



HAMK

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Automation-as-Code with Python - Robocorp (Sema4.ai)

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October 2024

Automation-as-Code

- **Definition**

- Implementing automation using standard programming languages
- Managing automation like regular software development
- Following DevOps and Software Engineering practices

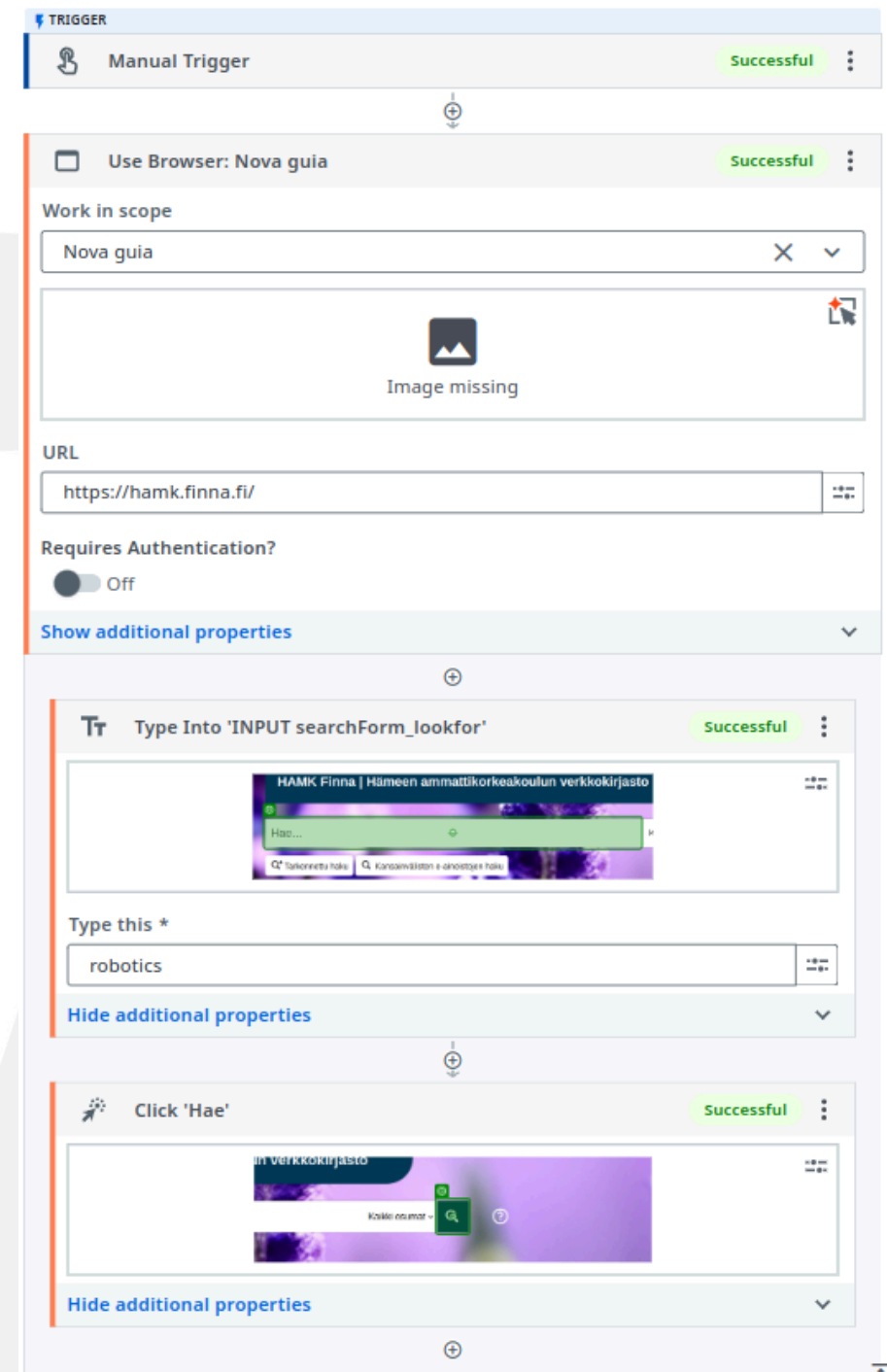
Key Principles of Automation-as-Code

- Version Control (Git)
- Code Review Process
- CI/CD (continuous integration/continuous delivery) Integration
- Infrastructure as Code (IaC)
- Test-Driven Development
- Modular Design

Example: Robocorp vs UiPath

```
#imports
@task
def open_page():
    page = browser.goto("https://hamk.finna.fi/")
    page.locator("#searchForm_lookfor").fill("robotics")
    page.locator(".btn-primary > .fi-basic-search").click()
    browser.screenshot()
```

- Text- vs visual-based (block) programming



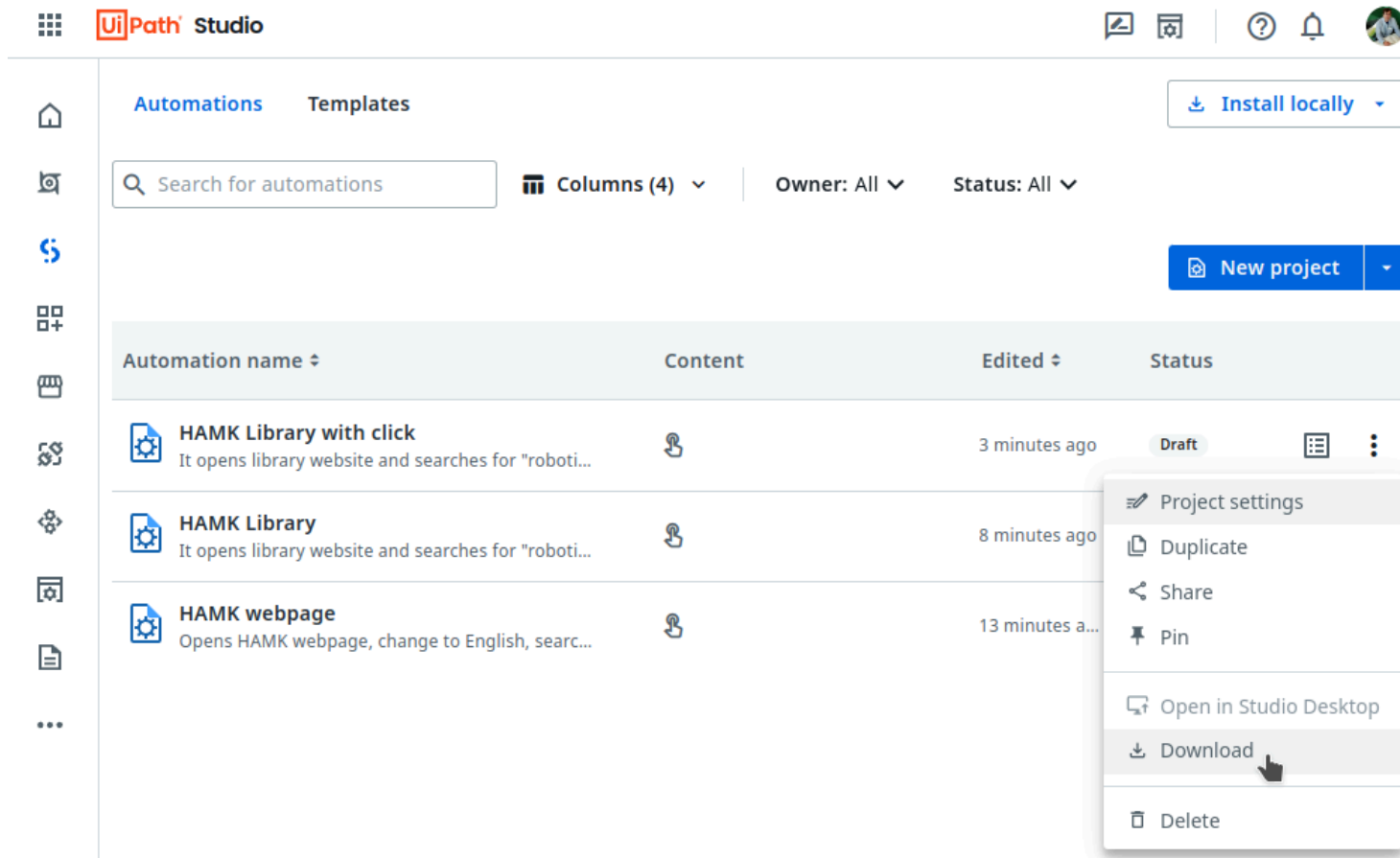
The screenshot displays the Robocorp Studio interface for a workflow. The workflow consists of three steps:

- Manual Trigger:** A step labeled "Manual Trigger" with a status of "Successful".
- Use Browser: Nova guia:** A step labeled "Use Browser: Nova guia" with a status of "Successful". It includes a "Work in scope" dropdown set to "Nova guia", a "URL" field containing "https://hamk.finna.fi/", and a "Requires Authentication?" toggle set to "Off". Below the step, there is a visual representation of the browser page with a search bar and a "Hae..." button.
- Type Into 'INPUT searchForm_lookfor':** A step labeled "Type Into 'INPUT searchForm_lookfor'" with a status of "Successful". It includes a visual representation of the search bar with the text "robotics" entered.

Each step has a "Show additional properties" or "Hide additional properties" link below it.

Text-based in UiPath

To be precise, you can also use text-based programming in UiPath 🤖



The screenshot displays the UiPath Studio interface. At the top, the 'UiPath Studio' logo is visible. Below it, there are tabs for 'Automations' and 'Templates'. A search bar labeled 'Search for automations' is present, along with filters for 'Columns (4)', 'Owner: All', and 'Status: All'. A 'New project' button is also visible. The main area shows a list of automations with columns for 'Automation name', 'Content', 'Edited', and 'Status'. Three automations are listed: 'HAMK Library with click', 'HAMK Library', and 'HAMK webpage'. A context menu is open over the 'HAMK webpage' automation, showing options: 'Project settings', 'Duplicate', 'Share', 'Pin', 'Open in Studio Desktop', 'Download' (highlighted), and 'Delete'.

| Automation name | Content | Edited | Status |
|--|---------|-----------------|--------|
| HAMK Library with click It opens library website and searches for "roboti..." | 👤 | 3 minutes ago | Draft |
| HAMK Library It opens library website and searches for "roboti..." | 👤 | 8 minutes ago | |
| HAMK webpage Opens HAMK webpage, change to English, searc... | 👤 | 13 minutes a... | |

But...Text-based in UIPath is XML 😞

```
66      <AssemblyReference>UiPath.UIAutomationNext.Activities.Design</AssemblyReference>
67    </scg:List>
68  </TextExpression.ReferencesForImplementation>
69  <Sequence sap:VirtualizedContainerService.HintSize="356,732" sap2010:WorkflowViewState.IdRef="Sequence_1">
70    <sap:WorkflowViewStateService.ViewState>
71      <scg:Dictionary x:TypeArguments="x:String, x:Object">
72        <x:Boolean x:Key="IsExpanded">True</x:Boolean>
73      </scg:Dictionary>
74    </sap:WorkflowViewStateService.ViewState>
75    <ui:ManualTrigger Result="{x:Null}" DisplayName="Manual Trigger" sap2010:WorkflowViewState.IdRef="ManualTrigger_1" />
76    <uix:NApplicationCard AttachMode="SingleWindow" CloseMode="IfOpenedByAppBrowser" DisplayName="Use Browser: Nova guia" sap2010:WorkflowViewState.IdRe
77      <uix:NApplicationCard.Body>
78        <ActivityAction x:TypeArguments="x:Object">
79          <ActivityAction.Argument>
80            <DelegateInArgument x:TypeArguments="x:Object" Name="WSSessionData" />
81          </ActivityAction.Argument>
82          <Sequence DisplayName="Do" sap2010:WorkflowViewState.IdRef="Sequence_2">
83            <uix:NTypeInto ActivateBefore="True" ClickBeforeMode="Single" DisplayName="Type Into 'INPUT searchForm_lookfor'" EmptyFieldMode="SingleLine"
84              <uix:NTypeInto.Target>
85                <uix:TargetAnchorable BrowserURL="hamk.finna.fi" CVScreenId="de37aa6a-0986-446c-8333-04d50db0e82a" CvElementArea="379, 198, 758, 50" CvT
86              </uix:NTypeInto.Target>
87            </uix:NTypeInto>
88            <uix:NClick ActivateBefore="True" ClickType="Single" DelayAfter="5" DisplayName="Click 'Hae'" sap2010:WorkflowViewState.IdRef="NClick_1" Key
89              <uix:NClick.Target>
90                <uix:TargetAnchorable BrowserURL="hamk.finna.fi" CVScreenId="94532730-f1d2-4070-a20d-a8d6f86f96ec" CvElementArea="1131, 197, 50, 50" CvT
91              </uix:NClick.Target>
92            </uix:NClick>
93          </Sequence>
94        </ActivityAction>
95      </uix:NApplicationCard.Body>
96      <uix:NApplicationCard.TargetApp>
97        <uix:TargetApp Area="0, 0, 0, 0" BrowserType="Chrome" Selector="&lt;html title='Nova guia' app='chrome.exe' /&gt;" Title="Nova guia" Url="https:
98      </uix:NApplicationCard.TargetApp>
99    </uix:NApplicationCard>
100  </Sequence>
101 </Activity>
```

Automation-as-Code vs Traditional RPA

| Aspect | Automation-as-Code | Traditional Automation |
|-----------------|-------------------------------|------------------------|
| Development | Code-first approach | GUI-based development |
| Version Control | Git-based | Limited or proprietary |
| Reusability | Modular components | Limited reusability |
| Testing | Unit tests, integration tests | Manual testing |
| Deployment | CI/CD pipelines | Manual deployment |
| Maintenance | Standard code maintenance | Platform-dependent |
| Learning Curve | Steeper (requires coding) | Gentler (low-code) |

Some Tools for Automation-as-Code RPA

- [BotCity](#)
- [Python RPA](#)
- [Robocorp](#)
 - Transitioning to [Sema4.ai](#) (29/Jan/2024)
 - Moving away from Robot Framework to [full Python solution](#) (12/Feb/2024)

(Now Old) Robocorp with Robot Framework

- Example: search "robotics" in HAMK's library website
- Easy to read, but a different syntax/language
- Anyway, [Robot Framework](#) continues to be a [great tool](#)
 - Specially for test automation (more about it latter)

```
*** Tasks ***
Search For Robotics Books
    Open Browser    ${URL}    chrome
    Maximize Browser Window
    Wait Until Element Is Visible    ${SEARCH_BOX}    timeout=10s
    Input Text    ${SEARCH_BOX}    robotics
    Click Button    ${SEARCH_BUTTON}
    Wait Until Element Is Visible    ${RESULTS_PAGE}    timeout=10s
    Sleep    2s    # Wait for results to load completely
    Capture Page Screenshot    robotics_search_results.png
    [Teardown]    Close Browser
```

Robocorp features

- Open-source RPA framework
- Built for developers and Python enthusiasts
- Alternative to traditional RPA platforms
- Focus on software development best practices
- Reviews in [Gartner report](#)
 - "(Robocorp) is doing away with the cumbersome drag-and-drop, rigid and inefficient graphical programming paradigm of the traditional RPA giants"
 - "by developers for developers"

Key Advantages of Robocorp

- Native **Python Syntax**
 - No need to learn custom keywords
 - Full access to Python ecosystem (modules and packages)
 - Better IDE support and tooling
- Better Debugging
 - Standard Python debuggers work out of the box
 - Easy to set breakpoints and inspect variables
 - Clear stack traces

Code Example: Browser Automation

```
from robocorp.browser import Browser

def search_google():
    browser = Browser()
    page = browser.open_page("https://google.com")

    # Modern selector syntax
    search_box = page.get_element("input[name='q']")
    search_box.type("Robocorp Python")

    # Built-in waiting mechanisms
    page.click("input[name='btnK']")
```

Cloud Features of Robocorp

- You can run locally in your computer or on the cloud
- Cloud solution
 - Control Room for orchestration
 - Built-in logging and monitoring
 - Process and task analytics

RPA vs Test Automation: Key Differences


- **RPA** automates business processes end-to-end
 - Replaces manual repetitive tasks
 - Focuses on production workflows
 - Handles real business data
- **Test Automation** validates software functionality
 - Uses test data and environments
 - Focuses on finding defects
 - Typically runs in test environments

RPA vs Test Automation: Technical Aspects

| Aspect | RPA | Test Automation |
|----------------|---------------------------|---------------------|
| Error Handling | Business continuity focus | Bug detection focus |
| Data | Production data | Test data |
| Environment | Production systems | Test environments |
| Scheduling | Business hours/on demand | CI/CD pipeline |
| Success Metric | Process completion | Test coverage |
| Reporting | Business metrics | Test results |
| Security | Production credentials | Test credentials |

Summary: RPA vs Test Automation

- RPA collects and fills real data
- Test automation finds bugs in software
 - Very important for developers
 - **Robot Framework** is one of the best tools

**ROBOT
FRAME
WORK** 

Robot Framework is an open source automation framework for test automation and robotic process automation (RPA). It is supported by the Robot Framework Foundation and widely used in the industry.

Its human-friendly and versatile syntax uses keywords and supports extending through libraries in Python, Java, and other languages.

It integrates with other tools for comprehensive automation without licensing fees, bolstered by a rich community with hundreds of 3rd party libraries.

Getting started with Robocorp Sema4.ai

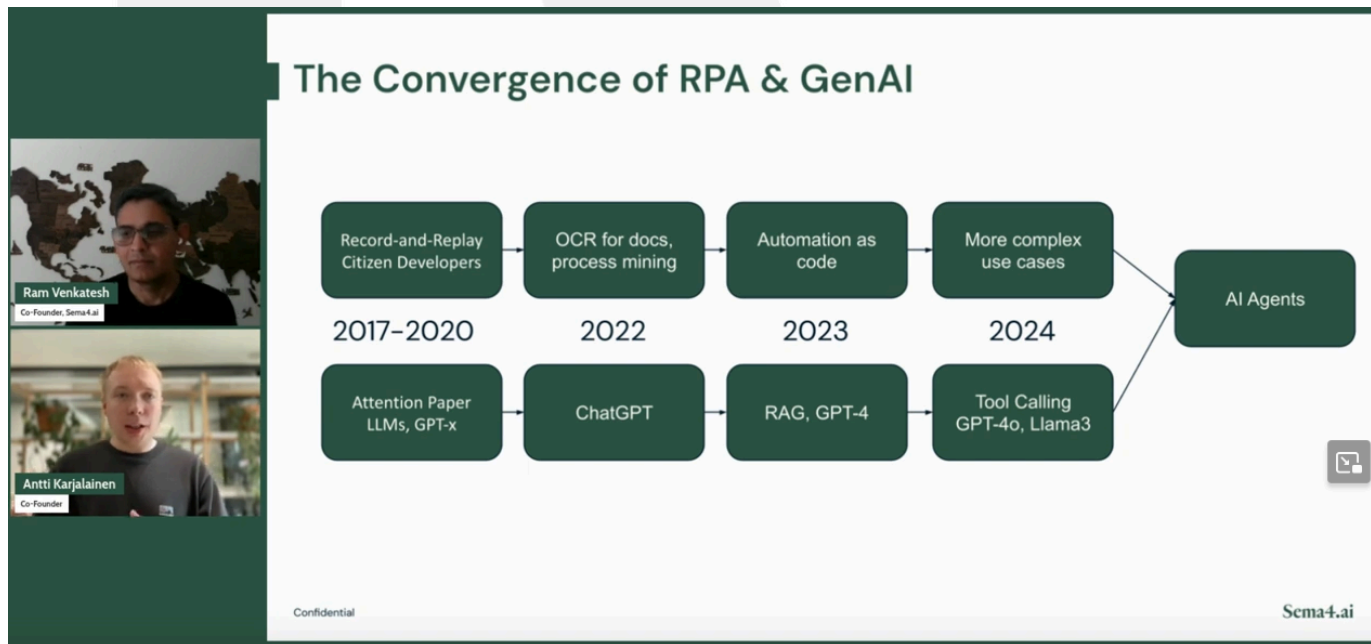
- Install VS Code
- Install Sema4.ai Extension for VS Code
- Keep in mind that many things are changing
 - Updates at <https://updates.sema4.ai/>
- Use the assistant [ReMark](#)
- Run the example for searching a keyword in HAMK's library website

Next steps

- Practice at [RPA Challenge](#)
- Developer [training at Sema4.ai](#)
- Keep updated at [Sema4.ai blog](#)
 - Enterprise AI Agent – The Future of Knowledge Work (Oct 17, 2024)
 - Sema4.ai Recognized in the Gartner Hype Cycle... (Aug 6, 2024)
 - From RPA to Enterprise AI Agents (May 8, 2024)


(Near) Future

Webinar: From RPA to AI Agents: The shift in automation every leader needs to know (published Sept 26, 2024)




(Near) Future (cont.)

Webinar: From RPA to AI Agents: The shift in automation every leader needs to know (published Sept 26, 2024)



Ram Venkatesh
Co-Founder, Scma4.ai



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Evolution of Intelligent Automation

TASKS

Robotic Process Automation
Simple, rigid, repetitive, rule-based

- Structured processes
- Structured data
- UI-centric authoring
- Start from desktop macros

PROCESSES

Automation-as-code
Anything with an API

- Python ecosystem
- Browser automation, UI automation, document OCR
- Database access
- Scale to enterprise level processing
- Scalable, flexible, agile and resilient

WORK

AI Agents
Flexible tasks that need reasoning

- Unstructured processes
- Unstructured data
- Natural language based
- Constrained autonomy**

Scma4.ai