Automation of pay anomalies by machine learning provides best payroll experience

Rajagopal Arputham Chetty
Senior Workday Systems Analyst – Payroll – LifeTime, USA

* Corresponding Author: **Rajagopal Arputham Chetty**

Article Info

ISSN (online): 2582-7138
Volume: 06
Issue: 02
March-April 2025
Received: 03-03-2025
Accepted: 01-04-2025
Page No: 1823-1826

Abstract
This article focusses on explaining the challenges of identifying the anomalies in payroll processing and how machine learning is playing a significant role in this area to help the payroll administrators to identify and solve the pay anomalies. This article uses Workday Payroll based on US payroll rules. This article also explains the concepts, model and effectiveness of Workday Pay Anomalies which provides the best payroll experience to payroll administrators across different industry organizations.

DOI: https://doi.org/10.54660/.IJMRGE.2025.6.2.1823-1826

Keywords: ERP, Workday Payroll, Pay Result, Pay Result Lines, AI, Input, Output, Model, Monitoring, ML

Introduction

Payroll administrators across various organizations are expected to process the payroll for their employees timely and accurately irrespective of the count of employees, frequency of pay and geography. The biggest challenge faced by the payroll administrators was to audit the processing data to identify the pay anomalies and correct before the payment is complete. To overcome this challenge, payroll administrators are dependent on various payroll audit reports to identify the pay anomalies every time and in case of a new anomaly the reports need to update for the next run. Many times, payroll administrators are expected to process multiple reports and combine the data to identify the anomaly which is not only additional work during processing time but also time-consuming results in delay of payroll. Workday Payroll has produced a concept of Pay Anomalies which identify the pay anomalies based on the previous results set and set the critical level for each anomaly using machine learning model. This model will learn from each run and provide the best pay anomaly results in quick time in a single user experience.

1. What is Machine Learning (ML)?

Machine Learning is part of Artificial Intelligence (AI) which enables the process to learn from the data and improve the process over the course of time without any explicit programming. It used data algorithms to identify the patterns and make decisions based on those patterns.

2. How Machine Learning (ML) Works?

The base foundation of ML is all about data and efficiency of the ML depends on this foundation.

Step 1: Data Collection
Gather the relevant data from various data sources like databases, files, or real-time streams.

Step 2: Data Pre Processing
Validate and clean the data by removing the duplicates, handling missing values, apply any specific rules and normalize the data for suitable analysis.

Step 3: Model Selection
Validate, identify, and choose the appropriate machine learning model based on the problem type. We can also build custom models for any specific usage.

Step 4: Training
Use the training data to teach the model by adding or adjusting the parameters of the model to track and minimize the errors.

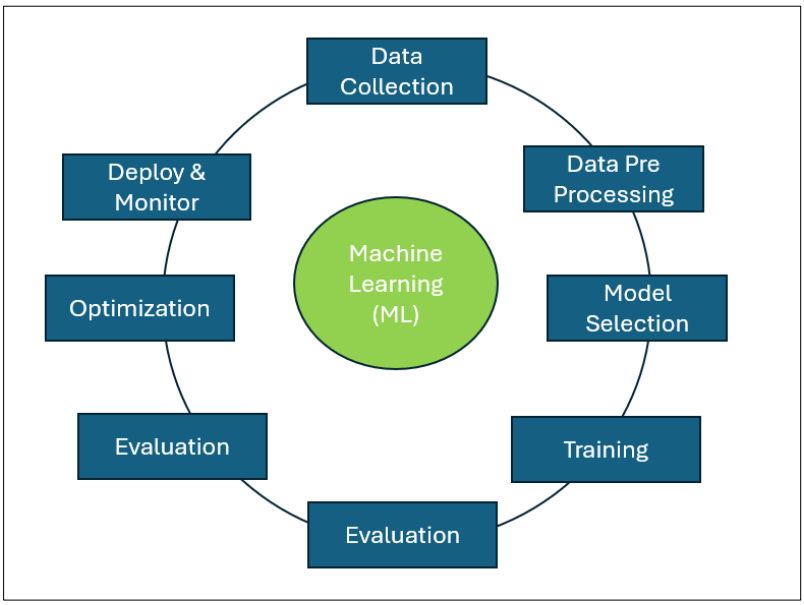

Fig 1: Machine Learning Key Steps

Step 5: Evaluation
Evaluate the model performance based on the results output using metrics of accuracy, precision etc.
Step 6: Optimization
Fine tune the model by adjusting the parameters for the best outcome results
Step 7: Deploy and Monitor
Deploy the model in the application to make predictions and decisions. Monitor the model for the performance and update the data for the model for the accurate output.

3. Workday Payroll Result Abnormalities

Payroll result Abnormalities are nothing, but the payroll results calculated by Workday payroll, for 1 or more reasons are not typical results for a regular payroll calculation. Workday uses machine learning to identify normal pay calculation and the result the patterns based on the historical payroll results and current payroll results.

4. Workday Pay Anomalies

Workday Pay Anomalies continually analyses the payroll calculation results processed during the payroll calculation and provide the payroll exceptions and abnormal payroll results to the payroll administrators. It also provides insights into these abnormal payroll results. This helps the payroll administrators to review the abnormal payroll results using the Pay Anomalies Report with comprehensive filtering capabilities. This report helps the payroll administrators to process payroll accurately and timely without spending lot of time to identify the payroll exceptions.

5. Setup Steps to Enable Workday Pay Anomalies

Step 1: Enable Innovation features and Machine Learning Data Contributions.

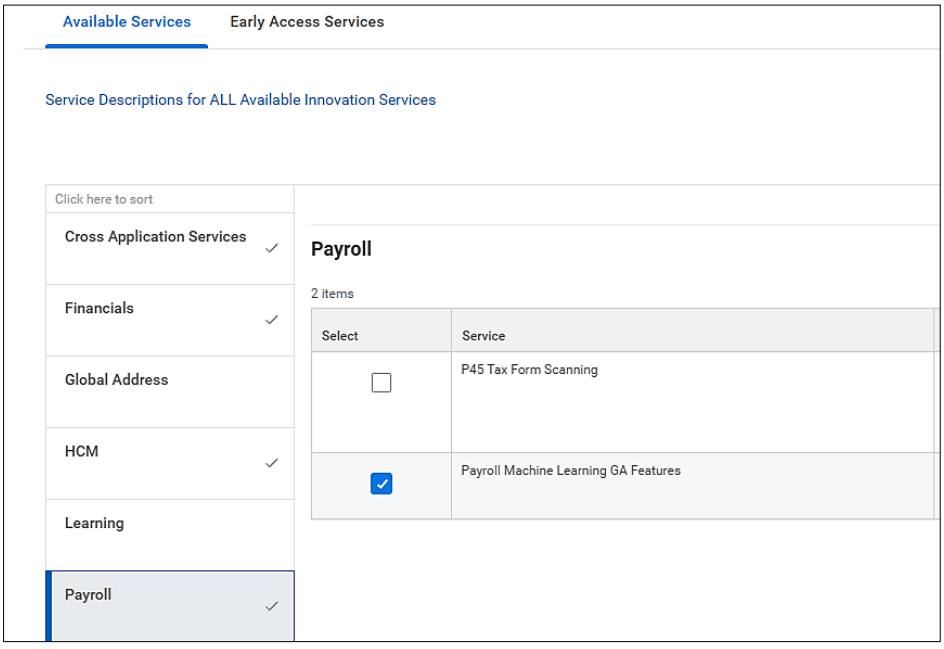

Fig 2: Enable Innovation features

Step 2: Opt in with all the below 6 data categories for the data model.

- Anomalous Payroll Results
- Payroll Data
- Payroll Data (Historical)
- Pay Anomalies Validations
- Previous State of Payroll Results
- Worker Data

Category	Description	Opt In	
Payroll Data (Historical)	Historical payroll result data	☑	View Data Collected
Anomalous Payroll Results	Potential anomalous historical payroll result data for machine learning model training	☑	View Data Collected
Worker Data	Worker data that's relevant or has impact to payroll	☑	View Data Collected
Pay Anomalies Validations	Payroll result data based on Maintain Payroll Insights Configurations settings, payroll insight predictions, and user feedback for model training and iteration in order to fine tune machine learning model accuracy	☑	View Data Collected
Previous States of Payroll Results (Historical)	Uncompleted states of historical payroll results	☑	View Data Collected
Payroll Data	Current payroll result and pay component data	☑	View Data Collected

Fig 3: Category Enabling

6. Model Information and Work Architecture

The model which is used by Workday for Pay Anomalies uses the Payroll Result and each of the individual payroll result lines as input to the model and provides the output abnormal payroll result with the confidence level and the potential reason.

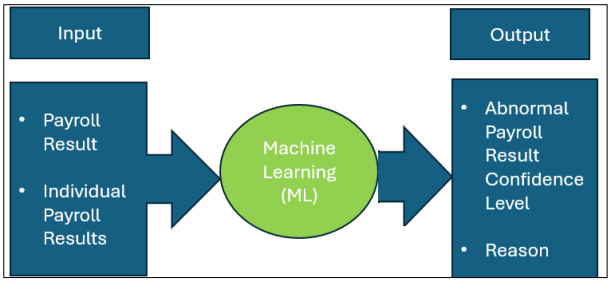

Fig 4: Model Architecture

How the model Works?

This Model uses XGBoost tree model for anomaly prediction. This model takes the payroll result calculated by the Workday Payroll and compares with the previous payroll results of the worker for the dollar amount and the pay events during the payroll period. The predicted abnormal payroll results are then classified as low, medium and high based on the result abnormality, Shapley Additive exPlanations (SHAP) values are used for feature importance evaluation and the feature strings with the top 5 SHAP values are given to the customer in payroll insight results for triaging potential issues causing an abnormal payroll result.

How did the model train?

Pay Anomalies use tenant models which are trained in customer specific data. The training set data contains 1 year of historical payroll results and individual payroll result lines with predefined anomaly labels. Payroll administrators can submit the feedback label for the new anomaly and the model will use this customer label for fine tuning the model for the customer specific accuracy.

Model Testing

80% of the historical data and the recent 20% is used for initial model testing and the user feedback label is used for fine tuning the model.

Benefits

Some of the benefits of the Pay Anomalies are as below:

- Allow a complete view of all in-progress payroll results.
- Comprehensive and powerful ways to slice and filter the data.
- Based on the model fine tuning, it will streamline your payroll audit process.

7. Pay Anomalies Business Function

Payroll administrators are expected to perform the routine payroll processing steps by loading the inputs required and all other required inputs for payroll processing. Once the payroll calculation is complete, run the Pay Anomalies report. This report will provide all the pay anomalies with the confidence level and status for that payroll calculation run with comprehensive report filter in the left side of the panel. Payroll administrators are expected to review the results and act. Payroll administrators have the option of flagging the Pay Anomaly to Normal or they can assign the existing Pay Anomaly tag or even create a new Pay Anomaly tag and assign to the individual result. Based on the action, the model will consider the Pay Anomaly and fine tune for the next run.

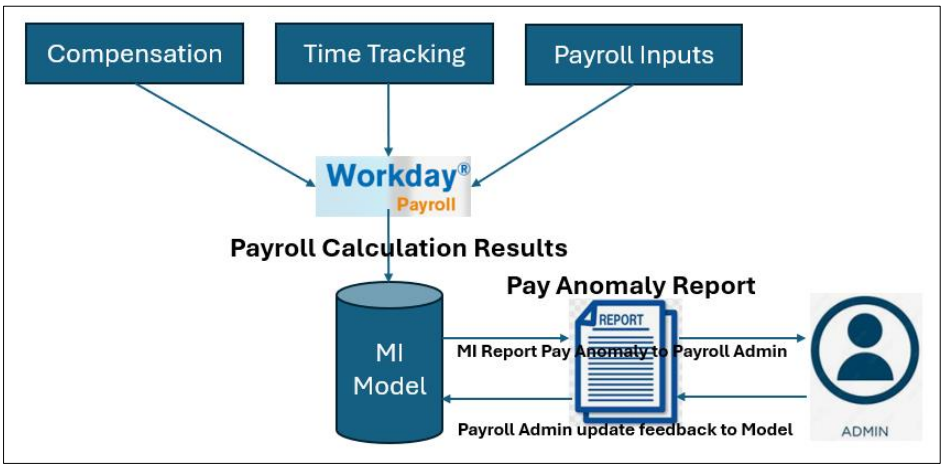

Fig 5: Workday Pay Anomaly Business Flow

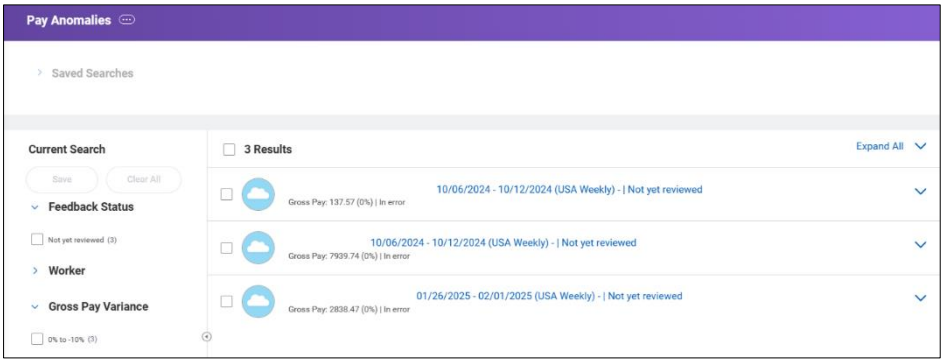

Fig 6: Sample Workday Pay Anomaly Data

Conclusion

Workday's automation of Pay Anomalies using Machine Learning solves the biggest challenge faced by payroll administrators to audit the payroll exception during the payroll processing. This process not only provides solutions but also enables the payroll administrators to create new pay anomalies without any technical solution build. Also, this Pay Anomaly feature provides comprehensive filtering option to the payroll administrators, so that they can filter on specific set of pay anomalies and act on those exceptions. With this feature, there is no need to build various reports to track the exceptions and no need to process many reports and consolidate the various exceptions and there is no need of maintenance of technical objects. As this feature is based on MI, the model will learn and fine tune the anomalies in each run based on the User feedback which in turn will provide the consolidate anomalies. With this Machine Learning model of Pay Anomalies, now payroll administrators not only can process the payroll accurately and timely but also saves more time and effort for the users. This solution makes Workday Payroll another greater step to have the best payroll experience for the payroll administrators.

References

1. Workday Community Portal [Internet]. [cited 2025 Apr 02]. Available from: https://resourcecenter.workday.com/
2. Google [Internet]. [cited 2025 Apr 02]. Available from: https://www.google.com
3. GeeksforGeeks. Machine learning [Internet]. [cited 2025 Apr 03]. Available from: https://www.geeksforgeeks.org/machine-learning/