Synthesizing Multi-View Models of Software Systems

Bernard Lambeau bernard.lambeau@uclouvain.be

March 29, 2011

Abstract

${\bf Acknowledgements}$

I would like to thank \dots

Contents

\mathbf{A}	bstra	net	i				
\mathbf{A}	ckno	wledgements	ii				
1	Inti	ntroduction 2					
2	A multi-view modeling framework						
	2.1	Event-based behavior models	3				
		2.1.1 Message Sequence Charts for instance behaviors	3				
		2.1.2 Labelled Transition Systems for class behaviors	3				
	2.2	State-based abstractions	3				
		2.2.1 Fluents and state variables	3				
		2.2.2 Guards in behavior models	3				
		2.2.3 Decorations on behavior models	3				
	2.3	Intentional models as goal graphs on fluents	3				
3	Dec	Deductive synthesis of LTS models from guarded hMSCs					
	3.1	From guarded HMSC to guarded LTS	4				
	3.2	From guarded LTS to pure LTS	4				
	3.3	Model analysis perspectives of deductive synthesis	4				
4	Inductive synthesis of LTS models from MSC and hMSC						
	mo	dels	5				
	4.1	From grammar induction to model induction	5				
	4.2	Interactive induction of LTS models from MSCs	5				
	4.3	Pruning the induction space with state information	5				
	4.4	Pruning the induction space with goals	5				
	4.5	Pruning the induction space with control information	5				
5	Eva	luation	6				
	5.1	Experimental results on case studies	6				
	5.2	Experimental results on synthetic data	6				
	5.3	The Stamina Competition	6				
		5.3.1 Motivation and overview	6				

		5.3.2	Scientific setup	6			
		5.3.3	Baseline: Performance of Blue-Fringe	6			
		5.3.4	Competition results	6			
6	Imp	olemen	tation	7			
	6.1	Auton	naton and Induction toolkit	7			
	6.2	Web A	Application Sketching from Scenarios	7			
	6.3	A FLT	TL Model-Checker for g-hMSC Models	7			
	6.4	The G	isele Clinical Pathway Analyzer	7			
7	Discussion and Related Work Conclusion						
8							
Bi	Bibliography						

List of Figures

List of Tables

Introduction

A multi-view modeling framework

- 2.1 Event-based behavior models
- 2.1.1 Message Sequence Charts for instance behaviors
- 2.1.2 Labelled Transition Systems for class behaviors
- 2.2 State-based abstractions
- 2.2.1 Fluents and state variables
- 2.2.2 Guards in behavior models
- 2.2.3 Decorations on behavior models
- 2.3 Intentional models as goal graphs on fluents

Deductive synthesis of LTS models from guarded hMSCs

- 3.1 From guarded HMSC to guarded LTS
- 3.2 From guarded LTS to pure LTS
- 3.3 Model analysis perspectives of deductive synthesis

Inductive synthesis of LTS models from MSC and hMSC models

- 4.1 From grammar induction to model induction
- 4.2 Interactive induction of LTS models from MSCs
- 4.3 Pruning the induction space with state information
- 4.4 Pruning the induction space with goals
- 4.5 Pruning the induction space with control information

Evaluation

- 5.1 Experimental results on case studies
- 5.2 Experimental results on synthetic data
- 5.3 The Stamina Competition
- 5.3.1 Motivation and overview
- 5.3.2 Scientific setup

State machines

Training and test samples

Submission and scoring

- 5.3.3 Baseline: Performance of Blue-Fringe
- 5.3.4 Competition results

Implementation

- 6.1 Automaton and Induction toolkit
- 6.2 Web Application Sketching from Scenarios
- 6.3 A FLTL Model-Checker for g-hMSC Models
- 6.4 The Gisele Clinical Pathway Analyzer

Discussion and Related Work

Conclusion