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PyFeedback: Flask-Based Student Feedback System for Effective Analysis

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ABSTRACT: The "Student Feedback System" is a tool used in educational institutionsto gather feedback from students regarding their experiences with facultymembers. The system aims to improve the overall quality of education byidentifying areas of improvement for faculty members.

The system typically consists of an online platform based on Python Flask framework, where students can anonymously provide feedback on various aspects of their academic experience, such as course materials, teaching methodologies, and the accessibility and availability of faculty members. The feedback collected through the system is used by administrators to evaluate the performance of faculty members and provide them with constructive feedback.

The "Student Feedback System" has numerous benefits, including promoting transparency in the educational process, allowing students to express their opinions and concerns without fear of retribution, and providing faculty members with valuable feedback that can be used to improve their teaching and overall performance. It also allows administrators to identify areas for improvement in the educational program, leading to a better educational experience for students.

KEYWORDS:Evaluate the performance,Student, Administrators, Python, Flask, Better educational experience

I. INTRODUCTION

In the past, feedback on faculty members was often informal and subjective, making it challenging to evaluate their performance and provide them with constructive feedback. The need for a more structured feedback system became more apparent in the late 20th century when there was a shift towards student-centered learning. As the focus shifted from the teacher to the student, there was a growing emphasis on the quality of instruction and the need for continuous improvement. With the rise of digital technology, educational institutions began to adopt online feedback systems to gather feedback from students more efficiently. The use of such systems has become increasingly popular in recent years as institutions seek to improve the quality of education and ensure that faculty members are meeting the needs of their students.

So, we decided to develop a feedback system which will digitalize and ease the workflow of collecting and analyzing the feedback data. According to the research that we have done, we discovered that the existing system has loopholes, those systems are difficult to maintain and have many drawbacks as they were developed using PHP, JS or other languages. Then we came to conclusion to develop a system using Python with the help of Flask Framework.

Developing the Student Feedback System in Python has these Advantages:
1. Python is commonly regarded as being beginner-friendly due to its simplified syntax, making it easier for inexperienced developers to learn and contribute to code development.
2. Flask is a web framework that is lightweight, flexible, and well-suited for small to medium-sized projects, enabling rapid and efficient development of web applications.
3. The Python community is extensive and active, with numerous developers continuously developing and maintaining various libraries and packages that can be utilized to enhance the system's functionality. Additionally, Flask offers a range of extensions and plugins that can be easily integrated into the system, reducing development time and effort.
4. Python is known for its strong support for data analysis and scientific computing.
5. Python has a reputation for being a secure programming language.

Our System has three modules:
1. Admin
   There is only one admin who will act as central feedback coordinator.
2. Sub-Admin

There will be one sub admin per department available in institution.
3. Student
   There role is to only give feedback.

II. RELATED WORK

We while developing our system referred to the existing system of our college which was PHP based and was developed by a student named Rushikesh Kamble.

A PHP-based student feedback system is a web application that allows students to provide feedback on their instructors or professors using the PHP programming language. The system typically allows students to rate their instructors based on various criteria, such as teaching effectiveness, communication skills, and responsiveness, and provides summary reports to instructors and administrators.

Some potential drawbacks of a PHP-based student feedback system include:

1. Security vulnerabilities: As with any web application, a PHP-based feedback system may be vulnerable to security breaches if not designed and implemented securely.
2. Reliance on technology: If the system experiences technical issues, it may be difficult or impossible for students to provide feedback, potentially limiting the usefulness of the system.
3. Lack of participation: Even with a well-designed system, students may be hesitant to provide feedback or may not take the process seriously, which could limit the usefulness of the system.
4. Bias and inaccurate feedback: There is always a risk of bias or inaccuracies in feedback, which could negatively impact instructors or the overall usefulness of the system. It is important to design the system with appropriate checks and balances to ensure accurate and fair feedback.
5. PHP based systems are offend difficult to maintain.
6. The previous system's UI was not well designed and neither responsive to multiple resolutions.
7. The Major issue with the system was that it generated a unique code for every student and use it to authenticate the student while giving feedback, but this lead to break the confidentiality of feedback given. The administrators were able find out about who has submitted the feedback which leads to unfair means of feedback. As student came to know about this,they hesitate to give proper feedback.

III. PROPOSED SYSTEM

From our previous system, we have studied and understood all the drawbacks and later came to the conclusion that to improve the systemconfidentiality we have to eliminate the unique code generation for all students and come up with a solutionthat there will be one common code generated for each session for all students, no individual codes. This will maintain the confidentiality of the student as the administrator will never understand who has submitted feedback and even the integrity will be maintained. We have a second priority in our improvement with the user interface to make it more attractive with aminimalist design and provide a seamless experience. Even we decided to make the system compatible to multiple device resolutions so that students can give the feedback using there mobiles too. We also made improvement in backend for bulk data submission to the system. And at last improvement in feedback data analysis and report and letter generation at real-time during feedback.

IV. CORE TECHNOLOGY

1. HTML

HTML stands for Hypertext Markup Language. It is a markup language used for creating web pages and other types of digital documents that can be displayed in a web browser. HTML consists of a series of elements, which are used to define the structure and content of a web page. These elements can include headings, paragraphs, lists, links, images, and more.

When you create an HTML document, you use tags to define each element of the page. For example, the <p> tag is used to define a paragraph of text, while the <img> tag is used to insert an image. You can also use attributes within these tags to provide additional information about each element, such as the source file for an image or the target URL for a link.

Overall, HTML is an essential tool for creating web pages and other digital content that can be viewed and interacted with in a web browser.

2. CSS

CSS stands for Cascading Style Sheets. It is a style sheet language used for describing the presentation of HTML and XML documents, including the layout, colors, fonts, and other visual elements.

The application of CSS enables website designers to dissociate the structure of a web page from its presentation, which simplifies the process of managing and modifying the visual aspects of a website.With CSS, you can define styles for individual elements on a web page, as well as for groups of elements or the entire page.

CSS works by using selectors to target specific HTML elements, and then applying one or more style rules to those elements. Style rules can include properties such as font-size, background-color, and margin, among others.

3. Python (Flask)

Python is a programming language that is widely utilized for various purposes such as web development, scientific computing, data analysis, artificial intelligence, and more. It is admired for its user-friendly and readable code structure, making it a favorite among developers who value simplicity. Additionally, Python has a vast community of active developers who contribute to its continuous development.

On the other hand, Flask is a favored web framework for Python, mainly used for creating web applications. It is known for its adaptability and ease of use and is usually chosen for smaller projects that do not require the extensive features offered by other larger frameworks such as Django. Flask offers multiple libraries and tools to aid web application development, including support for routing, templates, and integration with databases.

When combined, Python and Flask provide the opportunity to create efficient, dynamic, and powerful web applications. The extensive libraries and tools available with Python and the flexibility and simplicity provided by Flask allow developers to design applications that are easy to maintain and highly dependable.

4. MySQL

The open-source relational database management system, MySQL, is utilized for storing and organizing data and is a common choice for web applications. MySQL is often used alongside other web technologies such as PHP, Python, and Ruby.

MySQL implements a client-server architecture where the database is stored on a server, and client applications can access it through a network. Structured Query Language (SQL) is used to manage relational databases, and MySQL supports it. With SQL, users can perform data operations like create, read, update, and delete on a MySQL database.

MySQL is praised for its reliability, scalability, and performance, making it popular for small and large-scale applications. It also provides various security features such as encryption, backup and recovery, and user authentication and authorization to ensure data security and integrity.

In conclusion, MySQL is an essential tool for managing data in web applications and is utilized in diverse industries, including finance, healthcare, e-commerce, and more.

V. WORKING

A Student Feedback System typically involves three modules: the student module, admin module and the sub-admin module. Here's how each module works:

1.Admin Module

This module is for the central feedback coordinator who will manage and control overall feedback. There will be only one admin and he will have the most of system's permissions to maintain the feedback system. This module has multiple sub modules within it to ease the usage and organization of data, those sub modules are described below:

A. Home:
Once the admin login to the system this will be the first module visible to them.

In this you can set start/end date and time of feedback. As soon as the feedback is started the code generations module activates and give you a 7-character length unique code to access that feedback session e.g. (Co8! t0q).

The code will always consist of 1 upper case character(A-Z) following with 2 numeric digit (0-9), 1 random special character (such as !@#$&) and rest 3 lower characters (a-z). You also have an option to regenerate different code while the session is on. As soon as session ends the code will we wiped out from database and students will no longer will able to access the feedback.

In home you also have options available to clear system data of feedback. You can clear Feedback data and comments, Teaching record, Division, Batch, Faculty, Subjects in just one click.

B. Department:
In this you can add, edit or delete departments that your institution consists. This need to setup only once.

C. Class:
In this you can add, edit or delete class or years to complete that course. This will be static you won't need to change it later. E.g. (First Year, Second year, Third Year)

D. Division
In this you can add, edit or delete division according to the particular department and class. You need it add data in this only if there is division to your department else you can skip this module.

E. Batch
Now according to the data filled in above modules you can now finally add batches to your divisions as per department and class. If there is no division it will automatically recognize it and give "--" instead of division.

F. Faculty
In this you can add, edit or delete faculty to the departments. Also, you can add faculties in bunch by using our excel format. There are filters available to access data according to your need and you can even print the data.

G. Subject
In this section you can add subjects according to subject type, semester, subject code, department. Even you can add subjects in bulk data by using our excel format provided. There are filters available according to department, subject code, subject name to easily access data. You can also print these data as per requirement.

H. Teaching Record
It is one of the most important and crucial module of our feedback system, based on which feedback, report generation, letter and analysis will work. You can add, edit and delete, search data using filters, print data. In this you have to insert which faculty will be assigned which subjects for teaching according to department, class, semester, batches, division.

I. Questions
Here you should enter the questions which should be asked while collecting feedback from students.
There will be question along with four options.

J. Users
In this admin can manage the sub admin access. You can add, delete the sub-admin for different departments from here.

K. Report
In this the real-time report generation of side by side of feedback will be executed. There are two options you either view report or comments given by students. None of the student's name or id is included to maintain the confidentiality. Comments will be displayed in anonymous manner. Reports are generated by making the average of the particular teaching record according to faculty. And based on average remarks are generated Excellent, Good, Average and Poor. You can save report generated in Pdf format.

L. Letter
As per report the letters are generated. If the feedback is "Excellent" or "Good" Appreciation letter is generated for that particular faculty for that subject else if the feedback is "Poor" or "Average" Strategy Format and Counselling Form is generated.

2.Sub-Admin Module
This module is for the sub-admins who will manage and control data of their particular department. This module also has multiple sub modules same as admin. But sub admin has restricted access to these modules. The modules visible to sub-admin are:

A. Division
B. Batch
C. Faculty
D. Subject
E. Teaching Record

These modules are same as of admin, the only difference is that only data related to sub-admins department will be accessible and will be able to manage here.

3.Student Module
This module is made for students to give feedback. It consists of 3 modules further:

A. Code Verification:
Here the admin will provide common code to all students generated at admin module for that particular session of feedback. If the code is valid then only students will be able to login to feedback system for further process.

And if student try to access this page out of set duration of feedback an Error 404 page will be displayed.

B. Student Login:

Once the code is valid student will arrive at this page and will select the course information by using the fields given in form and login to the main feedback section.

If there will be no feedback available for particular options selected student will get prompt in regards to it.

C. Feedback:

This is the main feedback module. Here there will be questions and below them the faculties that teach particular student and the subjects. There will be four options ahead of each faculty. Students have to select and rate the faculty according to performance for that question.

There will be multiple questions and at last there will be a comment section where student can express their thoughts and suggestions to improve the educational experience. Once everything is done students can submit the feedback and the Thank you page will load confirming that the feedback is submitted successfully. Then after three seconds you will be redirected back to the code verification page.

VI. UML DIAGRAMS

1. Flowchart
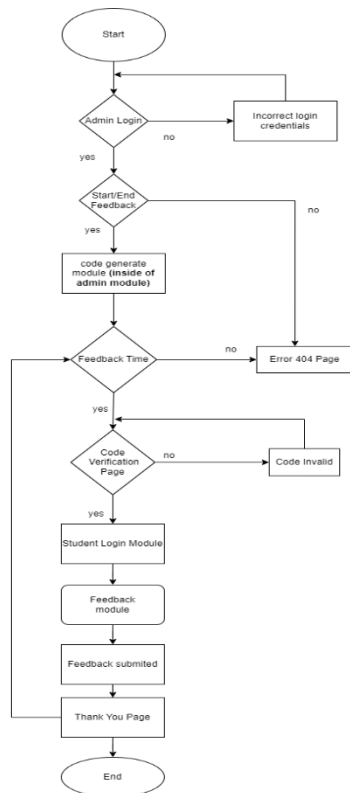
Fig.1.Student Module Flowchart
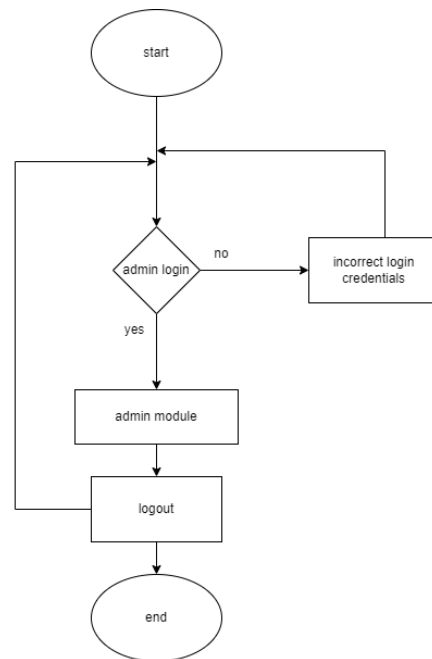
Fig. 2. Admin Module Flowchart

2. **Use Case Diagram**
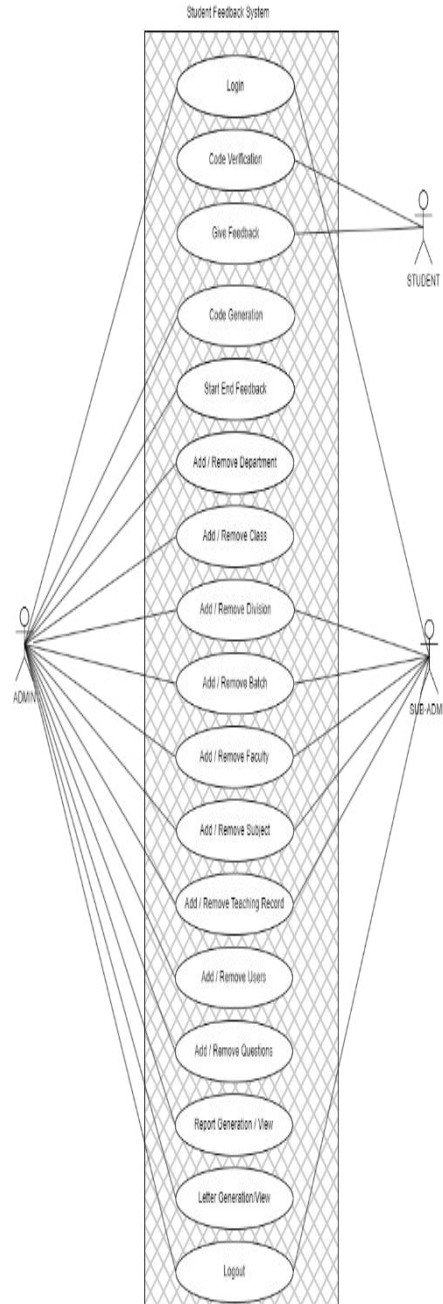
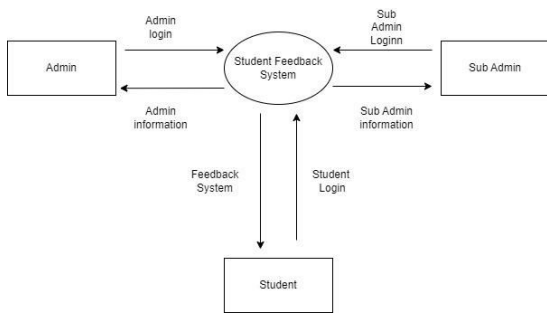

Fig.3. PyFeedback Use case

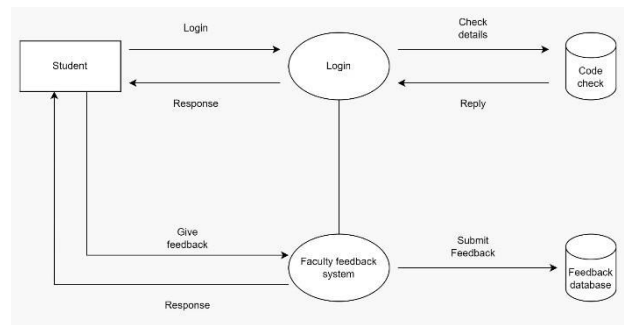### 3. Data Flow Diagram

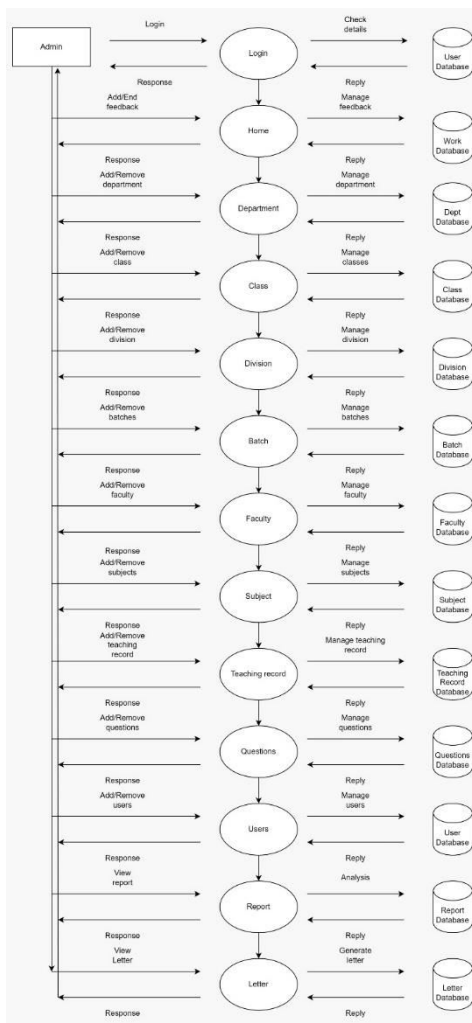Fig.4. DFD level 0

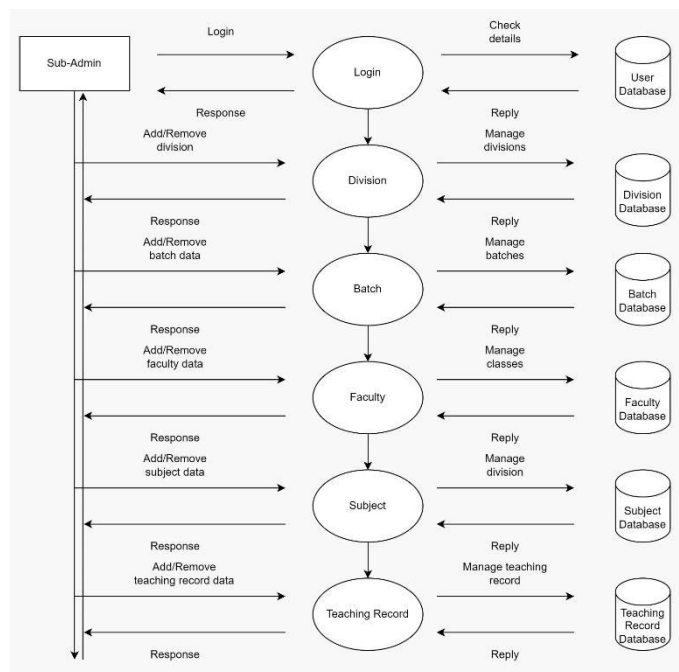Fig.5. Student DFD level 1

Fig.6. Admin DFD level 1

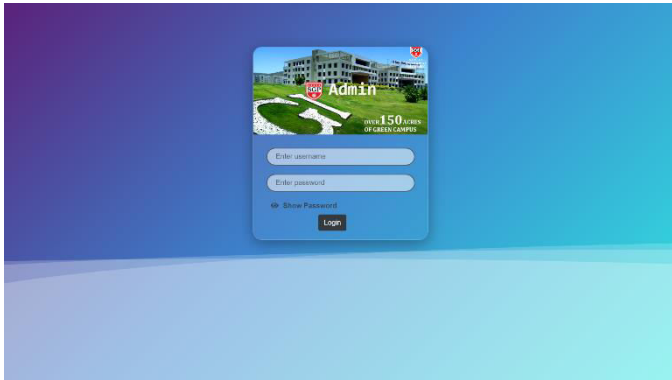Fig.7.Sub-Admin DFD level 1

VII. RESULTS

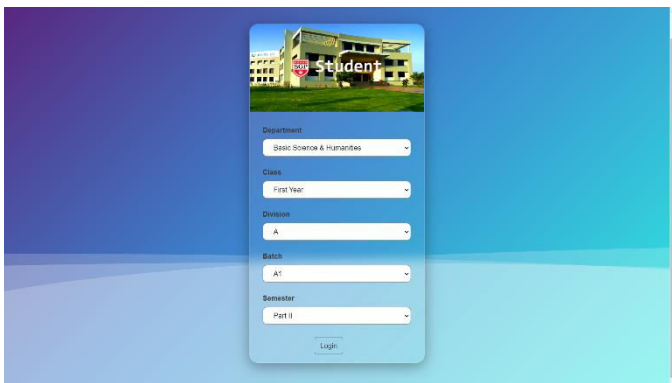Fig.8.Admin Login Page

Fig.9.Student Code Verification Page
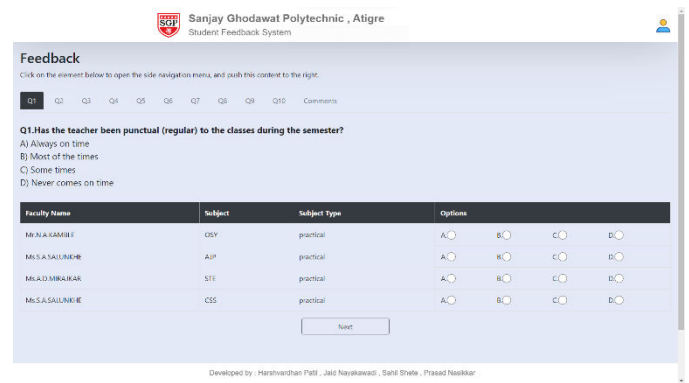

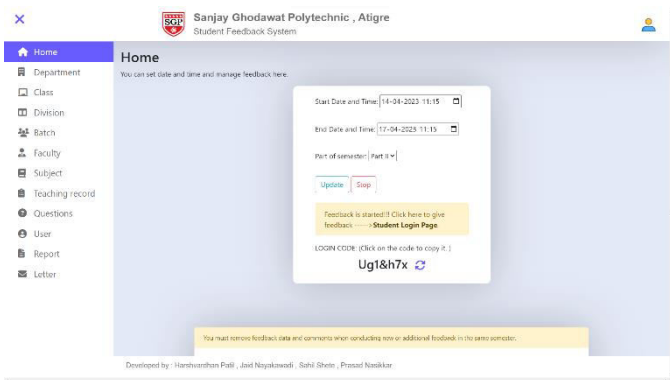Fig.10. Student Login Page
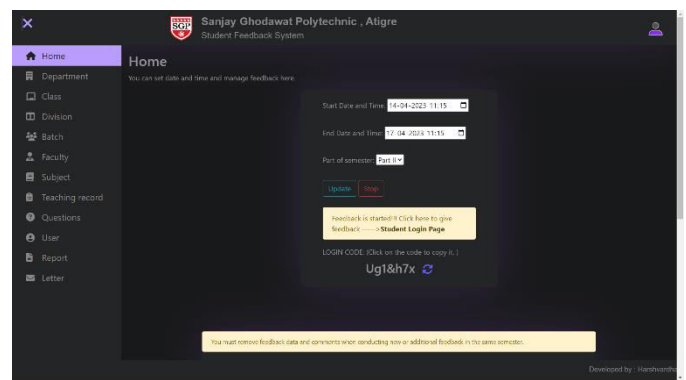

Fig.11.Feedback Page

Fig.12.Admin Module Page

Fig.13.Admin Module Dark Mode

VIII. CONCLUSION AND FUTURE WORK

We successfully completed the proposed system. Our Pyfeedback is a useful tool for educational institutions to collect and analyze feedback from students regarding the performance oftheir faculty. By implementing a Python-based Student Feedback System,we have over come on various drawbacks from the previous feedback system, we have successfully changed and upgraded the previous system by updating User Interface by making a website which can be accessed on various display resolutions, can adapt mobile view, added a dark mode, other functional problems have been overcome such as inserting bulk data of faculty/subjects, real-time feedback is fetched and stored in database which is our advancement than previous system and by doing this the educational institutions can streamline the process of collecting feedback, save time and resources, and make faster decisions to improve the quality of student educational experience.And the major thing is we maintained the feedback confidentiality by eliminating the unique code system for all students and implementing a common 7-character code generation for particular feedback sessions.

Future Enhancements:
a) Artificial intelligence-based analytic
b) Customize feedback forms
c) Mobile app integration
d) Multi-language support

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