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Applications of Robotic Process Automation in Smart Governance to Empower COVID-19 Prevention

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Abstract

This paper explores how the robotic process automation (RPA) can benefit financial applications. To fully exploit RPA technologies potential will empower higher education and finance, which makes a better future together. The mechanism of RPA to mimic the process of human thinking in solving financial problems was discussed. Important technologies, challenges from

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1. Introduction

Since the COVID-19 pandemic broke out, there are mounting evidences supporting the investigation that changes in contact patterns shape the dynamics of the COVID-19 outbreak 1. Implementation of strict lockdown strategies turned out to be the effective approach to block domestic and abroad virus transmission. As a result, keeping distance and remote work has had a disastrous impact on society and finance service. For a long time, assistants for providing governance consultation were thought to be indispensable for governance activities,

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especially for mounts of manual financial work or earthquake science with high repeatability and low added value. With the tide of reducing virus transmission, unmanned technologies have been broadly developed. Facing with the question of how could finance do more work without hiring more people or even reducing people. As one technology with high autonomy of artificial intelligence (AI), robotic process automation (RPA, or digital labor) is the answer, which defined as a software solution that simulates/mimics the steps of non-subjective process, enhances the interaction between human and computer, and executes repeatable tasks based on certain rules by using the technology in the user interface layer. Another RPA definition by the IEEE Standards Association as a preconfigured software instance that uses business rules and predefined activity choreography to complete the autonomous execution of a combination of processes, activities, transactions, and tasks in one or more unrelated software systems to deliver a result or service with human exception management [3].

As one of 100 radical innovation breakthroughs for the future technologies [2], RPA will lead an irreversible evolution between AI and robots. Trough models and algorithms of producing a capacity to learn and to perform cognitive tasks, AI systems were believed as highly autonomous information-processing technologies. RPA, with a short development history, is a technology that uses low-code visual drag-and-drop systems to automate the workflow of a process. It's commonly accepted that Warren McCulloch and Walter Pitts put out the intelligence work in 1943 for the first time. In 1987, American Institute of Certified Public Accountants put the intelligence into financial management for the first time. Since 2000, UiPath company began to build up a platform for RPA. In 2016, Deloitte and Kira Systems built RPA into finance and auditing. Since then RPA was applied in a diverse fields, such as accounting, finance, auditing, procurement, supply chain management, human resources and customer service.

Nomenclature

AI	artificial intelligence
Chatbot	cloud intelligent chatting robot
OCR	Optical character recognition
RPA	robotic process automation

2. Key technologies and infrastructures of RPA

Combined with AI technologies (such as natural language processing, speech recognition, machine translation, image recognition), RPA have been integrated into financial service in business and universities. As one of the most successful application of RPA, cloud intelligent chatting robot (abbreviated to chatbots) empowers finance service in university through changing contact patterns.

By identifying the keywords in the question description and automatically provide standard replies to customers, chatbots reduce the pressure of financial reimbursement and improve the satisfaction with financial services for teachers and students. Chatbots are endowed with human intelligent thinking by rules and algorithms to complete repeated basic answers and complex management work. To improve the exactness of chatbots, a set of predefined rules and scripts for keywords must be written into the program to yield predefined answers. Based on clearly predefined rules, the chatbot could automatically provide answers with simultaneously collecting information data. Now the key technologies are AI technologies, natural language processing and machine learning. More cloud computing and conversational technologies are integrated into the intelligent chatbots. The mainstream installation mode is to be integrated in different ecosystems including mobile office ecosystems, social platforms (such as network) and messenger applications (such as Facebook, twitter, Tiktok, Tallmall, JingDong and Wechat). Others are standalone applications. On the 8th China (ShangHai) International Technology Fair, a disinfect-robot with a china-self-developed robot core control system integrated with indoor scanning laser acoustic microscope technology and 3D visual recognition technology, it can complete the killing of virus at terrain circumstances.

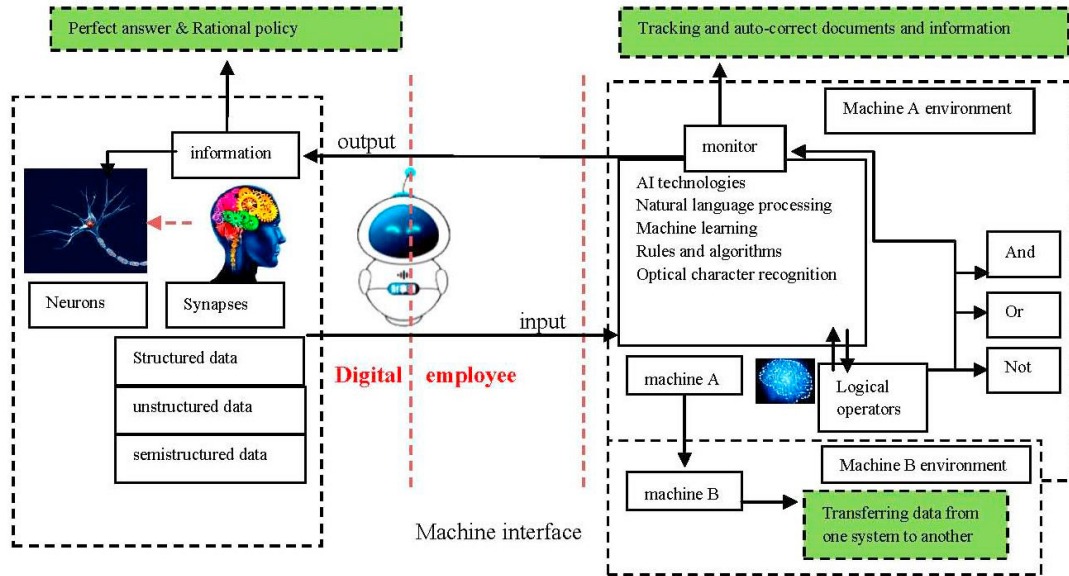


Fig. 1. The mechanism of RPA to mimic the process of human thinking

3. Applications and merits

In China University of Geosciences, we deployed the chatbot CaiShitong embedded in Wechat application to provide 24 hours online answer service. Expense reimbursement is the most common financial activity in universities with the highest participation of students and teachers. The merits are as following:

Customer satisfaction with low costs. Without any body contact, it serves all departments of finance on the cloud. After the utilization of intelligent chatbots, a large number of telephone calls from consultants and a large number of telephone answers from financial staff has been cut into chatbots on the applications on smart phone, which save consultants and finance staff both time and energy. It's estimated that a software robot can cost as little as one-third price of an offshore full-time employee, and do the work of two to five full-time employee through working 24/7. Therefore, chatbot make it possible to achieve economic benefits.

Compliance. Without subjectiveness but armed with clear rules, RPA provides great improvements in accuracy and cycle time with high efficiency, which are easy and quick to implement compared to the traditional process automation. RPA can perform the same tasks without error by removing employee from tedious and repetitive tasks, which leave employees with creative and competent activities and handling of exceptions.

Great performance & quality. Being trustworthy, consistent and tireless, chatbot automatically conducts 24 hours real-time conversations by answering teachers' and students' questions, and handles all kinds of financial business online intelligently. Meanwhile, data security, and increased productivity are the typical benefits.

4. Challenges for the next generation RPA

The first and foremost challenge is cooperativeness. Good performance of RPA stems from improvement of AI algorithms and technologies. Chatbot will evolve into virtual assistant and get smarter compared with smart human assistants to get progressively better at understanding and responding to user questions and commands. Good performance needs frequent maintenance from improved AI algorithms and technologies. In the foreseeable future, the line between smart human assistants and robot will blurred with a human+robot mode. Smart robots could be integrated into every aspect of financial activities. The future of RPA is closely linked to the future of AI and chips which the workflow will broaden to financial appointment, financial analysis, budget and accounting. Apparently, there is a long way for intelligent robot to order a financial appointment, or order an interview. Blockchain will put a

though influence on the transactions and financial services. Furthermore, to make visualization, sophisticated dashboards are designed to be integrated into RPA

Another challenge is responsiveness. If emergency incidents or other exceptions happen, RPA will follow no specific rules, which need employee to do mammal work. To send spontaneous alerts, peer-to-peer communication should be met. Solution to spontaneous reaction could be realized by machine learning. Thus AI powered robot will get better at understanding the emergency extent and intent behind human's questions. Effective actions and when the software needs upgrade, RPA could auto-upgrade at the same time.

In the end, readability and interconnectedness is a final challenge to be overcome. Reading and transforming the unstructured data, such as video, picture or voice have to ask aid from optical character recognition (OCR), big data, and other interconnected transforming technologies. Between these interconnected technologies, several various leading basic theories are also desirable.

COVID-19 prevention technologies have been increasingly tied up with artificial intelligence technologies applications, which drives the advances of digital economy. To fully exploit RPA technologies potential will empower higher education and finance, which makes a better future together. This discussion of RPA would cast a positive effect in solving financial problems under the circumstances of smart governance. In the following research, theoretical and conceptual discussion of RPA will be highly desirable.

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