

FOR IMMEDIATE RELEASE

Robotic Process Automation (RPA) using AI technology

Verified ability to automate 70% of certificate processing in receipts and disbursements

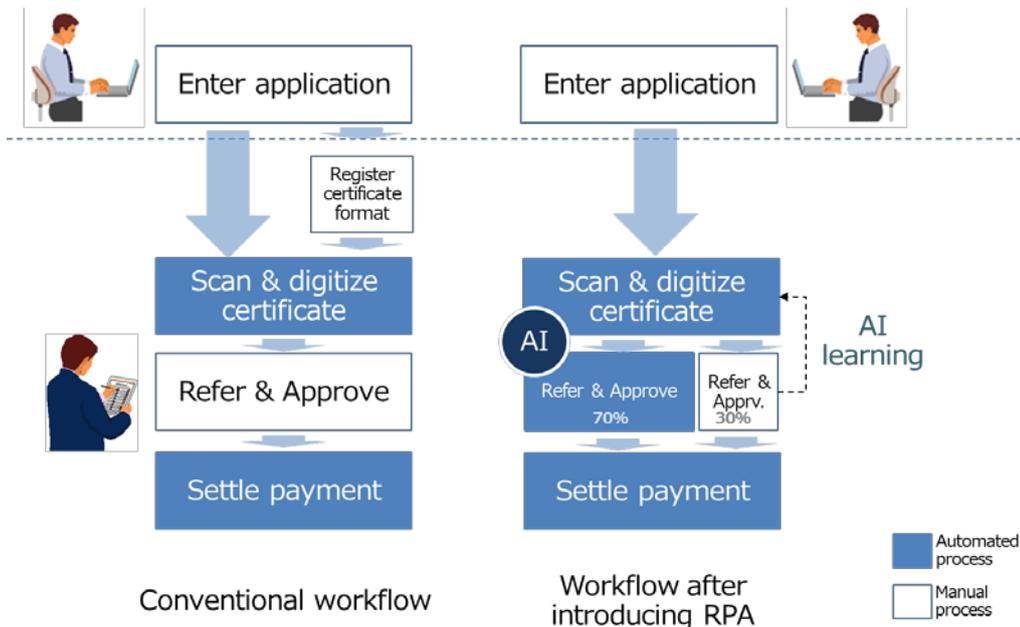


Figure 1. Disbursement workflow comparison

Tokyo, June 22, 2017 --- Hitachi, Ltd. (TSE: 6501, Hitachi) today announced the development of robotic process automation (RPA) technology which employs AI⁽¹⁾ to automate tasks involved in processing receipts and disbursements, from reading certificates through to approval. A field-test of an RPA system incorporating this technology at Hitachi Management Partner Corp. (Hitachi MP), a subcontractor for shared services related to human resources and finance for the Hitachi Group, resulted in confirming that automated processing was possible for 70% of the certificates. This system is now being considered for full scale operation from October 2017. Hitachi intends to contribute to Workstyle Reform by introducing this system to improve the efficiency of administrative tasks in companies.

In recent years, the outsourcing of administrative tasks within companies to an external specialist company, business process outsourcing (BPO), has become widespread. At the same time, companies undertaking BPO are increasingly challenged to cope with the growing workload and shortage of workers, and are looking to introduce RPA systems which provide automated processing of tasks by

robots. A typical administrative task is certificate confirmation, where the information entered by an applicant to a computer is cross-checked against a certificate, such as that for disbursement. Using OCR (optical character recognition) technology, it is possible to automatically read text information from pre-registered certificates but if the format is different, then a human operator is required to manually register the new certificate format. Further, as the referencing and approval process also requires confirmation by a human operator, there are still many tasks that need to be handled by humans.

To alleviate this issue, Hitachi developed AI technology that can read text information from various certificate formats, cross reference the information with that entered by the applicant, and determine whether to approve the application. The RPA system implementing this technology realized automated processing in 70% of certificates. The AI technology developed consists of the following two types:

1. AI technology to identify word context

In addition to identifying necessary information from the certificate for referencing and approval, such as Purchaser, Vendor, Invoice amount, it is necessary to recognize the attribute of the words, e.g. “this word means a monetary amount” or “this word means a company name.” With the technology developed, the relationship with other surrounding words and characters, are analyzed to recognize the attribute of the word. For example, the AI identifies the attribute by looking at “if there is a yen mark on the left side, then this is a monetary value” or “if there is a comma every 3 numerical digits, then this is a monetary value,” etc.

2. AI technology to estimate certainty of text data set

It is possible to automate approval from data sets by training the AI to learn the necessary item set for referencing. For example, if a condition is set to “approve payment when items that correspond with ‘Purchaser,’ ‘Vendor,’ and ‘Invoice amount’ exist” for receipts and disbursements tasks, then if an item such as ‘Vendor’ cannot be identified, the AI will determine that payment cannot be made and forward the certificate for confirmation and approval by a human operator. AI technology based on combinatorial optimization was developed to determine the ideal word set (character information set) for approval from combinations of word set candidates for each item. With this technology, word sets are ranked in order of certainty, and through learning the AI can increase precision. The highest ranked word set is then selected, and used to automate the approval decision-making process.

Invoice

A Bill to: ABC Co., Ltd.

C Amount due ¥7,020

B XYZ Co., Ltd.

Street address
City, State, Postcode

Description	Unit price	Quantity	Tax	Amount (incl. tax)
Item A	¥1,000	2	¥160	¥2,160
Item B	¥1,500	3	¥360	¥4,860
	D		E	
Total				¥7,020

1. Identify word context

A B Recognize enterprise name by indicators such as "co., ltd."
C ~ E Recognize monetary amount by indicators such as starting with "¥" or a comma every 3 digits

2. Estimate certainty of text data set

A Company name after "Bill to"
→ Highly likely to be "Purchaser"
B Company name near address
→ Highly likely to be "Vendor"
C Value in bigger point after "Amount due"
→ Highly likely to be "Invoice amount"
D E A value not in proximity to "invoice" and printed in smaller point
→ Low likelihood of being "Amount due"

➔ **A B C** text data set is the most likely to be "Purchaser," "Vendor" and "Invoice amount"
Determine that the information can be approved

Figure 2. Image of technology to identify the attribute of words and estimate certainty of text data set

The certificates that were forwarded to a human operator by this RPA system are automatically used as learning material for the AI thus eliminating the need for human intervention in improving the accuracy of the system.

Applying the AI technology developed to RPA, Hitachi has developed a Class 2⁽²⁾ RPA system which automates the receipt and disbursement process from reading the certificate through to approval. In addition to adopting the system for receipt and disbursements from October 2017, Hitachi MP will apply the system to other administrative processes such as for travel expenses and end-of-year tax adjustments, Further, by leveraging Hitachi Group know-how, Hitachi will extend this system to other sectors such as finance, insurance and public services. Hitachi aims to contribute to Workstyle Reform by promoting this system and improving the efficiency of administrative tasks in companies.

(1) AI: Artificial Intelligence

(2) Class 2: The second highest level in the three levels of RPA technology, indicating RPA able to process unstructured data or knowledge.

About Hitachi, Ltd.

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, delivers innovations that answer society's challenges. The company's consolidated revenues for fiscal 2016 (ended March 31, 2017) totaled 9,162.2 billion yen (\$81.8 billion). The Hitachi Group is a global leader in the Social Innovation Business, and it has approximately 304,000 employees worldwide. Through collaborative creation, Hitachi is providing solutions to customers in a broad range of sectors, including Power / Energy, Industry / Distribution / Water, Urban Development, and Finance / Government & Public / Healthcare. For more information on Hitachi, please visit the company's website at <http://www.hitachi.com>.

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