

Development and Application of RPA Financial Robot Project-based Teaching Case Library from the Perspective of Industry-Education Integration

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Abstract: In the context of the digital economy and the digital transformation of finance, it is imperative to create a teaching resource system that is in line with actual operations in view of the pain points of the separation of accounting teaching content from the actual business of enterprises and the lack of systematic practical cases in colleges and universities. The research adopts the method of in-depth collaboration between schools and enterprises to jointly develop an online project case library covering high-frequency scenarios such as procurement, sales, and fund management, and reconstruct a multi-level curriculum system. Practice has proven that this model can effectively strengthen business understanding and technical application capabilities, and achieve seamless connection between classroom teaching and corporate positions. The research provides a replicable reference path for the innovation of digital and intelligent accounting talent training mechanisms and the reform of practical teaching in vocational colleges.

Keywords: Integration of industry and education; RPA financial robot; Project-based teaching; Case library

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1. Introduction

As the digital transformation pilot work of small and medium-sized enterprises continues to advance, the application of robotic process automation (RPA) in corporate financial management is becoming more and more common, which puts forward urgent requirements for comprehensive accounting talents with digital intelligence practical capabilities. At present, most relevant teaching explorations focus on theoretical explanations or single software interface operations, lacking dynamic case resources based on real business logic and reusable scenarios, resulting in a structural misalignment between teaching supply and industrial demand. Exploring the construction of a project-based case library under the integration mechanism of

industry and education has important academic and practical value for improving the digital finance and accounting curriculum system and rationalizing the path of collaborative education between schools and enterprises ^[1].

2. The value of RPA financial robot project-based teaching case library construction

2.1. Connect with the intelligent financial needs of enterprises and improve the adaptability of talent training

Robotic Process Automation (RPA) is an intelligent software that can simulate and enhance the interaction process between users and computer systems based on preset business processing rules and operating behaviors, automatically complete a series of specific workflows and expected tasks, and effectively realize the integration of people, business, and information systems. The construction of a project-based teaching case library can transform high-frequency business scenarios such as corporate procurement, sales, and fund management into standardized teaching projects, making professional teaching content closer to the actual job responsibilities of the company, effectively shortening the distance between education supply and job demand, and significantly improving job competency ^[2].

2.2. Promote curriculum and teaching reform and promote the digital transformation of professional content

There are multiple participants in the integration of industry and education, and all parties have different interest demands. Only by promoting production through education, using industry to assist education, and working together can the integration of industry and education be continued and deepened. The project-based teaching case library integrates RPA technical principles and script development with classic financial management logic, and is based on a modular structure, forcing fundamental changes in the traditional syllabus, teaching methods, and assessment methods. The reform has accelerated the cross-integration of professional basic courses and digital intelligence technology, providing operational support for the upgrading of teaching models and updating of course resources for accounting majors.

3. Development of RPA financial robot project case library from the perspective of industry-education integration

3.1. Principles of case library development

The construction of the case library should be guided by capabilities, driven by projects, rely on school-enterprise cooperation, and be constantly updated. The development process aims to improve comprehensive capabilities such as technology application and business understanding. The teaching design is based on the real business of the enterprise and integrates abstract technical instructions into specific financial problem-solving paths to form project units. Both the school and the enterprise jointly participate in demand research, case design, standard formulation, and other work to ensure that the cases come from front-line practice. Establish a regular maintenance and update mechanism to ensure the advancement and practicality of teaching content based on technological development and changes in corporate practice.

3.2. Specific development standards and structural elements of unit cases

The development of standard unit cases is based on strict specifications and transforms business pain points into teaching task goals. The case design has standardized operation guidelines and details the layout flow chart, data dictionary, and script logic, so that the business context and technical logic can be clearly correlated. According to the characteristics of enterprise business changes, the case sets up an expansion thinking module to guide users to conduct secondary designs for script optimization, closely following dynamic situations such as rule changes, and requiring the design of improvement plans with strong scalability, thus forming a standardized development paradigm with a rigorous structure.

3.3. Case design of real high-frequency financial scenarios of enterprises

3.3.1. Basic cognitive categories, financial automation concepts and instruction rule application cases

The case design starts from the most basic single-point automation tasks of the enterprise and selects single business links such as invoice header extraction and basic data comparison as the entry point. The design plan mainly displays the basic technical elements of RPA software, integrating core instructions such as mouse clicks, text input, keyboard simulation, and variable assignment into specific tasks. The teaching design is arranged to guide students to complete basic operations such as variable type definition and basic condition judgment. Through simple and intuitive automation process demonstration and practice, you can have a preliminary understanding of the operation logic of automation technology and lay a good technical operation foundation for future advanced learning.

3.3.2. Process modeling category, high-frequency business process dismantling and logical construction cases

The case design is based on high-frequency business processes such as corporate procurement reconciliation and accounts receivable verification, and mainly cultivates the ability to standardize the dismantling and logical sorting of business processes. The design plan requires transforming complex unstructured business processing steps into structured flow charts and data flow tables. The teaching design guides the sorting out of business branches, determines trigger conditions, determines data transmission relationships, and forms a strict business logic relationship map. Training to transform actual business into algorithmic logic, master the core methods of converting from a business perspective to a technical perspective, and improve the ability to model and architect complex businesses.

3.3.3. Script development class, control extraction, data processing and exception capture cases

The case design goes deep into the practical level of software development, relying on complex tasks such as multi-table data integration, structured extraction of PDF invoice data, and cross-interface data entry. The design plan must accurately extract all web and desktop interface controls and write regular expressions to efficiently clean and parse unstructured text. In order to ensure that unexpected situations will not occur due to pop-up interference, network delay, data loss, and other reasons when the software is running, a nested exception handling mechanism and logging module are designed. Rely on high-intensity technical details practice and script debugging to improve code stability and execution efficiency.

3.3.4. Comprehensive practical training, cross-system, multi-department business collaborative automation cases

The case design creates a scenario covering the whole process collaboration of ERP system, CRM system, tax platform, and online banking system, simulating the real complex business ecology of the enterprise^[3]. The design plan includes all automated closed loops from sales order receipt, automatic invoicing, capital inflow matching, automatic generation of financial vouchers, etc. In teaching, advanced technical skills such as process modeling, interface calling, data perspective, and automated scheduling need to be comprehensively used to solve cross-department data barriers and system compatibility issues. Through comprehensive practical exercises in all scenarios, system integration capabilities and overall deployment capabilities of automation projects have been comprehensively improved.

4. Practical application of RPA financial robot project case library from the perspective of industry-education integration

4.1. Business process dismantling and case transformation

The school-enterprise collaboration team conducts data desensitization and modular reconstruction of the company's real accounts payable reconciliation, purchase write-off, expense reimbursement, sales invoicing, and other typical business processes. It was sorted and disassembled into sub-processes such as reading business system document data, calling external platform interfaces to batch verify the authenticity and status of invoices, comparing fund transfer records, and automatically generating accounting vouchers in the accounting system. A clear business data flow diagram, variable comparison table, and field mapping relationship table were formed, which served as the main material for practical teaching.

In the specific practical operation process, it is necessary to draw a standardized flow chart based on detailed business logic, design variable types and data dictionaries, and clarify the underlying path of cross-system data interaction and parameter transfer. Through in-depth analysis of the underlying logic, complex unstructured business processing steps are transformed into structured algorithmic logic, conditional branches and decision trees, and the implementation method of converting real accounting business into automated technical solutions is mastered, accurately matching the practical skill requirements of enterprise automation positions, truly realizing the seamless connection between business logic and technical implementation, ensuring that every step of operation can be traced and verified, and effectively breaking through the understanding barriers between the business side and the technical side.

4.2. Standardized training and script writing

The practical training process is based on the elements of standard unit cases, and the platform directly provides VAT invoice data, customer header information, and product detailed lists in real business scenarios. It is required to complete precise control picking of various complex interface elements, interface coordinate positioning, regular expression writing, and data cleaning rule setting in the designated RPA software to ensure that the written script can efficiently capture, parse, and process various PDF documents, spreadsheets, image data and other unstructured text, and accurately enter it into the relevant system to generate a queue to be processed.

In response to emergencies such as inconsistent document information, network transmission delays, verification code blocking, and system-forced pop-up interference that occur during software operation, a

nested exception capture mechanism and error logging module are specially set up. By submitting code and performing automated system verification and running tests, timely feedback of high-frequency error logs and code line numbers helps to correct code logic loopholes, variable assignment errors, infinite loops and other problems, and comprehensively trains code writing standards and the ability to debug scripts under unexpected business conditions, making automated scripts highly stable and fault-tolerant when unattended, greatly improving the actual running quality of enterprise-level automated scripts ^[4].

4.3. Multi-system collaboration and project drills

The case library has built a comprehensive training environment including accounting system, business management system, electronic tax bureau, online banking system, etc., and carried out cross-department and cross-system automated collaborative drills. The robot automatically logs in to the online banking platform to download electronic statements and transaction statements, exports detailed accounts from the accounting system, completes the automatic reconciliation of accounts and the generation of a difference adjustment table and a list of unsettled items, and finally fills in the processing results into the designated template and completes the generation of data pending accounts and system vouchers, without manual intervention in the entire process.

During the drill, technical skills such as process modeling, interface API calls, UI element automation, data pivoting, and automated scheduling should be comprehensively used to solve problems such as cross-system data barriers, invalid identity credentials, and format incompatibilities. The entire process comprehensively simulates the overall work of real positions in the enterprise, guides and standardizes the packaging of automation scripts, environment deployment, voucher security encryption, and scheduled task configuration, and strengthens the overall integration, operation and maintenance management, and landing skills of automation projects in complex IT environments, so that it can independently undertake the development, testing, and maintenance of enterprise-level automation processes, and fully adapt to the real environment of modern enterprise digital transformation.

4.4. Financial data integration and automatic reporting of statements

The practical training environment must simulate the financial accounting scenario of multiple branches and multiple sets of accounts of a group enterprise. The RPA robot can be programmed to automatically log in to various independent accounting systems and back-end databases at regular intervals, obtain underlying financial data such as balance sheets, income statements, and account balance sheets in batches, complete cross-system data format conversion, field alignment, and standardized cleaning and sorting, completely solve the problems of data islands and information fragmentation between multiple systems, and build a unified data analysis base.

The financial robot automatically fills the cleaned data into the preset management report template, and uses built-in formulas and logical judgment rules to complete cross-table data checking and matching. After the data is verified to be correct, multi-dimensional management cockpit dynamic charts are automatically generated, and email services are called to distribute them to relevant management positions. This realizes unmanned automated processing of the entire process of financial data from decentralized extraction, cleaning, and sorting to visual reporting. It greatly improves the efficiency and accuracy of management report issuance, reduces the chance of errors caused by manual summary and copying, provides

enterprises with high-quality digital and intelligent financial accounting practice support, and promotes the transformation of financial analysis work from basic accounting to management decision-making support.

5. Conclusion

Focusing on the development and application of the RPA financial robot project case library, the curriculum system was rebuilt, school-enterprise cooperation was strengthened, and the teaching content was closely aligned with job requirements. Through real-life scenario transformation, standard unit case design, and online platform iterative sharing, we explore implementation paths for digital and intelligent financial talent training from the perspective of integrating production and education. With the development of technology and the continuous deepening of corporate practice, the dynamic update mechanism will always ensure the advancement of case resources and provide continuous practical teaching support for the cultivation of compound talents.

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