



# eGovPayroll Pre-Audit System: A Web-Based Automated Payroll Discrepancy Detection

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## ABSTRACT

Government agencies in the Philippines continue to encounter persistent challenges in payroll processing, particularly in the manual verification of data, inconsistent tax calculations, and inadequate monitoring of withholding tax obligations. These recurring inefficiencies often lead to discrepancies, non-compliance with Bureau of Internal Revenue (BIR) regulations, and delays in remittance reporting. Addressing these issues requires a modernized, technology-driven approach that replaces manual audit procedures with automated and accurate digital verification.

This research presents the **eGovPayroll Pre-Audit System**, a web-based automated solution designed to streamline payroll verification, detect discrepancies, and compute taxes accurately based on current BIR tax tables. Through automated payroll extraction, real-time discrepancy detection, category-based payroll management, and smart validation workflows, the system reduces human error and significantly increases audit efficiency. By providing a centralized platform for payroll comparison, tax computation, and pre-audit reporting, the system enhances transparency and strengthens financial accountability in government operations.

The proposed innovation empowers accounting and audit officers with a faster, more accurate, and data-driven method of validating payroll records. Ultimately, the system demonstrates the potential of digital transformation to modernize government processes and improve compliance with national tax regulations.

**Key words:** Payroll auditing, tax discrepancy detection, government automation system, BIR tax computation, payroll data extraction, pre-audit management system, digital payroll verification.

## 1. INTRODUCTION

In today's changing financial environment, it is critical for government agencies to have the highest levels of accuracy, transparency and efficiency when dealing with their payroll

and tax obligations. However, many agencies still use outdated methods to process payroll and calculate employee tax obligations; which exposes them to risks including inaccurate withholdings, delayed reporting, and non-compliance with applicable laws and regulations [1].

At the Commission on Population and Development - Regional Office IX, these issues are demonstrated through the current payroll process used by the Regional Accountant (Accountant II), Mr. Ian Christopher C. Alayon.

Currently, all payroll processing and employee tax computations are processed manually using excel spreadsheets. Although excel provides some level of functionality, it is extremely prone to human error in correlating payroll information with tax computations. As a result, payroll processing is frequently riddled with inaccuracies in withholdings, and subsequently increases the likelihood of submitting erroneous reports to the Bureau of Internal Revenue (BIR).

Additionally, the lack of an automated system complicates the tracking of monthly and annual tax obligations, thus increasing the difficulty of complying with federal regulations.

As a result of the need for more efficient payroll processing, the development of the proposed eGovPayroll Pre-Audit System: A Web-Based Automated Payroll Discrepancy Detection was conceptualized.

This proposed system will automate the pre-audit payroll functions by automatically extracting and validating payroll data from Excel files, thereby significantly reducing the amount of manual intervention needed in processing payroll, and thereby decreasing the number of computational errors that can occur.

Furthermore, the proposed system will include mandatory government deductions such as the Government Service Insurance System (GSIS), PhilHealth and Pag-IBIG Fund, as well as updated BIR tax tables to accurately compute the tax liability of employees.

Automated payroll processing has been identified as a significant concern globally. According to studies conducted by PwC (2021), manual payroll errors have resulted in billions lost by businesses worldwide each year, while Deloitte (2020) identifies the increased complexity of tax laws as one of the most pressing needs for technological solutions [2].

Similarly, both the Philippine Institute for Development Studies and the Philippine Statistics Authority have emphasized that limited automation results in errors in calculating tax obligations and operational inefficiency in the Philippine public sector [3].

Recognizing these concerns, the eGovPayroll Pre-Audit System is viewed as a comprehensive web-based solution that will improve payroll accuracy, streamline tax monitoring and enhance financial accountability. Through its integration of automated discrepancies, category based payroll management and real time tax validation, the proposed system presents a new paradigm for payroll processing for the Commission, and for all public and private entities who experience similar difficulties.

Finally, this innovation will promote compliance, efficiency and transparency in the operation of government financial management systems (Figure 1).

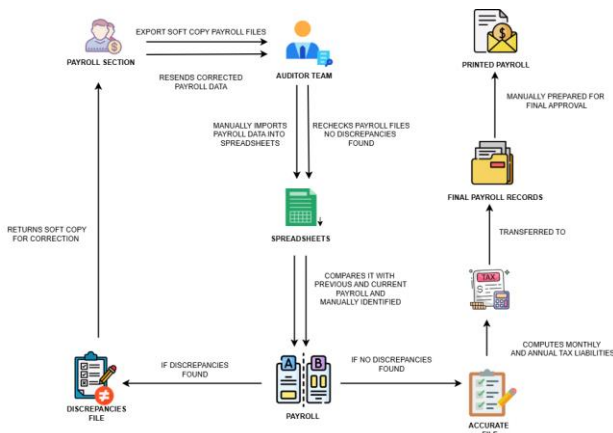


Figure 1: Product Perspective

The system shifts from slow, Excel-dependent manual auditing to a centralized automated verification platform capable of processing uploaded payroll files, identifying inconsistencies, and performing tax computations.

## 2. METHODOLOGY

The development of the **eGovPayroll Pre-Audit System** follows the Waterfall Model, a structured and sequential software development approach commonly applied to projects with clearly defined requirements. In the Waterfall methodology, each phase—requirements analysis, design, development, testing, deployment, and maintenance—must be completed before proceeding to the next. This model ensures well-documented processes, controlled progression, and a systematic workflow suitable for systems requiring accuracy and compliance-driven design. As payroll systems involve

legal and financial compliance, the Waterfall model provides the necessary rigor, documentation, and verification for accurate system behavior [5].

## 3. RESULTS

According to the systematic strategy outlined in the Methodology section, the results of every stage of development are as follows.

### 3.1 Requirements Specification

During the requirements specification phase, the team gathered essential information through consultations with the POPCOM IX accounting personnel and the project adviser. These discussions revealed that the existing payroll verification process depended heavily on manual Excel-based checking, which resulted in repeated data comparisons, inconsistent tax computations, and frequent discrepancies. From this assessment, the team identified the critical system requirements needed to address these issues: automated payroll file extraction, accurate discrepancy detection, category-based data organization, secure administrator authentication, and a tax computation module that strictly follows the latest BIR tax tables. These key requirements formed the foundation of the eGovPayroll Pre-Audit System, ensuring that its design directly responded to the most pressing challenges in the current pre-audit workflow.

### 3.2 Planning

The planning phase established the overall direction of the eGovPayroll Pre-Audit System by defining its objectives, scope, and priority deliverables. The team created a structured development roadmap to ensure that each stage—from system design to deployment—followed a clear and organized sequence. Tasks were assigned based on members’ technical roles to maximize efficiency and maintain accountability throughout the project. This phase also involved outlining resource requirements, project constraints, and timelines using a Work Breakdown Structure (WBS) [6]. By planning the workflow early, the team ensured that development remained aligned with system requirements, minimized risks of delays, and provided a solid foundation for building a functional and compliant pre-audit automation system.

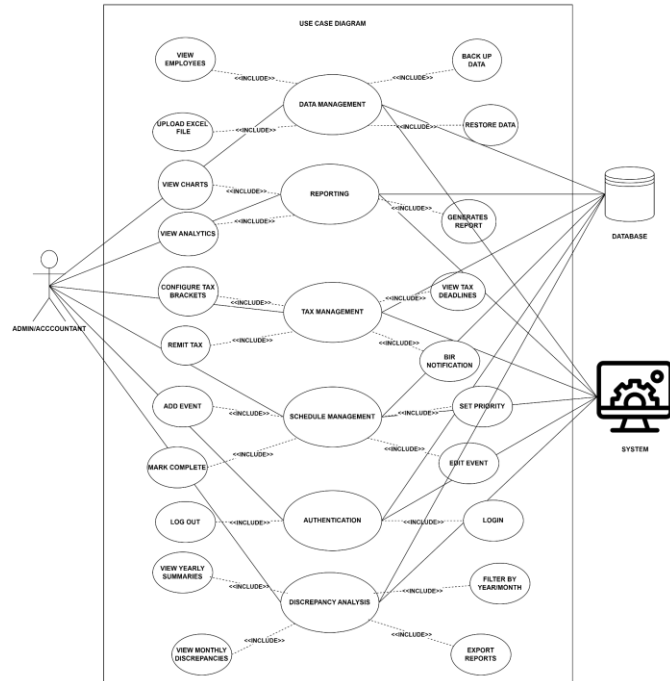
### 3.3 Designing

The designing phase focused on translating the system requirements into a clear technical blueprint and user-centered interface. The team developed the system architecture, including modules for payroll extraction, discrepancy detection, tax computation, and secure authentication. A well-structured database design was created to support efficient storage and retrieval of payroll records, computed taxes, and discrepancy logs. The use case diagram defined the Admin’s interactions with the system, helping to clarify the system’s functional scope and workflow. Interface designs emphasized simplicity, clarity, and ease of navigation to ensure that audit personnel could perform tasks such as uploading files,

reviewing discrepancies, and generating reports with minimal complexity [4]. This design phase ensured both the technical robustness and usability of the eGovPayroll Pre-Audit System.

### B. Use Case Diagram

A use case diagram (Figure 2) illustrates the key functionality of the system and its interaction with the users. It assists in the definition of the scope of the system and is easier in the perception of what the system needs to do from the user perspective, which is important throughout the planning and design phases.

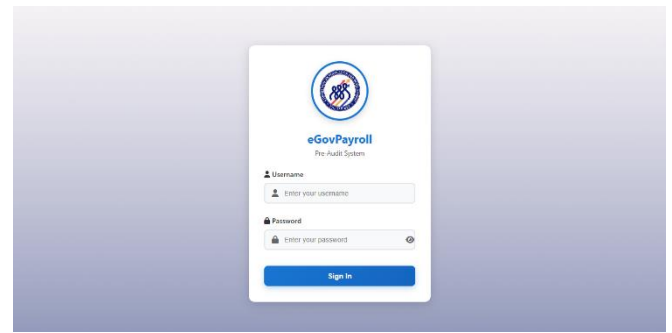


**Figure 2:** Use Case Diagram

This diagram indicates the use case model of this system, with the Admin as the primary user responsible for file upload, validation, discrepancy review, tax computation, and report generation.

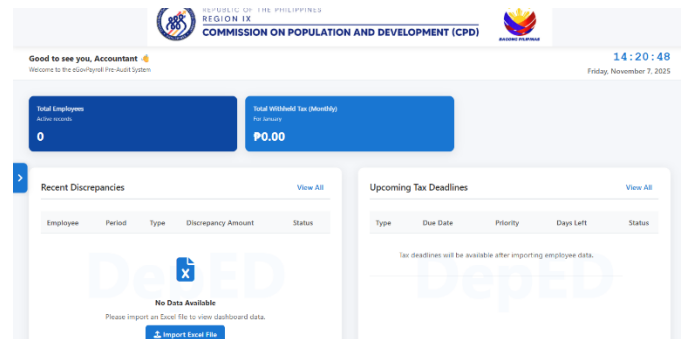
### C. Interface Design

The Interface Design is aimed at producing easy to use design, where the functions of the system are well displayed such as the navigation buttons, text fields, and dropdown menus [7]. Its main purpose is to provide an easy and seamless experience to the user of the site- enabling women to complain easily and comfortably and enable administrators to process cases easily with less complexity. Such design favors ease of accessibility, understandability, and easy interface to every feature within the system.



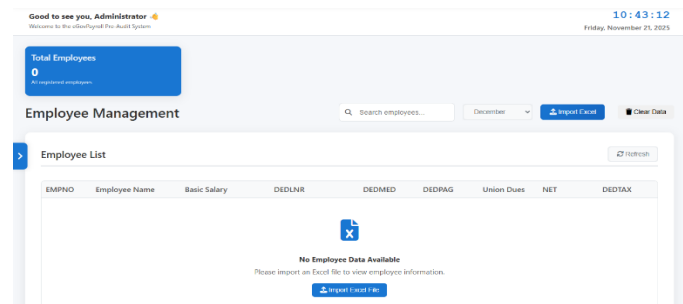
**Figure 3:** System Login

Figure 3 presents the Login Page, which serves as the secure access point to the eGovPayroll Pre-Audit System. It allows authorized personnel from the accounting and finance department to access payroll data, tax computations, and system features necessary for pre-audit processing. This security mechanism ensures that sensitive employee payroll information and financial records are protected at all times, maintaining data confidentiality and integrity within the system.



**Figure 4:** System Dashboard

The Dashboard (Figure 4) displays key payroll and compliance indicators, including monthly tax totals, net variances, upcoming deadlines, and pending actions. A sidebar menu on the left provides quick navigation to core modules such as Employees, Discrepancy Table, Schedule, Reports & Analytics, Settings, and Logout. This interface serves as the central hub for monitoring real-time payroll status and audit readiness.



**Figure 5:** Employees Interface

The Employee Management interface (Figure 5) presents the total number of employees and displays a searchable, filterable employee list. Users may import payroll data via Excel files or clear existing data using the available buttons. When no data is present, the system prompts the Admin to upload an Excel file to load employee records. This interface enables efficient employee data review and verification.

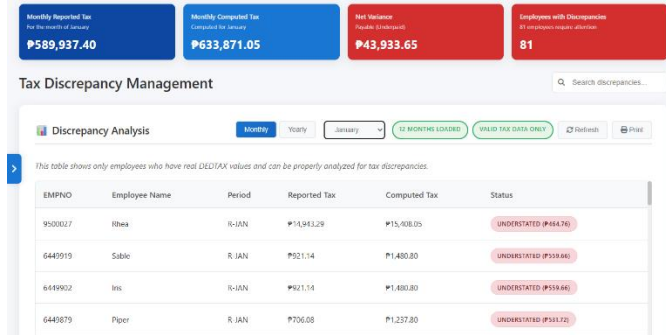


Figure 6: Tax Discrepancy Management Interface

The Tax Discrepancy Management interface (Figure 6) features four dashboard cards summarizing Monthly Reported Tax, Monthly Computed Tax, Net Variance, and the number of Employees with Discrepancies. Below, a detailed discrepancy table allows the Admin to review tax variances, filter data by month or year, refresh results, and export or print reports. This interface centralizes the process of identifying and validating tax discrepancies.

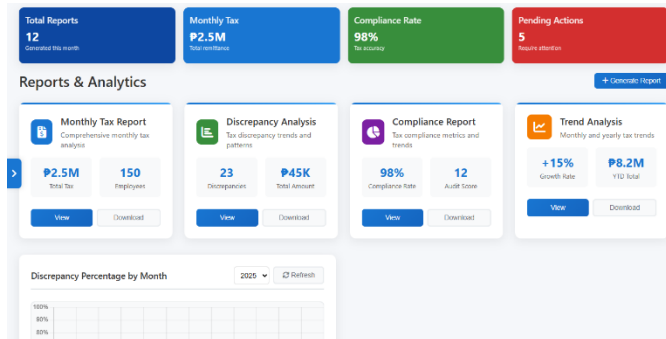


Figure 7: Report & Analytics Interface

The Reports & Analytics interface (Figure 7) provides summarized performance insights such as total reports generated, monthly tax amounts, compliance rate, and pending actions. Below these metrics, categorized report boxes—Monthly Tax Report, Discrepancy Analysis, Compliance Report, and Trend Analysis—allow the Admin to view or download detailed analytics. A graphical chart is also displayed for visual representation of monthly discrepancy percentages.

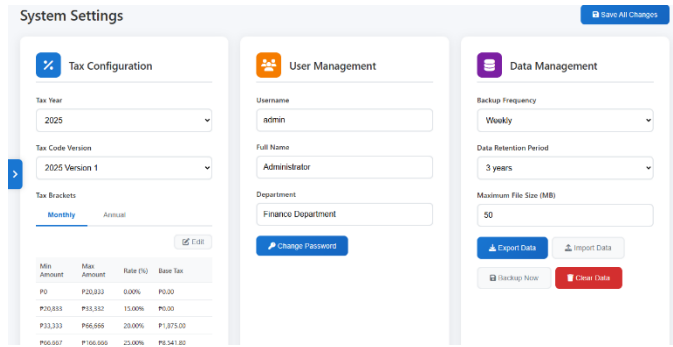


Figure 8: Settings

The System Settings interface (Figure 8) is divided into three sections: Tax Configuration, User Management, and Data Management. Admins can configure tax years and tax brackets, update user profile details, change passwords, adjust data retention periods, export/import system data, and initiate backups. This interface centralizes all system-level controls for configuration and maintenance.

### 3.4 Development Implementation

The development phase involved the actual construction of the system based on the approved design specifications. The team began by implementing the core backend functionalities, including secure authentication, payroll file parsing, discrepancy detection algorithms, and the automated tax computation engine. Once the backend logic was established, the frontend interfaces were developed to ensure clear navigation and intuitive interaction for the Admin user. Throughout the process, modules were built incrementally and continuously reviewed to ensure alignment with functional requirements. Integration between the backend and frontend was performed to guarantee seamless data flow, especially for payroll uploads, discrepancy logs, and pre-audit report generation. This structured development approach ensured that each component worked cohesively and supported the system's objective of automating the payroll pre-audit workflow.

### 3.5 Testing

The testing phase was conducted to ensure that the system performed accurately, securely, and consistently across all functionalities. Unit testing was first carried out to validate individual components such as tax computation, file validation, and discrepancy detection. Integration testing followed, confirming the smooth interaction between modules—from payroll upload to final report generation. System testing evaluated the overall performance, focusing on speed, accuracy, and stability under typical data loads. Finally, User Acceptance Testing (UAT) was performed with POPCOM IX accounting personnel to verify that the system met actual operational needs. Feedback gathered during UAT allowed the team to refine usability, improve response times, and correct minor inconsistencies. The results confirmed that the system was ready for deployment and capable of supporting real-world pre-audit activities.

### 3.6 Deployment

The deployment phase involved installing and configuring the system in a secure server environment where authorized Admin users could operate it reliably. The system was set up with proper server configurations, database initialization, and user authentication settings to ensure full operational readiness. Prior to official rollout, a pilot deployment was conducted to observe system performance under actual workplace conditions and identify potential issues. The team also oriented the accounting personnel on system usage, data handling procedures, and security protocols to ensure proper adoption. After confirming system stability, the eGovPayroll Pre-Audit System was formally deployed, making all its automation features available for use in the payroll pre-audit process of POPCOM IX.

### 3.7 System Evaluation and Maintenance Considerations

System evaluation was performed to assess the reliability, accuracy, and usability of the eGovPayroll Pre-Audit System after deployment. Evaluation criteria included functional correctness, response time, security measures, and ease of use. Results showed high performance in detecting discrepancies, computing accurate taxes, and generating pre-audit reports, confirming that the system effectively addressed the limitations of the manual process. The system was also designed with maintainability in mind, allowing future updates to tax tables, validation rules, and interface components without disrupting core operations. A maintenance plan was established to conduct periodic checks, apply security patches, monitor server performance, and incorporate feedback from POPCOM IX audit personnel. This ensures that the system remains dependable, secure, and adaptable to future organizational or regulatory changes.

## 4. CONCLUSION

In summary, the eGovPayroll Pre-Audit System is an innovative technology-enabled platform designed to alleviate the manual payroll processing and tax computation problems that many organizations experience. For many years, many organizations have been relying on spreadsheet-based methods which expose them to high risks of errors, inefficiency, and non-compliance with relevant laws and regulations. The eGovPreAudit will greatly minimize human errors, improve the speed of processing payroll information and calculate accurately all employee withholding taxes and other mandatory deductions (e.g. BIR, GSIS, PhilHealth, and Pag-IBIG Fund).

Furthermore, the proposed eGovPreAudit will allow for the automated importation of payroll data, automatic discovery of discrepancies and category-based management of payroll information. These features will enhance the efficiency and reliability of financial operations. Additionally, it will support organizations to comply with various government regulatory requirements while providing greater transparency and accountability in the administration of their payroll systems. In addition, the eGovPreAudit will enable organizations to utilize up-to-date tax tables which will ensure that tax obligations are

properly calculated based on current government policies and guidelines.

The eGovPreAudit is anticipated to significantly reduce the time spent manually processing payroll; provide improved monitoring of monthly and annually tax liability; and assist in preparing accurate reports regarding tax remittance to concerned government agencies. Overall, this innovation will contribute to the enhancement of organizational financial management practices and to promote a more efficient, reliable and compliant payroll processing systems for public and private sector institutions.

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