
Application of Full Automation as an Additional Tool for Effective Payment of Salaries of Civil Servants of Federal Government of Nigeria

Onwodi, G.

Department of Computer Science,
National Open University of Nigeria
Abuja, FCT, Nigeria
E-mails: gonwodi@noun.edu.ng

ABSTRACT

Automated systems can easily achieve significantly superior performance in terms of power, precision and speed of operation. It involves the conversion of a work process, a procedure, or equipment to automatic rather than human operation or control which premised on a deep re-organization of the work process, during which both the human and the machine functions are redefined. Early automation relied on mechanical and electromechanical control devices; however, the computer gradually became the leading vehicle of automation which is usually associated with computerization, digitization and digitalization. Automation has found itself to be a very important tool in the all sectors of life. This thesis is therefore focused majorly on the application of system automation as an additional tool for the payment purposes. It also provides a web based solution for account details verification to ensure 100% payment.

Keywords: Automation, Payment, Salaries, Civil Servants, Web-based Solutions, Nigeria

CISDI Journal Reference Format

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1. INTRODUCTION

In a bid to achieve optimum timeliness, use of materials, speed, quality, effectiveness, efficiency, cost effectiveness and performance in systems with a view to reduce human error, effort has been in place to replace human with machines in practice. This effort therefore gives birth to system automation. Gerovitch (2010) define automation as the conversion of a work process, a procedure, or equipment to automatic rather than human operation or control. Automation does not simply transfer human functions to machines, but involves a deep re-organization of the work process, during which both the human and the machine functions are redefined. Automation is concerned with performing a process by means of programmed commands combined with automatic feedback control to ensure proper execution of the instructions. The resulting system is capable of operating without human intervention. Human intervention is reduced by pre-determining decision criteria, sub-process relationships, and related actions — and embodying those predeterminations in machines. It is widely used in E-Commerce, Banking, Telecommunication industry etc. Automation technology has matured to a point where a number of other technologies have developed from it and have achieved a recognition and status of their own. Robotics is one of these technologies.

2. RELATED BACKGROUND

2.1 Automation as Payment Solution

Workato through Massimo Pezzini (2022) stated categorically that business leaders recognize that solving problems with automation leads to business agility, innovation, and faster time to value. Workato, a research company carried out the work automation survey to assess the implementation of automation in workplaces resulting in the Work Automation Index report. Work Automation Index 2022 provided some of the key findings by stating that automation usage is exploding as it is becoming more accessible as the number of automations is doubling year over year.

Work Automation Index 2022 provided some of the key findings by stating that automation usage is exploding as it is becoming more accessible as the number of automations is doubling year over year. It also asserted that there has been a massive growth since 2020 with the following statistics;

- 1074% growth in business intelligence automations,
- 666% in customer support,
- 659% in finance, and so on.

The report also shows that finance is the most automated department. Finance outweighs IT, totaling 26% of all automations. Order-to-cash continues to be one of the top automated processes. Record-to-report automation also saw significant growth with a 290% increase. Jon Gitlin, a Content Strategist at Workato attested to the fact that the analysis of the automation carried out as part of our Work Automation Index on average, fall under finance. Hence, Finance & Accounting is now the most automated business function. When analyzing the automations that 900 of clients built in 2021 as part of the Work Automation Index, it was found that 26% of an organization’s automations, on average, fall under finance; this trumps IT’s share, the runner up, by a full percentage point.

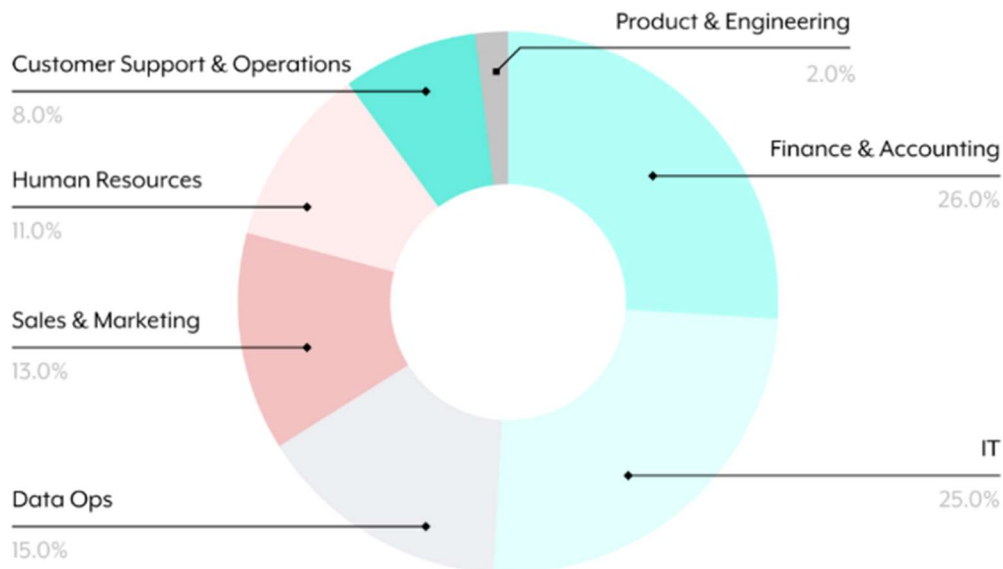


Fig 2.1: 2022 Automation Index

2.2 Automation System

Automation has been achieved by various means including mechanical, hydraulic, pneumatic, electrical, electronic devices, and computers, usually in combination. Complicated systems, such as modern factories, airplanes, and ships typically use all these combined techniques. The benefit of automation includes labor savings, reducing waste, savings in electricity costs, savings in material costs, and improvements to quality, accuracy, and precision. Automation has three basic building blocks – power source, feedback control machine programming.

2.2.1 Types of Automation

- a. **Fixed Automation:** Fixed automation, also known as hard automation, refers to an automated production facility in which the sequence of processing operations is fixed by the equipment configuration. In effect, the programmed commands are contained in the machines in the form of cams, gears, wiring, and other hardware that is not easily changed over from one product style to another. This form of automation is characterized by high initial investment and high production rates. It is therefore suitable for products that are made in large volumes. Examples of fixed automation include machining transfer lines found in the automotive industry, automatic assembly machines, and certain chemical processes.
- b. **Programmable Automation:** Programmable automation is a form of automation for producing products in batches. The products are made in batch quantities ranging from several dozen to several thousand units at a time. For each new batch, the production equipment must be reprogrammed and changed over to accommodate the new product style. This reprogramming and changeover take time to accomplish, and there is a period of non-productive time followed by a production run for each new batch. Production rates in programmable automation are generally lower than in fixed automation, because the equipment is designed to facilitate product changeover rather than for product specialization. A numerical-control machine tool is a good example of programmable automation. The program is coded in computer memory for each different product style, and the machine tool is controlled by the computer program. Industrial robots are another example.
- c. **Flexible Automation:** Flexible automation is an extension of programmable automation.. In flexible automation, the variety of products is sufficiently limited so that the changeover of the equipment can be done very quickly and automatically. The re-programming of the equipment in flexible automation is done off-line; that is, the programming is accomplished at a computer terminal without using the production equipment itself. Accordingly, there is no need to group identical products into batches; instead, a mixture of different products can be produced one right after another.

3. SYSTEM AUTOMATION DESIGN AND ARCHITECTURE

3.1 System Automation Design

The designed application for the system automation employed a client / server architecture utilizing a Three-tier system, which separates applications into three logical and physical computing tiers. This is the predominant software architecture for traditional client-server applications. This specific application is expected to carry out a pre payment verification of the produced payroll with a view to ascertain the success and failure rate of payroll. This will to a great extent assist to reduce the level of failed payment as at the time the real payment is carried out.

3.2 System Automation Design Process

The system design process consists of six steps namely:

- i. **Scope and requirement:** This enables us to know the purpose for the automation e.g. to provide a medium for the pre payment process, the platform to the application and limitations.
- ii. **Identifying the inputs/control data:** This consist of a similar Ms Excel Document serving as the input data and typical account details serving as the control data.
- iii. **Understanding the User Interface elements:** This consist of the front-end of the application. It includes Graphical User Interface (GUI), Menu-Driven Interface (MDI), Form-Based Interface (FBI). All these are web based.
- iv. Craft first interaction
- v. Build conversation
- vi. **Testing:** This can be done on a mobile device, laptops and desktops to know the functionality, with series of input data. Also, the update ability of the application was tested by inserting up to fifty record to it.

3.3 System Automation Design Architecture

Client Server Architecture is a computing model in which the server hosts, delivers and manages most of the resources and services to be consumed by the client. This type of architecture has one or more client computers connected to a central server over a network or internet connection. This system shares computing resources. It is also known as a networking computing model or client/server network because all the requests and services are delivered over a network. Here, many clients (remote processors) request and receive service from a centralized server (host computer). Client computers provide an interface to allow a computer user to request services of the server and to display the results the server returns. Servers wait for requests to arrive from clients and then respond to them.

3.3.1 Simulation Application Flow chart

The application flow chart which this project represents is as depicted below. It shows the step by step procedures in the utilization of this application to verify the account details of staff from the payroll before final payment is done.

- **Upload File:** The generated payroll – input data - is uploaded to the database for verification
- **Database:** It contains the correct account details of the staff – the control data. The uploaded file is checked against the controlled data to affirm is correctness
- **Verification Process:** The process of verifying the input data with the control data
- **Data Corresponds:** refers to the input record that is correct i.e they are the same with the data in the data base. These records will result to successful payment.
- **Unverified Data:** refers to the wrong input record i.e those that will result to failed payment.
- **Email report of verified data/accounts:** Means at which the result of the verification output is transmitted aside its view on the monitor.

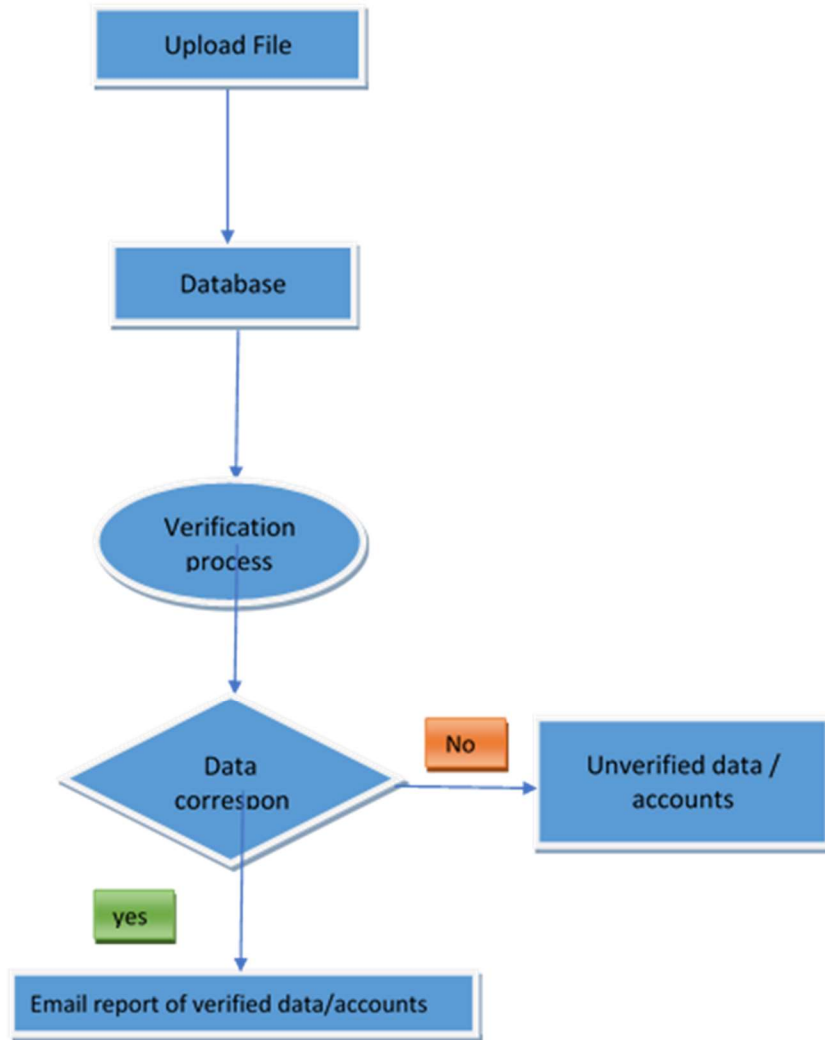


Fig 3.1 Flow Chart Diagram for the Automation Process

4. UNDERSTANDING THE APPLICATION

This web based application was develop for simulation of system automation of the payment of salaries; it was designed to demonstrate that the verification of the payroll payment details before the final payment is made is possible. The technology used for the design of the application is built on Python Programming Language version 3.10. Django, pandas and openpxyl are the automation tools employed in its development and design.

5. CONCLUSION

Research in automation for payment purpose verification had led to development of solutions. Up to date tool for system automation are on the increase every day. As every system is devising the means of having a better payment system on daily basis, It is therefore essential for all institutions involved in payment including both private and public entities sundry to look in this direction and automate all their payment processes.

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