

# Workflow software coded by AI

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# Center for Genetic Programming: Workflow software coded by AI

Workflow management software helps run corporations' processes. As each corporation's needs are unique, the software needs to be custom-designed for each client and changes frequently. This results in cumbersome workflow SW development projects that last months, or even years before new workflows are in place. The software's maintenance is also correspondingly demanding.

There are emerging technologies, such as evolutionary algorithms, that have been shown to be successful in resolving these challenges. Our approach can shorten the software development effort from months to days, thanks to replacing manual programming work with automatically-coded software. This can help accelerate launch-speed of new products and workflows, reduce the overall duration and cost of workflow projects by up to 50%. The ops and maintenance of the workflow software is also greatly simplified.

Our organization, The Center for Genetic Programming (CGP), is dedicated to developing and applying this technology of evolutionary algorithms to real-life workflow solutions for clients. To pilot the application of evolutionary algorithms on a specific real-world situation, CGP was collaborating closely with the FIT VUT team. The following slides provide more detail on the pilot and its successful completion.

The pilot is now successfully completed, validating both the technology and time-savings of this approach.

# Additional context of the workflow software pilot

## Objective of pilot

The objective of the pilot was to:

- **Demonstrate feasibility** of using evolutionary algorithms to automatically generate workflows that meet pre-defined business requirements
- **Evaluate time needed** for a workflow to be generated

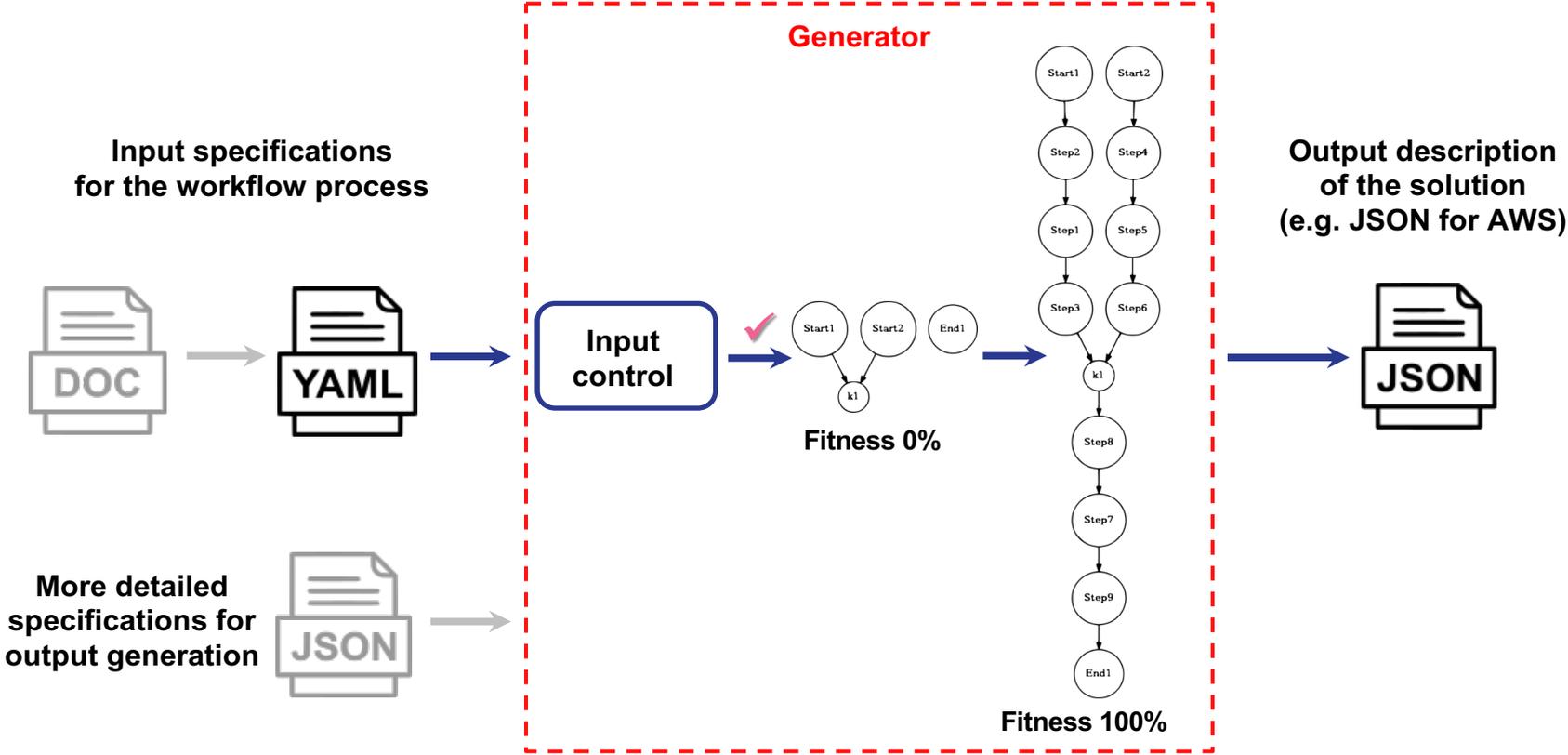
## Approach

- The pilot was done based on real-life software environment of a financial services company
- The pilot was done based on real-life business requirements of the company

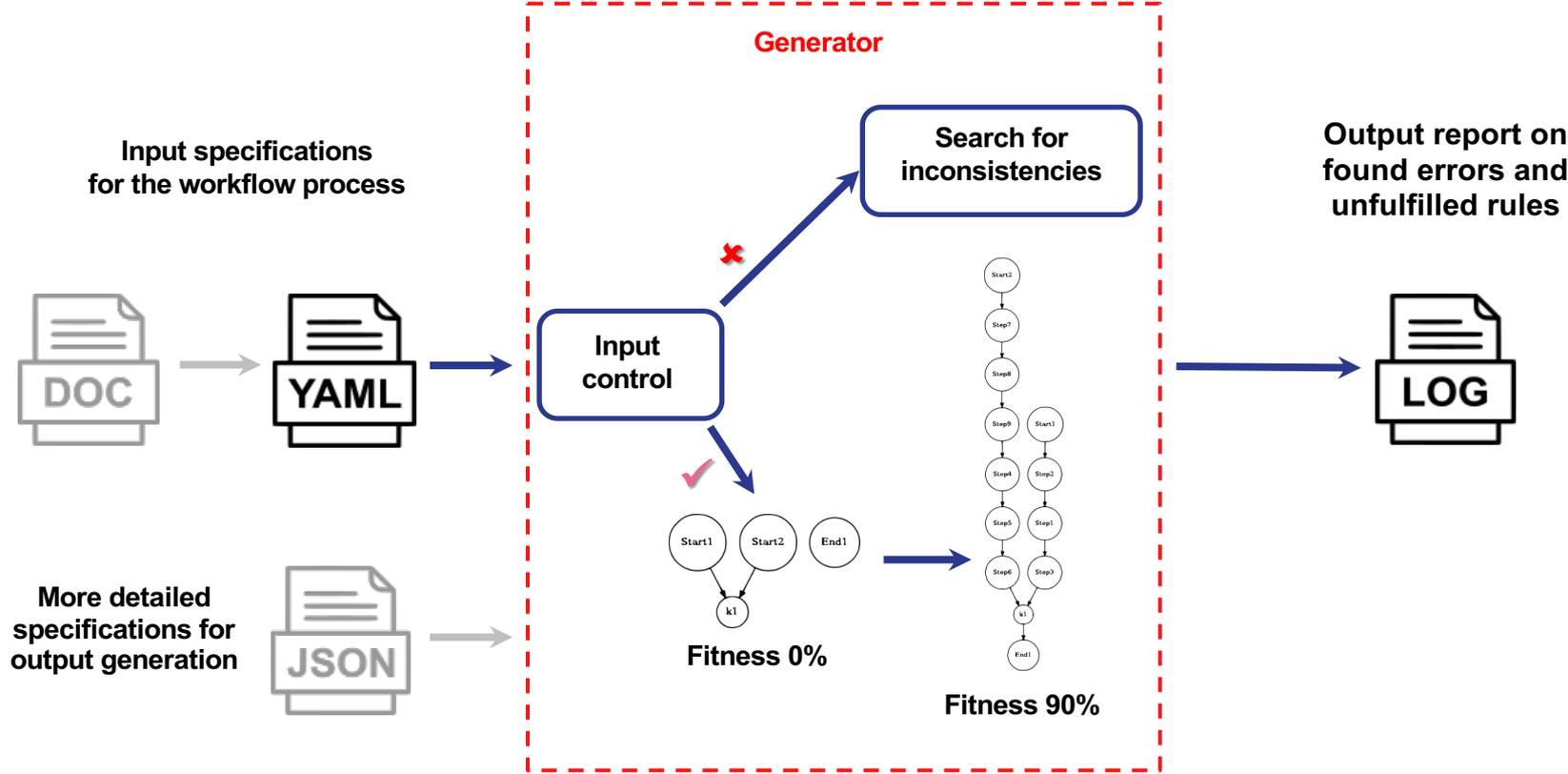
## Key principles of how the pilot functions

- The input is a list of business **rules** and a list of calls bound to specific steps
- The algorithm creates a solution (**sequence of steps**) that **100% meets the defined rules**
- Solutions can be **exported** to description output formats (e.g. JSON)
- In addition, it is viewable in the form of a **diagram** (generated internally by the program or as JSON to AWS)
- If the input **does not converge** to a solution, a list of unfulfilled rules is written to the output **log file**

# Pilot implementation: Workflow 1 - solution found



# Pilot implementation: Workflow 2 – solution not found



# Pilot results: Performance measurement for finding a solution from 10 runs

SPECIFICATION	# OF STEPS	# OF RULES	# OF GENERATIONS	TIME [s]
HelloWorld	12	15	≈251	≈2,4
Long branch	34	38	≈348	≈13.2
Multiple branches	21	12	≈32	≈1,1

# Pilot results: key take-aways

- The pilot has demonstrated that our **technology based on evolutionary algorithms** can successfully **automatically generate workflow software** that meets business requirements (i.e. “logical rules for the workflow”)
- Furthermore, the pilot has shown that the technology generates results at a high-enough speed to allow **50%+ savings of time and resources** in large-scale workflow management projects
  - The savings are achieved on the software generation and validation side, which can be automated through our technology
  - Human work will still need to take place in working with clients to record business requirements for the workflow software. This work can be further simplified through consistent structuring of data collection

If you are interested in discussing your specific use case and whether our solutions could help with your workflow software needs, feel free to reach out to us at [cgp@centergp.com](mailto:cgp@centergp.com) .