## SOFTWARE PROJECT ASSESSMENT

# EMPLOYEE MONITORING SYSTEM


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## Abstract

This Paper evaluates the Employee Monitoring System, a software project developed by a group of software engineering students from the 2008 batch as their graduation thesis. The project focuses on providing information security for companies' data by tracking employees' activities, such as browser destinations, opened windows, and keystrokes. The system aims to enhance data protection, prevent unauthorized access, and ensure employees' adherence to their assigned tasks. This assessment examines the project from a software project management perspective, assessing the five project processes and evaluating the project documentation types from start to finish. The findings and recommendations from this assessment will provide insights into the project's effectiveness, documentation quality, and potential areas for improvement.

# EMPLOYEE MONITORING MANAGEMENT SYSTEM

## Introduction

The Employee Monitoring System is a software project developed by software engineering students as their graduation thesis. The project aims to address the increasing demand for computers in day-to-day activities and emphasizes the significance of data for computer operations. However, concerns such as data loss, data theft, and unauthorized sharing of information have led to the need for improved data security measures. In response, the project introduces a tracking system designed to monitor employee activities, including browser destinations, opened windows, and keystrokes, while also tracking time allocation to various tasks. This assessment file aims to critically analyze the project's key components, including project management practices, documentation quality, and system functionality. Through an assessment of stakeholder satisfaction, security measures, and usability considerations, this evaluation will provide valuable insights and recommendations for further project enhancements.

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# PROCESS ASSESSMENT

## 1. Initiating Process:

The main idea of the project is providing information security for companies' data. The developed system tracks employees' activities like browser destination, opened windows and keystrokes and notify the company if there is any suspicious act like unauthorised access to a file, and check if the employees are doing their work and not spending their work hours on social media. This was clearly stated in the abstract of the documentation.

Describing the possible stakeholders as any organisations with hired employees and wanting their security to be kept will be too generalised,while it is true that any company with hired employees can potentially benefit from the proposed system, it is important to identify and engage with specific stakeholders within each company.

The general objective of the documentation explicitly describes what is going to be developed.
Specific Objectives: The specific objective provided in the documentation focuses on the necessary steps to be taken in order to achieve the general objective of providing information security for companies' data.
The following are the specific objectives of the project provided in the documentation.

1. Understanding the company's policy: This goal is crucial since it aids in comprehending the information security rules and procedures that the company currently has in place. It guarantees adherence to the company's policies and offers a basis for matching the suggested system with its needs.
2. Examining the working hours and locations of the company: The purpose of this objective is to get data on the working hours and locations of the company's employees. Setting time restrictions and determining which particular machines inside the system need to be tracked both depend on this information.
3. Carrying out research on the problem they are encountering: To achieve this goal, research will be done to identify the precise information security issues or difficulties that the company is facing. It facilitates understanding of the problems at hand and directs the creation of feasible solutions inside the suggested framework.
4. Reviewing papers and research that deal with this topic: This goal highlights how crucial it is to go over previous papers, investigations, and studies about employee monitoring and information security. By incorporating industry standards and recommendations into the proposed system, this stage helps to leverage current knowledge and best practices.
5. Exploring different existing systems related to the proposed system: This objective involves researching and evaluating other systems or technologies that are similar to the proposed system. This exploration helps in understanding existing solutions, identifying potential gaps or areas for improvement, and ensuring that the proposed system offers unique advantages or features.
6. Discovering requirements and constraints for the proposed system: This objective involves gathering and documenting the specific requirements and constraints that need to be considered during the development of the proposed system. It ensures that the system meets the company's needs while adhering to any technical, budgetary, or regulatory constraints.

Overall, this specific objective provides a comprehensive approach to understanding the company's policies, requirements, and challenges related to information security. It emphasises research, analysis, and exploration as crucial steps in developing an effective solution.

## Scope Evaluation

A project that tracks employee actions and alerts the organisation to any suspicious activity or unauthorised access is described in the scope document that is provided. The project's goal is to ensure information security for companies' data. The technology also seeks to guarantee that workers are not wasting work time on social media and are instead concentrated on their tasks. This is an assessment of the scope:
The primary goal of the initiative is to improve information security in companies by keeping an eye on and recording workers' computer usage on designated workstations.

## 2. Project Planning:

**TIME:** The t**ime management plan** the documentation described that the phases that the team is going to go through are brainstorming ideas, presentation and title approval, proposal development , proposal defence, requirement elicitation , data collection, design, implementation, testing and finalising the project.It gives a larger amount of time for the implementation phase ,design and requirement analysis.However, relatively the time provided for the requirement analysis is smaller from expected for this type of projects. As allocating lesser times will have the following implications.

**Risk of Inadequate Planning**: A shorter requirement elicitation and design phase may result in insufficient time for thorough planning, which can lead to overlooked requirements, inadequate system architecture, or potential rework during implementation.

**Reduced Flexibility:** With less time for requirement elicitation and design, there may be limited room for exploring alternative solutions or considering different design options. This can impact the overall quality and scalability of the system.

**Increased Rework:** Rushing through the requirement elicitation and design phase may increase the likelihood of design flaws or oversights, leading to more rework and delays during implementation.

The **quality management plan** seems to address some of the potential risks associated with tracking and monitoring employee activities. By allowing the company or organisation manager to choose what to track and monitor, the plan provides flexibility and customization to the system, which can help mitigate privacy concerns and potential employee resistance.

The plan's approach of making the system flexible so that managers can ignore some files and social media for a while and notify employees that those are ignored is also a positive step towards addressing privacy concerns. This approach shows that the project team is aware of the potential privacy risks and is taking proactive measures to ensure that employee privacy is respected.

However, there are a few potential issues that should be considered:

- **Lack of Employee Input:** While giving managers control over what to track and monitor can help mitigate privacy concerns, it's important to ensure that employees are aware of the system and have some input into its design and implementation. This can help build trust and ensure that the system is perceived as fair and transparent.
- **Impact on Productivity:** Introducing a monitoring system can potentially impact employee productivity, particularly if employees feel that they are being constantly watched or monitored. It's important to communicate the benefits of the system to employees and ensure that it is implemented in a way that minimises disruption to their work.
- **Data Security:** Collecting and storing employee data can also present security risks, particularly if the system is not properly secured or if employees are not trained on how to use it securely. It's important to implement appropriate security measures and provide training to employees on how to use the system safely.

Generally, the planning process of this project lacks **risk identification** ,**risk quantification** ,**risk response development** , **procurement planning** and **solicitation planning** which are core parts of the software development process. This in a project's planning process can have significant consequences for the success of the project, particularly in software development. These steps are critical components of the software development process, and their absence can lead to challenges in managing risks, allocating resources, and engaging external parties. Incorporating these core parts of the software development process into the planning phase can help ensure a more comprehensive and successful project execution.

## 3. Project Execution

Given the time constraints, the project team utilized

- React,
- Electron, and
- Node.js

to develop the system efficiently. These technologies provided a robust foundation for building a modern and versatile system. The team adopted an iterative development methodology, allowing them to make progress in incremental stages. Despite the rushed nature of the implementation, they demonstrated adaptability and resourcefulness in prioritizing essential features and delivering a functional solution within the given timeframe. Regular meetings and progress updates facilitated effective communication and collaboration among team members, enabling them to stay aligned with project objectives. While the execution process showed promise, it is important to acknowledge that the time constraints may have impacted the thoroughness of the implementation, potentially resulting in missed requirements or areas for improvement.

## 4. Project Monitoring and Control:

Given the limited timeframe and the potential for missed implementation requirements, the monitoring and controlling activities may have faced challenges. It is crucial to establish effective monitoring and controlling practices to ensure project success. Regular progress updates and status meetings would have provided opportunities to assess the project's progress, identify potential risks, and make necessary adjustments. Implementing a bug tracking system would have allowed the team to capture and address software issues promptly. Quality assurance measures, such as code reviews and testing, would have helped ensure the system's reliability and performance. While the assessment lacks specific information about these practices, it is important to recognize their significance in mitigating risks and ensuring the overall quality of the project.

## 5. Project Closure:

As the project was not intended for deployment but rather as a demonstration for academic purposes, the closure process may have differed from typical software development projects. However, certain closure activities are still relevant and valuable. The team likely conducted a thorough evaluation of the system's functionality and gathered feedback from professors and evaluators to assess its success as a graduation thesis. This feedback would have provided insights into the strengths and weaknesses of the system, highlighting areas for improvement. In addition, the team may have prepared documentation, such as the thesis report, to document their work, methodologies, and findings. This documentation would have provided insights into the system's design, implementation, and potential future enhancements. Furthermore, the team could have considered the dissemination of their findings and project outcomes through presentations, conferences, or publications, allowing their work to contribute to the wider academic community.

# DOCUMENTATION ASSESSMENT

## ASSESSMENT OF THE SRS DOCUMENTATION

**UI**

The website under evaluation exhibits several issues related to visual appearance and colour contrast. These aspects play a crucial role in user experience and can significantly impact the overall usability of the website.The website lacks an appealing design,The overall look and feel are outdated and fail to create a visually engaging experience for users.
There is inconsistent use of colours, fonts, and visual elements. This inconsistency can confuse users and diminish the website's credibility.

**FUNCTIONAL REQUIREMENTS**

- FR01: Sign Up
- FR02: Sign In
- FR03: Register Device-Users
- FR04: Display List of Device-Users
- FR05: Register Resource
- FR06: Register Suspicious Activity
- FR07: Warn Employee
- FR08: Notification
- FR09: Track Activity
- FR10: Recover File
- FR11: Set “Do not Track”
- FR12: Register HR Personnel
- FR13:Deactivate HR Personnel Account
- FR14: Activate HR Personnel Role

These are the identified functional requirements for the system.
The functional requirements identified appear to be clear and unambiguous. Each requirement has a unique ID, name, introduction, input fields, description, outputs, error handling, and dependencies.
The descriptions provide clear explanations of the purpose of each functionality, and the input fields and outputs are adequately specified. The error handling is also mentioned for each
requirement, indicating that the system should display the appropriate error message in case of any errors or issues during the execution of the functionality.
The requirements cover all the necessary features and functionalities of the software, ensuring that it meets the user needs and goals. They define specific functions and operations that the software should perform, resulting in a comprehensive and complete solution. By adhering to these requirements, the software is designed to fulfil the desired objectives and deliver a satisfactory user experience.

**USE CASES**

The provided use case scenario describes various functionalities and interactions within an Employee Monitoring System. Here is an evaluation of the use case:

- **Use Case Coverage:** The use case covers essential functionalities such as user sign up, sign in, viewing device user list, registering resources, registering suspicious activities, viewing reports, recovering files, setting "Do Not Track" for users, registering HR personnel, deactivating and activating HR personnel accounts.
  - It provides a comprehensive overview of the system's capabilities.
- **Actors:**
  - The primary actors are identified as Admin, HR Personnel, and User.
  - The roles and responsibilities of each actor are clearly defined.
- **Pre-Conditions and Triggers:**
  - The pre-conditions and triggers for each use case are specified appropriately.
  - For example, UC-02 (Sign In) requires UC-01 (Sign Up) as a pre-condition.
- **Main Success Scenarios:**
  - The main success scenarios outline the steps involved in achieving the goals of each use case.
  - They provide a clear sequence of actions and expected outcomes.
- **Extensions and Alternative Scenarios:** The use cases include extensions and alternative scenarios to handle exceptional situations or errors.
  - For example, UC-04 (Register Resource) includes an extension scenario for already registered resources.
- **Post-Conditions:**
  - The success and failure post-conditions are defined for each use case.
  - They specify the expected system state after the successful or unsuccessful execution of a use case.

**System Level and Scope:**

- The level of the use cases is defined as "System", indicating that they cover the system's functionality as a whole.
- The scope is mentioned as an Employee Monitoring System.

In general the provided use case scenario is well-structured and covers a wide range of functionalities within an Employee Monitoring System. It provides a clear understanding of the system's behaviour and allows for effective communication among stakeholders.

**NON-FUNCTIONAL REQUIREMENTS**

These specifications cover important aspects of the system and provide measurable criteria for evaluating its reliability, availability, privacy, maintainability, portability, and usability

***Reliability***: The requirement states that the system should provide accurate results with 99.9% accuracy, which is a measurable criterion for reliability.

***Availability***: The requirement specifies that the system should operate 24/7, ensuring continuous availability.

It also addresses the scenario of internet disruptions, stating that if the internet is disrupted while sending information to the server, the system should resend the information once the internet connection is restored.

The requirement also mentions that if the system is non-operational, it should present a notification to users informing them of its unavailability.

***Privacy***:The requirement focuses on privacy protection for HR roles and the company's information.

It mentions the use of an authentication mechanism to prevent unauthorised access.

The requirement also emphasises compliance with the company's privacy policy.

***Maintainability***:The requirement states that the system should be flexible enough to accommodate changes and modifications as needed.It also highlights the ability to repair or replace faulty components without affecting the functioning parts.

***Portability***:The requirement specifies compatibility with Windows operating systems but excludes compatibility with Linux or macOS.

***Usability***: The requirement emphasises ease of use, smooth navigation, and quick response times within the system.

## ASSESSMENT FOR THE SOFTWARE DEVELOPMENT SPECIFICATION

The purpose of the document is clearly stated as translating business requirements and processes into a technical design for application development.It provides a clear overview of the system architecture, which follows the Model View Controller (MVC) framework. The roles and responsibilities of each component (Model, View, and Controller) are explained in detail.The document provides a clear explanation of why the MVC architecture was chosen for the system development. It highlights the benefits of MVC, such as supporting parallel development, reducing code duplication, and allowing for independent modification of components.

**Development Methods & Contingencies:** The document outlines the development methods and contingencies for the Employee Monitoring System. It specifies that an Object-Oriented approach will be used, and provides details on the specific implementations for the desktop application, website backend, website frontend, and data storage. The document is well-structured and provides clear explanations of the technical components and their roles in the system.

**The system architecture** is explained clearly using a system decomposition diagram following the MVC framework.Each diagram, shows the overall structure and organisation of a complex system, and identifies the major components or subsystems within a system. By breaking down the system into smaller components, it becomes easier to analyse and manage each component individually.Using these diagrams promote modularity and reusability by showing how different components interact with each other.

**Generally**, the software design has addressed almost all the requirements outlined in the Software Requirements Specification (SRS), which means that the design has more or less successfully met the needs of the stakeholders and provided a solution that satisfies their requirements.Sequence diagrams for each functional requirements stated in the SRS documentation is drawn showing how the interactions and order of messages exchanged between objects or components within a system.Each diagram shows objects or components involved in the system's interactions,the messages exchanged between objects or components, the period of time during which an object is actively processing a message or performing an action,return values.parallel execution, where multiple objects or components are performing actions simultaneously,conditions and loops to represent decision-making or repetitive behaviour within the system's interactions.There is also a detailed design for each classes identified in the class diagram provided. The detailed class comprises of the classes' attribute and methods with their return type which makes the implementation part easier.

## CONCLUSION

In conclusion, the assessment of the Employee Monitoring System project acknowledges the challenges faced due to time constraints and the potential for missed implementation requirements. The utilization of React, Electron, and Node.js demonstrated the team's technical skills and their ability to develop a functional system. However, since the project was not intended for deployment but rather as a graduation thesis, the practicality and real-world implementation aspects may have been less emphasized. it is important to recognize the significance of effective monitoring and controlling processes in ensuring project success and the value of closure activities such as evaluation, feedback gathering, documentation, and knowledge dissemination. The project serves as a valuable learning experience for the students and provides a foundation for future enhancements and refinements. Moving forward, it would be beneficial to consider the broader practical implications and industry standards when undertaking similar projects, even in the context of academic thesis.