Streamlining and Optimizing End to End Fintech Industry Process through RPA

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Abstract: In the rapidly evolving financial technology (Fintech) landscape, process automation has emerged as a pivotal strategy for enhancing operational efficiency and customer experience. This paper presents a comprehensive approach to address the intricate challenges faced by a prepaid gift card issuing business in Pinelabs company, leveraging Robotic Process Automation (RPA) and Python capability. By seamlessly integrating legacy GUI-based applications and APIs, an innovative bridge is established that removes the gaps between diverse systems. The developed RPA solution, implemented using UiPath, demonstrates substantial time savings and cost reduction. Furthermore, this work evaluates the socio-economic impact of the RPA solution, considering implications on job displacement. The results of the proposed system showcase not only the transformative capabilities of RPA but also the importance of preserving data security and privacy in automated processes.

Keywords: Robotic Process Automation, UiPath, Operational Efficiency, Process Automation Framework, Data Processing

Introduction

The fintech sector is undergoing a remarkable transformation, driven by advancements in automation and digitalization. As financial services intertwine with technological innovations, organizations are increasingly turning to Robotic Process Automation (RPA) as a strategic solution to streamline complex and labor-intensive workflows. In this context, this paper presents a comprehensive exploration of the integration of RPA and Python technologies to address the intricate challenges faced by a prepaid gift card issuing business in Pinelabs company operating in the fintech landscape.

The prepaid gift card business, a cornerstone of modern commerce, relies on intricate processes involving customer onboarding, prepaid gift card related operations. Manual handling of these operations, compounded by the presence of legacy GUI-based applications and APIs, has often resulted in inefficiencies, delays, and potential errors. This research aims to bridge this operational gap by harnessing the power of RPA, which not only automates repetitive tasks but also facilitates seamless communication between disparate systems.

The primary objective of this paper is to present a robust RPA solution developed using UiPath and Python. By creating an intelligent bridge between legacy applications and modern APIs, proposed solution offers a novel approach to harmonizing processes that previously existed in isolation. This integration not only enhances operational efficiency but also ensures data security and customer data privacy, a paramount concern in the FinTech domain.

Furthermore, this paper delves into the multifaceted impact of RPA implementation. Beyond its technical implications, we consider the socio-economic facets, including the potential displacement of human

workers due to automation. Also, research analysis seeks to provide insights into the delicate balance between technological advancement and workforce dynamics, shedding light on the broader implications for the industry.

In the following sections, we will elucidate the background and problem statement, detail the methodology employed to develop the RPA solution and present the empirical results of its implementation. Through this comprehensive exploration, we aim to contribute not only to the realm of technical innovation but also to the broader discourse on the evolving landscape of fintech, automation, and their profound societal implications.

Literature Review

Robotic Process Automation (RPA) has emerged as a transformative technology with applications spanning diverse industries. Drawing insights from a spectrum of research efforts, proposed system delves into the integration of RPA, smart technologies to streamline operations, enhance customer experiences, and address operational challenges within the intricate realm of the prepaid gift card issuing business in Pinelabs.

Santos et al. [1] offer a sweeping perspective on RPA implementation, emphasizing an end-to-end view of processes. Their holistic approach to RPA adoption aligns seamlessly with our study's intricate exploration of the entire process chain, ranging from request inception to flawless execution. The significance of their work resides in their thorough analysis of RPA's transformative potential within business processes, underscoring the need for a strategic and holistic approach to automation.

In the realm of auditing, Huang et al. [2] provide an indispensable framework for deploying RPA within audit procedures. Their meticulous framework not only guides but also inspires our research by illuminating the intricate possibilities of RPA integration in auditing. This framework resonates deeply with our research objectives, particularly when handling the sensitive financial data inherent to the gift card industry. Their study dissects how RPA can revolutionize the efficiency and accuracy of auditing processes, a theme that seamlessly intersects with our pursuit of process. Cohen, Michael and Rozario [3] delve into the world of RPA's substantive audit applications, offering a nuanced exploration of its role in audit tasks. Their work contributes profoundly to our understanding of RPA's potential in automating critical validation and verification processes. In the context of gift card operations, where precision is paramount, their insights are invaluable. Their research offers a glimpse into how RPA can be harnessed to simplify intricate auditing procedures, which parallels our drive for operational efficiency.

Madakam et al. [4] navigate the transformative landscape of digital workforces driven by RPA, thereby offering profound insights into the broader socio-economic implications of automation. Their work brilliantly aligns with our study's keen interest in the evolving dynamics of the workforce as it adapts to the age of automation. By emphasizing the importance of reskilling and adaptability, their research mirrors our exploration into the changing workforce dynamics.

Within the financial sector, Alberth et al. [5] underscore the imperative of comprehending RPA's capabilities. Their insights into RPA's pivotal role in financial processes resonate profoundly with our research's inquiry into its potential applications within the gift card industry. Their work elucidates the substantial efficiency gains achievable through RPA adoption and provides a solid underpinning for our study's core focus on process optimization.

Ketkar, Yashodhan and Gawade [6] dissect the effectiveness of RPA in data mining using UiPath, aligning seamlessly with our study's utilization of UiPath for automation. Their research fuels our approach to harnessing RPA technologies for data-centric tasks. Their study highlights RPA's prowess in data extraction and analysis, echoing the relevance of our data-driven endeavors. In a similar vein, Malathi et al. [7] scrutinize RPA's performance in automating the PDF download process, unveiling the efficiency gains that automation begets. Their insights harmonize seamlessly with our aspiration to optimize processes within the gift card industry. Their research unravels how RPA can seamlessly streamline document-related workflows, a theme that resounds throughout our study.

Sutipitakwong and Jamsri [8] evaluate RPA's effectiveness in fine-tuning laborious tasks, complementing our study's resolute focus on the seamless streamlining and optimization of workflows. Their research accentuates RPA's pivotal role in automating repetitive and manual tasks, a narrative that reverberates with our mission to enhance operational efficiency.

The symbiotic relationship between ChatBot technology and RPA to automate student management systems is leveraged by Gajra et al. [9], enhancing interactions and alleviating administrative burdens. The interplay of intelligent assistants and RPA reflects the potential for enhanced customer experiences and operational efficiency, a principle that embed within proposed solution. However, this paper centered on student-centric interactions, while proposed system tailors this synergy to the unique intricacies of the gift card issuing business, encompassing customer onboarding,

prepaid gift card related operation, and data management processes.

Enríquez et al. [10] undertake a systematic mapping study, casting a comprehensive net over the diverse applications of RPA within both scientific and industrial contexts. Their research enriches our understanding of the expansive landscape of RPA adoption. It provides invaluable insights into the myriad domains where RPA has left an indelible mark, imparting an enriching perspective to our exploration of RPA's multifaceted versatility.

In a pivotal role, Issac, Muni, and Desai [11] offer a meticulously delineated analysis of various RPA tools. Their work directs our selection and evaluation of RPA solutions, grounded in a deep understanding of the tools' capabilities. Their insights into the critical aspects of tool selection align with our research's practical implementation.

By synthesizing insights from these diverse studies, Research uniquely positions itself within the fintech landscape. Proposed system bridges the gap between legacy systems and modern APIs, offering a tailored RPA solution that optimizes end-to-end workflows while critically evaluating the broader socio-economic consequences.

Business Process and RPA

In the landscape of modern organizations, the concept of business processes plays a central and transformative role. Business processes are the lifeblood of an organization's operations, defining how tasks and activities are executed to achieve specific objectives and deliver value to customers and stakeholders. Understanding the fundamentals of business processes is essential to appreciate the significance of process optimization through Robotic Process Automation (RPA) and process mining.

Definition of Business Process

Business processes can be understood as structured sets of activities, tasks, and interactions that are designed to accomplish a particular business objective. These processes encapsulate the sequence of steps required to deliver products or services, manage resources, and meet organizational goals. They serve as the backbone of an organization's daily operations, guiding how work is performed, monitored, and improved.

Business processes can take various forms, ranging from simple to complex. They can include customer onboarding, order processing, inventory management, financial reporting, and more. These processes often involve multiple participants, systems, and data flows, making them intricate and dynamic.

Robotic Process Automation

Robotic Process Automation (RPA) represents a paradigm shift in how organizations approach the automation and optimization of their business processes. RPA stands as a groundbreaking technology reshaping the landscape of modern business operations. In an era marked by an increasing emphasis on digital transformation and automation across industries, RPA has emerged as a pivotal catalyst for enhancing operational efficiency, realizing cost savings, and elevating the customer experience.

At its core, RPA employs software robots, often referred to as "bots," to automate tasks that were conventionally executed by humans. These bots possess the capability to emulate human actions, such as logging into systems, copying and pasting data, and conducting calculations, all performed with a speed and precision that surpasses human capacities. By automating these repetitive tasks, organizations can liberate their human workforce to concentrate on higher-value activities that demand creativity, critical thinking, and problem-solving skills

Background and Problem Statement

This section provides the information about prepaid gift card issuing business industry, research objectives, and the significance of the research.

Prepaid Gift Card Issuing Business Dynamics

The prepaid gift card issuing business, an integral component of modern commerce, has witnessed exponential growth and adoption in recent years. The allure of convenience, personalization, and digitalization has led to increased reliance on gift cards for gifting, employee incentives, and customer loyalty programs. However, the industry's expansion has also brought about a set of intricate challenges in managing diverse operations, including client onboarding, gift card operation, customer services, and bulk card-related issues.

Legacy Systems and Operational Gaps

The prepaid gift card issuing business, an integral

component of modern commerce, has witnessed exponential growth and adoption in recent years. The allure of convenience, personalization, and digitalization has led to increased reliance on gift cards for gifting, employee incentives, and customer loyalty programs. However, the industry's expansion has also brought about a set of intricate challenges in managing diverse operations, including client onboarding, gift card operation, customer services, and bulk card-related issues.

Prepaid Gift Card Issuing Business Dynamics

Many established fintech companies still operate legacy GUI-based applications alongside modern API-driven systems. These disparate systems often result in operational gaps, delays, and potential errors due to the manual intervention required to bridge the technology divide. The coexistence of GUI-based applications and APIs poses a unique challenge in streamlining processes while ensuring data integrity and customer experience.

Rationale for RPA Integration

In response to the complexities of the prepaid gift card issuing business and the operational challenges posed by legacy systems and modern technologies, organizations have turned to Robotic Process Automation (RPA) as a transformative solution. RPA offers the promise of automating repetitive tasks, reducing manual errors, and enhancing operational efficiency. By seamlessly integrating diverse systems, RPA has the potential to revolutionize how companies manage their operations, ensuring a more efficient and seamless end-to-end workflow.

Research Objectives

The primary objective of this research is to develop and implement a comprehensive RPA solution that addresses the challenges faced by a prepaid gift card issuing business in Pinelabs company. Specifically, this study seeks to:

- Streamline and automate the workflow for customer onboarding and gift card related operations.
- Bridge the gap between legacy GUI-based applications and modern APIs, ensuring a cohesive and uninterrupted process.
- Evaluate the impact of RPA implementation on operational efficiency, time savings, and cost reduction.
- Analyze the socio-economic implications of RPA on

workforce dynamics, job roles, and job displacement within the fintech industry.

Significance of the Study

This research holds significant implications for both the fintech and RPA domains. The successful implementation of an RPA solution tailored to the prepaid gift card issuing business in Pinelabs company not only contributes to operational efficiency and customer experience but also provides insights into the broader applications of RPA in addressing operational challenges. Furthermore, the examination of socio-economic impacts sheds light on the nuanced consequences of automation on the workforce, fostering a deeper understanding of the evolving relationship between technology and human roles.

Methodology

In this section, Elucidate the methodology employed to develop and implement the Robotic Process Automation (RPA) solution tailored to the prepaid gift card issuing business in Pinelabs company. The integration of RPA, UiPath, Python (Flask), and legacy GUI-based applications, alongside modern APIs, forms the cornerstone of the proposed system approach.

The workflow begins with a customer-initiated request, communicated via email and accompanied by an attachment containing pertinent data, typically it can be any any form. The request is transformed into a service ticket within the ticketing tool, orchestrated by the designated assistant. A critical component of the methodology is the seamless integration between ticketing tool operations and the subsequent RPA-driven processes.
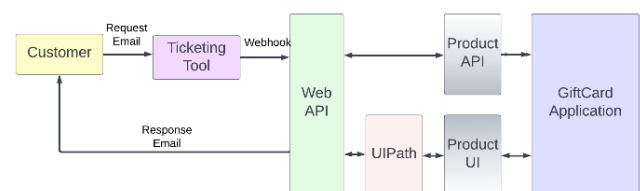

Figure 1. Architecture of end-to-end process automation for customer service request

A visual representation of the architecture for the proposed methodology is provided in Figure 1. The architecture diagram showcases the interconnected processes and technologies involved in the end-to-end automation workflow. This diagram offers a holistic view of the integration between the Ticketing tool, API

application, UiPath Orchestrator, and the product application, illustrating the seamless flow of operations.

The input for the process is derived from customer emails, which often include attachments or detailed requests. These emails serve as the trigger for the automation workflow. The primary goal is to efficiently process the incoming requests. The output of the process is a response email, indicating either a successful execution or a failure, accompanied by a comprehensive transaction report detailing the actions taken.
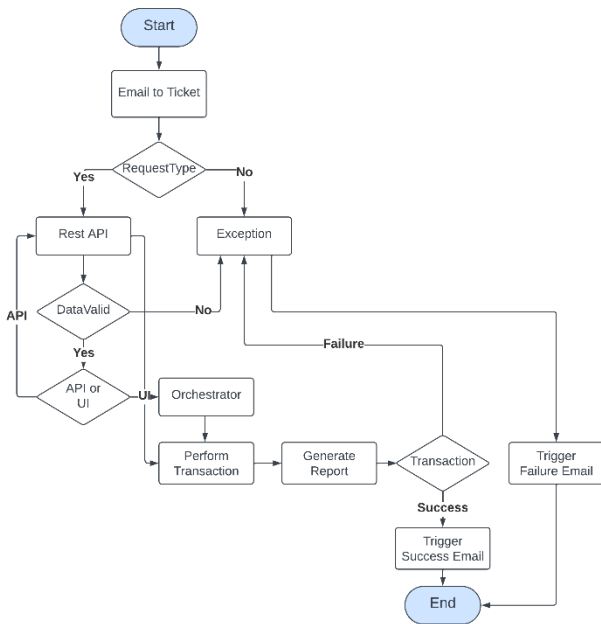
Figure 2. Flowchart of end-to-end process automation for customer service request

This synergy between automated Python API applications and the UiPath platform enables a seamless and agile approach to streamlining a wide range of business processes. The complete flowchart illustrating this automation process is thoughtfully presented in Figure 2, providing a visual roadmap of how these technologies collaborate to optimize operational efficiency.

Flask API Application

Upon triggering the webhook, a Python-based Flask API application orchestrates the subsequent steps of the automation workflow. This API application serves as the central hub for data validation, payload preparation, communication with the product application's APIs, and subsequent response handling.

GUI-Based Automation via UiPath

Orchestrator

In instances where requests necessitate interaction with the product application's graphical user interface (GUI), the Flask API application still performs user authorization and payload preparation. However, instead of API calls, the application interfaces with the UiPath Orchestrator. Orchestrator oversees the execution of pre-developed processes within the product application's GUI, facilitating a seamless, automated, and error-free sequence of actions. Outcome reports are transmitted to relevant stakeholders, completing the feedback loop.

UiPath Process Development and Integration

The UiPath process development involves the creation of workflows that replicate human interactions within the product application. Orchestrator manages the deployment and execution of these workflows, ensuring consistency and accuracy in the GUI-based interactions, as shown is Figure 3.
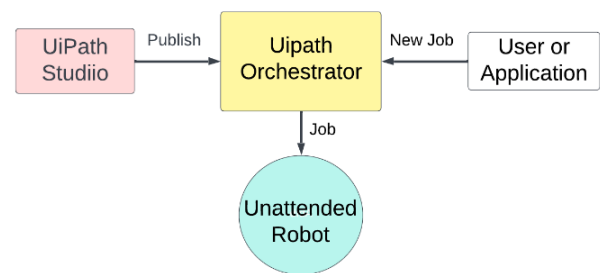

Figure 3. UIPath architecture

Our methodology capitalizes on UiPath's modular approach to enable efficient and precise automation. The meticulous implementation of this methodology synergizes RPA, Python and Flask library, and UiPath to streamline complex operations within the prepaid gift issuing business in Pinelabs company. It bridges the gap between legacy GUI-based interactions and modern APIs, ensuring an optimized, efficient, and customer-centric workflow.

Results

This section presents the empirical outcomes and findings of our implemented Robotic Process Automation (RPA) solution for the prepaid gift card issuing business in Pinelabs. The results are organized based on the different aspects and objectives of the study, showcasing the impact of the RPA solution on various key performance indicators.

Performance Metrics and Efficiency

For measuring performance and efficiency, we are using Full-time equivalent (FTE) as an indicator. FTE is a unit of measurement for the employee workload. It allows us to compare across various contexts. FTE is best suitable for calculating effort reduction or cost optimization for a project. 1.0 FTE is equivalent to a full-time worker. Equation 1 presents the formula for the FTE calculation.

$$FTE = Total\ hours\ /\ Employee\ working\ hours \qquad (1)$$

For this research automated process of two teams in the Pinelabs company, **Helpdesk team** and **Program activation team (PAT)**. Helpdesk team is responsible for gift card related operation handling and PAT is responsible for new merchant onboarding. Table 1 shows the FTE Efforts savings using RPA. FTE efforts are calculated based on one month of May 2023 data. This data contains total fulfilled requests and total UIPath tool run time. A total of 20 working days and 8 hours per day working hours are considered for calculation shown in Table 1.

Table 1. FTE Efforts Savings using RPA

Teams	FTE Efforts Savings (FTE)	Efforts savings FTEx160 (Hours)
Helpdesk	4.04	646.40
PAT	2.78	444.30

These efficiency gains are attributed to the automation of manual tasks, which streamlined processes and reduced the time required to handle customer requests. A total of **1090.7 hours** in a month is saved using the RPA solution.

Additionally, the capacity of the Program Activation Team to handle tickets exhibited remarkable growth, as depicted in the following Figure 4. As ticket handling increased from 602 in 2021 to 1302 in 2022. This surge indicates a remarkable **116.28%** improvement in the number of tickets handled. This achievement is a testament to the scalability and efficiency gains achieved through RPA implementation, illustrating its potential to accommodate higher workloads and enhance operational performance.

The substantial percentage improvement underscores the transformative impact of our RPA solution, positioning the Program Activation Team to address customer needs more effectively and efficiently. This enhancement positively impacts operational efficiency and contributes to heightened customer satisfaction as service delivery is expedited.

One notable outcome of the RPA implementation is the substantial reduction in Service Level Agreement (SLA) time for client onboarding by the Program Activation

Team. Previously, the onboarding process required an SLA of one week to onboard a new client. However, through the integrated RPA solution, Proposed system achieved a remarkable optimization, resulting in the reduction of the SLA time to just three days. This reduction signifies a **57.14%** improvement in the SLA time frame, allowing the Program Activation Team to onboard clients with greater efficiency and agility.
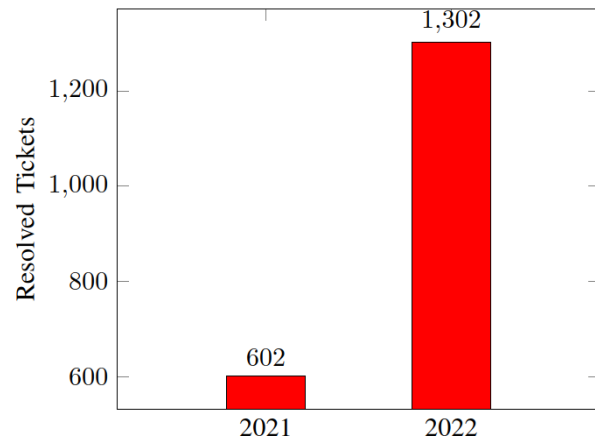

Figure 4. Annually using RPA resolved tickets

Compare to manual process execution which is performed by human, using UIPath RPA exception features unexpected error rate is minimized to almost **0%**. any exception or business error is captured by the UIPath bot and it will raise an alert to the assistant.

Process Streamlining and Optimization

Different type of request process like gift card related or on boarding related request process is streamlined through RPA and gives customer end to end smooth experience and quick response for the request. Optimizing process will reduce the process cycle time.

For example, current on boarding process for one client, RPA is taking 1 hour. And clients are on boarded in bulk. so, optimization in onboard process time can lead to higher FTE efforts savings and cost reduction. Optimization is directly related to efforts and cost which we try to reduce.

Socio-Economic Implications

Beyond the technical enhancements, the integration of RPA within the gift card issuing business presented significant socio-economic implications. The deployment of the RPA solution led to an evolution in the roles and responsibilities of the workforce, as well as an overall transformation in resource allocation.

Job Displacement and Reskilling: The introduction of automation prompted a shift in job roles. Tasks previously undertaken manually were now executed by the RPA solution, leading to a reallocation of human resources. While concerns regarding job displacement were recognized, proactive measures were taken to ensure a smooth transition. Workforce members were offered reskilling opportunities to acquire skills that align with higher value tasks, ultimately contributing to a more versatile and agile workforce.

Conclusion

This study has explored the transformative potential of Robotic Process Automation (RPA) in revolutionizing the gift card issuing business. Through seamless integration of RPA, UiPath, Python Flask application, Proposed system achieved substantial efficiency gains and process optimization. The reduction in processing time and error rates underscores the tangible benefits of automation, leading to a streamlined operational framework that accelerates processes and ensures precision.

Beyond technical improvements, RPA's socio-economic implications emphasize a harmonious coexistence between automation and workforce evolution. Our proactive approach to reskilling and reallocation mitigates job displacement concerns, enabling employees to contribute to higher-value tasks and innovation. The dynamic fusion of human expertise and machine efficiency emerges as a cornerstone of proposed system findings. While challenges in legacy system integration were evident, the potential of RPA remains vast. The convergence of RPA with cognitive capabilities and advanced machine learning opens avenues for adaptive automation and complex decision-making. Looking ahead, further exploration in these realms holds the potential to reshape industries and redefine organizational possibilities. Proposed system primarily pertains to the scope of analysis and the single-case context. A broader multi-industry analysis and comparative study with similar organizations could provide a more comprehensive perspective on RPA's impact. In summation, proposed system showcases RPA's multifaceted impact on the prepaid gift card industry, bridging technical prowess with socio-economic foresight. This research contributes to the discourse surrounding automation's evolution, presenting a future where RPA is not just a tool, but a catalyst for industry transformation and innovation.

Acknowledgment

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