

Monitoring System for Classroom Session in Skill Training

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Abstract: Skill-training classrooms need regular monitoring to make sure that training sessions are conducted properly and learners are actively participating. It is also important to maintain accurate attendance and check whether trainers are following the planned schedule. In many training centers, these activities are handled manually, which can take a lot of time and may sometimes result in incomplete or delayed information.

This research proposes a Monitoring System for Classroom Sessions in Skill Training to make the monitoring process easier and more organized. The system provides a digital way to record attendance, track classroom activities, check session progress, and prepare reports. Trainers, administrators, and authorized supervisors can use a centralized dashboard to view the required information. The system helps reduce manual record keeping and provides better visibility of classroom activities. It can also help supervisors identify problems related to attendance, session progress, or planned classroom activities at the right time. The proposed system can be developed as a web-based application using secure login, a database, dashboards, and reporting features.

Keywords: Skill Training, Classroom Monitoring, Attendance, Session Tracking, Dashboard, Trainer Monitoring, Reporting System.

1. INTRODUCTION

1.1 Background

Skill development programs are designed to help learners gain practical knowledge and improve their skills. For these programs to be successful, classroom sessions need to be conducted properly, learners should attend regularly, and trainers should follow the planned schedule. In many training centers, attendance and session details are still recorded manually using registers, spreadsheets, or different records. Managing information in this way can take more time and can make it difficult for supervisors to know the actual status of a classroom session. [5], [6], [7]

A digital classroom monitoring system can make this process easier by keeping important information in one place. Attendance, session schedules, trainer details, learner participation, classroom activities, and reports can all be managed through a single system. The proposed system is mainly focused on monitoring classroom sessions and supporting trainers rather than replacing their work. It provides useful information to authorized users so that they can identify issues such as low attendance, delayed sessions, incomplete activities, or other problems during training. In this way, the system can help training centers manage classroom sessions more efficiently and take timely action when required.

1.2 Importance

The classroom monitoring system plays an important role in improving the management of skill-training sessions. It provides a clear view of classroom activities and helps supervisors understand how training sessions are being conducted. The system reduces the need for maintaining attendance and session records manually, which saves time and effort for trainers and supervisors. It also makes it easier to identify problems occurring during a training session and take suitable action at the right time. Since the information is stored in an organized manner, supervisors can review the progress and performance of training activities more easily and prepare reports when required. In this way, the system helps improve the overall quality of skill training and supports better decision-making based on actual session information. [5], [6]

1.3 Monitoring System

The proposed monitoring system is a digital platform designed to make the management and supervision of classroom training sessions easier and more organized. It allows authorized users to monitor the activities carried out during training sessions and maintain important session-related information. Trainers can enter details about each session and record student attendance, while administrators or supervisors can access the information through dashboards and

reports. The system stores all the collected information in a structured database, making it easier to find previous records whenever required. These records can also be used to review training activities, identify problems, and understand the progress of classroom sessions. In this way, the monitoring system reduces manual work and provides a simple and effective method for managing skill-training sessions. [4]

1.4 Types of Monitoring

The proposed system includes different types of monitoring to manage classroom training activities effectively. Attendance monitoring is used to maintain information about the presence and absence of learners during training sessions. Session monitoring helps track the sessions that are planned and those that have been completed, making it easier to follow the training schedule. Trainer monitoring maintains details related to trainers, batches, timetables, and the activities conducted by them. Activity monitoring keeps track of practical and theoretical activities performed during the training and records their current status. Report monitoring provides summarized information about attendance, sessions, trainers, and activities, which can be accessed by authorized administrators and supervisors for reviewing and managing the training process. [4], [10]

1.5 Research Problems

The existing process of monitoring classroom training activities can involve several difficulties when it is managed manually. Maintaining classroom records manually requires considerable time and effort from trainers and supervisors. Attendance information from different batches may also be difficult to collect, organize, and review in one place. In some cases, supervisors may not receive updated information about the progress of training sessions on time, which can make it difficult to identify and solve problems quickly. When information is maintained in separate records, comparing past sessions and analyzing historical performance becomes more difficult. The absence of a centralized reporting system can further delay the process of identifying issues and taking corrective action. Therefore, there is a need for a centralized monitoring system that can organize classroom information and make it easily available to authorized users. [5], [6]

1.6 Scope

The scope of the proposed classroom monitoring system covers the management and monitoring of different activities involved in skill-training sessions. The system can be used to record and monitor learner attendance for each training session, helping trainers maintain accurate attendance information. It also includes the management of important details such as batches, trainers, timetables, and classroom sessions in an organized manner. The system can track the completion of planned sessions and practical or theoretical activities, allowing supervisors to understand the progress of training. Authorized users can access dashboards to view important information in a simple and organized way. The system can also generate daily, weekly, monthly, and batch-wise reports for monitoring and performance review. In addition, historical records can be maintained so that previous training activities can be reviewed and analyzed whenever required. [2], [4]

1.7 Objectives

The main objective of the proposed system is to develop a centralized platform for monitoring and managing skill-training classroom sessions in an efficient manner. The system aims to digitize attendance and session records so that important information can be maintained accurately and accessed easily. It is designed to provide trainers and supervisors with timely information about classroom activities and session progress. Another objective is to generate useful reports that can help in reviewing training activities and making better management decisions. The system also aims to reduce the time and effort required for manual record keeping and improve the overall efficiency of classroom monitoring. By providing updated information about attendance and session activities, the system can help trainers and supervisors identify problems at an early stage and take appropriate action.

1.8 Need of the System

A dedicated classroom monitoring system is needed to make the management of skill-training activities more organized and effective. Regular monitoring of learner attendance, session completion, trainer activities, and learner participation is important for maintaining the quality of training. When this information is maintained manually or in separate records, it can take more time to update, retrieve, and compare the required information. A centralized monitoring system can bring all these records together in one place, making them easier to maintain and access whenever required. It can also provide useful reports and updated information to trainers and supervisors, helping them understand the progress of training sessions. By identifying attendance or session-related problems at an early stage, the system can help management take appropriate action and prevent such problems from affecting the overall training outcome. [5], [6]

1.9 Selection of Life Cycle Model for Development

The Incremental Model is suitable for developing the proposed classroom monitoring system because the complete system can be developed step by step instead of building all features at once. The application can be divided into smaller modules such as user authentication, attendance management, session management, dashboards, and report generation. Each module can be developed, tested, and improved before moving to the next stage. This approach makes it easier to identify and correct errors during development. Feedback from trainers, administrators, and supervisors can also be considered after each increment and used to improve the next part of the system. Therefore, the Incremental Model provides a flexible and systematic approach for developing the classroom monitoring system according to the requirements of its users. [2]

2. LITERATURE REVIEW / RELATED WORK

The development of digital systems in education and skill training has received considerable attention because traditional methods of maintaining records can require significant time and effort. Existing learning management systems, attendance systems, classroom monitoring applications, and training-management platforms show that digital record keeping can make educational activities easier to organize and manage. Attendance systems help reduce the dependence on paper-based registers, while learning management platforms provide facilities for managing learners, courses, assessments, and learning progress. Classroom analytics further improves the use of educational data by helping institutions understand patterns related to learner participation and performance. [5], [8], [10]

However, skill-training environments have requirements that may not be completely addressed by general learning management systems. In a skill-training classroom, it is important to monitor not only learner attendance and academic progress but also the status of training sessions, trainer activities, batch information, classroom activities, and overall session performance. The proposed classroom monitoring system focuses on these operational requirements by providing a centralized platform for recording session status, trainer activity, batch-wise attendance, classroom events, and management reports. In this way, the proposed system can provide an additional monitoring layer that works alongside existing learning management platforms and helps trainers and supervisors manage classroom training activities more effectively.

3. METHODOLOGY

The proposed research follows a system development methodology for designing and developing the classroom monitoring system. The first step is to study the existing process used for monitoring classroom training sessions and understand the difficulties faced by trainers, administrators, and supervisors. Based on this study, the functional and non-functional requirements of the system are identified and organized. [2], [4]

After identifying the requirements, the structure and working of the proposed system are designed using suitable database models, process-flow diagrams, and UML diagrams. The system is then developed by implementing the required modules, such as user management, attendance, session monitoring, and reporting. Once the basic system is developed, it can be tested using sample classroom-session data to check whether the different functions work correctly. The results of testing and evaluation can then be used to identify improvements and make the system more useful for managing skill-training classroom activities.

3.1 Feasibility Study

The feasibility study is carried out to determine whether the proposed classroom monitoring system can be developed and used successfully in a practical training environment. The study considers the technical, operational, economic, and schedule aspects of the system. [2], [4]

Technical Feasibility: The proposed system can be developed as a web-based application using suitable web technologies and a relational database. Secure user authentication and dashboard facilities can be used to provide the required monitoring functions and ensure that information is accessible only to authorized users.

Operational Feasibility: The system is designed to be simple and practical for trainers, administrators, and supervisors. Role-based access can provide different screens and functions according to the user's responsibilities, such as recording attendance, managing sessions, monitoring activities, and viewing reports.

Economic Feasibility: The proposed system can help reduce the use of paper records and decrease the manual effort required to collect, organize, and consolidate classroom information. Therefore, it can provide a cost-effective approach to managing training records.

Schedule Feasibility: The Incremental Model allows the system to be developed in stages. The essential functions, such as user authentication, attendance, and session monitoring, can be developed first, while additional features and improvements can be introduced in later stages. This makes the development process easier to manage within the available time.

3.2 Risk Analysis

Risk analysis is an important part of the development of the proposed classroom monitoring system because it helps identify possible problems that may affect the system and its users. One major concern is security risk, where unauthorized users may try to access learner or trainer information. This can be controlled by using secure authentication and providing access based on user roles. [2]

Another concern is data quality risk. Incorrect attendance entries or inaccurate session information can affect the reliability of reports and may lead to incorrect conclusions. Proper validation and careful data entry can help reduce this risk. Technical risk may also occur if there is a network problem or server failure, which could temporarily interrupt access to the monitoring system. Regular maintenance and suitable backup arrangements can help minimize its impact. There is also an adoption risk, as some trainers or supervisors may need basic training before they can use the system comfortably. Providing simple instructions and user guidance can make the system easier to adopt. Finally, privacy risk must be considered because the system stores learner and trainer information. Such information should be protected and made available only to authorized users.

3.3 Requirement Collection and Identification

The requirements for the proposed classroom monitoring system can be identified by studying the existing classroom and training processes. Information can be collected by observing how attendance, session activities, trainer details, and other records are currently maintained. Interviews and discussions with trainers and supervisors can help understand the problems they face and the features they expect from the proposed system. Questionnaires can also be used to collect opinions and suggestions from different users. Existing attendance and session records can be reviewed to understand the type of information that needs to be stored and managed. [2]

The main stakeholders of the proposed system are the administrator, trainer, supervisor, and learner. Each stakeholder has different responsibilities and requirements. The administrator manages users and system information, while the trainer records attendance and session-related activities. The supervisor monitors training progress and reviews reports, whereas the learner is mainly concerned with attendance and participation in training sessions. Understanding the requirements of all these stakeholders helps in designing a system that is practical, useful, and easy to use.

3.4 Software & Hardware Requirements Specification (SRS)

The proposed classroom monitoring system requires basic hardware and software resources for its development and use. The hardware requirements include a computer, laptop, or smartphone through which users can access the system. Depending on the implementation, the system may also require server or cloud infrastructure for storing and processing data. Additional devices such as QR-code scanners or biometric devices may be used if automated attendance recording is required. [2], [4]

The software requirements include a suitable web application framework for developing the system, a database management system for storing classroom and user information, and a web browser for accessing the application. Dashboard and reporting components are also required to present attendance, session, and performance information in an organized manner.

A reliable network connection is required for communication between users and the system. The application should use a secure Internet or LAN connection with HTTPS to protect information during data transmission. The system can operate on commonly used operating systems such as Windows, Linux, and Android, provided that the device supports the required web browser or application.

3.5 Functional Requirements

The functional requirements describe the main functions that the proposed classroom monitoring system should provide to its users. The system should allow users to log in securely and access features according to their assigned roles. Administrators should be able to create and manage training batches and maintain learner information. The system should also provide facilities for creating timetables and maintaining records of classroom sessions. [2]

Trainers should be able to record and manage learner attendance for each session. They should also be able to enter information about the topics covered, activities conducted, and completion status of each session. Supervisors and administrators should be able to view a monitoring dashboard that presents important classroom information in an organized manner. The system should provide attendance and session reports that can be used for monitoring and review. It should also allow authorized users to search and filter previous monitoring records, making it easier to find and analyze historical classroom information when required.

3.6 Non-Functional Requirements

The non-functional requirements define the quality and performance standards that the proposed classroom monitoring system should maintain during its use. Security and privacy are important requirements because the system will store

learner, trainer, attendance, and session-related information. Access to this information should therefore be controlled according to the user's role. [2]

The system should also provide good usability, so that trainers, administrators, and supervisors can use its features without unnecessary difficulty. Reliability is another important requirement, as the system should store information accurately and provide suitable backup facilities to prevent the loss of important records. The application should have a good response time for common operations such as recording attendance, viewing session information, searching records, and generating reports. Finally, the system should be scalable, allowing it to support an increasing number of learners, batches, sessions, and training centers without affecting its overall performance.

3.7 Assumptions

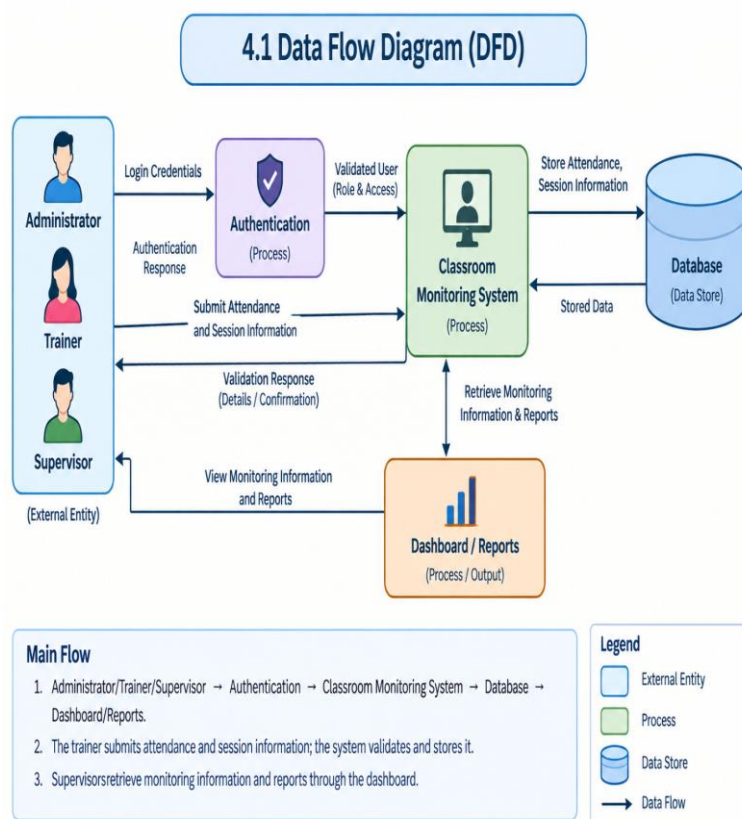
The proposed classroom monitoring system is developed based on certain assumptions about its users and the training environment. It is assumed that all authorized users, such as administrators, trainers, and supervisors, will have valid login credentials to access the system. It is also assumed that the administrator will have the required information about training batches and learners before the system is used. [2]

The system assumes that users have access to a suitable computer, laptop, or smartphone along with a reliable network connection. It is further assumed that attendance and session-related information will be entered correctly by the responsible users. Accurate data entry is important because the reliability of reports and monitoring results depends on the quality of the information stored in the system.

4. DIAGRAM DESIGN

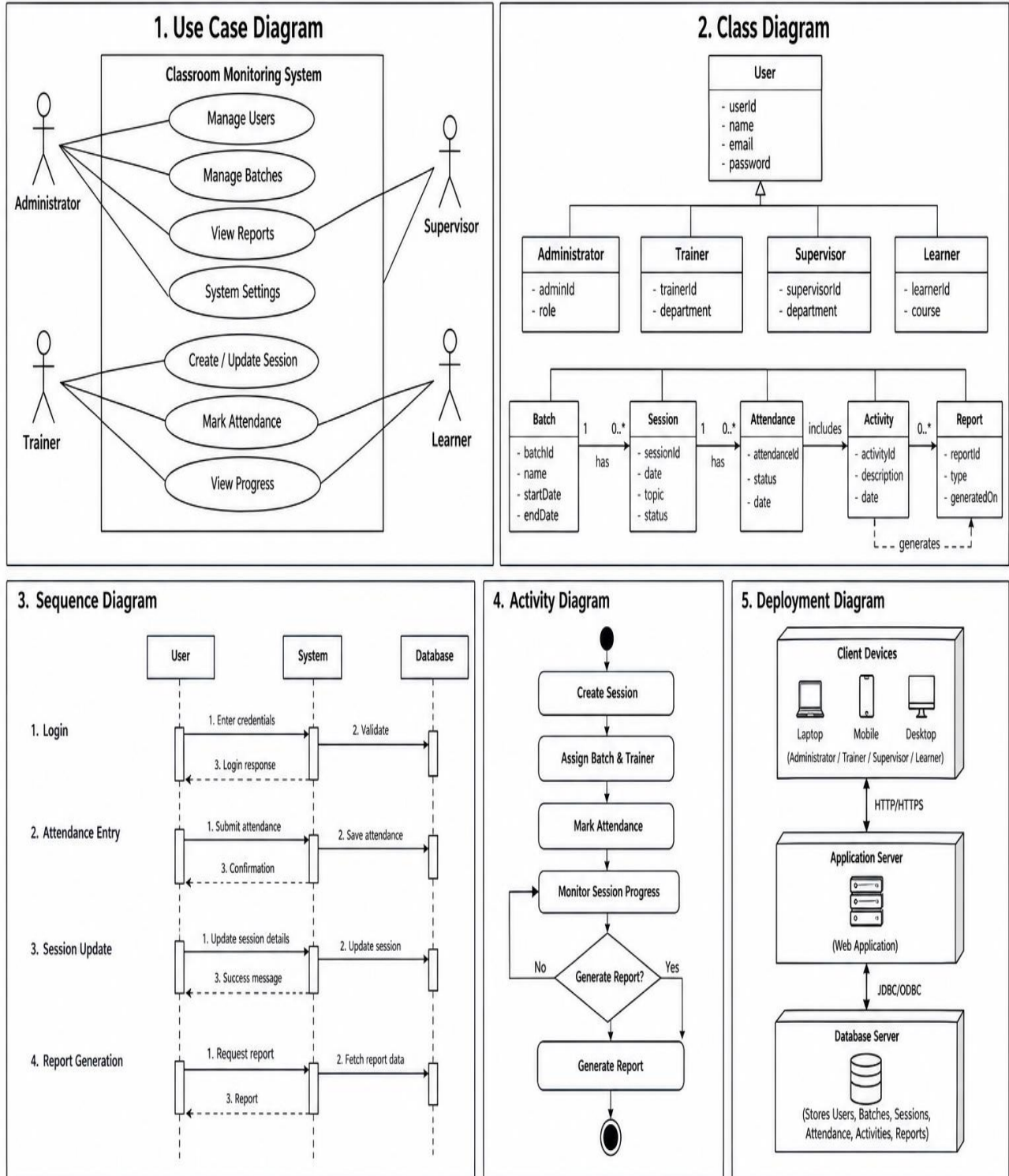
The diagram design of the proposed classroom monitoring system is used to present the structure, working process, and interaction between different users and system components in a clear manner. Data Flow Diagrams (DFD) can be used to show how information moves between users, system processes, and the database, while UML diagrams can describe the functional and structural aspects of the system. Following the structure of the sample research paper, suitable DFD and UML diagrams can be included to explain the working of the proposed classroom monitoring system. These diagrams help in understanding how attendance, session details, trainer information, learner records, and reports are managed within the system.

4.1 Data Flow Diagram (DFD)



4.2 UML Diagrams

UML diagrams provide a visual representation of the proposed system. They can be used to model users, system functions, data structures, and interactions. [3]



4.3 Proposed Use Cases

The proposed classroom monitoring system provides different functions according to the responsibilities of each type of user. The Administrator has the highest level of access and can manage users, training batches, trainers, classroom sessions, and system reports. The Trainer can view the sessions assigned to them, record learner attendance, and update the status of classroom sessions and activities. The Supervisor can monitor the progress of different batches, review attendance information, and access reports to understand the overall training performance. The Learner has limited access to the system and can view their own attendance and session-related information whenever these details are made available to them. This role-based approach ensures that each user can access the information and functions required for their responsibilities. [3]

5. EXPECTED RESULTS AND DISCUSSION

The proposed classroom monitoring system is expected to make the management of skill-training sessions more organized and efficient by bringing important classroom information into a single system. Instead of maintaining attendance, session details, and activity records separately, the system will store them in a structured manner. This will make it easier for trainers and supervisors to access and review the required information. The dashboard can provide a clear view of attendance, session progress, and activity status, while the reporting facility can help supervisors compare different batches, identify learners with low attendance, and check whether planned sessions have been completed on time. [10]

The effectiveness of the proposed system can be evaluated by comparing its performance with the existing manual method. Factors such as the time required to prepare attendance and session reports, accuracy of stored information, ease of using the system, response time, and user satisfaction can be considered during evaluation. A pilot implementation with selected skill-training batches can provide practical feedback from trainers, supervisors, and learners. The feedback can then be used to identify limitations and make further improvements to the system. Overall, the proposed system is expected to reduce manual effort, improve the availability of classroom information, and support better monitoring and management of skill-training activities.

5.1 Expected Benefits

The proposed classroom monitoring system is expected to provide several benefits for the effective management of skill-training activities. It will make classroom monitoring information available more quickly, allowing trainers, supervisors, and administrators to access the required records without searching through multiple manual documents. The system can also reduce paperwork and avoid repeated data entry by maintaining information in a centralized digital database. [5], [6], [10]

The system is expected to improve the transparency of training-session records because attendance, session progress, and activity information can be maintained in an organized manner. It can provide better support to supervisors and administrators by giving them timely information about classroom activities and training progress. In addition, maintaining historical records and reports will allow management to review previous training activities, compare performance, identify problems, and make better decisions based on available information.

5.2 Limitations

Although the proposed classroom monitoring system can improve the management of training activities, it has some limitations. The accuracy and usefulness of the reports depend on the information entered by trainers and other authorized users. If attendance or session details are entered incorrectly, the resulting reports may also be inaccurate. The system may also be temporarily affected by network or server problems, which can make real-time monitoring unavailable. [2], [4]

The proposed system mainly focuses on digital record management and classroom monitoring. More advanced monitoring features, such as automatic activity detection, may require additional hardware such as sensors, cameras, or integration with other systems. Another important limitation is the protection of learner and trainer information. Proper privacy measures and access-control policies are required to ensure that stored information is available only to authorized users.

6. CONCLUSION

Effective monitoring is an important part of successful skill training because regular observation of attendance, classroom sessions, trainer activities, and learner progress helps maintain the quality of training. The proposed Monitoring System for Classroom Session in Skill Training provides a centralized way to manage and review these

activities. By bringing user authentication, attendance management, session tracking, dashboards, and reporting together in one system, it can reduce the effort involved in maintaining manual records and make important monitoring information easier to access.

The proposed system also provides a foundation for further improvements in the future. Additional features such as QR-based attendance, biometric attendance, mobile applications, automated notifications, data analytics, and AI-based identification of attendance or session-related irregularities can be integrated to make the system more effective. Before implementing the system on a larger scale, it should be tested with actual training batches and evaluated based on feedback from trainers, supervisors, administrators, and learners. This practical evaluation can help identify limitations and improve the system according to real-world training requirements.

7. FUTURE SCOPE

The proposed classroom monitoring system has good potential for further development as technology and training requirements continue to change. In the future, attendance can be made more convenient by integrating QR-code or biometric-based attendance, which can reduce manual entry and improve the accuracy of attendance records. A mobile application can also be developed so that trainers and supervisors can access classroom information and update records using their smartphones.

The system can be further improved by providing real-time alerts when a learner has low attendance or when a planned session is missed. Data analytics can be introduced to study learner participation and batch performance trends, helping supervisors understand training progress more effectively. The system can also be integrated with existing Learning Management Systems (LMS) so that classroom monitoring information and learning-related records can be managed together.

In addition, Artificial Intelligence (AI) can be used to identify learners who may be at risk of poor participation by analyzing attendance and session activity patterns. Finally, cloud deployment can allow the system to support multiple training centers from a centralized platform. These future enhancements can make the proposed system more intelligent, accessible, and useful for large-scale skill-training management.

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