like irrelevant to domain, duplicate answers and insignificant related to the questions. This process is useful in portraying unbiased analysis to the higher authorities to enable them take key appraisal based decisions. Selecting the right text mining algorithm is essential for the success of the mentioned system.

- Pratik Borse, Aishwarya Chinchpure, Rajat Singh, Deepak and Swati Shinde, "Comprehensive Faculty Appraisal and Development System Using Data Analytics and Data Visualization", 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA).

  In this paper, the authors describe the design and development of a web based appraisal system for performance evaluation of faculties using Data Analytics. They also focus on Data Visualization to make data more presentable for ease in appraisal based decision making. Microsoft Azure has been used as a Cloud platform to make data processing and storage safe and hassle-free. Traditional appraisal methods like Rating system, Grading system are studied and compared with modern appraisal methods like Management by Objectives, 360 degree feedback. Microsoft Stack is used for web development. A web based appraisal system will be useful for accessibility from any device having browsing capabilities compared to platform specific software.

Chapter 3

Proposed System

Our proposed system will be a web based staff appraisal system which will eliminate the need of physical forms for appraisal and make the entire process hassle-free.

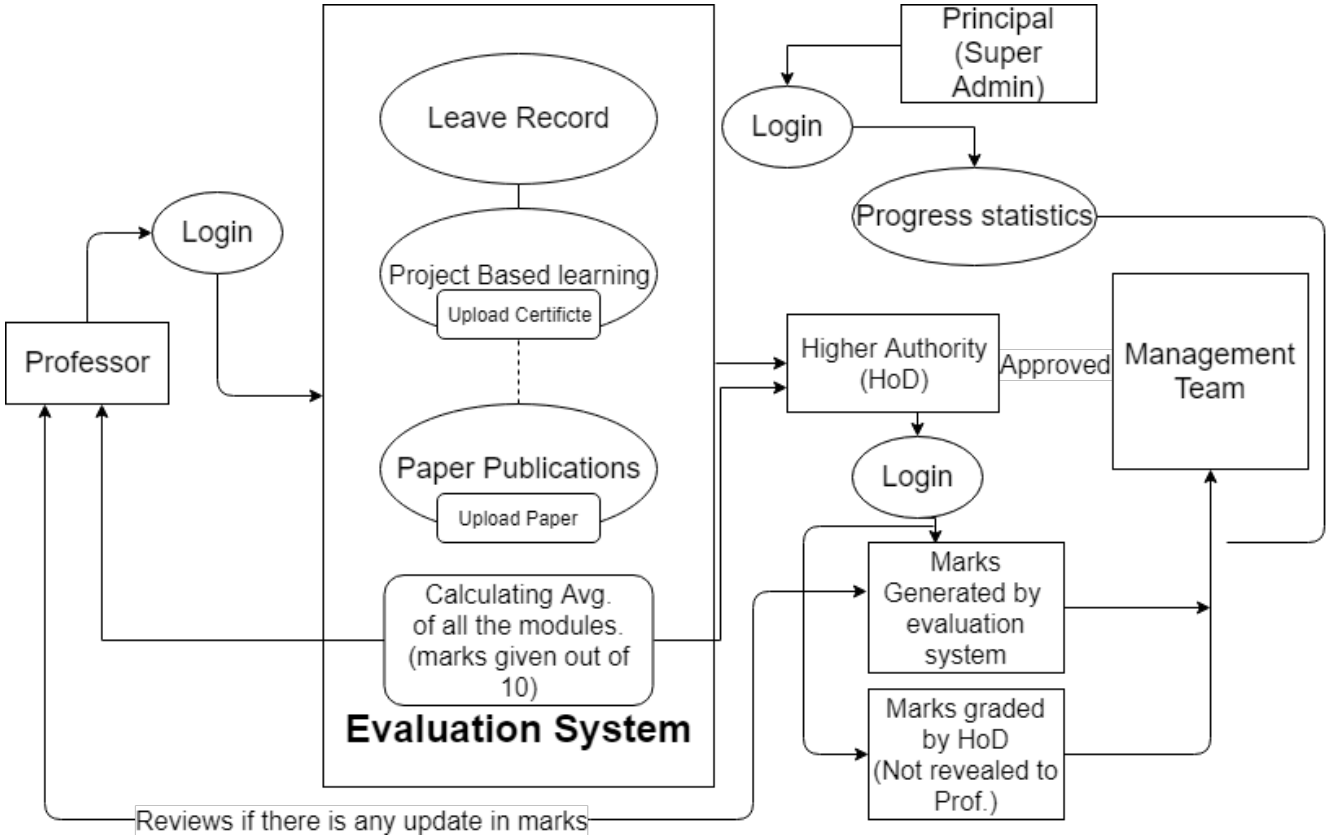


Fig 3.1: Proposed system

After login, faculties can access and fill relevant form online and also have an option to upload certificates if required. On the basics of the form filled each staff will be graded marks, both by self-appraisal and by HOD. The marks will be provided on the basis of the data filled and other parameters like total leaves taken, extra curricular activities, number of paper published etc. After submitting the form it will be proceeded to higher authority and thereafter the management for final appraisal.

Chapter 4

Project Design

For designing Appraisal system for engineering colleges, several common factors have to be considered. Along with common factors, the hierarchy of the institute has to be studied. The hierarchy is generally common depending on the type of institute.

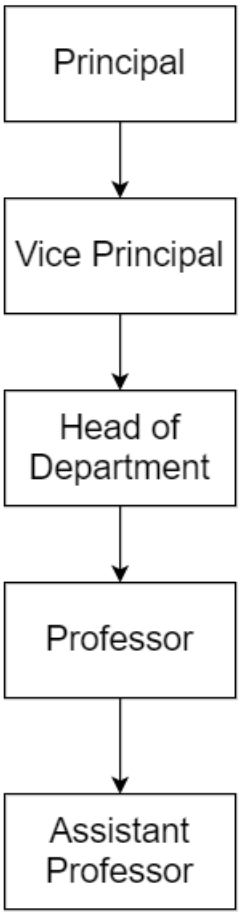


Fig 4.1: Hierarchy diagram

For example, the hierarchy of an engineering college as shown in Fig 4.1 generally con-

sists of Principal, Vice Principal, Head of Department, Professor and Assistant Professor. The privileges can be set according to the role and position in the hierarchy.Similarly, in our project, we have three types of users, Faculty, Head of Department(HOD) and Principal/Management. The Faculty user which includes both professors as well as assistant professors will have the least privileges.Their task is to fill details in the relevant appraisal forms and enter self-appraisal scores. HOD will have more privileges than faculty since they have to review the scores and forward it to the principal/management. Management will have the highest privileges.

4.1 Basic Diagrams

4.1.1 System Architecture

In Appraisal System for educational institutes, the main goal is to eliminate the physical forms and other hassles and make the system completely online. The roles and tasks are well defined for different types of users in the system based on their actual role in the institute

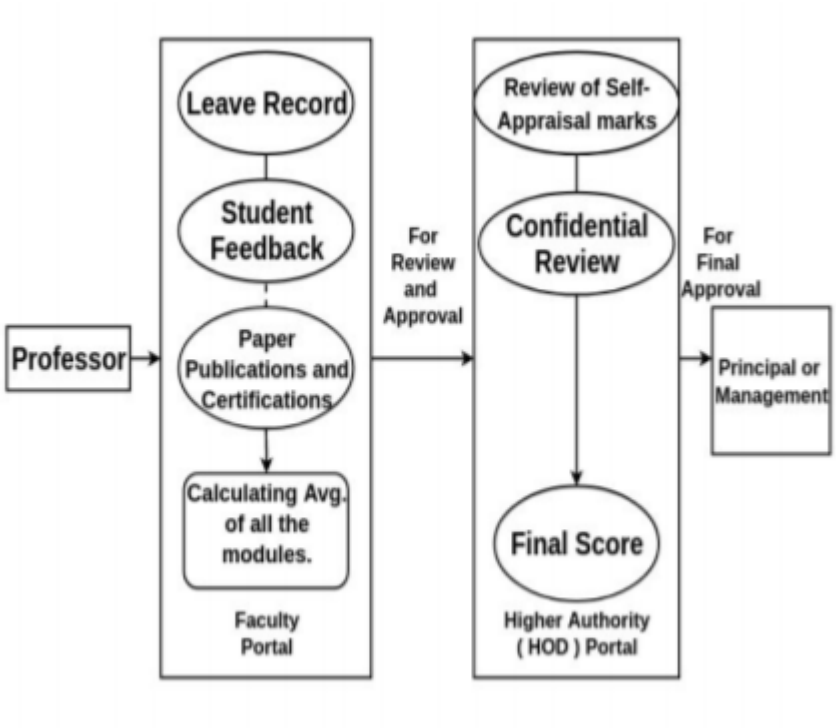


Fig 4.1.1:System Architecture

The system architecture consists of the 3 main constituents of the system, the faculty, the HOD and the Management. Here in Figure 4.1.1, we can see the constituents and roles performed by Faculty, HOD and Management.

4.1.2 Use Case Diagram

Use case diagram shows the relationship between a user of a system and its use cases.

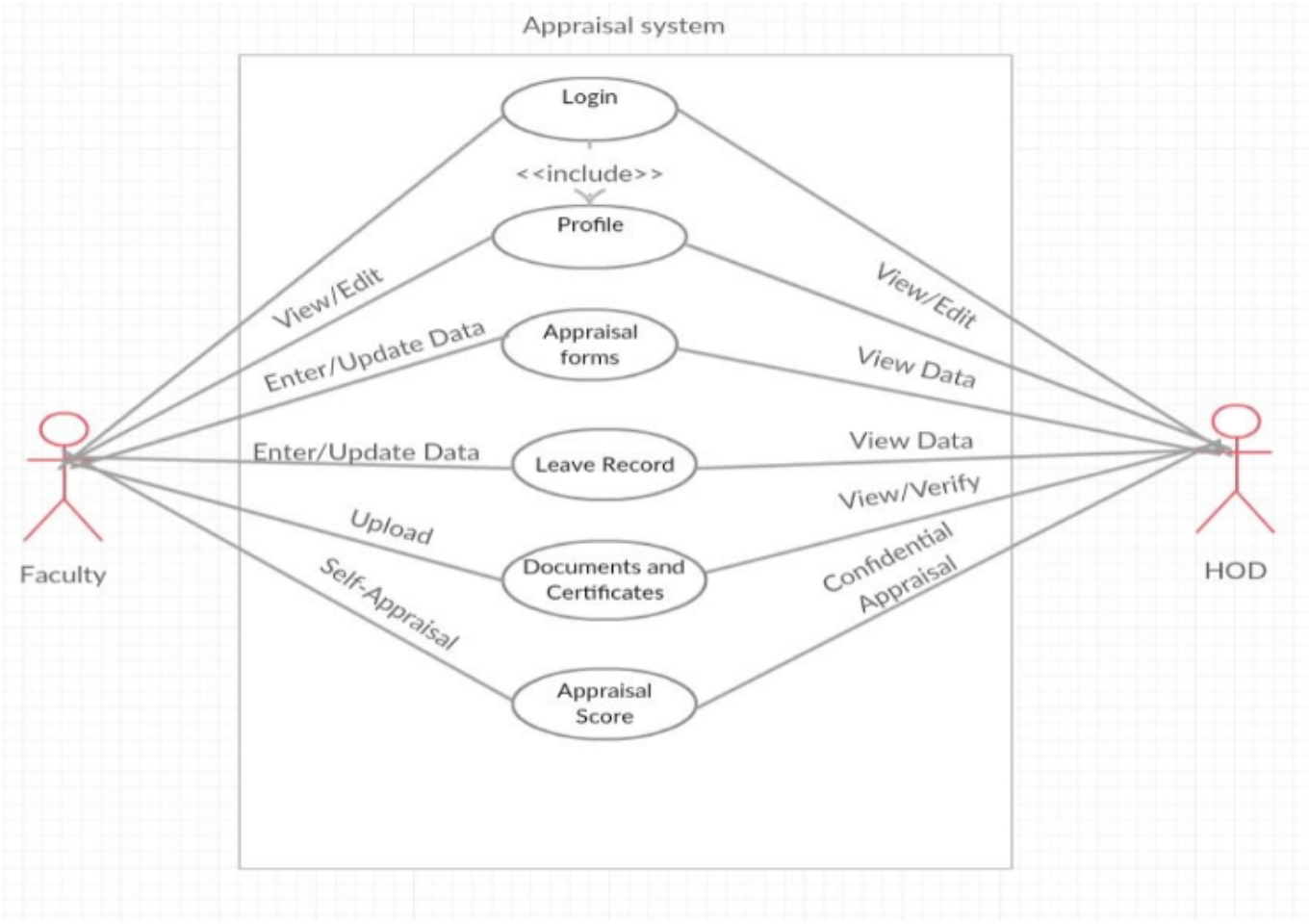


Fig 4.1.2: Use Case Diagram

Here, the Use case diagram of Staff Appraisal system is showing the various roles performed by Faculties and HOD. These include filling self appraisal forms, enter Leave data, uploading Documents, Editing Profile, etc. by the faculties and verification, modification and approval of the same data by HOD. The HOD has an additional task in filling confidential form which also gets forwarded to management

4.1.3 Class Diagram

The class diagram is the main building block of object-oriented modeling. It is used for general conceptual modeling of the structure of the application, and for detailed modeling translating the models into programming code.

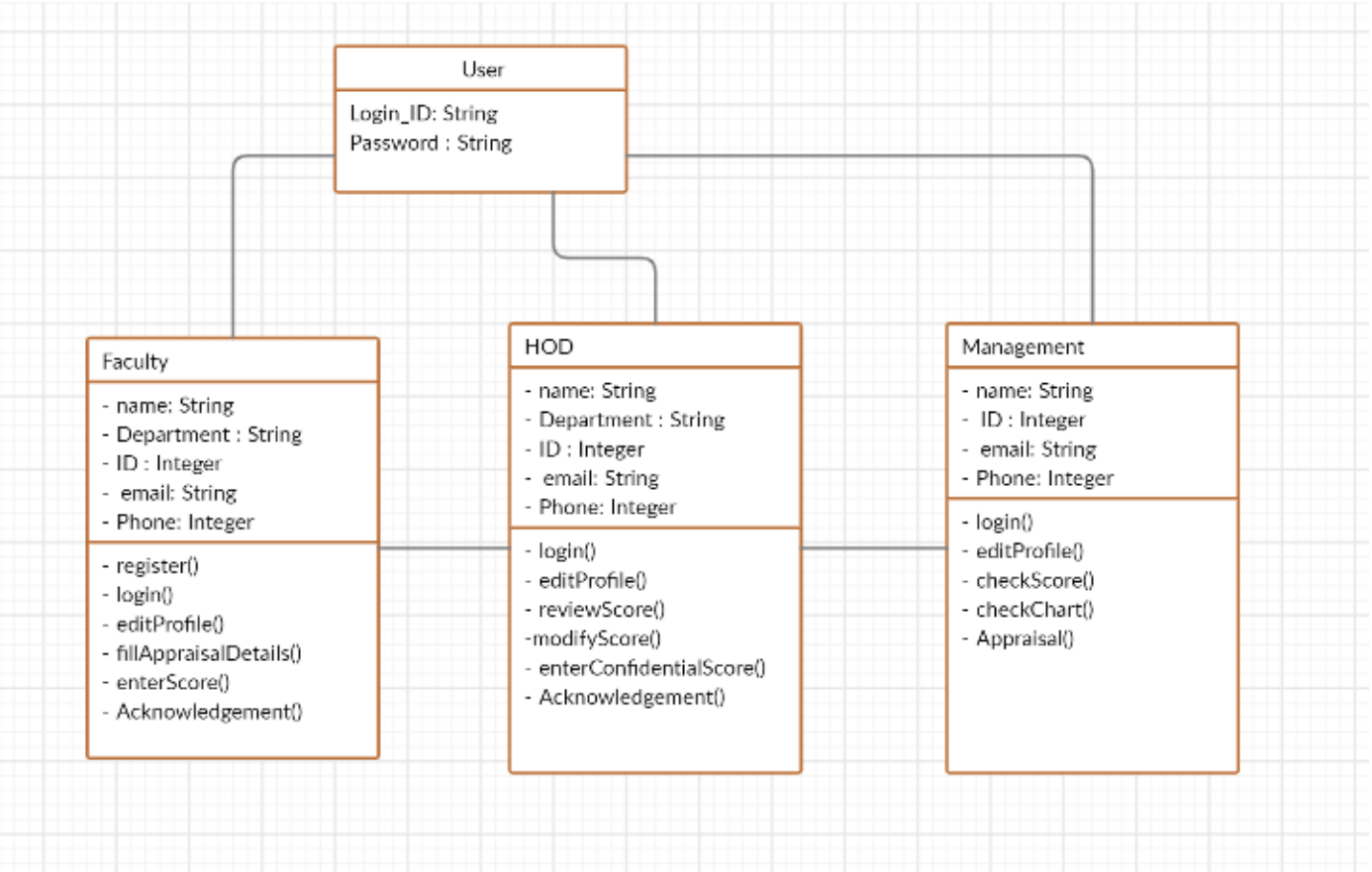


Fig 4.1.3: Class Diagram

Here the class diagram of our projects the various parameters and functions performed by each class of users.

4.1.4 Sequence Diagram

A sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.

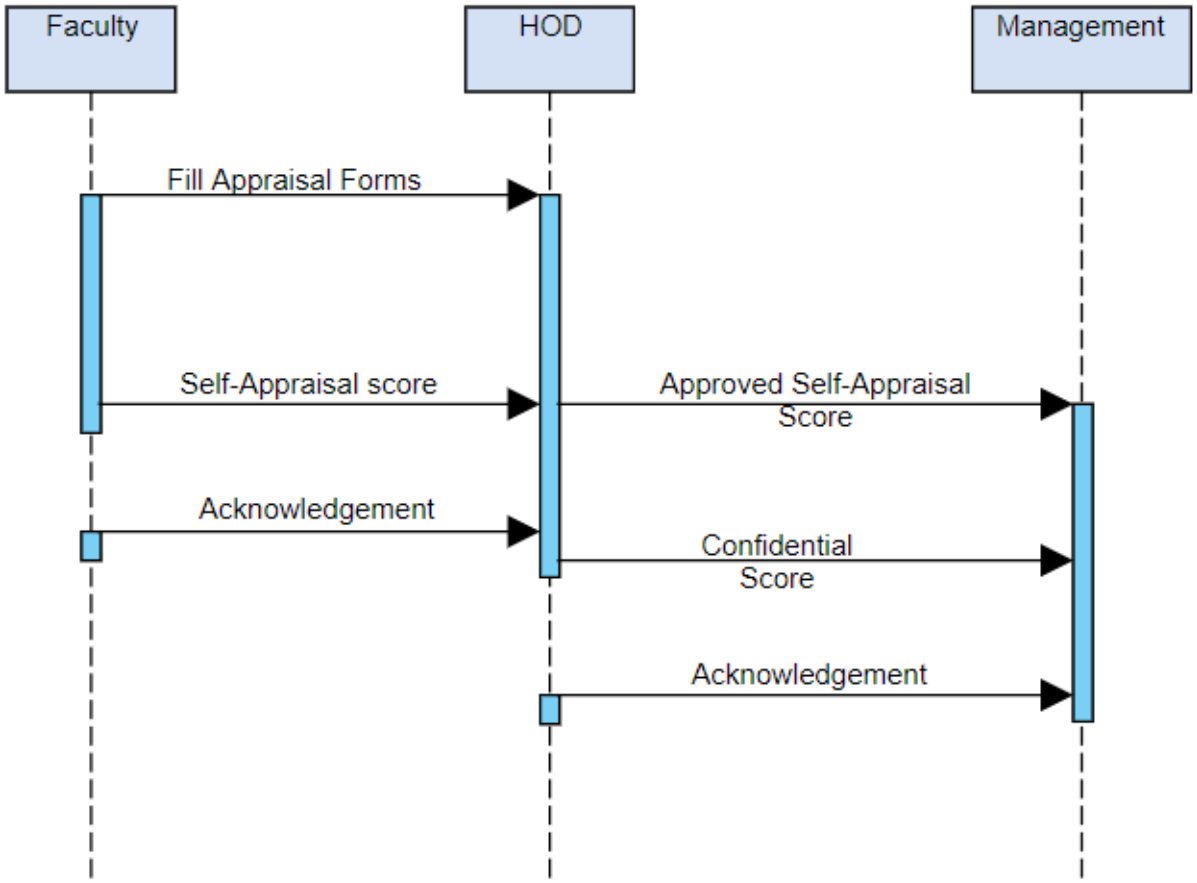


Fig 4.1.4: Sequence Diagram

Here the sequence and interactions between various objects is depicted. The Faculty interacts with the HOD in the form of self appraisal score submission along with the filled forms justifying the same.The HOD interacts with the Management through confirmation of faculty self appraisal scores and submission of Confidential scores.

4.1.5 Activity Diagram

An Activity diagram shows the behavior of a system. It shows the various decisions taken during the flow of project from starting point to ending point.

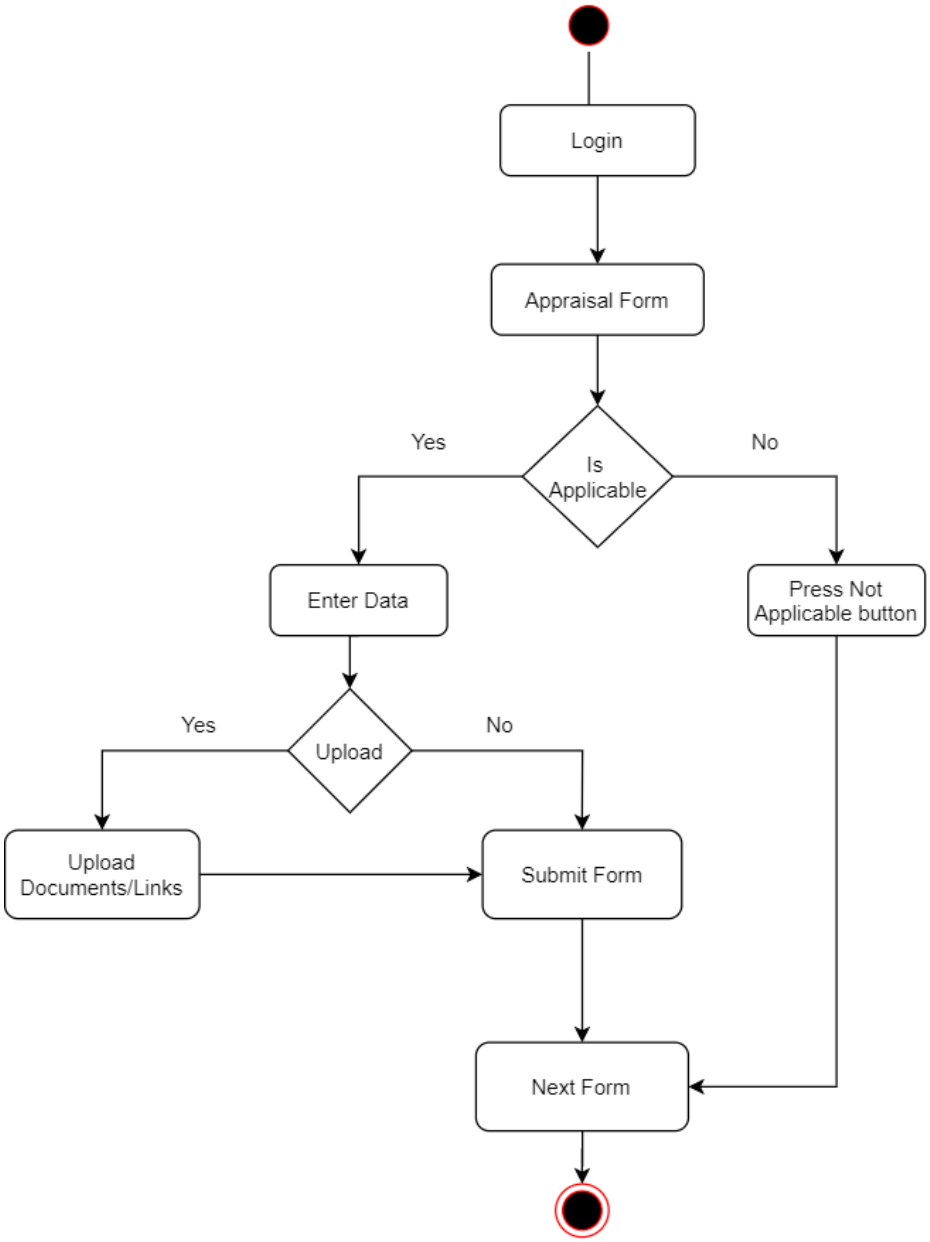


Fig 4.1.5:Activity Diagram

After login, faculties can access and fill relevant form online and also have an option to upload certificates if required. For staff appraisal system, not all self-appraisal forms are applicable for all faculties. Decisions like which form to fill, which files to upload and self-appraisal score have to be taken by individual faculties.

Chapter 5

Project Implementation

5.1 Code Snippets

Our project is a web based application built using Nodejs for Online Appraisal of staff in an educational institute.

```
passport.use('faculty', new LocalStrategy({ usernameField: 'email' }, function (email, password, done) {
    var query = { email: email };
    Faculty.findOne(query, function (err, faculty) {
        if (err) throw err;
        if (!faculty) {
            return done(null, false, { message: 'User Not found' });
        }
        bcrypt.compare(password, faculty.password, function (err, isMatch) {
            if (err) throw err;
            if (isMatch)
                return done(null, faculty);
            else
                return done(null, false, { message: 'Password do not match' });
        })
    });
}));


passport.use('hod', new LocalStrategy({ usernameField: 'email' }, function (email, password, done) {
    var query = { email: email };
    Hod.findOne(query, function (err, hod) {
        if (err) throw err;
        if (!hod) {
            console.log("no hod")
            return done(null, false, { message: 'User not found' });
        }
        bcrypt.compare(password, hod.password, function (err, isMatch) {
            if (err) throw err;
            if (isMatch)
                return done(null, hod);
            else
                return done(null, false, { message: 'Password do not match' });
        })
    });
}))
```

Fig 5.1.1:Login Authentication

This is code for login authentication. We used Passport.js, a javascript library specifically built for authentication purposes in Nodejs.

After filling the applicable forms, there are still some ambiguities in the faculties mind. There may be issues like incorrect data, outdated data, lack of summary, etc. Before entering self appraisal score, solving these issues is necessary. To solve this, a Faculty Overview page has been designed to handle these problems.

```
// Faculty Overview form
router.get('/faculty/facultyOverview', ensureAuthenticated, (req, res) => {
    let finalResult;
    AcademicYear.find({ user: req.user.id })
        .then(result => {
            if (!result) {
                req.flash('error_msg', 'Select the academic year before proceeding');
                res.redirect('/');
            }
            // academic_year_id = result[0].user;
            year = result[0].academic_year;
            FacultyMarks.find({ $and: [{ user: req.user.id }, { academic_year: year }] })
                .then(result => {

                    finalResult = result;
                    var loads = [modules.TeachingLoad.findOne({ $and: [{ user: req.user.id }, { academic_year: year }] }).exec()
                    ];
                    Promise.all(loads)
                        .then(result => {
                            return Promise.all(result);
                        })
                        .then(([teachingLoad, teachingAssistant, newBooks, addedExp, innovation, ···
                        })
                })
                .catch(err => {
                    if (err) throw err;
                })
        })
});
```

Fig 5.1.2:Faculty's Overview Page

This is the code for faculty overview page where the faculty gets to have a overview of all the forms they have filled.Here they the overview of forms from all the annexures.Here they have two options of edit and view,The faculties can either edit the form if there are any changes or else just view the entire form.Also the have the final submit option wherein a final submit is done and after this no changes can be done.

There are two types of scores in a faculty appraisal system. Confidential and Self Appraisal. Confidential form in any organization is filled by a senior employee. In case of engineering colleges or other educational institute, it is generally filled by the HOD. This score is not to replace self appraisal but in addition to it.

```
// hod overview form
router.get('/hod/hodOverview/:id/:year', ensureAuthenticated, (req, res) => {
    let finalResult;
    FacultyMarks.find({ $and: [{ user: req.params.id }, { academic_year: req.params.year }] })
        .then(marks => {
            finalResult = marks;
            facultID = marks[0].user;
            year = req.params.year;
            //console.log(facultID);
            //console.log(finalResult);
            var loads = [modules.TeachingLoad.findOne({ $and: [{ user: facultID }, { academic_year: req.params.year }] }).exec(),···
            ];
            Promise.all(loads)
                .then(result => {
                    return Promise.all(result);
                })
                .then(([teachingLoad, teachingAssistant, newBooks, addedExp, innovation,···
                })
        })
        .catch(err => {
            req.flash('error_msg', 'No submissions yet.');
            res.redirect('/users/hod/home');
        })
});
```

Fig 5.1.3:HOD's Overview

This is a part of HOD's form wherein the HOD will evaluate a particular faculty based on self appraisal score and some parameters of confidential form. This code checks whether a faculty has submitted his/her self appraisal score and forms for review by the HOD.

The final appraisal based decisions lie with the management. It is therefore important that the management gets a clear view of the appraisal data.

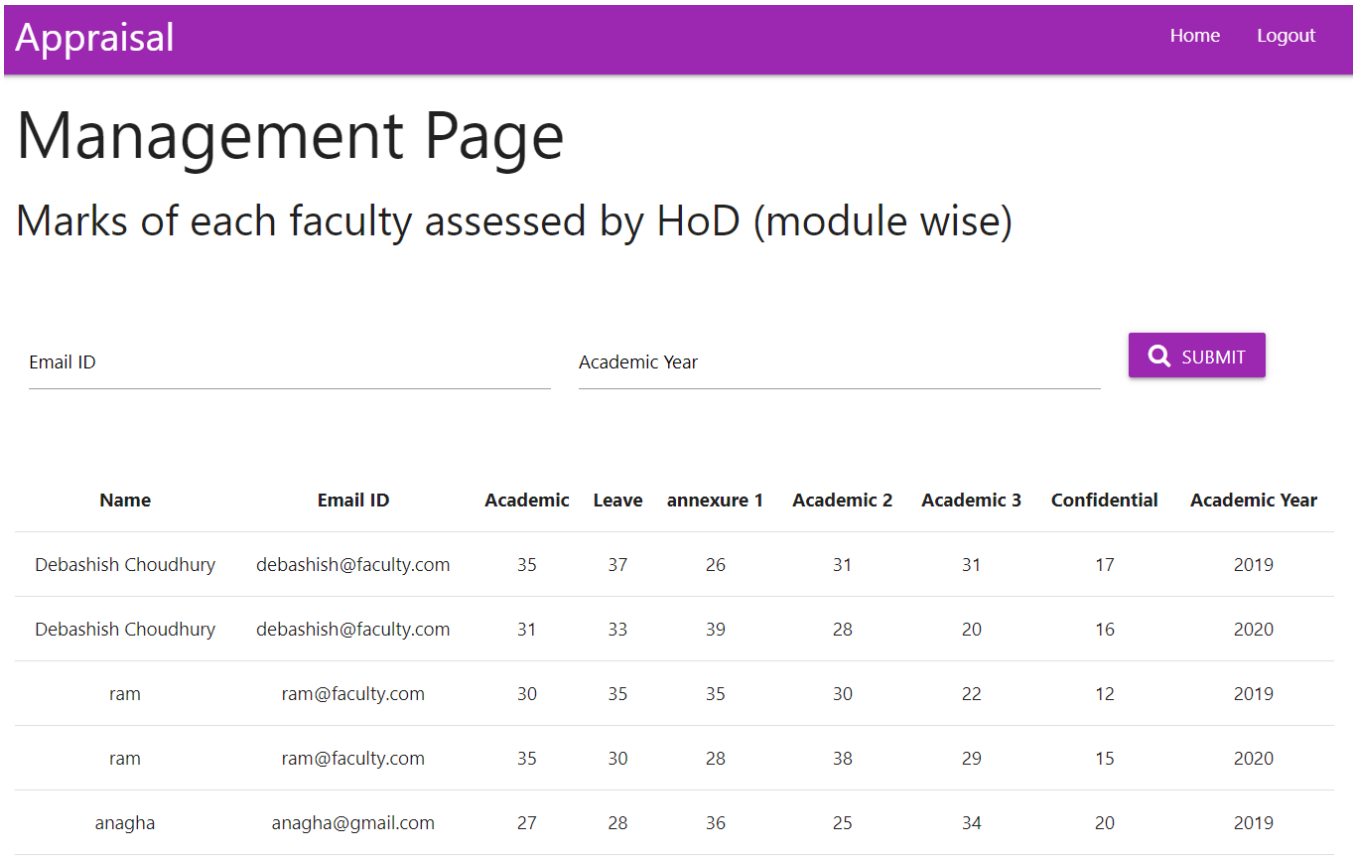
```
<script>
    var facultyYear = '{{#each year}}{{this}}{{/each}}';
    var year = facultyYear.split(',');
    var marks = '{{#each finalMarks}}{{this}}{{/each}}';
    var facultyMarks = marks.split(',');
    var ctx = document.getElementById('myChart').getContext('2d');
    var myChart = new Chart(ctx, {
        type: 'bar',
        data: {
            labels: year,
            datasets: [{
                label: 'Total no. of marks',
                data: facultyMarks,
                backgroundColor: [
                    'rgba(255, 99, 132, 0.2)',
                    'rgba(54, 162, 235, 0.2)',
                    'rgba(255, 206, 86, 0.2)',
                    'rgba(75, 192, 192, 0.2)',
                    'rgba(153, 102, 255, 0.2)',
                    'rgba(255, 159, 64, 0.2)'
                ],
                borderColor: [
                    'rgba(255, 99, 132, 1)',
                    'rgba(54, 162, 235, 1)',
                    'rgba(255, 206, 86, 1)',
                    'rgba(75, 192, 192, 1)',
                    'rgba(153, 102, 255, 1)',
                    'rgba(255, 159, 64, 1)'
                ],
                borderWidth: 1
            }]
        },
        options: {
            scales: {
                yAxes: [{
                    ticks: {
                        beginAtZero: true
                    }
                }]
            }
        }
    });
</script>
```

Fig 5.1.4:Display Results in form of chart

This code is for graphical or chart view of the scores initially obtained in tabular form. This view helps the management in analysing the data and decision making.

5.2 Result

The formal appraisal decision making power of each staff lies with the management. The HOD forwards the updated self appraisal score as well as confidential score to the Principal/Management. The result is the final appraisal score which helps the management makes key appraisal decisions.



Name	Email ID	Academic	Leave	annexure 1	Academic 2	Academic 3	Confidential	Academic Year
Debashish Choudhury	debashish@faculty.com	35	37	26	31	31	17	2019
Debashish Choudhury	debashish@faculty.com	31	33	39	28	20	16	2020
ram	ram@faculty.com	30	35	35	30	22	12	2019
ram	ram@faculty.com	35	30	28	38	29	15	2020
anagha	anagha@gmail.com	27	28	36	25	34	20	2019

Fig 5.2.1:Principal/Management View

Fig 5.2.1 shows our project's management login where the faculties whose score have been assessed and approved by the HOD along with confidential score are displayed. The faculties can be searched according to nae, email and academic year. This data enables the management to take appraisal related decisions.

Chapter 6

Testing

In this section we have introduced some testing snippets of the module.Basically we performed unit testing and integration testing which goes according to our working modules.

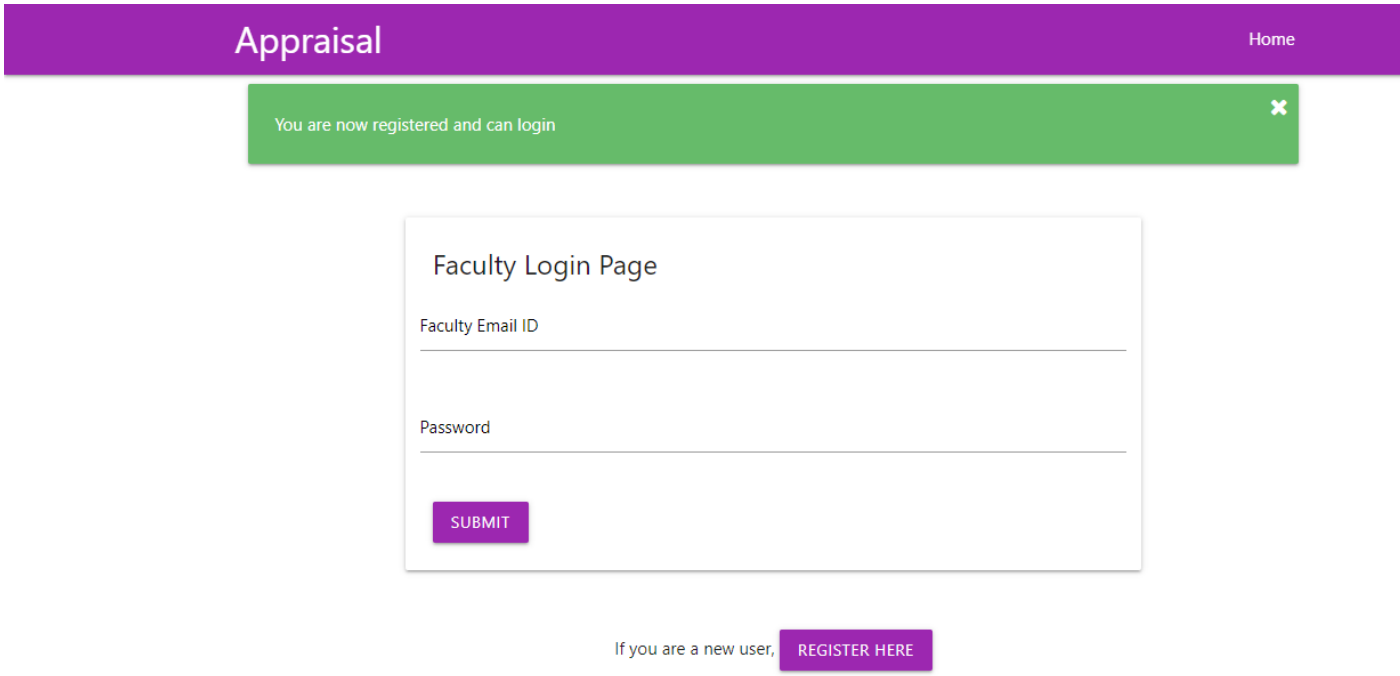


Fig 6.1:Unit Testing

In Fig 6.1 we performed unit testing. In Fig 6.1 a unit of the appraisal system i.e Registration for Faculties is done wherein the faculties enter all the details and it is tested whether all the parameters are fulfilled and the login is successfull.

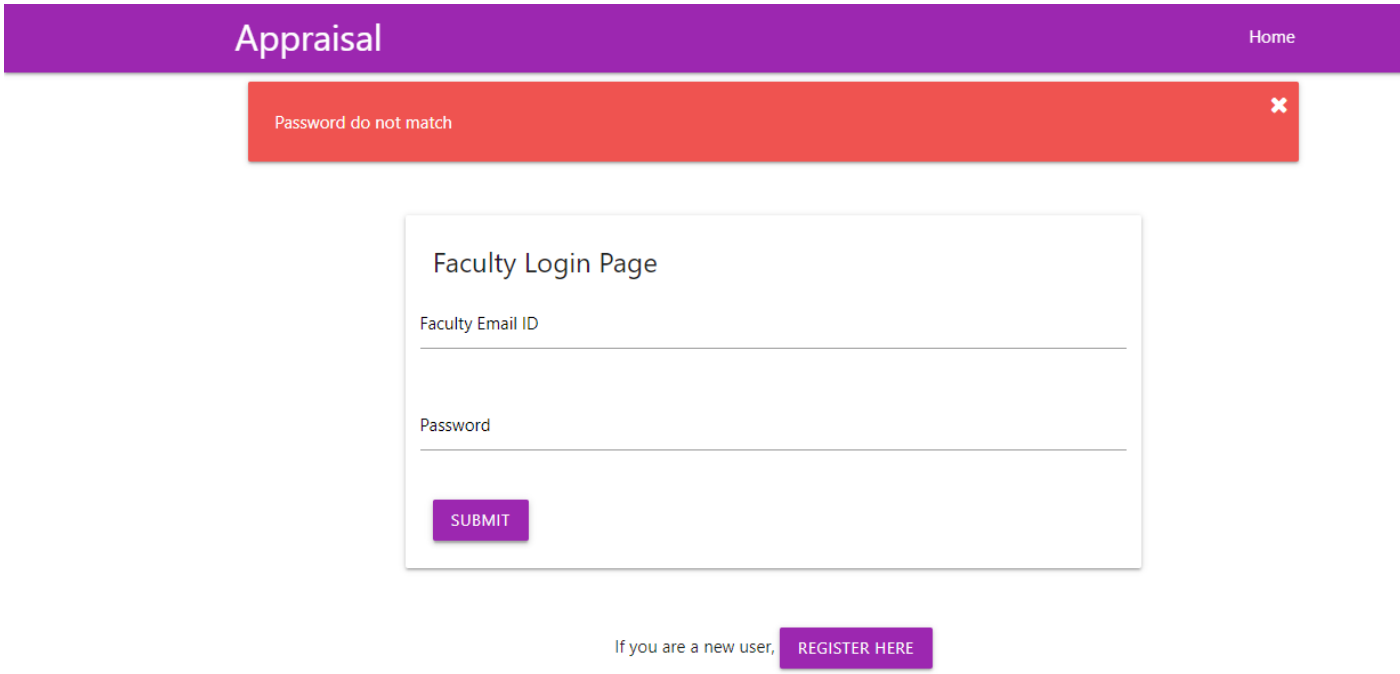


Fig 6.2:Unit Testing

In Fig 6.2 we again performed unit testing. In Fig 6.2 a unit of the appraisal system i.e Sign In for Faculties is checked by entering the wrong details which prompts the alert message and thus this verifies that validation is checked accordingly.

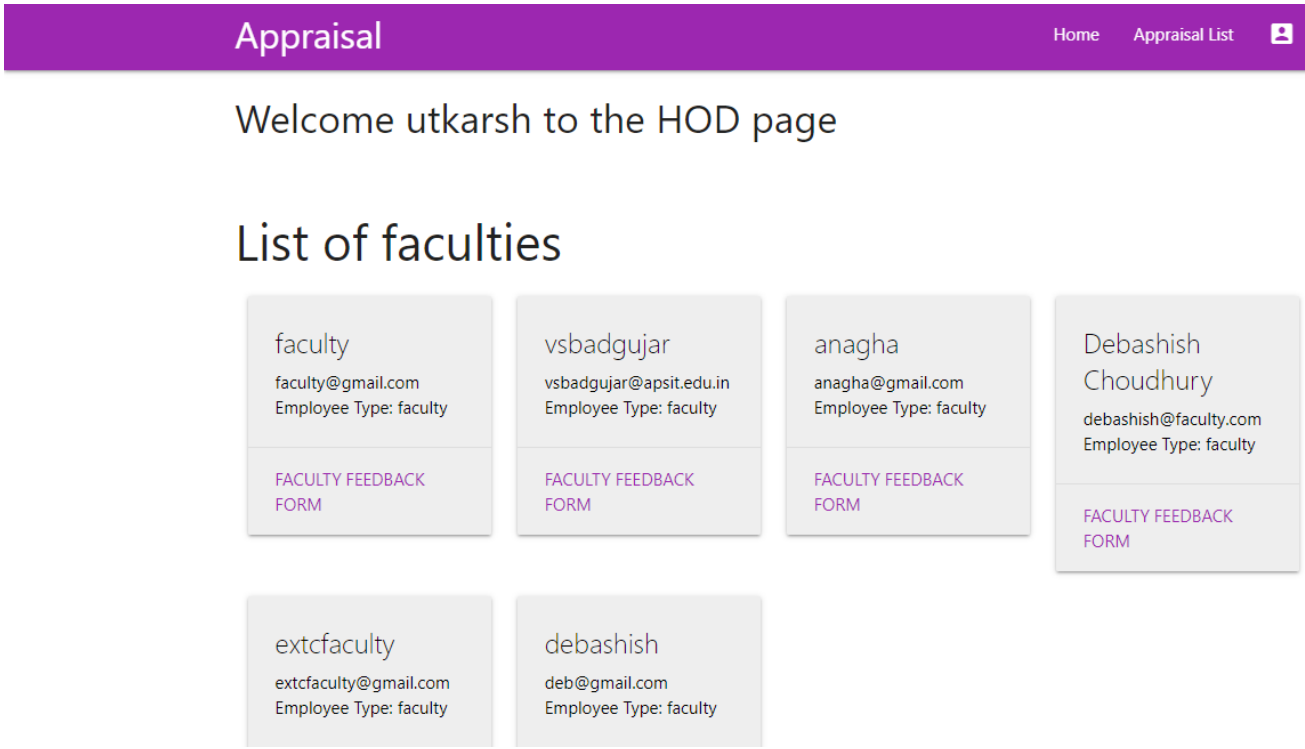


Fig 6.3:Integration Testing

In Fig 6.3 we performed Integration Testing. In Fig 6.3 a entire sub-part of the appraisal system is tested based on the previous unit testing.Just as we did testing for faculties the same part was done for the HOD part.After successfully testing the unit we performed this integration Testing.Here in Integration Testing we can see HOD page displaying a list of all successfully registered faculties.

Chapter 7

Conclusion And Future Scope

7.1 Conclusion

Our proposed system will be a progressive web-app which will make the Staff appraisal process fully online and hassle free. Along with elimination of physical forms, it will also ease the verification process (by HOD or higher authorities). Also, educational institutes will not have to invest a hefty amount for developing a customized appraisal system as our proposed system will provide the same facilities. This is cost effective as well as saves time compare to the existing system.

7.2 Future Scope

The appraisal system will not only evaluate employee's performance but also escalate the educational institute's growth and increase it's teaching and overall quality Our appraisal system will also save cost of the educational institutes and the evaluation process can be changed according to criteria of different institutes . It also helps the professor's to track their growth on individual level based on the previous records which will serve as in input to data analysis. Based on the data analysis a new chart/graph can be generated which will help the educational institute to take further important decisions.

Bibliography

[1] Tejshree D. Chungade and Prof. Shweta Kharat, "Employee Performance Assessment in Virtual Organization using Domain-Driven Data Mining and Sentiment Analysis.", IEEE, International Conference on Innovations in information Embedded and Communication Systems (ICIIECS), 2017. https://ieeexplore.ieee.org/document/8276093

[2] Girish Keshav Palshikar, Manoj Apte, Sachin Pawar, Nitin Ramrakhiyani., "HiSPEED: A System for Mining Performance Appraisal Data and Text.", IEEE, International Conference on Data Science and Advanced Analytics, 2017. https://ieeexplore.ieee.org/document/8259809

[3] V. Shanmugarajeshwari, R Lawrence, "A Scrutiny of Teachers' Pursuance Using Classification Techniques", IEEE International Conference on Intelligent Techniques in Control, Optimization and Signal Processing, 2017. https://ieeexplore.ieee.org/document/8303123

[4] "Educational data mining that supports quality teaching: How to create a culture of data in educational policies", IEEE Global Engineering Education Conference (EDUCON), 2016. https://ieeexplore.ieee.org/document/7474664

[5] J. George, "720 Degree performance appraisals: An effective tool to efficiency of modern employees", IEEE International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT), 2016. https://ieeexplore.ieee.org/document/7755635

[6] Anagha Vaidya, Rajashree Jain and Prafulla Bafna, "Influence of Staff Student Interaction on Student Engagement", IEEE International Conference on Power Control Signals and Instrumentation Engineering (ICPCSI-2017). https://ieeexplore.ieee.org/document/8392188

[7] Pratik Borse, Aishwarya Chinchpure, Rajat Singh, Deepak and Swati Shinde, "Comprehensive Faculty Appraisal and Development System Using Data Analytics and Data Visualization", 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA). https://ieeexplore.ieee.org/document/8697379

[8] Amani A. Abed and Alaa M. El-Halees, "Detecting Subjectivity in Staff Perfomance Appraisals by Using Text Mining", 2017 Palestinian International Conference on Information and Communication Technology. https://ieeexplore.ieee.org/document/8038334

[9] I-Ling Yen, Farokh Bastani, Yongtao Huang, Yuqun Zhang and Xin Yao, "SaaS for Automated Job Performance Appraisals using Service Technologies and Big Data Analytics", 2017 IEEE 24th International Conference on Web Services. https://ieeexplore.ieee.org/document/8029789

Appendices

Appendix-A: Nodejs Download and Installation

1.In a web browser, navigate to https://nodejs.org/en/download/.

2.Run the installer i.e the .msi file

3.Accept the license agreement, click the NEXT button a bunch of times and accept the default installation settings

4. open the Windows Command Prompt, Powershell or a similar command line tool, and type node -v.(This is to confirm the installation.)

Appendix-B:Express Download and Installation

1.npm install -g express

2. ¿ npm install express –save

Appendix-C:Handlebars Download and Installation

1.npm install handlebars or yarn add handlebars

Appendix-D:MongoDB Download and Installation

1.Download the MongoDB installer file from the downloads section of the MongoDB website.

2.Find the dowloaded .msi file in the Windows Explorer. Double click the file and follow the prompts to install Mongo.

3.Create the directory where MongoDB will store it's files. From the command prompt run md .

sudo apt-get update
sudo apt-get install automake autoconf libxmu-dev build-essential

4.Start the mongodb daemon by running .exe in the Command Prompt. Or by running, C:→ *.exe*

5.Connect to MongoDB using the Mongo shell While the MongoDB daemon is running, from a different Command prompt window run C:.exe

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Publication

[1]Paper entitled **"Study on Feasibility of Uniform Appraisal System"** is presented at **"2020 6th IEEE International Conference on Emerging Trends in Information Technology and Engineering (ic-ETITE)"** by **"Utkarsh Naik,Anagha Devade,Debashish Choudhury,Prof.Anagha Aher,Prof.Vishal Badgujar ".**

[2]Paper entitled **"Study on Semi Automation in Uniform Faculty Appraisal System"** is presented at **"2020 6th IEEE International Conference on Advanced Computing Communication Systems (ICACCS)"** by **"Utkarsh Naik,Anagha Devade,Debashish Choudhury,Mrs.Anagha Aher,Mr.Vishal Badgujar".**