Cognitive Robotic Process Automation – Overview

Who needs cognitive RPA BOTs?

In a world of Big Data, soon, data availability will not be a problem, anymore. Everywhere, data is gathered, i.e. for customer care in insurance companies or in car production.

Some processes can be optimized by Robotic Process Automation (RPA) using rules. Software programs, executing those rules, are called BOTs (robots).

However, there is a large number of complex processes which cannot be described by rules because influencing factors are constantly changing, processes show high dynamics or required knowledge for decision taking is very complex.

In these processes, self-learning, cognitive RPA BOTs are required which are able to discover hidden and complex data patterns, even in big data or in hardly any data. Thus, these complex processes are automated in a dynamic and predictive way.

What does a cognitive RPA BOT do?

A cognitive RPA BOT learns from executed processes, understands which steps lead to success and when, and derives complex networks which realize

- On the one hand, highly-accurate predictions (predictive analytics) and
- On the other hand, control processes in a predictive way (prescriptive analytics).

As one example, energy optimization in buildings is described, here, to explain differences between rule-based RPA BOTs and cognitive, self-learning RPA BOTs:

A market leader in building automation decided to offer solutions for renewable energy. The objective was that their clients can realize maximum independency from utilities because they generate their own energy by wind or sun.

With the help of rule-based control, it was already possible to reduce required external electricity. Rules controlled charging and discharging of batteries, to store electricity.

However, within a short period, they became aware that – even the world of energy efficiency in buildings – is much too complex to be described in rules.

Therefore, a cognitive RPA BOT discovered best strategies when wind / sun energy should be used in which way.

The following graphics shows charging and discharging of a battery for an entire week.

- Lower part of graphics:
  Energy control based on fixed rules.
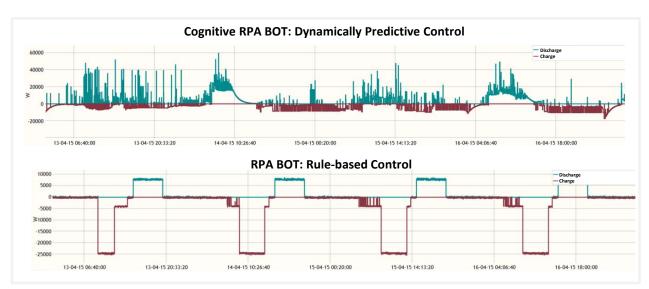- Upper part of graphics:
  A chaotic picture, indeed!
  Energy flows within a battery are controlled in a dynamic and predictive way.
  Seeing this "chaos", it is obvious that pre-defined rules could never be able to reach the same result.

And the result is impressive:

- Using a cognitive RPA BOT for dynamically predictive optimization, you can reach up to 100% independence from your utility.
- In addition, electricity costs, you still have to pay for external energy, are reduced. Optimization takes place in both aspects: Entire volume as well as energy peaks.

Cognitive RPA BOTs control interwoven processes, which cannot be managed with complex rules

Which character traits do cognitive RPA BOTs have?

Self-learning algorithms are the core of a cognitive RPA BOT´s character. They have the following skills :

- Complexity
  Cognitive algorithms discover even most complex data patterns. In this way, even multi-layer and dynamic process structures can be managed.
- Transparency in Disturbing Factors
  Cognitive RPA BOTs explain interrelations, i.e. in pointing out which data is – when - responsible for machinery damage.
- Understand Changes Automatically
  When contexts change, then, algorithms understand those changes and their impact. Thus, no human being (Data Scientist) is required for adjusting those algorithms, manually.
- Scalability
  With the help of its self-learning algorithms, cognitive RPA BOTs adjust automatically when other instances need to be managed, too. This can be, for example, when additional production machinery or other model series need to be optimized.
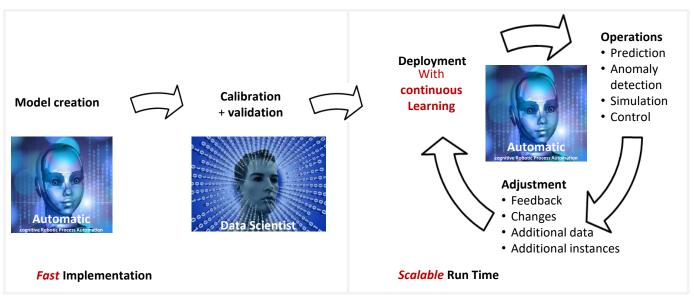
Last but not least: Part-Automation of Data Scientist
It is even possible that cognitive RPA BOTs execute some of the creative work, a Data Scientist does!
In this way, more solutions can be realized in less time.

Where do cognitive RPA BOTs generate tangible benefits?

- In discrete manufacturing, RPA BOTs ensure that, for example, tiny errors in car bodies are discovered right after press and punch processes. If hairline cracks are detected in final assembly, then, corrective action is very expensive and future car owners might have to wait for their new cars for a long time.
- In process industry, cognitive RPA BOTs predict which quality a product will have, i.e. cement powder when being processed in a mill.

But even more: Prescriptive Analytics calibrates machinery in a predictive-optimal way. Even after batch changes, required quality is reached very quickly. Thus, bad quality is reduced to a minimum.

- Customer care staff in insurance companies work with pre-selected client lists, in order to focus on those clients that either have high potential for cross-selling, or are in high risk for churn.
  Customer care employees normally have a very large customer base. Thus, they are not able, anymore, to personally know all individual clients well enough for good client judgement.
- In order to reduce energy costs, production companies, but also more and more telecommunication and software companies, operate their own energy generation machineries. Those machines are normally sized in such a way that they can cover dynamic energy demand. However, if less energy is required, additional energy should be generated if selling surplus at Energy Trade is lucrative.
  Cognitive RPA BOTs predict dynamic energy demand, analyze market situations for energy trading and give recommendations to energy trader which energy products should be offered when for which price at energy fair.
  At the same time, machinery operators receive recommendations how to generate electricity. Last but not least, trading processes are automated.
- Early prediction of future machinery failure reduces costs up to 90% at locomotive engines.
  Cognitive RPA BOTs assess heath status for individual motors with the help of complex KPIs and trigger service processes early in advance before damage will happen.

Here, only a few examples are described where cognitive RPA BOTs realize significant value. However, you can see that there are highly-dynamic processes in many industries which can only be optimized with Artificial Intelligence.

Model creation

Calibration + validation

Automatic
cognitive Robotic Process Automation

Data Scientist

Fast Implementation

Deployment
With
continuous Learning

Operations
- Prediction
- Anomaly detection
- Simulation
- Control

Automatic
cognitive Robotic Process Automation

Adjustment
- Feedback
- Changes
- Additional data
- Additional instances

Scalable Run Time

Part-Automation of Data Scientists

PREDICT
INTELLIGENT SOLUTIONS