Generating program code for psychological experiments from high-level descriptions

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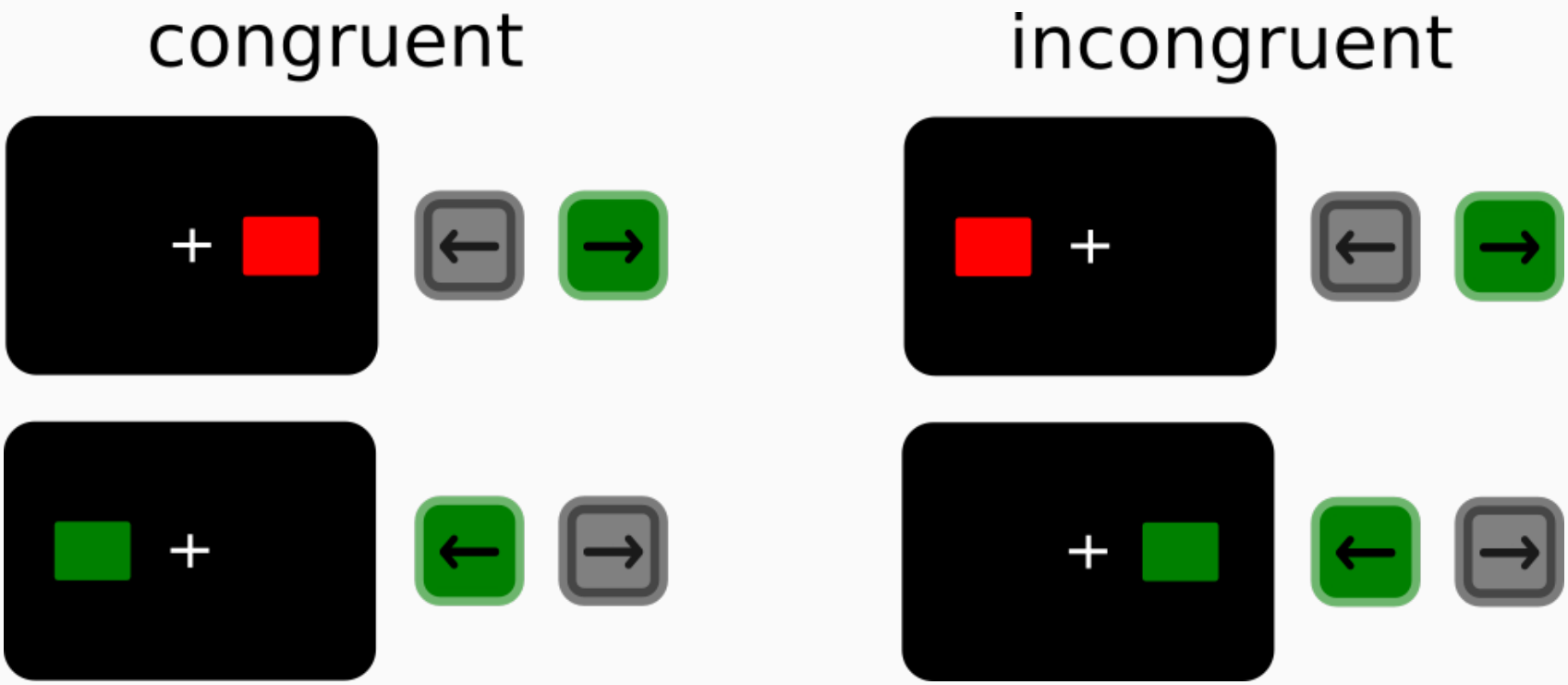
September, 2019 @ ERK Portorož Slovenia

Introduction

Experimental Psychology

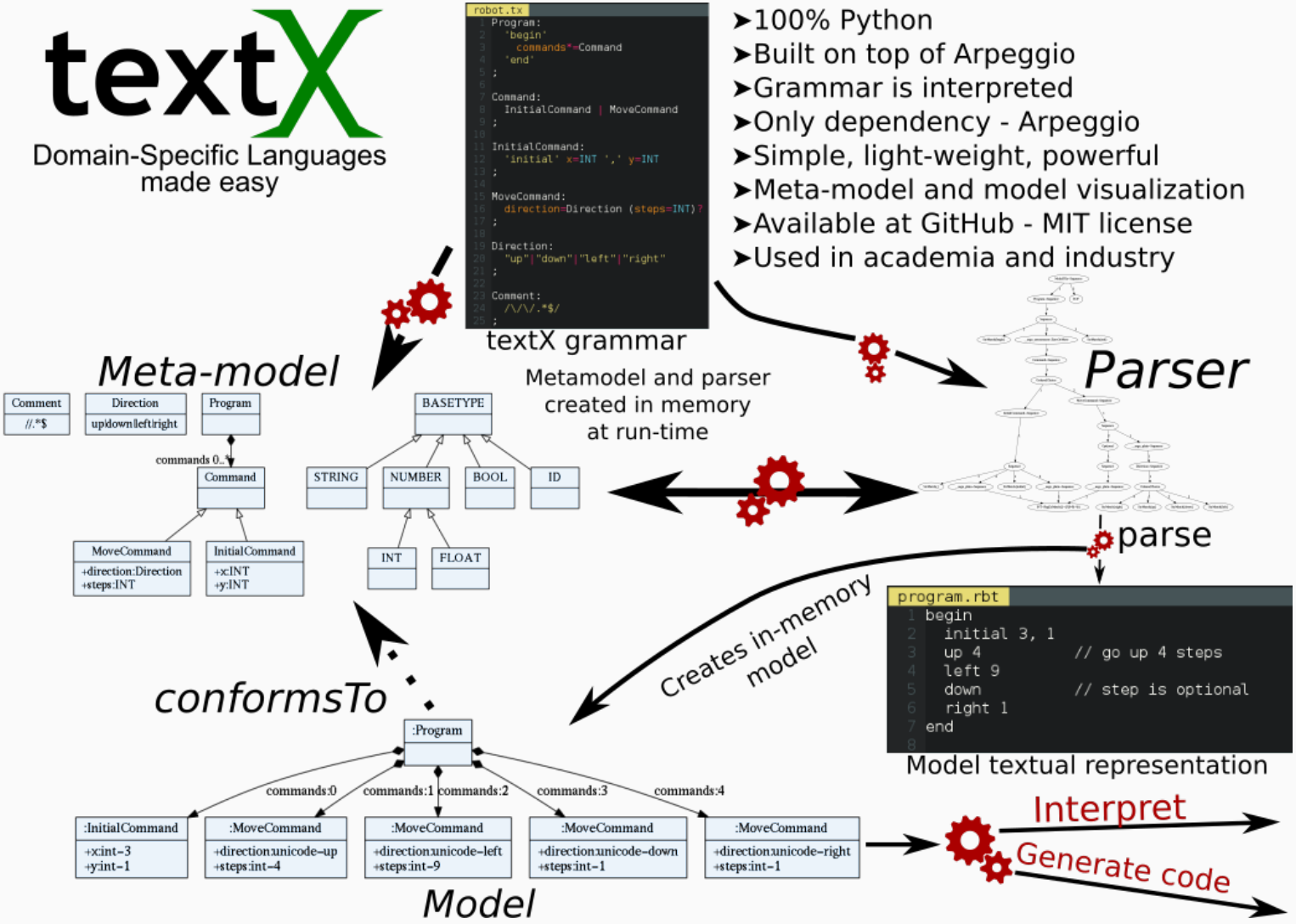
An example – the Simon effect test



Motivation

Domain-Specific Languages

What are they?



https://github.com/textX/textX

I. Dejanović, R. Vaderna, G. Milosavljević, Ž. Vuković, TextX: A Python tool for Domain-Specific Languages implementation, Knowledge-Based Systems 115, 1-4, 2017.

pyFlies

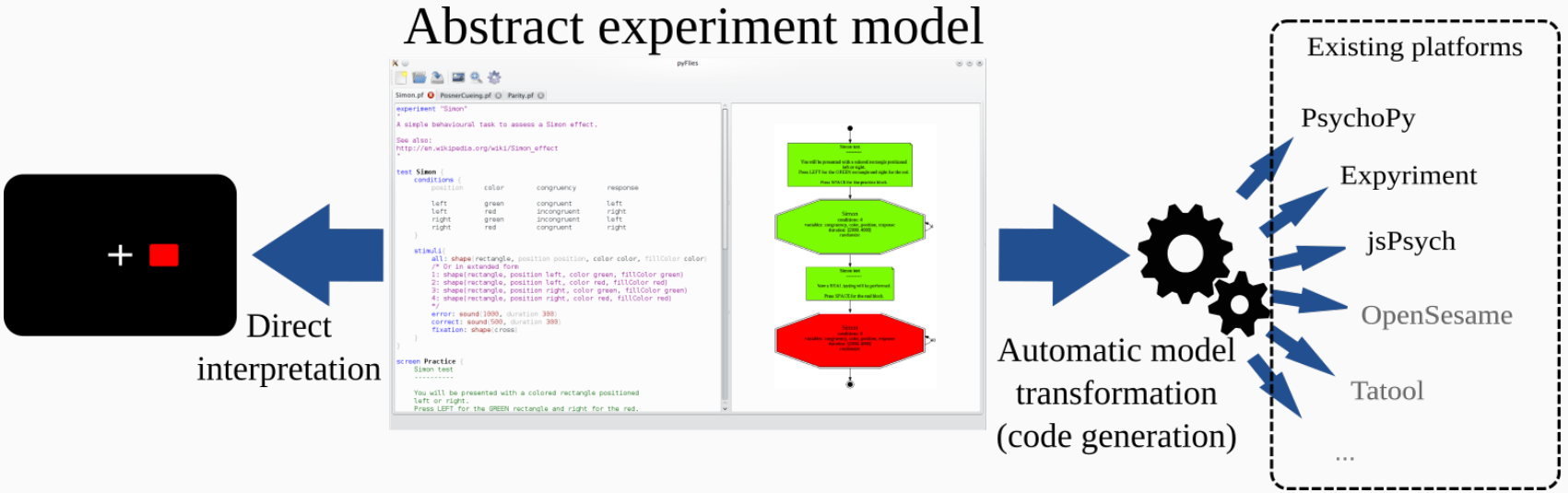
pyFlies code for the Simon effect test

```
test Simon {
  conditions {
    position  color  congruency   response

    left      green  congruent    left
    left      red    incongruent  right
    right     green  incongruent  left
    right     red    congruent    right
  }

  stimuli{
    all: shape(rectangle, position position,
               color color)
    error: sound(1000)
    fixation: shape(cross)
  }
}
```

Target code generators



Template engines

```
# Run experiment
# Create folder for experiment results.
timestr = time.strftime("%Y%m%d-%H%M%S")
exp_folder = '{{m.name}}-%s' % timestr
os.mkdir(exp_folder)

{%- for e in m.structure.elements %}
    {%- if e.__class__.__name__ == "ScreenInstance" %}

present_stimuli(screen_{{e.type.name}})
    {%- elif e.__class__.__name__ == "TestInstance" %}

run_block(exp_folder, "{{e.type.name}}", {{e.type.name}}_varNames,
          {{e.type.name}}_conditions, {{e.type.name}}_condition_stimuli,
          {{e.trials}}, {{e.practice}}, {{e.randomize}},
          {{e.type.name}}_fixation, {{e.type.name}}_error,
          {{e.type.name}}_correct)
    {%- endif %}
{%- endfor %}
```

Template

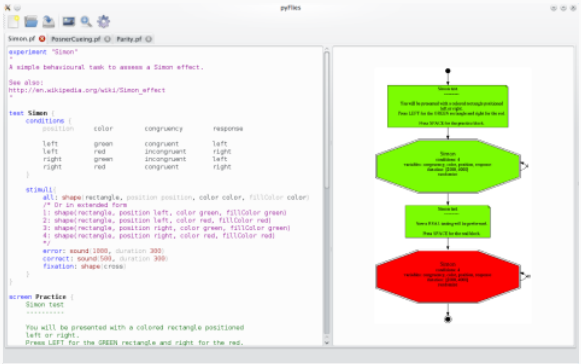
Template engine

```
# Run experiment
# Create folder for experiment results.
timestr = time.strftime("%Y%m%d-%H%M%S")
exp_folder = 'Simon-%s' % timestr
os.mkdir(exp_folder)

present_stimuli(screen_Practice)

run_block(exp_folder, "Simon", Simon_varNames,
          Simon_conditions, Simon_condition_stimuli,
          1, True, True,
          Simon_fixation, Simon_error, Simon_correct)
```

Generated source code



pyFlies model

Conclusion

Thanks! Q&A?