TECHNISCHE UNIVERSITÄT KAISERSLAUTERN

SYNT Workshop - SyGuS Comp'17

Saturday 22.07. 2017

E3Solver: Decision Tree Unification by Enumeration

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Introduction

- E3Solver: an enumerative solver for programming by example
- Participated in SyGuS Comp‘17 (Bitvector subtrack) and won, unexpectedly, the first place!
- Source code is publicly available (https://github.com/sygus-tools)

Solving in two phases

Enumerate terminal expressions

$E_1(in_1, out_1) \longrightarrow T_1$

$E_2(in_2, out_2) \longrightarrow T_1$

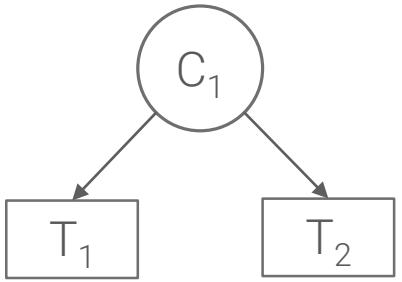
$E_3(in_3, out_3) \longrightarrow T_2$

$E_4(in_4, out_4) \longrightarrow T_3$

$E_5(in_5, out_5) \longrightarrow T_3$

$E_6(in_6, out_6) \longrightarrow T_1$

Enumerate decision tree conditions



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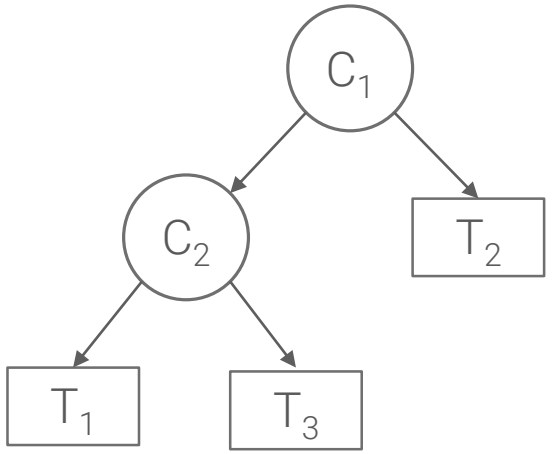
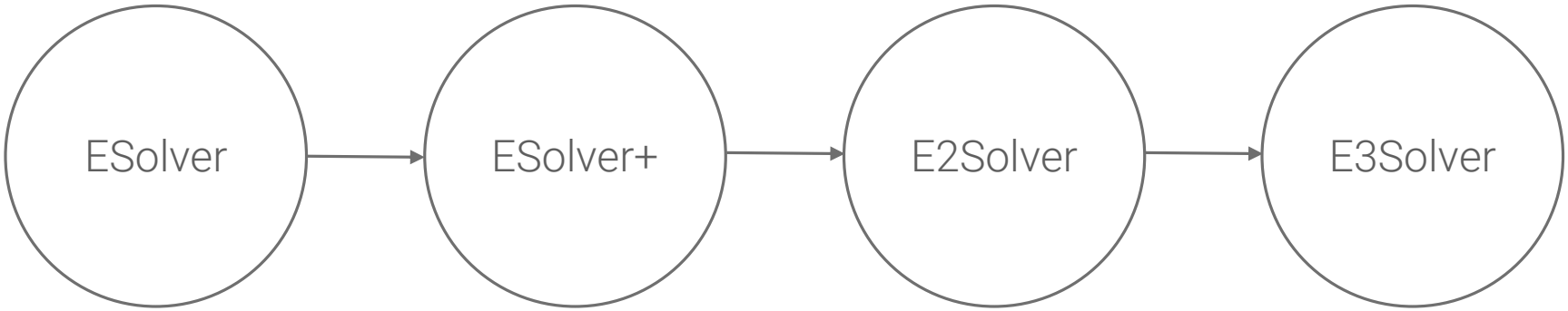


Key properties

- Correct-by-contruction
- Incremental
- Cheap unification steps. Bottelneck in terms enumration

$$\underbrace{Exp[in_i] \neq Exp[in_j]}_{\text{Non-constant condition}} \wedge \underbrace{(Exp[in_i] = 1 \vee Exp[in_j] = 1)}_{\text{One true branch}}$$

History of E3Solver



- Credit´s due to **Abhishek Udupa** for the well-written and publicly available code of ESolver

Questions?