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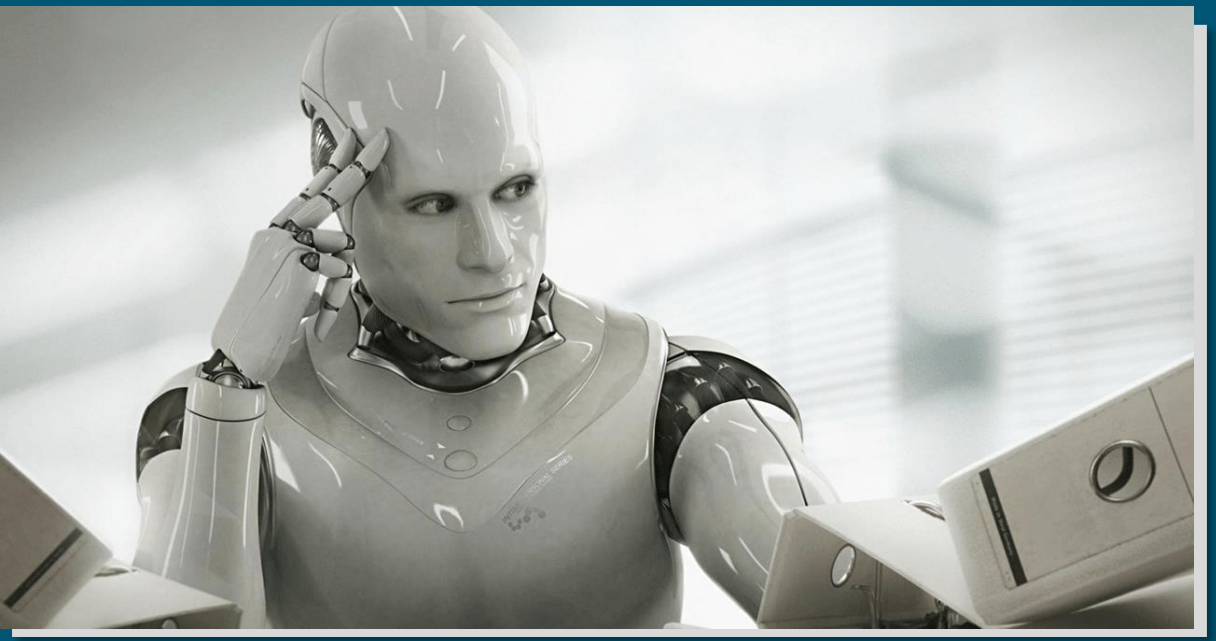
Document Automation

AT THE CORE OF COGNITIVE RPA

The Advance of Robotic Process Automation



Automation Technologies

Potential Economic Impact Is $6.7 trillion by 2025

- Mckinsey & Company

Robotic Process Automation has the attention of CIOs, IT Departments, Line of Business Managers, IT Vendors, Channel Partners and the investment community. McKinsey predicts that Automation Technologies, which include RPA, will have a $6.7 trillion (US dollars) potential economic impact by 2025. This is second only to the mobile internet. Interestingly enough, market revenues for RPA Vendors to-date have been below $0.5 million. So, we are in the early stages of adoption.

That being said RPA is not all that new…with origins that go back to the beginning of the internet with “screen scraping” technology. Advances in machine learning and artificial intelligence promise to take RPA from its simplest form of mimicking keyboard strokes and mouse movements into self-training and decision-making capabilities. Advances that will take the first “level” of RPA level to Advanced RPA are being enabled by Capture Technology, which includes the ability to classify documents, identify, extract and move data from the source and place data in the proper business process and perform checks to validate that the proper process is being executed.

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RPA Limitations Today

With any technology adoption, there is excitement about potential benefits …. And the reality. RPA thrives on doing the same process over and over. RPA likes structure as it replicates the work of the knowledge worker. Unstructured work and documents cause issues today. Information contained in a picture is not handled well. Capture vendors engaged in OCR and Handwriting recognition are working with RPA vendors, and their real automation capabilities need to be considered when discussing potential RPA projects and requirements. For validation rules to work, database integration should be considered.

Structured Docs

Works with structured, encoded data

Images

Image data not dealt with well

OCR

OCR not good and no other recognition

Handwriting

Processing documents with handwriting wanted, but not handled

Unstructured Docs

Automated classification & extraction of unstructured documents relies on AI or neural nets

Business Rules

Business Validation Rules not well handled if there is no database

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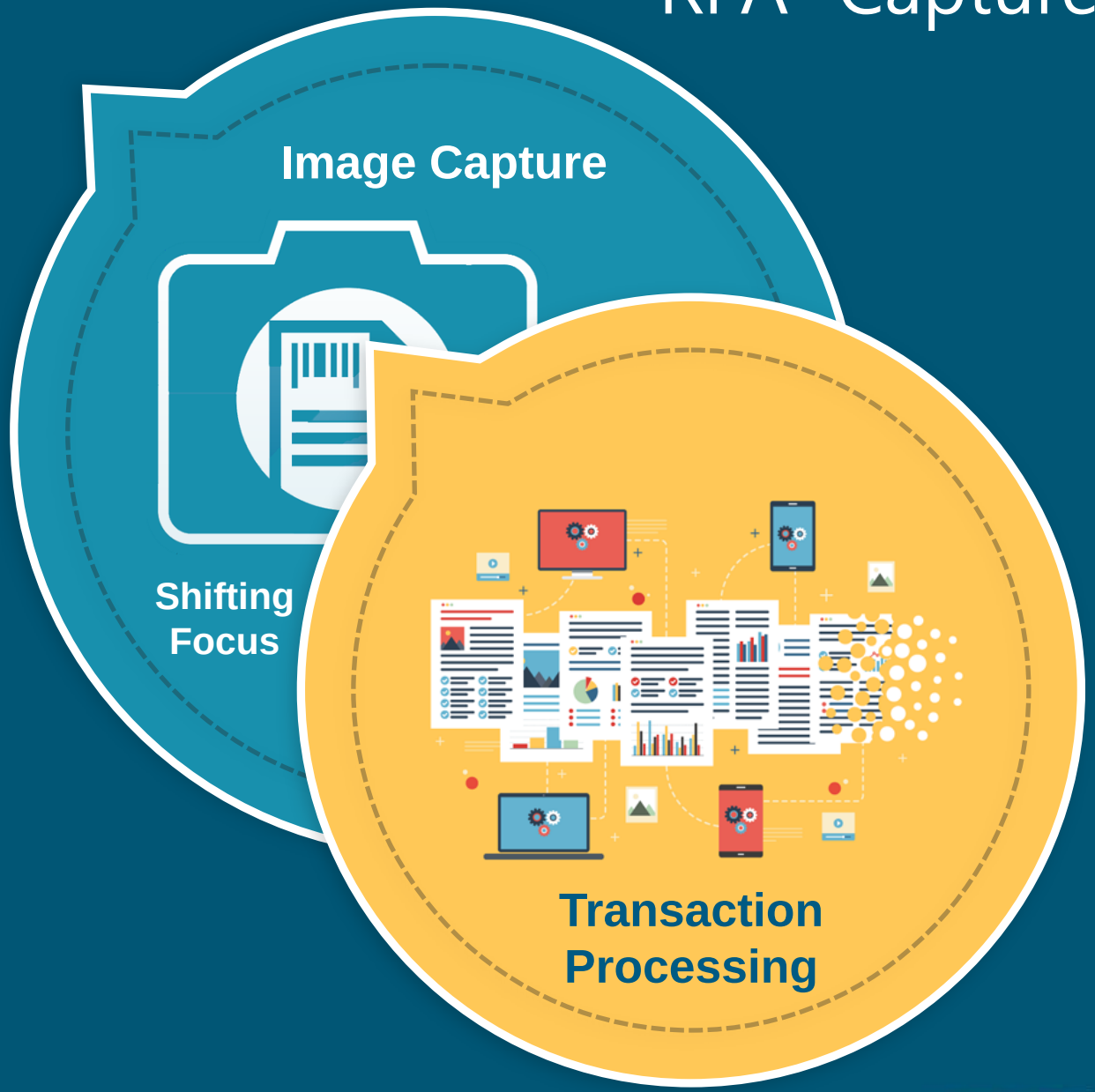
RPA "Capture Connection"



Capture software has evolved to enable data from any input channel to be transformed into actionable information.

> "Business is getting transacted at ever-faster speeds and automation with AI and robotics is critical to keeping up. Capture Services assist with the classification and extraction of accurate relevant transactional data, which is then integrated with the business process."
>
> *- HSA Inc., WW Capture Software Market Report*

Digital Transformation along with Business Automation has created an appetite for data to be transformed into actionable information. This information can be entered into the business process and accessed from in office and mobile settings.

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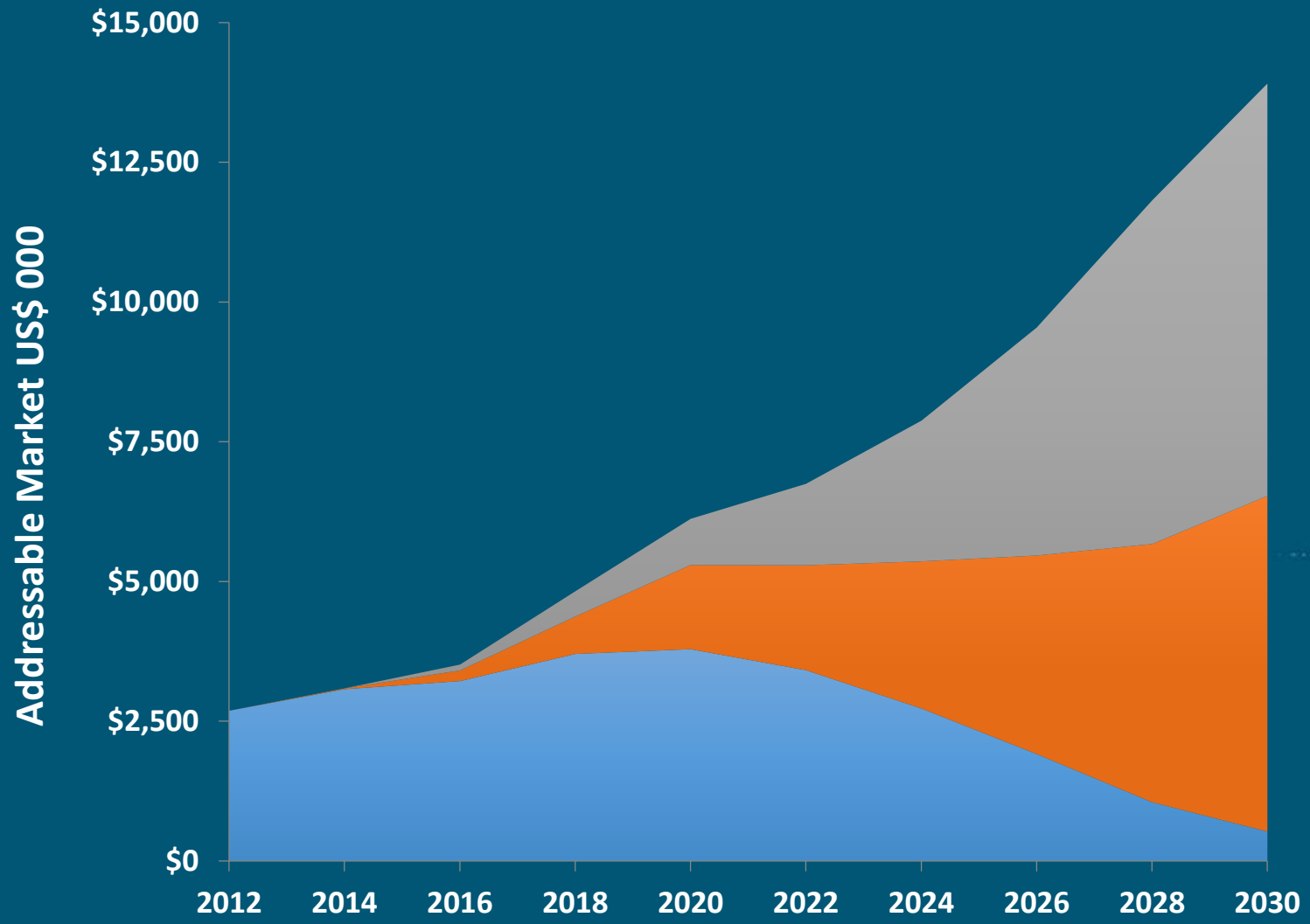
Worldwide Market Potential $30bn



We project market growth continuing in capture with the overall Worldwide Total Addressable (or Available) Market for Capture 2.0 reaching $30B. The Serviceable Available Market that vendors are reaching is about half of that amount or $15bn (considering Capture 1, Capture 2 and RPA).

Capture 1 involves basic image processing, Capture 2 is a service architecture for data understanding and business rule automation. RPA will take advantage of these technologies and expand to implementations that advance data understanding and decision making.

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RPA Development Path

Cognitive Robotic Process Automation (RPA) refers to software that can be easily programmed to do basic tasks across applications just as human workers do. There are two important elements here. First, “a bot must be easy to develop and deploy.” Second, it must “do basic tasks” like a human would. The software robot can be taught a workflow with multiple steps and applications, such as taking received forms, sending a receipt message, checking the form for completeness, filing the form in a folder and updating a spreadsheet with the name of the form, the date filed, etc. RPA software is designed to reduce the burden of repetitive, simple tasks on employees.

Past

Basic screen scraping or web scraping

Today

Bots designed for multi-source input and multi-destination to eliminate keystrokes

OCR and Handwriting Recognition

Near Term

Document Recognition

Integration of Document Classification and Learning Algorithms

Future

Machine-based Predictions and Decisions

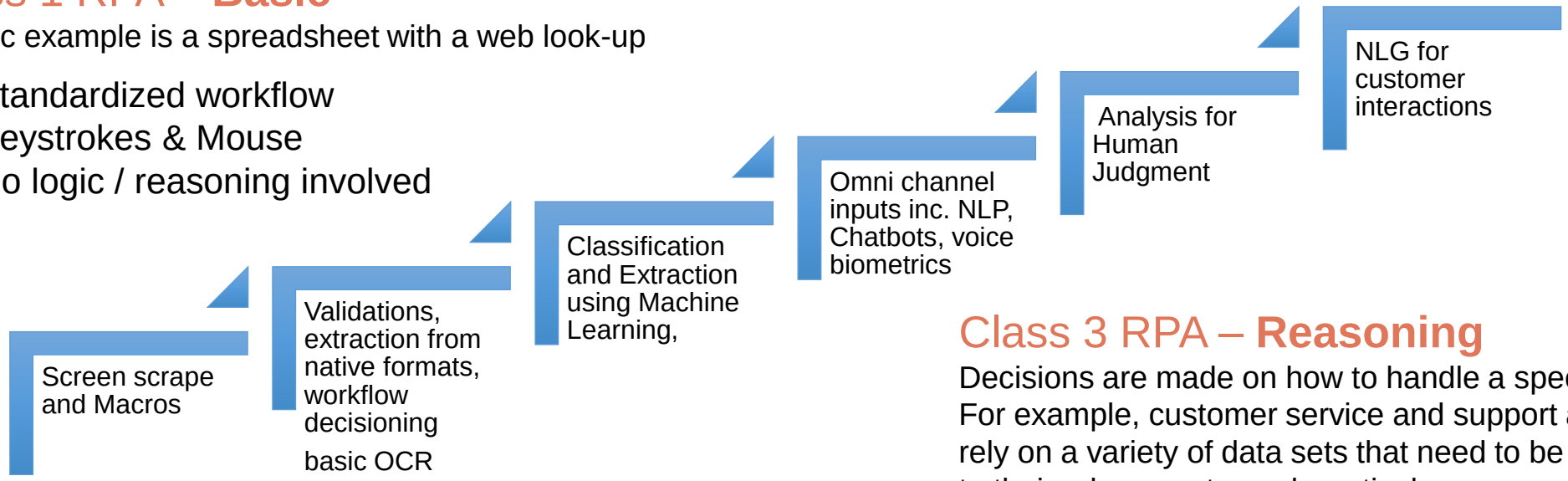
Where RPA and AI Intersect

Cognitive RPA can apply different levels of artificial intelligence: basic, learning and reasoning for predictive analysis and decision making.

Class 1 RPA – **Basic**

A basic example is a spreadsheet with a web look-up

- Standardized workflow
- Keystrokes & Mouse
- No logic / reasoning involved



Class 2 RPA – **Learning**

A learning example is accurately extracting data from new structured, semi and unstructured documents that enter the workflow

- Class 2 RPA - Learning
- Unstructured or Semi Structured Data in workflow
- Capture Technology Applied to Document Classification & Data Extraction

Class 3 RPA – **Reasoning**

Decisions are made on how to handle a specific process. For example, customer service and support applications rely on a variety of data sets that need to be evaluated as to their relevance to each particular case.

- Cognitive Capture applied – Voice to Text, Sentiment Analysis, NLP
- Artificial Intelligence applied
- Predictive analysis and decision making

Banking & Finance Use Cases

A number of prime document processing candidates for RPA in banking and finance could use automation. Tasks breakdown into front-office activities such as customer onboarding and back-office processes like 401K automation, business analytics and compliance tasks. For example, one large international bank reduced the customer onboarding process from 8 days to 1 day.

Credit Underwriting

Retail Credit Assessment check: income, expense, exposure

Retail Fraud detection check internal & external data for suspicious activity

KYC Automation

Automation of “Know Your Customer”

Multi-source data intense
Read and extract signatures handwritten forms, photos

Government compliance mandate

Automation of 401K

Automation of 401K details for employees working at a large enterprise company

Automated document classification and determination of completeness

Trade Settlement

Automation of trade resolution

Automation of unmatched and pending trades of various geographic regions

Insurance Use Cases

In insurance, customer onboarding is also a priority and automation exponentially speeds up the onboarding process. Claims processing and fraud detection also benefit from automation. Claims that are low value and straightforward can be fully automated with optimal savings and decreased customer response times.

New Business & Underwriting

Automatically gather and process data related to the applicant from internal and external sites

Increase onboarding speed

Claims Processing

Quickly input FNOL

Automatically notify loss adjusters and assign to claims handlers, integrating disparate claim data

Speed up the process for improved customer retention

Business & Process Analytics

Gain visibility and metrics into RPA-driven workflows

Enable process improvement with quality data analytics

Fraud Detection

Facilitate more thorough investigations of potentially fraudulent activities

Optimize cost control

Healthcare Use Cases

In healthcare, we have often moved to electronic systems, but we still see department silos. Claims processing can be much more efficient and accurate reducing turnaround time. Manual handling of documents is still common, but we see a major shift toward automation—starting with small projects to see how well automation can be leveraged within the enterprise.

Claims Administration

Claims adjudication and processing

Payment integrity complaints

Appeals

Member Management

Account setup, eligibility, and enrollment

Billing

Benefit management

Customer service

Provider Management

Provider credentialing

Provider data management

Contracting audits

Network management

Health & Care Management

Population health and wellness

Utilization management

Care coordination and case management

Remote monitoring

General Administration:
finance, accounting and training

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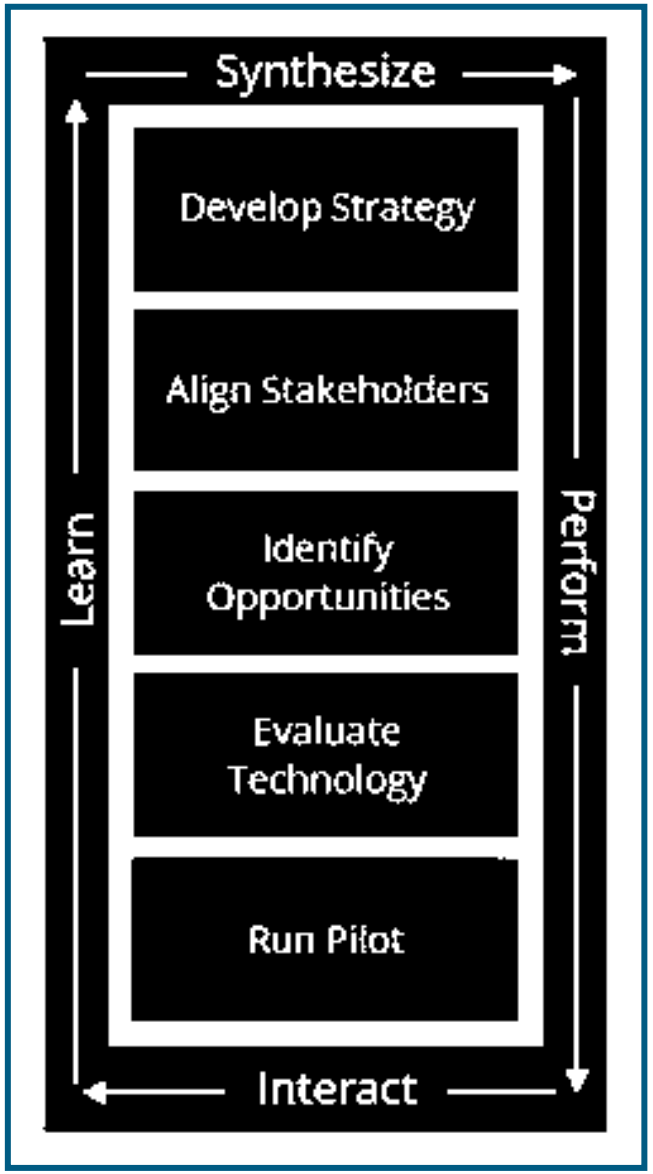
RPA Action



- Start with small simple repetitive processes
- Step & Repeat – Land & Expand
- Establish a “Center of Excellence for RPA”
- Opportunities for RPA & Cognitive Capture - exist now

Start with simple processes that have sufficient volume and have a contained consistent workflow. If you have a “stare and compare” work process that involves manual keying, this could be a prime candidate for automation.

There has been a lot of discussion about the impact on workers. Make sure that a good change management plan is in place and deploy your staff to activities that require reasoning and decision making. Once a test process has been automated look to the next process to take on… it should be easier the next time, and even easier the time after that. Programing and repurposing bots becomes more straightforward. The staff will be more comfortable with the changes taking place.

Establish your team as a Center of Excellence for RPA. If you are an outsource provider, clients will look to you as a resource that they can rely on. If you are a leader in an IT Department or in a line of business, others within the organization will look to your group as a resource.

Data Extraction & RPA

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Where RPA and AI Intersect

Classic Robotic Process Automation (RPA) simply encodes the knowledge of a SME for a given task into a set of rules that can be executed by a computer-based system

Mature machine learning for RPA is the advance of "*learn by example*" into the bot configuration process, where a system monitors SMEs' actions for different situations and learns from them.

RPA bots or specific automation routines work based on specific rulesets for structured processes and do not adapt or learn.

Many RPA deployments lack the ability to dynamically adjust and adapt. They lack the ongoing ability to add more value to complex, highly-varied tasks and to develop inferences for new insights.

Extending RPA with Machine Learning-based Analysis

01 **RPA THE DATA SUPPLIER**

The most practical way to apply ongoing machine learning to RPA implementations is to treat RPA as a **supplier of a large set of operational data**.

02 **LEARNING SYSTEMS**

This data is fed into a **learning system** that then identifies patterns and other "data features," which can be used to optimize existing encoded bots.

03 **CONSTANT FEEDBACK**

Ongoing learning has significant value since you cannot ask operational staff to **constantly report their every input and output**, but you *can require* the same of a computer system.

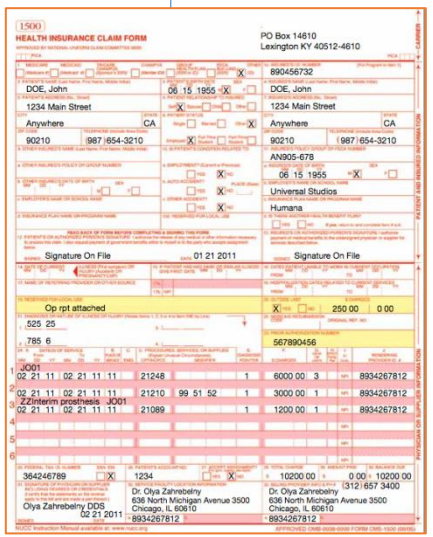
04 **MULTIPLE PROCESSES**

This ability presents an opportunity to **apply machine-learning-based AI to many different processes**.

Document Primer | Know Thy Documents

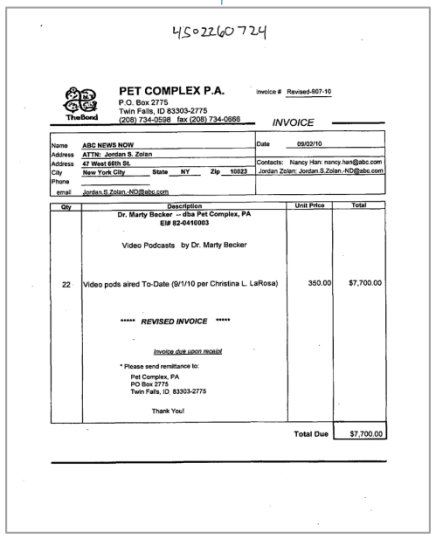
It's critical to understand the nature of your data. When it comes to documents, there are three common types: (1) structured documents where data locations are known; (2) semi-structured documents that are often transactional documents such as invoices, EOBs, remittances, etc. where common data is present, but the data location varies; and (3) unstructured documents where the information is mostly stored in prose such as email, contracts, etc. where the necessary data is not always present and the data location varies. Most of the time, the business need is to locate specific concepts or terms within the body of the document.

Structured Documents



Claim forms

Semi-structured Documents



Invoices

Unstructured Documents

Contracts

Examples

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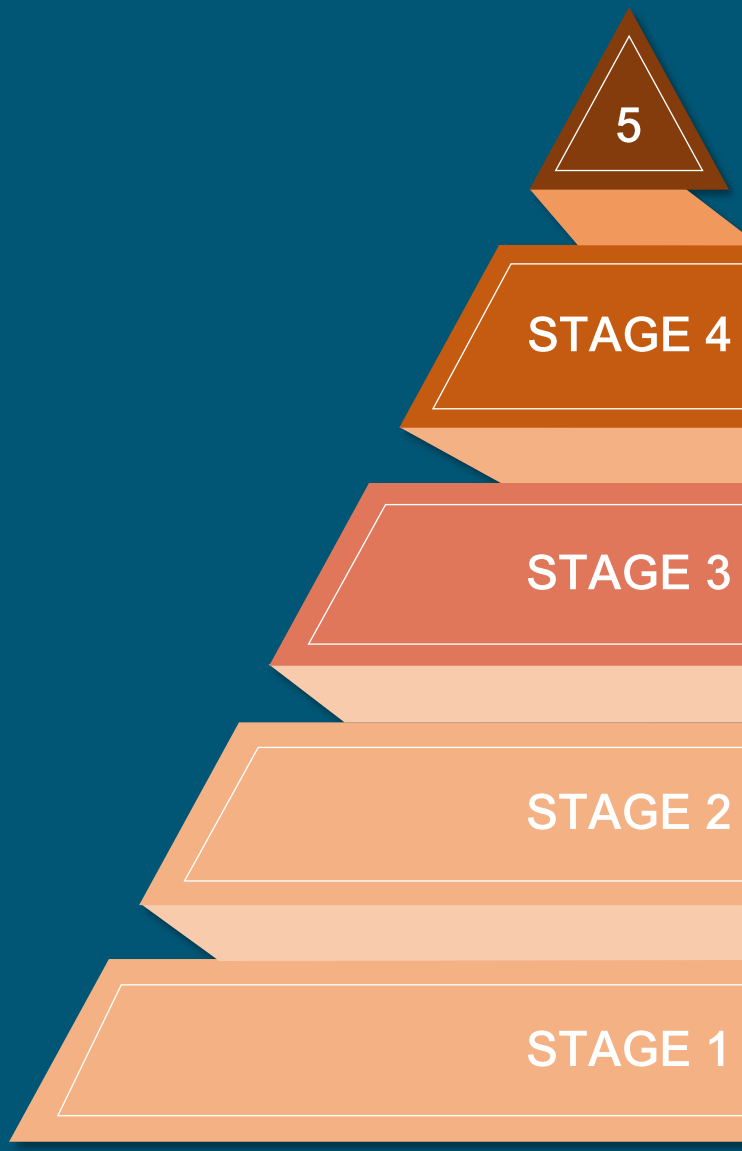
Document Automation Capability Maturity Model (CMM)



5 — All Steps Automated
via machine learning

STAGE 4 — Automation of semi-structured documents
via rules-based methods

STAGE 3 — Automatically identify and separate documents
instead of manually prepared

STAGE 2 — Automated data extraction from structured forms
manual prep and manual data entry of all other documents

STAGE 1 — Basic OCR Capture
manual processes

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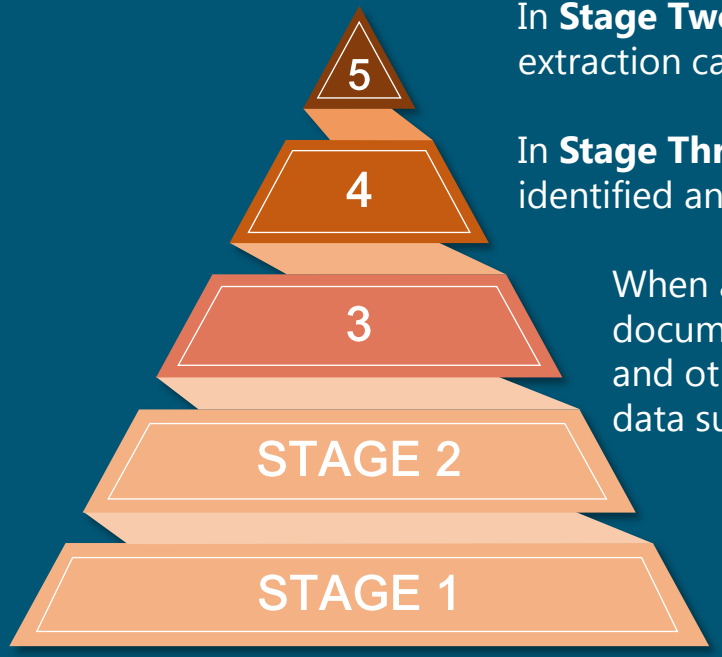
Document Automation Capability Maturity Model (CMM)

This is important because digital transformation projects don't stop with simple conversion of paper into images or dealing with only electronic variants such as PDF or Word files. It involves a step-wise adoption of capabilities aimed at automating the identification and extraction of key data regardless of document type, as well as automating the prerequisite tasks. Here is a Capability Maturity Model for document automation.

In **Stage One**, documents are prepped, separated, scanned and metadata is added by staff. Believe it or not, the majority of organizations still employ this at some level.



In **Stage Two**, documents are still manually prepped but we apply OCR to structured forms so that automated data extraction can occur. Other more-complex documents are still handled manually.

In **Stage Three**, we implement document classification and separation where all documents are automatically identified and separated instead of manually prepared. This means no need to use barcodes or separator pages.

When an organization reaches **Stage Four**, we progress to handling automation of semi-structured documents through rules-based methods. Rules-based approaches allow for identification of keywords and other techniques, often created manually or with some automation, which are then used to locate data such as a patient name on an EOB.

The last stage, **Stage Five**, all previous steps are automated, not through explicit rules-based techniques, but through machine learning. Use of real machine learning not only significantly reduces complexity of set-up, but allows a system to adapt and improve with the ultimate objective of getting as close to 100% straight-through processing as possible.

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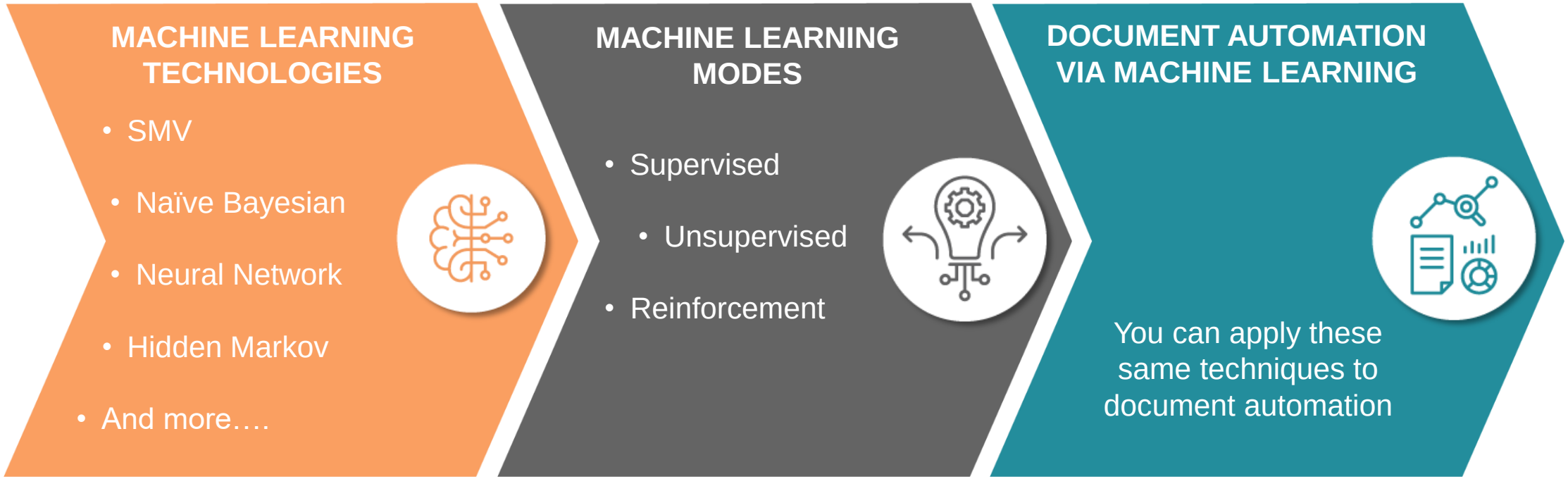
Machine Learning – the "Cognitive" in Cognitive RPA

The reality is that a lot of software uses a wide variety of techniques, not all of these are real machine learning. Also, where these advanced techniques are used, the wide variety of machine learning algorithms each have different strengths and weaknesses. The fact is that you can apply these machine learning techniques to document automation, and we are gradually seeing such systems introduced to the market.



- Supervised machine learning | you provide samples and expected outcomes and the software does the rest.
- Unsupervised machine learning | you only provide samples and the software attempts to group them.
- Reinforcement machine learning | the software learns through trial and error using past experience on real data.

Customer Onboarding

RPA USE CASE

RPA Use Case

The customer onboarding process at a financial institution is one RPA use case. Many perfunctory tasks are involved in this activity that are ideal for cognitive RPA:

01 Verification all documents submitted

02 Review of data within documentation

03 Know-your-customer verification

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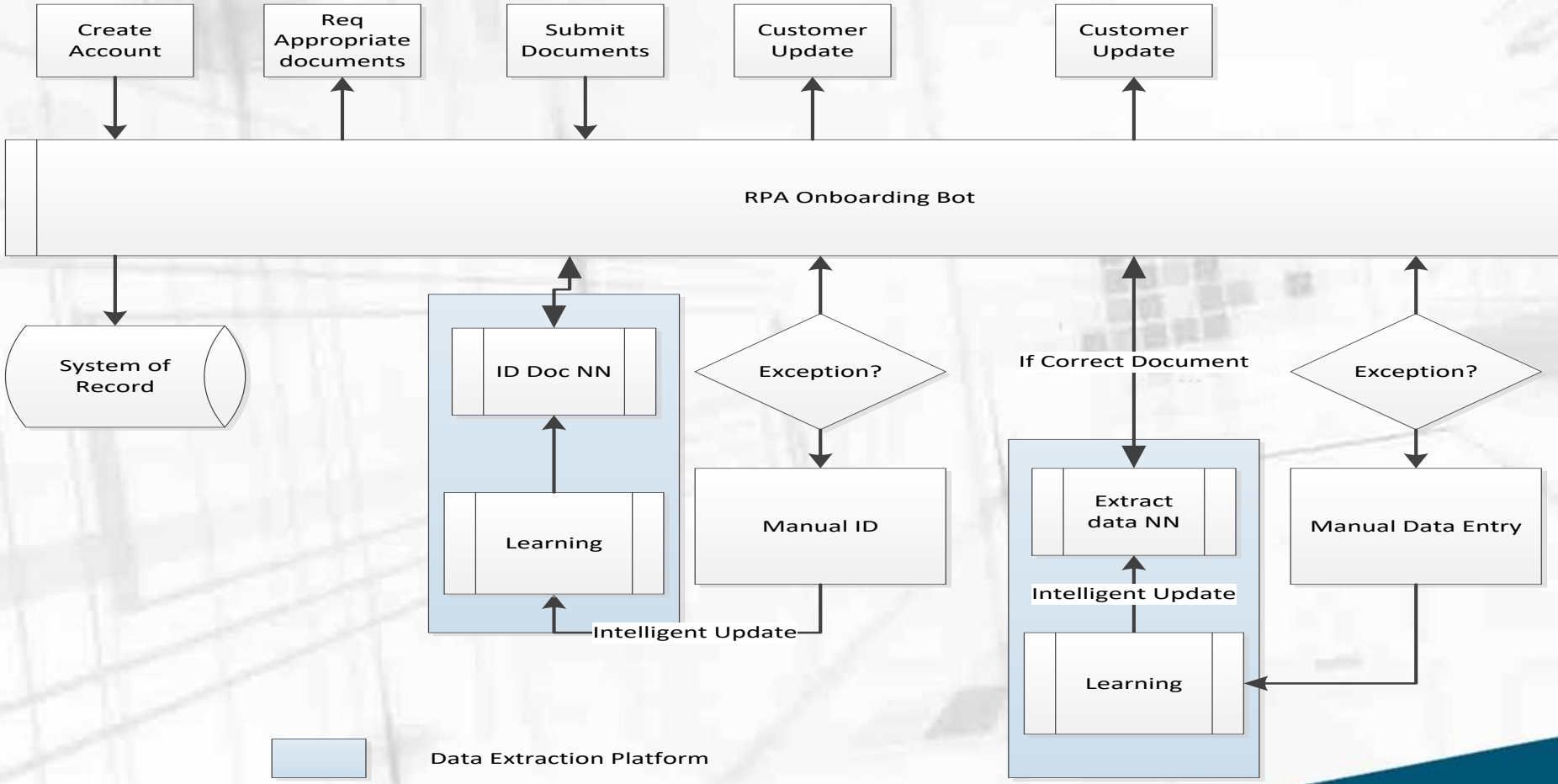
Customer Onboarding | RPA Use Case

RPA is gradually working its way into this “front office” process. Let’s examine where AI can add further value:

Activity	Description	RPA	AI Value
Document ID	Customer submits document via any source	RPA leverages document classification automation to sort documents	RPA can be trained via a learn-by-example approach. Exceptions can be automatically identified and routed through the training system to update the system
Customer Data Entry	Bank staff enters data	RPA, using automated data extraction via OCR, locates and populates data	While RPA can benefit from OCR, bank staff handles exceptions. System can use values entered by staff to update rules for next time
ID verification	Bank staff view supplied identification	RPA, using image analytics can identify security features. Data is extracted and input into credit check system	Just as with the previous two examples, AI benefits RPA when exceptions are encountered, learning these for new security features
Blacklist check	Bank staff reviews and compares against blacklists	RPA, using OCR, can extract names and match to database of KYC entries	Data incorrectly extracted are identified as exceptions, noted and reduce future errors

Applying AI-based Document Automation to RPA

The main benefit of applying AI-based data extraction to RPA systems is to reduce the potential for exceptions, which require costly and slower manual processing. This exception-reducing workflow takes advantage of RPA's inherent ability to collect key discreet data in the background on successes and failures, which can create a closed-loop system through an automated update of existing rulesets using machine learning-based AI.



The Parascript Paradigm

STATE-OF-THE-ART TECHNOLOGY

Parascript automation—leveraging advanced machine learning—solves the cost and complexity challenges of today's industry capture solutions

Automatically configures itself and adapts to changing streams of documents

Automatically measures and improves system performance

Automatically completes tasks without the typical time and expense of professional services

Automatically analyzes documents through self-learning from your tagged samples

Automatically creates a document map with only the click of a button

Automatically collects data during operations and uses it to measure and improve performance with no change to existing workflows

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The Parascript Paradigm

Parascript is focused on providing easy-to-use, self-configuring document automation software that is at the center of cognitive RPA:

SINGLE WORKFLOW

Combine scanned and electronic document support in the same workflow for single stream, straight-through processing

ANY DOCUMENT. ANY DATA.

Process structured, semi-structured and unstructured documents—including handwritten data—from mobile, fax, fileshare, email, scanners and more

ADVANCED AUTOMATION

Provides automated configuration of classification and data extraction for your varied document types and formats

MACHINE LEARNING

Get the highest accuracy results using Parascript software powered by machine learning, which automatically refines and improves performance

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THANK YOU!