Robotic Process Automation(RJSPIT303)

4-credits

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Syllabus

UNIT 01:

Robotic Process Automation

Scope and techniques of automation, About UiPath, Record and Play UiPath stack, Downloading and installing UiPath Studio, Learning UiPath Studio, Task recorder, Step-by-step examples using the recorder.

Sequence, Flowchart, and Control Flow

Sequencing the workflow Activities, Control flow, various types of loops, and decision making, Step-by-step example using Sequence and Flowchart, Step-by-step example using Sequence and Control flow.

UNIT 02:

Data Manipulation

Variables and scope, Collections, Arguments - Purpose and use, Data table usage with examples, Clipboard management, File operation with step-by-step example, CSV/Excel to data table and vice versa (with a step-by-step example

Taking Control of the Controls

Finding and attaching windows, Finding the control, Techniques for waiting for a control, Act on controls – mouse and keyboard activities, Working with UiExplorer, Handling events, Revisit recorder, Screen Scraping, When to use OCR, Types of OCR available, How to use OCR, Avoiding typical failure points.

Syllabus

UNIT 03:

Tame that Application with Plugins and Extensions

Terminal plugin, SAP automation, Java plugin, Citrix automation, Mail plugin, PDF plugin, Web integration, Excel and Word plugins, Credential management, Extensions – Java, Chrome, Firefox, and Silverlight

Handling User Events and Assistant Bots

What are assistant bots? Monitoring system event triggers, Hotkey trigger, Mouse trigger, System trigger, Monitoring image and element triggers, an example of monitoring email, Example of monitoring a copying event and blocking it, Launching an assistant bot on a keyboard event.

UNIT 04:

Exception Handling, Debugging, and Logging

Exception handling, Common exceptions and ways to handle them, Logging and taking screenshots, debugging techniques, Collecting crash dumps, Error reporting.

Managing and Maintaining the Code

Project organization, Nesting workflows, Reusability of workflows, commenting techniques, State Machine, when to use Flowcharts, State Machines, or Sequences, using config files and examples of a config file, Integrating a TFS server.

Deploying and Maintaining the Bot

Publishing using publish utility, Overview of Orchestration Server, Using Orchestration Server to control bots, Using Orchestration Server to deploy bots, License management, Publishing and managing updates.

Reference Book

1. Learning Robotic Process Automation, Alok Mani Tripathi, Packt Publishing Ltd., 2018

Chap 1:What is Robotic Process Automation?

The term automation is derived from the Greek words autos meaning self, and motos, meaning moving.

Automation, in simple words, is technology that deals with the application of machines and computers to the production of goods and services.

In the digital world, automation and software development are two different terms. Very often, however, one is confused with the other. If some portion of a workflow can be programmed to be done without human intervention, it can be called automation.

Developing an inventory management software system is called software development, while programming a step so that no more human intervention is required is called automation.

Examples of Automation: washing machines, microwave ovens, autopilot mode for automobiles and airplanes, Nestle using Robots to sell coffee pods in stores in Japan, Walmart testing drones to deliver products in the US, our bank checks being sorted using Optical Character Recognition (OCR), and ATMs, Account Reconciliation - comparison of financial records from various data source.

Scope and techniques of automation

There are various techniques used and available to automate steps and processes in an organization where software systems are being used to accomplish certain tasks.

➜ **What should be automated?**
Repetitive steps, Time-consuming steps High-risk tasks, Tasks with a low-quality yield, Tasks involving multiple people and multiple steps

➜ **What can be automated?**

In order to automate something, it needs to have the following characteristics:

Well defined and rule-based steps, Logical, An input to the task can be diverted to the software system, Input can be deciphered by software systems with available techniques, The output system is accessible, Benefits are more than the cost

➜ **Techniques of automation**
There are various techniques available for automation and programmers have been using them for years to increase efficiency in enterprises:

They are a compilation of a set of commands or tasks that are performed for maintenance and other types of activities.

The wrapper monitors activities in a client app and performs actions based on rules.
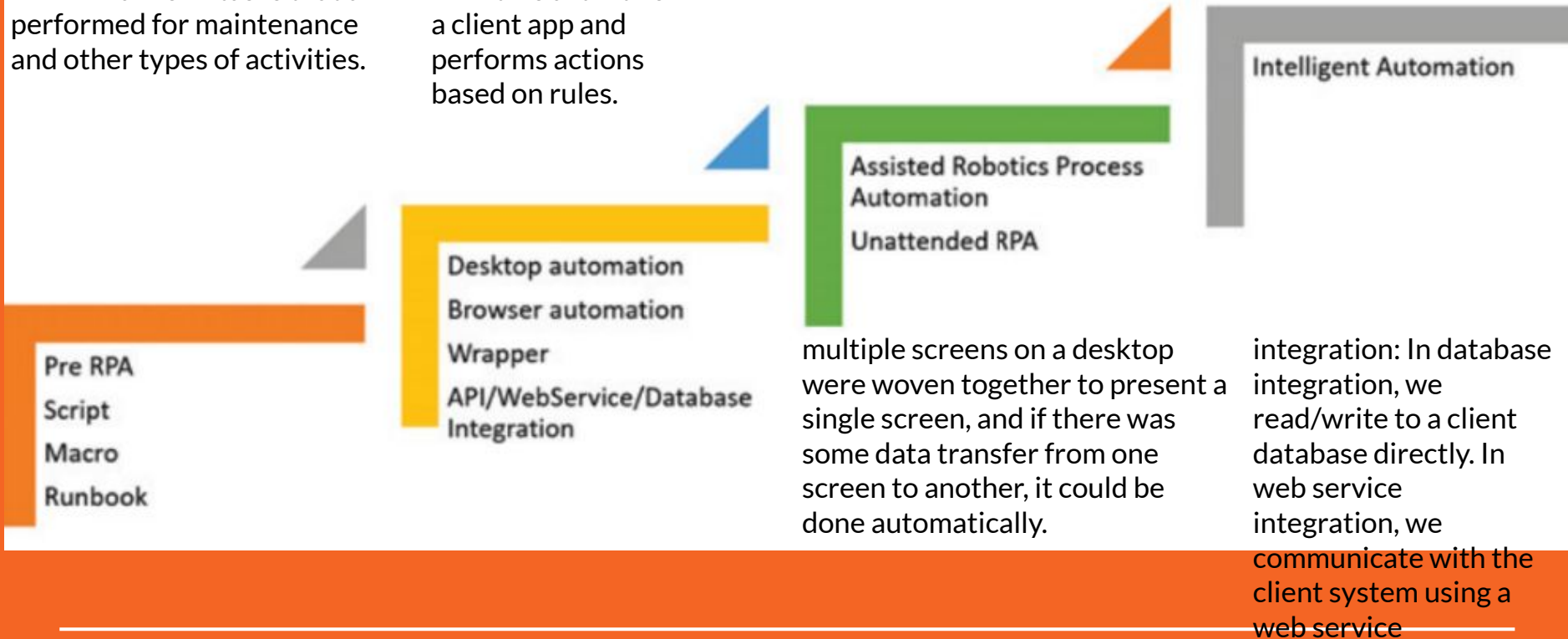
Pre RPA
Script
Macro
Runbook

Desktop automation
Browser automation
Wrapper
API/WebService/Database Integration

Assisted Robotics Process Automation

Unattended RPA

Intelligent Automation

multiple screens on a desktop were woven together to present a single screen, and if there was some data transfer from one screen to another, it could be done automatically.

integration: In database integration, we read/write to a client database directly. In web service integration, we communicate with the client system using a web service

Figure: Techniques of Automation

Robotic Process Automation

Robot in Robotic process automation means software programs that mimic human actions.

Perform calculations and complex task on the basis of data and predefined rules.

State activity: Transitions contain three sections- Trigger, Condition, and Action, which enable you to add a trigger for the next state or a condition under which an activity is to be executed.

RPA platforms allow the program, called Robots, to interact with any application in the same way a human would do, hence, automating rule-based work by recording those steps for later playback.

There is consistency in quality, accuracy, productivity and efficiency, faster delivery of services, and of course, lower operation costs.

Tip

In simple words, RPA involves the use of software that mimics human actions while interacting with applications in a computer and accomplishing rule-based tasks. This often requires reading from and typing, or clicking on existing applications that are used to perform the given tasks.

RPA vs Traditional Automation

- **Software Robot is trained using steps that are illustrative rather than using instructions based on code.**

- **RPA software, unlike traditional automation, is capable of adapting to dynamic circumstances, for example, when checking an electronic form of new employees in a company. If the pin code is missing in a form, in traditional automation the software would point out the blank field as an exception, and then a human being would search for the relevant pin code and correct the form. In RPA however, the software is capable of performing all the tasks mentioned previously with no human assistance.**

What RPA can do?

- Once trained, robots will perform task with same precision over and over again.
- These robots will interact with applications irrespective of the technology on which they are built: ERP - SAP, Oracle, MS and languages - . Net, Java.
- With AI, it can read from images, scan document. However, most of the implementation is happening with structured and digital data.
- Thus some of the technologies being adopted with RPA are as follows:
  - Machine learning
  - Natural language processing
  - Natural language generation
  - Computer vision

BENEFITS from RPA

The following industries can benefit a lot from RPA:
1.   Business process outsourcing (BPO): With RPA and its benefits of reduced costs, the BPO sector can now depend less on outsourced labor.
2.   Insurance: The complexity and number of tasks that must be managed in the insurance sector, from managing policies, to filing and processing claims across multiple platforms, regulatory compliance
3.   Financial sector
4.   Utility companies: Gas, electricity and water - meter reading, billing, and processing customer payments.
5.   Healthcare: Data entry, patient scheduling, and more importantly billing and claims processing, patient appointment.

BENEFITS of RPA

The following are the benefits of RPA:
1. Higher quality services, greater accuracy: With reduced human error and greater compliance, the quality of work is much better.
2. Improved analytics: Since these software Robots can log each action taken with the appropriate tag and metadata, it is very easy to get business insights and other analytical data.
3. Reduced costs: Nowadays, it is commonplace to hear that one Robot is equivalent to three human full-time executives
4. Increased speed: Robots are very fast and sometimes the speed of execution has to be reduced to match the speed and latency of the application on which these Robots work.
5. Greater compliance: adhere to the steps.

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6.   Agility: Reducing and increasing (Deployment and redeployment) the number of Robot resources requires managing the volume of the business process.

7.   Comprehensive insights: In addition to the audit trail and time stamping, Robots can tag transactions to use them later, in reports for business insight.

8. Versatility: RPA is applicable across industries performing a wide range of tasks from small to large businesses, simple to complex processes.

9. Simplicity: RPA does not need prior programming knowledge. Most platforms provide designs in the form of flowcharts.

10. Scalability:

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11. Non- invasive: If there is any changedsay, a technology upgrade it is much easier and faster for the virtual workforce to adapt to the changes. This can be done by bringing about modifications in the programming or introducing new processes.

12. Better management: Centralized platform - Lessen the need for governance.

13. Better customer service: Since Robots can work around the clock, capacity increases.

14. Increased employee satisfaction: With repetitive, dreary tasks now being taken over by the virtual workforce, employees are not just relieved of their workload, but can also engage in better quality work that requires the use of human capabilities and strengths such as emotional intelligence, reasoning, or tending to customers.

COMPONENTS of RPA

Any Robotics process automation platform provides some basic components, which together build the platform.
The following are the basic or core components of RPA:

- Recorder
- Development Studio
- Plugin/Extension
- Bot Runner
- Control Center

Recorder

- The recorder is the part of the development studio that developers use to configure the Robots.
- It records mouse and keyboard movements on the UI and this recording can be replayed to do the same steps again and again. This enables rapid automation.

Development studio

- Using the development studio, a set of instructions and decision-making logic is coded for Robots to execute.
- Flowchart, coding, programming logic

Extensions and plugins

- Most platforms offer many plugins and extensions to ease the development and running of bots.

Bot runner

- This is also referred to as the Robot, other components make it run.

Control center

- Manage, monitor, control robot operations.
- Start,stop, redeploy

RPA Platforms

Automation Anywhere
UiPath
Blue Prism
WorkFusion
Thoughtonomy
KOFAX

Record and Play

UiPath Components

In order to make the UiPath platform fully operational at an enterprise level, there are various components that need to be in place.

UiPath Studio

An advanced tool that enables you to design automation processes in a visual manner, using drag–and–drop functionality

UiPath Robot

Robot executes the processes built in Studio, just like humans

UiPath Orchestrator

Orchestrator is a web application that enables us to deploy, schedule, monitor and manage Robots and Processes
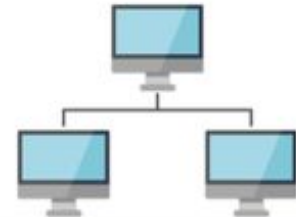
UiPath Studio

- It is development environment of UiPath.

- It is a primary tool to develop UiPath Robots.

- It can be used to configure steps of a task or launch a full recorder to record a sequence of steps.

- develop steps to perform tasks visually.

- By using the drag-drop facility from the toolbox, you may write a whole sequence of workflows to perform a set of tasks by Robots.

- in an enterprise environment you will receive process maps to understand the flow of work, which you will use to develop Robots.

- The designer gives you full control of the execution order and actions taken, also known as activities.
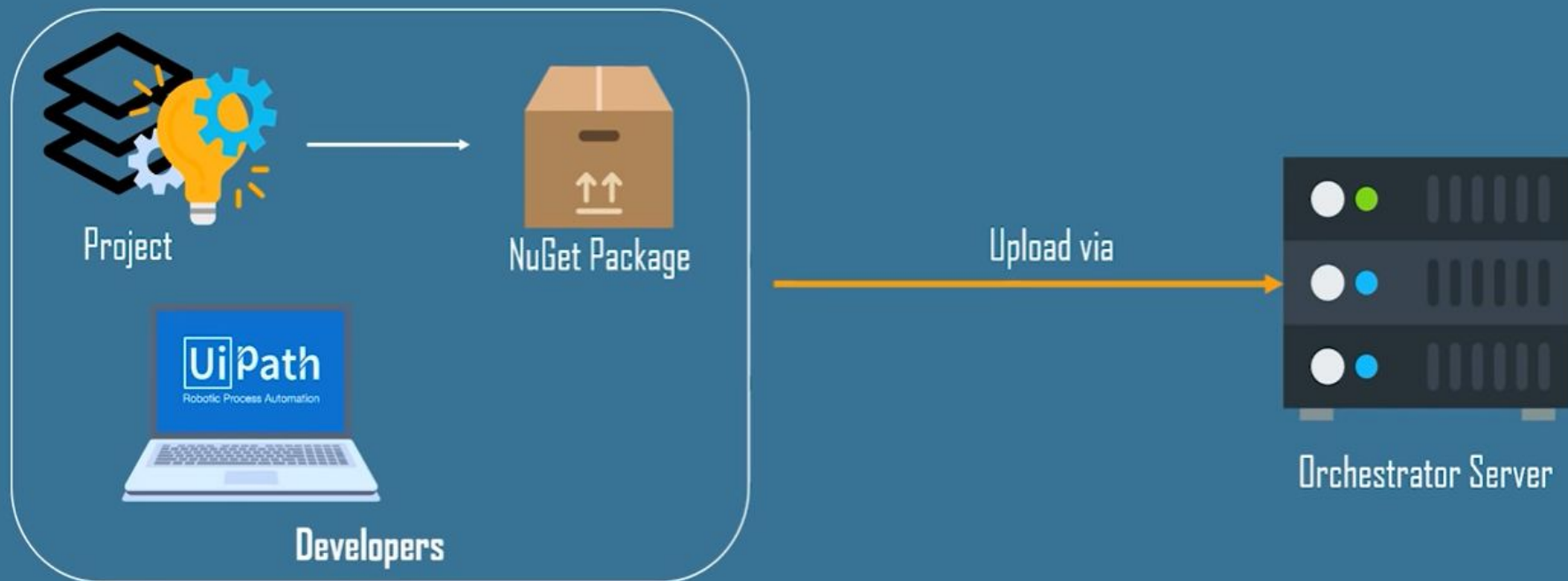
UiPath Robot

- It is also called an execution agent as it executes automation projects, or a runtime agent as it executes instructions generated by developing or recording processes in UiPath Studio.

- UiPath Robot is a Windows service that can open interactive/non-interactive window sessions to execute processes or a set of steps, developed or recorded using UiPath Studio.

- These Robots can be controlled by Orchestrator (Enterprise version)

Types of Robots:
1. Attended: It operates on the same workstation as a human to help the user accomplish daily tasks. Front office -> interact with human to do the required work.
2. Unattended: It can run unattended in virtual environments and can automate any number of processes. Back office -> does not interact with human.
3. Free: It is similar to Unattended Robots, but can be used only for development and testing purposes, not in a production environment.

UiPath Orchestrator

- UiPath Orchestrator is a server-based application that lets you orchestrate your Robots.

- It runs on a server and connects to all the Robots within the network.

- It has a browser-based interface that enables the orchestration and management of hundreds of Robots with a click.

- Orchestrator lets you manage the creation, monitoring, and deployment of resources in your environment, acting in the same way as an integration point with third-party applications.

- Behind the scenes, Orchestrator Server uses:
  a. IIS Server
  b. SQL Server (small size of data)
  c. Elasticsearch (large size of data)
  d. Kibana (open source data visualization plugin for Elasticsearch)