

Introduction to AI and Robotic Process Automation

Robotic process automation (RPA) is one of the fastest-growing segments in the enterprise IT space. Rapid adoption, driven by simple user interfaces and rapid deployment timelines, have generated massive cost savings for corporate back office teams. As a result, spending on RPA solutions is expected to grow from \$250 million in 2016 to over \$2.9 billion in 2021 according to Forrester.

Business Processes in which RPA can be used



Take over repetitive tasks that employees carry out **50-60** times a day



Periodic reporting, data entry and **data analysis**



Mass email generation, archiving, extracting



Conversion of data formats and graphics



ERP transactions



Process lists and **file storage**

KEY TAKEAWAYS:

- Understand the differences between RPA and AI
- Identify practical use cases and ROI
- Evaluate market leaders, value proposition, and market size
- Combine RPA + AI to automate increasingly complex tasks

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WHAT IS ROBOTIC PROCESS AUTOMATION?

Robotic Process Automation (RPA) is technology that allows businesses to automate repetitive tasks, thereby freeing up workers to step away from tedious activities and focus on work that requires a more "human" touch. A wide range of industries, including finance, healthcare, and retail, are rapidly employing RPA to fully or partially take over duties that once required heavy human interaction or to work collaboratively with employees to improve efficiency and accuracy. Unlike Artificial Intelligence (AI), RPA is not a "thinking" technology. Instead, RPA simulates human interaction within an interface, such as entering data into a field and clicking "Send," and repeats it, allowing mundane activities like data entry to be automated.

While traditional automation processes involve programming a machine to perform a specific duty within a process, RPA utilizes software robots that are capable of being taught entire workflows and how to use multiple applications. Because these software robots have the ability to manipulate multiple types of software they are capable of taking on the multiple steps required to complete step-based tasks. For example, RPA software robots can take over the repetitive workflow of processing online customer form submissions by checking that the form was completed, filing the information in a database or sending it to the appropriate parties within an organization, and emailing the customer notifying them that their form was received. Like training a human worker to use the several types of software needed to complete the form processing workflow, RPA software robots can be trained to operate each program. The capacity to automate processes like these can free up a great deal of employee time as "10-20% of human work hours are spent on dull, repetitive tasks." [9]

One of the biggest benefits of RPA is that it does not require a program upheaval to implement as it can be integrated with most existing systems and processes. If a business relies on Microsoft Excel for database management, for example, it can train RPA software robots to use the same program when task repetition is involved. This feature also allows RPA to be used as a collaborative resource rather than a replacement for human workers.

VENDORS



POPULAR USE CASES

DOCUMENT CLASSIFICATION

The process of routing and filing documents can be a simple but repetitive procedure requiring a large time investment from employees. RPA can apply a learned model to quickly sort documents into categories and even split large files containing a high number of pages into multiple classes. RPA's software robots can rename existing files to improve consistency and restructure folders to add organization, making it useful for both sorting new documents and bringing order to archived files.

REPORT BUILDING

Report building is another tedious project that often requires input from multiple applications and parties. Using RPA to automate reporting offers a big time savings to businesses. RPA can pull information from multiple sources to generate reports quickly and efficiently while also eliminating the errors that can occur when a human worker is attempting to extract data from numerous sources.

DATA ENTRY

The process of entering data into multiple applications and checking for errors is labor intensive and time consuming. Since many programs simply cannot communicate with one another, employees often have to enter the same data multiple times, leading to inconsistencies and keying errors. Since RPA software robots can learn multiple types of software, they can take data and enter it into all the necessary applications faster and more accurately than human employees. They can also check for inconsistencies and even be assigned rule-based activities such as invoice coding.

EMAIL PROCESSING

For businesses that receive a high volume of emails, sorting and processing them can be a daunting task requiring many hours and multiple individuals. With RPA, emails can not only be automatically forwarded to the correct individuals but also be identified and processed. For example, data from emails being sent to Accounts Payable could be received by RPA software robots and entered into a database or accounting program for processing. Emails for assistance with issues such as username lookups or password resets can also be handled without the need for human intervention.

FRAUD DETECTION

Detecting fraud in the banking and retail industries often requires employees to gather and assess a large amount of data. RPA can increase the efficiency of this process by noticing and reporting anomalies to employees and monitoring purchasing activity in real time.

VALUE PROPOSITION

COST SAVINGS

The projected cost savings from implementing RPA varies depending upon the amount of work that can be automated, but some businesses have reported seeing as much as a 300% return on investment (ROI) in the first year.[10] These savings come from a variety of factors, including:

- Reduced processing costs for documents, emails, and more
- The ability to perform outsourced tasks in-house
- Higher value-add work being completed by employees
- More tasks being completed in less time than is required by human workers
- Fewer employees required for tasks such as data processing, with an estimated "25-40 percent labor cost reduction in both IT and business process environment." [2]

TIME SAVINGS

An estimated 70-80% of rules-based tasks can be automated.[9] By automating the mundane tasks that fill up a large portion of a worker's day, RPA enables employees to spend less time on mindless activities and more time on other work, such as customer interaction.

RPA also allows tasks that take a human worker hours to complete to be finished in a matter of minutes. Take for example the case of The Volvo Group, which implemented RPA in its accounting department. Financial report validation that took workers 4 days per month to complete was automated by RPA and completed in two minutes.[3] Additional time savings include:

- Eliminating time spent correcting issues stemming from human error
- Increasing productivity by limiting redundant tasks
- Improving efficiency by allowing RPA to work within programs that cannot communicate with one another

By allowing RPA to handle mundane, rule-based activities, businesses can improve employee productivity, cut costs, and eliminate human error.

MARKET SIZE

In 2017, the RPA global market size was valued at USD 357.5 million.[5] Forrester projects that number to be USD 2.9 billion in 2021[7], while a Grand View Research report projects it to be USD 3.11 billion in 2025, demonstrating a compound annual growth rate of 31.1%.[6]

INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) is a broad term that refers to the simulation of human thinking in machines. AI exists in varied forms, some more advanced than others, but most AI systems are capable of performing tasks that once required aspects of human intelligence such as reason and problem solving.

Whereas RPA requires structured data to perform the same task or tasks repeatedly, AI has the capacity to assess less structured data and make decisions based on that information. AI can be found in a broad range of applications, from something as simple as a media application recommending new shows based on viewer watch history to more complex applications such as a driverless car making split-second decisions on the road.

Machine learning, a subset of AI, is particularly beneficial for applications where tasks are not always repetitive or choices need to be made about what actions to take. With machine learning, a system can continually pick up new information to modify its own behavior rather than being limited to pre-programmed rules. Just as a human adjusts his or her actions based on factors like environment, previous experiences, and trial and error, a system equipped with machine learning can change the way that it operates or handles a task to improve efficiency and accuracy. Since AI systems are also capable of making advanced computations, systems with machine learning can also take new and historical information and make predictions about the future.

POPULAR AI TOOLS FOR RPA

ABBYY - ABBYY is a software company that specializes in optical character recognition.

Cloud APIs - Google Cloud, Microsoft Azure, and IBM Watson offer cloud-based APIs that enable decision making in RPA workflows.

Python/R - A company with a Data Science team could invoke Python scripts in an RPA workflow, enabling integration with Tensorflow and other popular data science libraries.

USE CASES

COMPUTER VISION

Optical Character Recognition (OCR) is technology that can transform text from unchangeable documents, such as a scanned file or handwritten letter, into editable type. OCR analyzes an image and makes guesses about each character based on training and, in some cases, previous learning experiences. Scanners or cameras paired with OCR software are particularly helpful for digitizing old records.

Image Recognition is a form of AI that allows a computer to identify what it "sees" in an image. Similar to OCR, Image Recognition software is trained with thousands of images that allow it to begin recognizing objects when they appear in new images.

NATURAL LANGUAGE PROCESSING (NLP)

A **Chatbot** is software that simulates human conversation. Chatbots for both verbal and typed communications exist and are popular for tasks like taking orders, making reservations, or handling online support. Chatbots can learn from previous interactions and apply that knowledge to new problems.

Entity Resolution refers to the capacity to resolve multiple references to the same entity, such as when a single customer is linked to multiple phone or account numbers in a database. AI's ability to understand that the same entity may be referenced in different ways can add organization to chaos and even shrink complex databases by removing duplicates.

ANOMALY DETECTION

AI is employed heavily in industries such as finance for fraud detection. Systems are able to detect anomalies for events like credit card purchases. In addition to noticing odd activity such as a card being used in another state or country, AI can also learn customer spending habits and report when an unusual purchase has been made.

PREDICTIVE ANALYTICS

AI can apply **Predictive Analysis**, or the ability to look at an organization's historical data, parameters, etc., and use the outcomes of those figures to suggest the best strategy for the future.

Scoring is the task of taking information from a previous dataset and applying it to a new dataset to solve a problem or gain insight. For example, a retailer could take year-old information on return rates from a line of clothing and apply that data to a new line to help with budgeting and forecasting.

RECOMMENDATION ENGINES

Using AI to handle **FAQs** from customers can be implemented in collaboration with Chatbots, freeing up employees to perform other duties and opening up 24-hour customer service support opportunities.

AI can be implemented for **search engines** to help with factors like ranking algorithms. By noticing clicks and trends, AI can automatically update the top results of searches.

AI MARKET SIZE

International Data Corporation projects the AI market size to hit USD \$77.6 billion in 2022, up significantly from the 2018 forecast of USD \$24 billion.[4]

VALUE PROPOSITION

AI offers the capacity to automate an increasingly larger portion of tasks. More automation means lower operating costs in addition to freeing up employees to focus on other work. While improved operations, the removal of human error, and increased forecasting capabilities may outweigh cutting costs, the potential money-saving appeal of AI cannot be overlooked.

Take for instance the case of a Florida hospital that implemented AI to scan old medical and billing records to improve treatment and construct clinical pathways. The system took nine weeks and USD \$75,000 to implement and is expected to save the hospital as much as USD \$20 million over a three-year period.[1]

FUSING RPA WITH AI

While RPA and AI are distinctly different technologies, they can work hand-in-hand to automate a growing number of business tasks. While RPA can perform steps that are repeated and unchanging, AI can step in to “think,” analyzing data that is not consistent and making decisions from both training and previous learning experiences.

RPA software robots perform the same actions over and over again and cannot change their methods or rules without human interaction. A system using both RPA and AI, on the other hand, can notice trends and use data from the past to modify how it takes an action or add to its own intelligence.

On its own, RPA can mimic human actions such as button clicks and process data that is structured. Empowered with AI, RPA can take on unstructured data and incorporate technologies such as pattern detection and image recognition to handle a wider range of tasks.

HOW DOES IT WORK?

AI can be implemented into RPA interfaces, allowing judgement-based work to be automated in addition to recurring, structured tasks. RPA platforms empowered with AI are capable of completing a much wider range of tasks than RPA on its own, while RPA can allow AI to do more by completing the more menial aspects of a task that AI is not designed to carry out. For example, an AI Chatbot can receive an instruction from a human and then break that information down into tasks for the RPA software robots to carry out. This pairing can seamlessly automate tasks in areas such as customer service and database management.

HOW DOES IT ENHANCE EXISTING USE CASES?

AI can enhance existing RPA platforms by expanding on the number and types of tasks that can be automated, offering businesses the opportunity to implement more sophisticated automation opportunities. While RPA can click the same button over and over again, RPA with AI can determine which button on a page is the correct option to click for a specific action. RPA-managed databases can be further automated with AI by gaining the ability to recognize types of data and be taken to an advanced level by implementing AI image recognition technology.

The potential ways that RPA and AI can be implemented together are as diverse and numerous as the range of companies and industries that can benefit from the collaboration. As both technologies continue to develop, they will be capable of tackling more complex work, particularly “external, customer-oriented processes”[8] that still require human thinking and interaction today. The pairing of AI and RPA represents a future of increased automation in enterprise.

"U.S. insurers can unlock \$7 billion in total value — 10-15% of operating expenses — in 18 months by using artificial intelligence to automate certain core administrative functions."

The Accenture logo features a blue chevron symbol pointing to the right, positioned above the word "accenture" in a bold, black, lowercase sans-serif font.

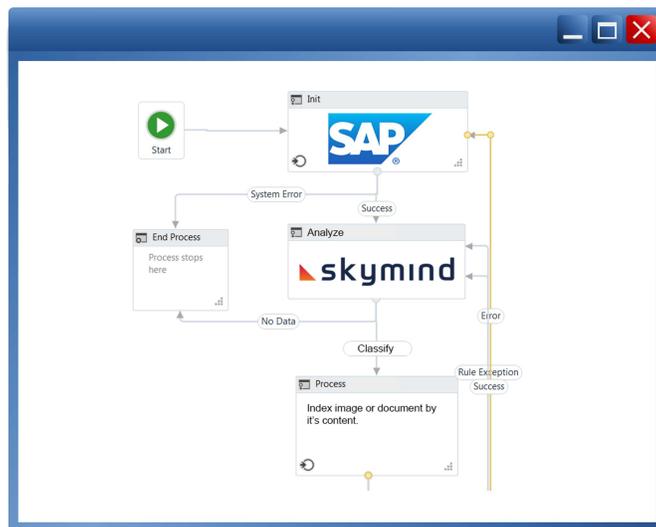
SKYMIND

SkyMind enables organizations to embed AI as a module or activity within existing RPA workflows. Integrated with widely used RPA vendors, SKIL works on top of existing IT infrastructure, bypassing the bottleneck of approving and deploying new software.

Think of SkyMind as an add-on to existing tools. It's sole purpose is to make it easy for teams to install, swap, and update machine learning models, accelerating time-to-value. As a result, SKIL supports a wide variety of use cases. For instance, a robot whose job is to sort pre-labeled documents can be upgraded to label AND sort unknown documents, alerting a human only if a document type is truly unknown.

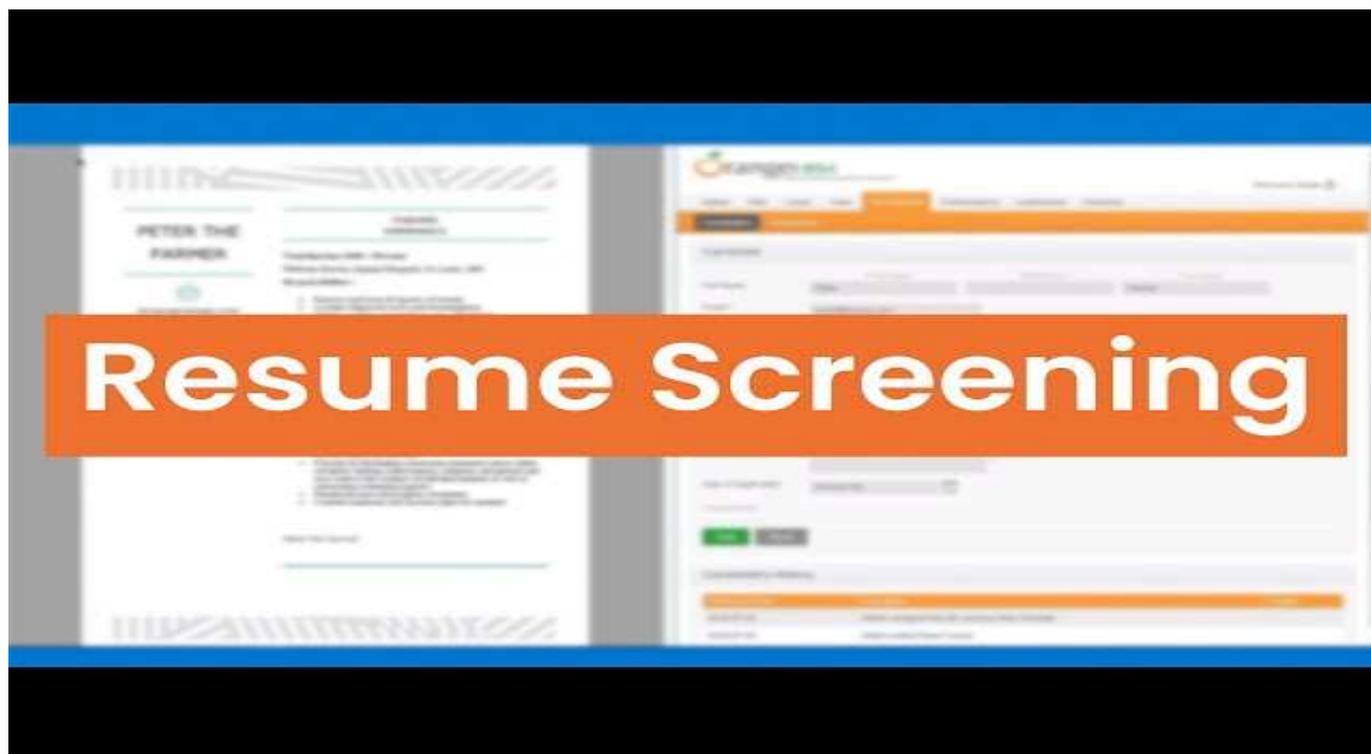
AI + RPA WORKFLOW

SkyMind's allows you to embed AI directly within existing RPA workflows.



DEMO

The UiPath robot will use an AI model developed by SkyMind to screen resumes for a data scientist position. It'll use the AI model to make decisions about the candidates and, when not sure, request help from an operator. The operator will teach the robot and that decision will be used to improve the model's accuracy and confidence.



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SkyMind offers AI infrastructure that enables corporate data scientists and IT teams to rapidly prototype, deploy, maintain, and retrain machine learning workflows that accelerate time to value. SkyMind bridges the gap between data science, DevOps and the big data stack.

