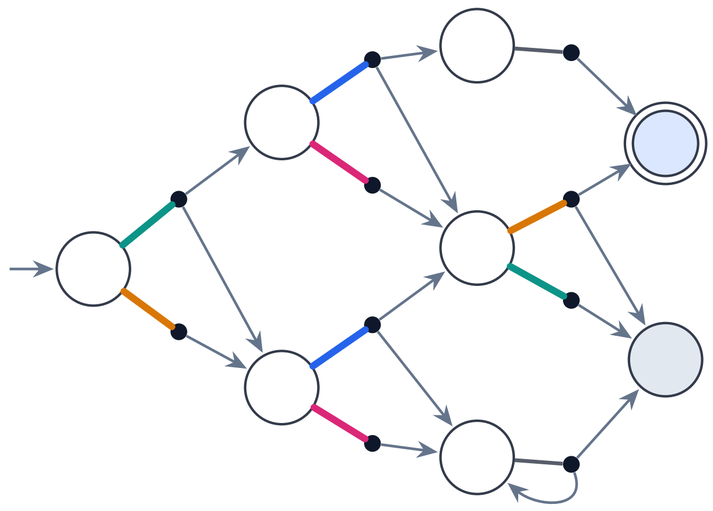
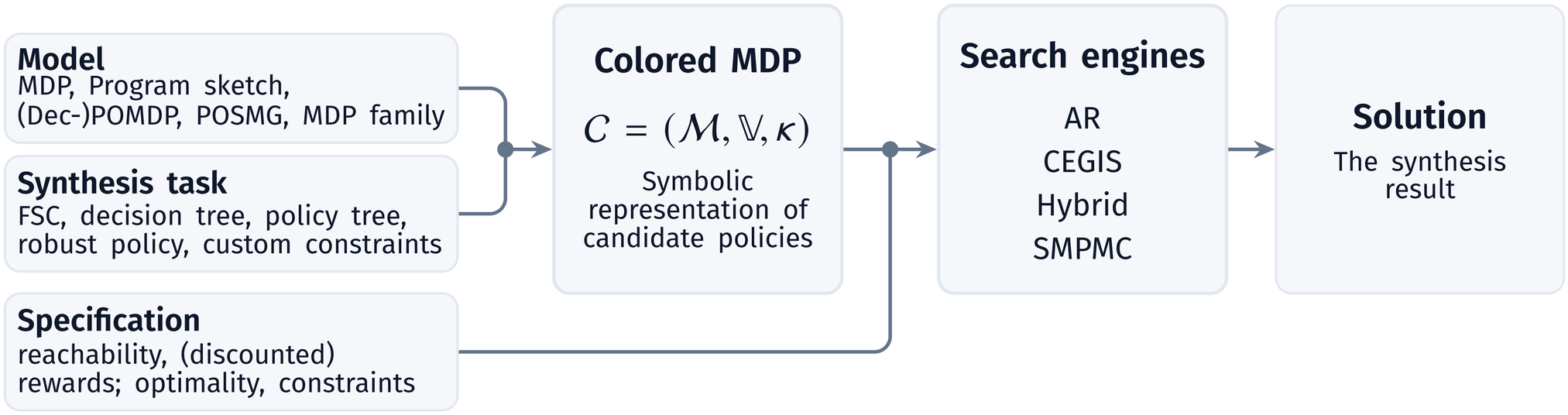
PAYNT

Tool (not only) for Constrained Policy Synthesis in MDPs

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PAYNT Overview



Key idea: Colored MDP compactly represents a set of feasible MDP policies. Dedicated search engines find a policy satisfying the specification.

pip install paynt

Built on top of **Storm**

Out-of-the-box Features

Program sketches
PRISM programs with holes

TACAS'21 CAV'21 JAIR'25

FSC synthesis
FSCs for (Dec-)POMDPs, POSGs

UAI'22 CAV'23, AAMAS'25

Policy trees
compact set of policies for family of MDPs

ATVA'24

Decision trees
DT policies for MDPs

CAV'25 UAI'25

Robust policies
policies that work in a set of environments

AAAI'26

Custom constraints
support for custom constraint formulation

AAAI'26, WIP

Get Involved

1. **One framework**: many interesting features available out-of-the-box
2. **Active development**: Feature requests are welcome!
3. **Coming soon**: define your own colored MDPs directly in Python
4. **Developers and users** of PMC tools, let's stay in touch

Join the PMC Tools Zulip

pmc-tools.zulipchat.com

Try PAYNT

github.com/randriu/paynt

TACAS'21 Andriushchenko, Češka, Junges, Katoen. *Inductive synthesis for probabilistic programs reaches new horizons.*
CAV'21 Andriushchenko, Češka, Junges, Katoen, Stupinský. *PAYNT: a tool for inductive synthesis of probabilistic programs.*
UAI'22 Andriushchenko, Češka, Junges, Katoen. *Inductive synthesis of finite-state controllers for POMDPs.*
CAV'23 Andriushchenko, Bork, Češka, Junges, Katoen, Macák. *Search and explore: symbiotic policy synthesis in POMDPs.*
ATVA'24 Andriushchenko, Češka, Junges, Macák. *Policies grow on trees: model checking families of MDPs.*
JAIR'25 Andriushchenko, Češka, Macák, Junges, Katoen. *An oracle-guided approach to constrained policy synthesis under uncertainty.*
AAMAS'25 Pontiggia, Macák, Andriushchenko, Chiari, Češka. *Decentralized planning using probabilistic hyperproperties.*
CAV'25 Andriushchenko, Češka, Junges, Macák. *Small decision trees for MDPs with deductive synthesis.*
UAI'25 Andriushchenko, Češka, Chakraborty, Junges, Křetínský, Macák. *Symbiotic local search for small decision tree policies in MDPs.*
AAAI'26 Heck, Macák, Češka, Junges. *Constrained and robust policy synthesis with satisfiability-modulo-probabilistic-model-checking.*