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Mobile-based Student Internship Monitoring System using Progress Tracking Algorithm

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Abstract

The Mobile-based Student Internship Monitoring System using Progress Tracking Algorithm was developed to enhance the University of Antique, Tario-Lim Memorial Campus, College of Computer Studies' management of student trainees. This system digitizes the manual handbook, allowing trainees to efficiently access and use it via a mobile application on Android devices. Administrators can manage users, system operations, and maintenance, while trainees can clock in and out, view timestamps, input daily tasks, manage forms, and link their accounts to parents and agencies. Faculty members can monitor student details, student time records, student tasks, and manage forms. Parents can view student details, time records, tasks, and manage forms, while partner agencies can validate records, evaluate performance, and manage forms. The system includes a GPS locator for tracking student's daily time records, generates comprehensive reports, and was evaluated by 30 stakeholders, including student interns, faculty, parents, partner agencies, and IT experts. The evaluation, based on ISO 25010 standards, confirmed the system's functionality, reliability, usability, efficiency, maintainability, security, portability, and compatibility. The study concludes that the system effectively manages intern records, enhances accountability through GPS tracking, and improves administrative processes with automated report generation, meeting or exceeding required standards and providing a high-quality solution for managing and monitoring student internships.

1. Introduction

The rapid progression of mobile technology has brought about a great deal of change in a number of areas of daily life, including education. The management and advancement of student internships is one area where these technology developments could have a significant positive impact. This study aims to develop a Mobile-based Student Internship Monitoring System utilizing progress tracking algorithms to enhance the efficiency and effectiveness of internship programs. Specifically, the research focuses on designing and developing a fully responsive Android-based Student Intern Handbook, which will streamline the management of student intern records. Furthermore, the system will incorporate a GPS locator to track student trainees' Daily Time Records, ensuring accurate and reliable logging of their activities. In addition to these features, the system will generate comprehensive reports such as daily time stamps and daily tasks, providing valuable insights into the interns' performance and activities. Through the implementation of this innovative system, the study aims to address existing challenges in internship monitoring and

pave the way for more efficient and effective management practices in educational institutions.

2. Methods

Methodology presents the project description, requirement analysis, testing, and evaluation of a Mobile-based Student Internship Monitoring System using a Progress Tracking Algorithm. Mobile learning, a result of rapid advancements in mobile technology, represents the next generation of e-learning, offering an attractive and effective means of knowledge delivery. The Android application developed in this study encourages students to use mobile devices as educational tools. The system, accessible anytime and anywhere on Android devices, allows users to navigate and view their progress and related information. A key feature is the implementation of a tracking algorithm with a GPS locator, which authenticates and verifies the student's location upon clock-in and clock-out during their internship, ensuring the intern reports to the assigned agency. The throw-away prototyping methodology was employed in developing the system, involving interviews and coordination with relevant stakeholders to gather data and requirements. The system was designed using Unified Modelling Language (UML) tools, including use case diagrams, activity diagrams, class diagrams, and sequence diagrams, to represent the system's functionality and interactions. The mobile application includes interfaces for students, faculty, agency representatives, and parents, each with specific functionalities such as viewing details, managing forms, and tracking daily tasks and time records.

2.1 Deployment Diagram

Deployment involves installing the application on Android devices and connecting to the internet for real-time updates (Refer Table 2 to 9).

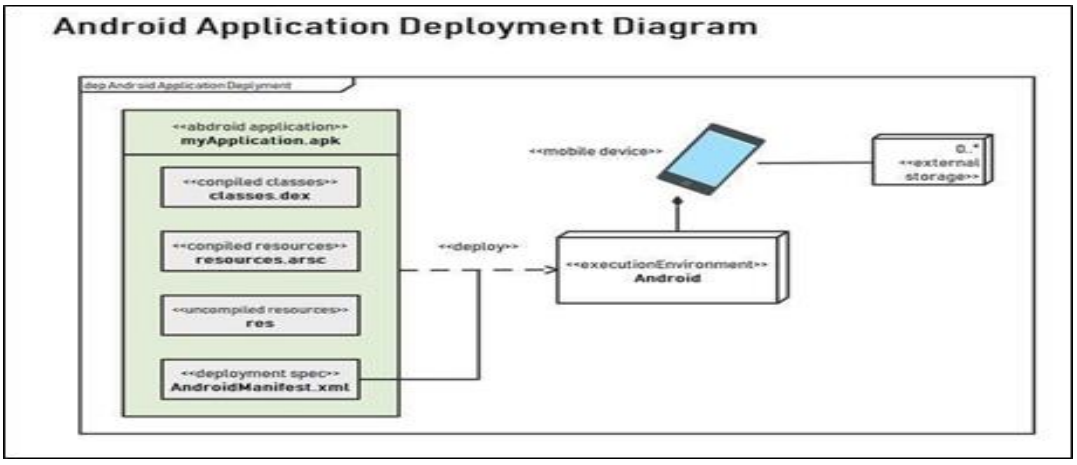

Figure 1 Deployment Diagram

Shown in Figure 1 is the deployment diagram of the system. The users are required to utilize an android based mobile device to access the application. The application will be installed in the mobile device of the user and should be connected to the internet to access, view, generate, and update information in the system [1].

2.2 System Evaluation

The survey instrument used in evaluating the Mobile based Internship Monitoring System using Progress Tracking Algorithm was a standardized questionnaire. This software evaluation is a criteria-based assessment questionnaire that measures quantitatively the software system features and overall effectiveness of the system using the International Organizations for Standardization ISO 25010.The questionnaire uses five-point scale where 5 as the highest and 1 as the lowest.

Table 1 Five-Point Likert Scale use for Evaluation

Mean Score	Verbal Interpretation
4.21-5.00	Excellent
3.41-4.20	Very Good
2.61-3.40	Good
1.81-2.60	Fair
1.00-1.80	Poor

The result of the evaluation was answered through the mean to measure the Functional suitability, Reliability (Table 1), Performance efficiency, Usability, Security, Compatibility, Maintainability, and Portability of the Mobile-based Student Monitoring System using Progress Tracking Algorithm of the University-TLMC, College of Computer Studies [2].

3. Results and Discussion

3.1 Results

To determine the system's acceptability, it was evaluated at the College of Computer Studies, University of Antique-Tario Lim Memorial Campus by specified end-users, including Student Interns, Faculty, Parents, Agencies, and IT experts selected through purposive sampling. A total of 30 respondents evaluated the system's performance based on the ISO 25010 standards, focusing on functional suitability, reliability, performance efficiency, usability, security, compatibility, maintainability, and portability. Student Trainees, Faculty, Parents, and Agencies tested and evaluated the system's functions using the mobile application, with students having the privilege to view the results as coordinated by the researcher. Additionally, IT experts accessed the mobile application interfaces to evaluate the entire system.

Table 2 Mean Distribution of Functional Suitability of the System

Functional Suitability	Mean	Interpretation	SD
Completeness	4.86	Excellent	0.38
Correctness	4.71	Excellent	0.76
Appropriateness	4.71	Excellent	0.49
Grand Mean	4.76	Excellent	0.19

Table 3 Mean Distribution of Reliability of the System

Reliability	Mean	Interpretation	SD
Maturity	4.83	Excellent	0.38
Availability	4.72	Excellent	0.58
Fault Tolerance	4.72	Excellent	0.47
Recoverability	4.76	Excellent	0.57
Grand Mean	4.76	Excellent	0.10

Table 4 Mean Distribution of Performance Efficiency the System

Performance Efficiency	Mean	Interpretation	SD
Time -behavior	4.86	Excellent	0.38
Resource Utilization	4.83	Excellent	0.38
Capacity	4.72	Excellent	0.53
Grand Mean	4.80	Excellent	0.09

Table 5 Mean Distribution of Usability of the System

Usability	Mean	Interpretation	SD
Appropriateness	4.93	Excellent	0.25
Learnability	4.79	Excellent	0.41
Operability	4.83	Excellent	0.38
User Error Protection	4.72	Excellent	0.53
Accessibility	4.83	Excellent	0.38
Grand Mean	4.82	Excellent	0.10

Table 6 Mean Distribution of Security of the System

Security	Mean	Interpretation	SD
Confidentiality	4.76	Excellent	0.43
Integrity	4.86	Excellent	0.35
Non-repudiation	4.76	Excellent	0.43
Protection Accountability	4.76	Excellent	0.50
Authenticity	5.00	Excellent	0.00
Grand Mean	4.83	Excellent	0.20

Table 7 Mean Distribution of Compatibility of the System

Compatibility	Mean	Interpretation	SD
Co-existence	4.57	Excellent	0.79
Interoperability	5.00	Excellent	0.00
Grand Mean	4.79	Excellent	0.56

Table 8 Mean Distribution of Maintainability of the System

Maintainability	Mean	Interpretation	SD
Modularity	5.00	Excellent	0.00
Reusability	4.86	Excellent	0.38
Analyzability	4.71	Excellent	0.49
Modifiability	5.00	Excellent	0.00
Testability	5.00	Excellent	0.00
Grand Mean	4.91	Excellent	0.24

Table 9 Mean Distribution of Portability of the System

Portability	Mean	Interpretation	SD
Adaptability	4.86	Excellent	0.38
Installability	4.71	Excellent	0.49
Replaceability	4.57	Excellent	0.79
Grand Mean	4.71	Excellent	0.21

4. Discussion

4.1 Functional Suitability

The data in Table 2.0 indicate the system's functional suitability, evaluated in terms of completeness, correctness, and appropriateness. The system received an excellent rating of 4.86 for completeness, meaning it covers all specified tasks and user objectives. Correctness was also rated excellent at 4.71, indicating the system provides accurate results [3]. Appropriateness was rated 4.71, showing the system effectively facilitates task completion and objectives. The grand mean for functional suitability was 4.76, also interpreted as excellent. The standard deviation results confirmed that the system meets all required functional suitability criteria.

4.2 Reliability

The system's reliability, as shown in Table 3.0, was evaluated based on maturity, availability, fault tolerance, and recoverability, all rated as excellent. Maturity received a mean value of 4.83, indicating reliable performance under normal operation. Availability was rated 4.72, showing the system is operational and accessible when needed. Fault tolerance also scored 4.72, demonstrating the system's ability to function correctly despite hardware or software issues. Recoverability was rated 4.76, indicating effective data recovery after interruptions or failures. The grand mean of 4.76 and the standard deviation results confirm the system's consistent quality and performance.

4.3 Performance Efficiency

The evaluators unanimously agree on the system's performance efficiency, as indicated by mean scores of 4.86 for time behavior, 4.83 for resource utilization, and 4.72 for capacity, resulting in a grand mean of 4.80. This signifies that the system performs well in achieving specific goals. The standard deviation results further substantiate the system's efficiency in achieving the desired outputs.

4.4 Usability

The evaluators concur on the system's usability, reflected in high mean scores: 4.93 for appropriateness, 4.79 for learnability, 4.83 for operability, 4.72 for user error protection, and 4.83 for accessibility, with a grand mean of 4.82. These scores indicate that the system effectively protects users against errors and aids in achieving specific goals. The standard deviation results confirm the system's usability [4].

4.5 Security

The system's security was evaluated using a 5-point Likert scale, achieving mean scores of 4.76 for confidentiality, 4.86 for integrity, 4.76 for non-repudiation, 4.76 for accountability, and 5.00 for authenticity, with a grand mean of 4.83. These ratings, interpreted as excellent, indicate that the system ensures data access is restricted to authorized users and maintains high security standards. The standard deviation results further confirm the system's security.

4.6 Compatibility

The system's compatibility, evaluated in terms of coexistence and interoperability using a 5-point Likert scale, received mean scores of 4.57 and 5.00, respectively, with a grand mean of 4.79. These ratings, interpreted as excellent, indicate that the system performs its functions efficiently without adversely affecting other products. The standard deviation results also confirm the system's successful operation.

4.7 Maintainability

The system's maintainability was evaluated using a 5-point Likert scale, achieving mean scores of 5.00 for modularity, 4.86 for reusability, 4.71 for

analyzability, 5.00 for modifiability, and 5.00 for testability, resulting in a grand mean of 4.91. These scores, interpreted as excellent, indicate that the system can be modified efficiently without compromising existing product quality. The standard deviation results further support that the system can be restored or repaired to a specified condition within a specified period.

4.8 Portability

The system's portability, evaluated in terms of adaptability, installability, and replaceability using a 5-point Likert scale, achieved mean scores of 4.86 for adaptability, 4.83 for installability, and 4.86 for replaceability, resulting in a grand mean of 4.71. These scores indicate that the system can effectively and efficiently adapt to evolving hardware and other usage environments. The standard deviation results confirm the system's portability.

Conclusion

Based on the findings of this study, several key conclusions can be drawn regarding the Mobile-based Internship Monitoring System using Progress **Tracking Algorithm:**

1. Firstly, the system has been effectively designed and developed to be fully responsive, efficiently managing student intern records through a user-friendly interface. This interface allows students to input and update their information easily while ensuring secure data storage and accessibility, thereby enhancing the overall management of internship programs.
2. Secondly, the implementation of GPS locator technology for tracking student trainees' Daily Time Records has proven highly effective. This feature accurately records interns' geographical locations, ensuring their presence at designated training sites. It enhances accountability and provides supervisors with real-time data to monitor interns' adherence to their schedules effectively.
3. Thirdly, the system's capability to generate comprehensive reports, including Daily Time Stamps and Daily Tasks, has been successfully realized. These reports offer valuable insights into interns' activities and time management, facilitating performance assessment and continuous improvement. Automated report generation saves time and minimizes manual errors, contributing to streamlined administrative processes.
4. Fourthly, the system underwent rigorous evaluation based on ISO 25010 standards, focusing on key quality characteristics such as functionality, reliability, usability, efficiency, maintainability, security, portability, and compatibility. The evaluation results indicate that the system meets or exceeds required standards across these areas. It demonstrates high reliability with minimal downtime, a user-friendly interface that enhances usability, efficient processing speeds, ease of maintenance, and adaptability across different devices and platforms.

In summary, the Mobile-based Student Internship Monitoring System has successfully achieved its objectives, offering a robust tool for managing and monitoring student internships. Its features, coupled with compliance with ISO 25010 standards, ensure a high-quality solution that meets the needs of both interns and supervisors, ultimately enhancing the overall effectiveness and efficiency of internship management processes.

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