ConfMaster@IJCAI 2017 printed for Sasha Rubin (sasharubin) at 2017-04-08 11:43:23

Discuss Paper

Paper# 2515: Towards Verification of Pushdown Epistemic Game Structures

Abstract

In this paper, we investigate the problem of
(PEGSs), an extension of pushdown game struct
extensions of alternating-time temporal logic
we show that size-preserving EARs will render
checking algorithms with matching low bounds,

Paper Type Full Paper

Keywords [Agent-based and Multi-agent Systems] Formal verification, validation and synthesis, [Multidisciplinary Topics and Applications] Validation and Verification

Average Rating 5.31

Submission File

Assigned Area Chairs Ana Bazzan (#29311) (UFRGS) assigned by Carles Sierra

Assigned Senior PC M... Alessio Lomuscio (#27436) (Imperial College London) assigned by Carles Sierra

Assigned PC Members Sasha Rubin (#21281) (University of Naples, Federico II) assigned by Carles Sierra

Catalin Dima (#21746) (LACL, Université Paris-Est Créteil) assigned by Carles Sierra

Aniello Murano (#24866) (Università di Napoli Federico II) assigned by Carles Sierra

Reviews

★★★★★☆☆☆☆☆

Review from PC Member Sasha Rubin (#21281) (Created: 2017-04-04 15:23:49, Last modified: 3 days, 20 hours ago)

Originality

★★★★★★★☆☆☆

Technical Quality

★★★★★★★★★☆☆

Significance

★★★★☆☆☆☆☆☆

Relevance

★★★☆☆☆☆☆☆☆

Quality of writing

★★★★★★★★★★

Overall Score

★★★★★☆☆☆☆☆

Confidence on your assessment

★★★★★★★★☆☆

Comments to Authors.

This paper studies the model-checking problem for multi-agent systems generated
by pushdown automata and epistemic alternating-time temporal logics ATEL and ATEL*.

The game-structures are infinite-state, i.e., configuration spaces of pushdown automata. These are called PEGS in the paper (pushdown epistemic game structures). The indistuinguishability relations come in three flavours: "size preserving" (introduced in [Aminof et al. 2013]), "regular" (which seem to be new to this paper) and "simple" (a special case of "regular").

The paper is theoretical. The focus is on structures with perfect- and imperfect information and agents with imperfect-recall (i.e., memoryless strategies).

The main results are:
- undecidability of ATL_ir assuming size-preserving relations.
- 2EXPTIME-completeness of ATEL*_ir and EXPTIME-completeness for ATEL_ir assuming regular relations.

The upper-bounds are achieved by standard techniques and easy reductions to the
known perfect-information cases, and the lower-bounds are immediately inherited from corresponding results about CTL(*).

On the positive side:
- this work presents a model of multi-agent system that combines two important aspects: infinite-state and imperfect-information. Previous work either deals with finite-state or perfect-information.
- the paper is very well written and the results are sound.

On the negative side:

- There are no new proof techniques.

- The motivation for the model for an AI audience is weak (*).

- The future work mentions "implementation of our algorithms". However, given (*), I do not see the value of such a direction.

(*) I reviewed a previous version of this paper for AAAI17. Then, my main concern was
that the motivation for an AI audience is weak. I wrote:

> 1. Pushdown systems are standard in software verification because they abstract procedure calls. Where do PEGS appear in MAS/AI, i.e., what kinds of agents and situations would result in a PEG? In the terminology of "interpreted systems", what are the local states of an agent in a pushdown setting?
>
> 2. The types of indistinguishability-relations considered are not well motivated. In the setting of a pushdown MAS, how should one define agents with perfect-recall? with imperfect-recall? with bounded-recall? Perhaps "size-preserving" captures perfect-recall. But what type of agents do "simple" and "regular" relations capture?

The authors do discuss issue 1. In the introduction they state that model-checking is undecidable taking the "synchronous product" of two pushdown-agents (each with their own stacks). Thus, they focus on agents that share a single stack. This is justified by arguing that in many scenarios a) an agent needs to explicitly keep track of its history, and b) all agents act synchronously (i.e., either all push or all pop). The authors suggest that synchronous stack operations and explicit history is important to rollback canceled transactions in e-commerce or automated trading. I commend the authors for providing more justification of their model for an AI audience. Although not wholly convincing, it is certainly a step in the right direction.

The authors do not discuss issue 2, and I feel this is still a major shortcoming of this work. The definitions of the epistemic relations are not motivated or justified (except in so far as they are mathematically natural).

Overall: this is a theoretically sound paper but without good motivation, except in that it deals with multi-agent systems of imperfect information which are an important class of systems. I believe this work deserves to be published, but not at a premier AI venue.

Typos:

Section 4: ATLE*

Comments after response period

There was no response to the reviews.

This submission has potential but a) does not give strong motivation for AI, and b) is very incremental (from a technical point of view).

Regarding a), after much discussion with a fellow reviewer, we believe that the following are potential applications of this line of work (that will, of course, need to be expanded upon):
i) an agent programmed in, e.g., AgentSpeak/JASON, could be abstracted to a pushdown system.

ii) a single stack might serve as a resource, see

e.g., http://dblp.uni-trier.de/pers/hd/a/Alechina:Natasha

e.g., http://dblp.org/rec/conf/prima/BullingN15

Regarding b), I should point out that this is not a reason for rejection. I would certainly consider acceptance to IJCAI of papers that are not very significant, but that are highly relevant.

Confidential Comments (Not visible to the authors)

Besides the stated concerns, I have the following meta concern.

If this paper is published it will help open the door to more papers on pushdown games of imperfect information. The result will be a host of papers without clear interest/utility to AI except to a small group of researchers. I do not think this is desirable. If, on the other hand, the authors had done a better job of motivating their setting, I would not fight for rejection since such a paper could certainly get people talking about good models of infinite-state multi-agent systems.

I've since reconsidered. After lengthy discussions with Nello, I conclude that there exists
reasonably good motivations in AI for studying pushdown systems with incomplete information.

★★★★★★☆☆☆☆

Review from PC Member Catalin Dima (#21746) (Created:

2017-04-04 13:59:42, Last modified: 3 days, 21 hours ago)

Originality

★★★★★☆☆☆☆☆

Technical Quality

★★★★★★★★★☆☆

Significance

★★★★★★☆☆☆☆

Relevance

★★★★★★★★★☆☆

Quality of writing

★★★★★★★★★☆☆

Overall Score

★★★★★★☆☆☆☆

Confidence on your assessment

★★★★★★★★★★☆

Comments to Authors.

The paper introduces Pushdown Epistemic Games (PEGS) as infinite-state multi-player games in which players have imperfect information. The imperfect information for players is given in serveral flavors, depending on the type of the dependence between the stack contents and agent information. The first dependence studied, the size-preserving Epistemic Accessibility Relation (EAR), requires that indistinguishability between configurations imply that stack content have the same size. Two restrictions are also defined: regular and simple EARs, in which the stack content only counts for a kind of "finite memory". Note also that all indistinguishability relations are memoryless on states. Then the authors study the model-checking problem for PEGS and several multi-agent logics of strategic abilities: the Alternating Temporal Epistemic Logics ATEL and ATEL* with perfect or imperfect information and perfect or imperfect recall.

The authors first show that model-checking is undecidable for size-preserving EARs even under the imperfect recall semantics of ATEL, due to the possibility to encode the history of each agent in its stack and then simulate indistinguishability with perfect recall. Then, regular and simple EARs are shown to be similar via a "synchronous product" construction on finite automata representing regular EARs. The decidability of model-checking for simple EARs and ATEL with imperfect recall is then proved using an encoding into Alternating Multi-Automata of Bouajjani, Esparza and Maler, and complexity results are provided for both ATEL and ATEL*.

Having participated to the review of the same paper for AAAI, I notice the authors have dropped the part of the study on a fixpoint variant of ATEL which posed some problems, and inserted a section presenting and discussing a simplified PEGS model to support for the relevance and applicability of the results in the

paper, which was the other weak point of the previous submission.

As a remark to address during the rebuttal, it would be better if some relevant formulas are provided and checked on the PEGS model. These formulas should argue in favor of the need of a stack against the stackless model, in the sense that they should have different truth values in a configuration of the PEGS and the same configuration *without stack* from the underlying CEGS.

Comment after rebuttal: it's a pity but, considering that the authors did not take into consideration the request to improve the relevance of the example in Section 3, I will lower my overall mark. I think that the somewhat general discussion in the paragraphs before Example 1 on the use of PEGS and the properties that can be checked on them is not sufficient if not accompanied with a relevant example which implements this discussion, which does not seem to be the case with Example 1.

Assessment from Sasha Rubin (#7291) (Created: 1 day, 15 hours ago, Last modified: 1 day, 15 hours ago)

Review assessment. Only visible to Area Chairs.

★ ★ ★ ★ ★ ★ ☆ ☆ ☆ ☆

[Optional] Assessment comments. Only visible to Area Chairs.

★ ★ ★ ★ ★ ★ ☆ ☆ ☆ ☆

Review from PC Member Aniello Murano (#24866) (Created: 2017-04-01 10:32:34, Last modified: 1 week ago)

Originality

★ ★ ★ ★ ★ ★ ★ ☆ ☆ ☆

Technical Quality

★ ★ ★ ★ ★ ★ ☆ ☆ ☆ ☆

Significance

★ ★ ★ ★ ★ ★ ★ ★ ☆ ☆

Relevance

★ ★ ★ ★ ★ ★ ★ ☆ ☆ ☆

Quality of writing

★ ★ ★ ★ ★ ★ ★ ★ ☆ ☆

Overall Score

★★★★★★☆☆☆☆

Confidence on your assessment

★★★★★★★★★★

Comments to Authors.

SUMMARY

This paper investigates the verification of infinite-state pushdown multi-agent systems with imperfect information, modelled by pushdown epistemic game structures (PEGS), under an imperfect recall semantics, where the agents only use memoryless or positional strategies. PEGS extend the known framework of pushdown game structures with epistemic accessibility relations (EAR), which formalize the indistinguishability of pushdown configurations w.r.t. an agent (each agent has only a partial view of the control state and stack content).

The paper addresses the model checking problem of PEGS against the logics ATEL and ATEL* which are known extensions of the standard alternating-time temporal logics ATL and ATL* with epistemic modalities.
The obtained results are as follows:
- the considered problems are undecidable when one considers size-preserving EARs, where two configurations are indistinguishable when the two stack contents have the same depth, the two control states are indistinguishable, and stacks symbols at the same positions are indistinguishable too. The negative result is obtained by a reduction from the model checking problem of finite-state concurrent game structures with imperfect information against ATL under a perfect recall semantics, which is known to be undecidable.
- In order to gain decidability, the paper considers regular EARs which are specified by deterministic finite-state automata (DFA) and partition the set of pushdown configurations into a finite number of equivalence classes. Hence, an agent can distinguish only finitely many configurations. In this setting, the problem for ATEL (resp., ATEL*) is claimed to be EXPTIME-complete (resp. 2EXPTIME-complete).

EVALUATION
On the positive side, the paper provides a valuable theoretical contribution to an interesting and active field of research. The paper is well-motivated and well-written with a full coverage and comprehensive discussion of the related work. The contribution is surely novel and of interest for the AI community.
On the negative side, one can observe that the technical contribution is not amazing. The undecidability result is easy to gain and the positive results (although the are clearly written and easy to absorb) are obtained by an adaptations of known techniques exploited for solving global pushdown model checking against CTL and CTL*.

Another important observation and **a question for the rebuttal** is the following: The claimed upper bounds (membership in EXPTIME for ATEL and 2EXPTIME for ATEL*) about the model checking of PEGS with regular EARs seem to hold only if the number of agents is fixed. Indeed, in the size of the PEGS, the authors do not take into account the sizes of the DFAs specifying the regular

EARs. On the other hand, the first step in the proposed algorithm is based on a reduction to the same problems restricted to simple EARs. This reduction is exponential in the number of DFAs which coincides with the number of agents. Since the provided upper bounds for **simple** EARS are in EXPTIME (resp. 2EXPTIME) for ATEL (resp., ATEL*), the considered approach leads at the end to a very high complexity, i.e. 2EXPTIME for ATEL and 3EXPTIME for ATEL* where in both the cases, there is a doubly exponential blow-up in the number of agents. Could you please comment on this?

REMARKS and TYPOS

- Abstract, line -3: "low" --> "lower"

- Page 1, Col. I, line -6: "is usually **of** finite state (as**,**e.g.,)" --> "is usually finite state (as, e.g.,)"- Page 1, Col. II, Par. 1, lines -4/-6: "In PGS agents ..... As the stack is unbounded, it represents.." --> "In PGS, agents ..... As the stack is unbounded, PGS represent.."- Page 2, Col. I, line 2: "A commonly adopted one" --> "A commonly adopted approach"
- Page 2, Col. I, Par. 2, line -6: "an reduction" --> "a reduction"

- Page 2, Col. I, Par. 2, line -1: "and we show they are optimal" --> "and we show that it is optimal"

- Page 2, footnote: "we can easily add **the** transitions .....the situation **that** some actions" --> "we can easily add transitions .....the situation where some actions"

- Page 2, Col. II. Par. Tracks and Paths, lines 7-9: "distinguishable" --> "indistinguishable". Moreover, you should say that the tracks π and π' have the same length.

- Page 3, Col. I, Par. 4, lines -2/-3: "(see later **of** this section).... approximations of EARs" --> "(see later in this section).... approximations of size-preserving EARs"

- Page 3, Col. I, Par. 5, line 3: "for every" --> "for all"

- Page 3, Col. I, Par. 5, line -4: "the purpose of DFA A_i" --> "the purpose of the DFA A_i"

- Page 3, Col. I, Par. 5, line -2: "for every word" --> "for all words"

- Page 3, Col. I, line -6/-7: "To represent ..... finitely" --> "In order to finitely represent ..... "- Page 3: "Why is the size of the DFAs omitted in the size of the given PEGS?"- Page 3, Col. II, Par. 5, line -8: "same number" --> "the same number"- Page 4, Example 1, line 11: "denotes change the value " --> "denotes change of the value "- Page 4, Col. I, line -13/-15: "To make the maximal use ... keep track the information she had .." --> "To obtain the maximal use ... keep track of the information the agent had .."- Page 4, Section 4, lines 5--6: "ATEL and ATLE* ... respectively " --> "ATEL and ATEL* ... ,respectively,"- Page 4, Section 4.1, lines 8--9: "ϕ being restricted to be atomic propositions and their negation" --> "ϕ being restricted to be either an atomic proposition or its negation"- Page 4, Section 4.1, line 12: ", the satisfiability relation ..." --> "The

satisfiability relation ..."- Page 4, third item in the semantics: "there exists a path ...**,**... " --> "there exists a path ...such that... "- Page 4, last item in the semantics: "using the relation ..." --> "but we use the relations"- Page 4, Column II, line -4: "to, e.g. [Clarke.." --> "to, e.g., [Clarke.."- Page 5, Col. I, Par. 3: "CTL and CTL* are special cases... satisfy **that** $A=\emptyset$ .... while **the latter two** .." --> "CTL and CTL* are special cases... satisfy $A=\emptyset$ .... while ATL_σ and $ATL*_\sigma$"- Page 5, Col. II, line 2: "the states of DFAs" --> "the states of the DFAs"- Page 5, Section 5.1, line 3: "is given as the pair **of**.." --> "is given as the pair .."- Page 5, Section 5.1, Par. 2, line 3: "to be constructed**,** stores" --> "to be constructed stores"- Page 5, Section 5.1, Par. 2, lines 5--9: "Formally, the PEGS $P'=(...)$ where ...., in addition,..." --> "Formally, the PEGS P' is given by $P'=(...)$, where ..... In addition,..."- Page 5, Section 5.1, one line before Theorem 4: "the valuation γ" ... according to γ' "--> "the valuation γ'" ... according to γ"- Page 5, Col. II, lines -3/-5: "We assume that each atomic proposition $q\in AP$ .. is associated with an AMA M_q *to denote* the set of configurations..." --> "We assume that each atomic proposition $q\in AP$ .. is associated with an AMA M_q which recognizes the set of configurations"
- Page 5, Col. II, line -1: What does it mean "to the problem of PDSs". Probably you mean the model checking problem of PDSs against CTL/CTL*.

- Page 6, Col. I, Par. 1: you should clarify that $v_i:P\times \Gamma \mapsto Ac$ is consistent with the given simple EARs.

- Page 6, Col. I, Par. 2, lines 4--5: "for every $i\in A$ with $d(i)=v_i(p,\gamma)$, d'..." --> "$d(i)=v_i(p,\gamma)$ for every $i\in A$, and d'". In fact, the transition relation of a PDS does not depend on the set of decisions. Thus, you should consider the union over the decisions consistent with v_i.

- Page 6, Col. I, first item before Lemma 1: "an AMA M_{v_a}" --> "one can construct an AMA M_{v_a}"

- Page 6, Col. I, second item before Lemma 1, line -3: "we can construct an AMA M_{v_a} **of** " --> "we can construct an AMA M_{v_a} with"

- Page 6, Section 6, lines -6/-8: "The model checking problem on PGSs under IR strategies **were** studied ...., **but only with perfect information**" --> "The model checking problem on PGSs under IR strategies **was** studied ....."
Remove **but only with perfect information** which is redundant.

- Page 6, Col. II, line -1: "and study of the model checking problem" --> "and the study of the model checking problem"

Confidential Comments (Not visible to the authors)

The review was made with the help of Laura Bozzelli

Assessment from Sasha Rubin (#7291) (Created: 1 day, 15 hours ago, Last modified: 1 day, 15 hours ago)

Review assessment. Only visible to Area Chairs.

★★★★★★★★★☆☆

[Optional] Assessment comments. Only visible to Area Chairs.

★★★★☆☆☆☆☆☆

Review from Senior PC Member Alessio Lomuscio (#27436)

(Created: 2017-03-16 22:44:44, Last modified: 3 weeks, 1 day ago)

Originality

★★★★★★☆☆☆☆

Technical Quality

★★★★★★★☆☆☆

Significance

★★★★☆☆☆☆☆☆

Relevance

★★★★☆☆☆☆☆☆

Quality of writing

★★★★★★☆☆☆☆

Overall Score

★★★★☆☆☆☆☆☆

Confidence on your assessment

★★★★★★★★☆☆

Comments to Authors.

The paper investigates the verification of so called pushdown multi-agent systems against specifications expressed in the logic ATEL and ATEL*. The paper presents a general undecidability results and then goes on to identify classes of structures for which decidability can be shown. In these cases the complexity is given.

The paper is very well structured and written. I did not check the accuracy of the proofs but the results and constructions reported are entirely reasonable. The problems I have with the paper concern the significance of the results presented in the context of an AI conference.

To begin, the paper addresses "pushdown MAS". It is not clear from the paper what particular MAS are amenable to modelling via pushdown systems. Very little is said in the paper about this. The only example in the paper concerns processes; it seems as if the authors do not have AI systems in mind at all, nor MAS.

The same concerns apply to the semantical classes studied. Firstly, the notion of

size preserving EARs is taken from the literature in an attempt to yield decidability. The paper shows this is insufficient but the question still remains: what systems are amenable to modelling via "size preserving EARs"? The paper identifies two further notions that lead to decidability: simple/regular valuations and EARs. Again, while mathematical definitions are given, no real intuition nor concrete example is provided as to what class of MAS this may be useful to. For this reason, I am unable to find the decidability results significant in the context of AI.

In summary, this may be a perfectly acceptable paper in theoretical computer science; but I see no relevance to AI. It is entirely possible that there is; I think it is a pity that the paper does not seem even to try to make that connection.

I suggest the authors explore the significance of their work in an AI context.

Confidential Comments (Not visible to the authors)

I feel this may be an OK paper in TCS but makes no attempt to build a bridge with AI.

Assessment from Sasha Rubin (#7291) (Created: 1 day, 15 hours ago, Last modified: 1 day, 15 hours ago)

Review assessment. Only visible to Area Chairs.

★ ★ ★ ★ ★ ★ ★ ☆ ☆ ☆

[Optional] Assessment comments. Only visible to Area Chairs.

Comments

Aniello Murano (#24866) wrote 3 days, 5 hours ago:

Dear Alessio,

I fully understand your point and I completely agree that "it is difficult for us to recommend acceptance" at this point. Therefore, I am fine to end up with a borderline evaluation (this is what we have now, right?).

Perhaps it does not add much to this paper but I have to confess that, out of 7 I got this year at IJCAI, this is the best one I have reviewed.

At any rate, I would not be embarassed if this paper would be accepted to fill the program, or, just as a short paper.

Best,

Nello

Alessio Lomuscio (#27436) wrote 3 days, 22 hours ago:

Dear All

Thanks for your further thoughts on this.

Nello, no problem if you'd like to keep a valuation as 6 of course.

Sasha, since you increased your scores quite considerably, can you please ensure your review reflects this (by highlighting the discussion held afterwards) and in particular addresses the point you originally raised on relevance?

Catalin, I do not think we make recommendations for short/long, just on acceptance. Any decision on short/long will take place later. Can I just ask you to ensure that your review fully reflects your current thoughts?

As we stand, with concerns on relevance, and no response from the authors, frankly I think it is difficult for us to recommend acceptance.

Thanks.

-A

Catalin Dima (#21746) wrote 3 days, 23 hours ago:

Dear all,

I do think that pushdown epistemic systems are interesting to study for several reasons, one of them being also that the (unique) stack can be used to model some type of "shared" recall. However I find it a pity that the authors did not provide feedback to our reviews, so I will not champion its acceptance.

Is it possible to accept short papers at IJCAI ?Best,Catalin

Sasha Rubin (#21281) wrote 6 days, 22 hours ago:

Dear all:

After lengthy discussions with Nello, I conclude that there exists reasonably good motivations in AI for studying pushdown systems with incomplete information.

Also, this version of the paper is an improvement of the AAAI version they

previously submitted. Moreover, the paper is well written and it seems to be error free. That said, the contribution is quite shallow.

Thus, I will raise my score to 5, and I will not fight for rejection.

Sasha

Aniello Murano (#24866) wrote 1 week ago:

It is a pity that the authors did not reply.

I went back once again on the paper and I still think that its content is interesting and worth discussing at an important venue like IJAI.

On the other hand I agree with the other reviews that motivations are not properly provided. However, I do not see this as a major problem here as I can imagine several real applications in AI for this setting. As previously discussed (and as Sasha also reported), I see good motivations in dealing with resources (following Alechina settings and energy games) or recursion in multi-agent software verification, where some variables are invisible. I think that the authors skipped this part due to the space limitation and by improperly referring to previous published works (or their combination).

That said, I would confirm my 6 (weak acceptance) as an overall score. In other words, I will not increase it because of the lack of motivations and some inaccuracies (although correct) on the computational complexity. On the other hand, as an expert on open pushdown system verification, I do not feel to reduce it, since this work is an important step forward in dealing with recursive multi-agent systems working under imperfect information.

In conclusion, I will not fight against its rejection but I would like to pass to the authors the message (at list from my side) that it is worth pursuing working on this subject, improve the paper as we suggest and send it to a next coming top venue conference.

Alessio Lomuscio (#27436) wrote 1 week ago:

Dear All

As far as I can see we have no responses from the authors.

We broadly seem to be on the same page regarding the comments. My concerns on significance and relevance remain after reading the reviews. I see Nello/Laura is borderline and the technical point is still unanswered. Catalin, is your view still the same?

Best

-A

 Catalin Dima (#21746) wrote 1 week, 4 days ago:

Correction to my last post: I agree with *Nello* that paragraph 2 in Section 3 gives an answer to this remark."

Catalin

 Catalin Dima (#21746) wrote 1 week, 4 days ago:

Dear all,

I agree with the questions on relevance, but I think it's a problem of both the model and the logic. I think that the authors could help by providing some relevant formulas for their example in section 3 that show a clear difference between the PEGS and the underlying CEGS. The paragraph just before Example 1 is not enough, and adding more comments in it would not suffice.

Concerning the problem of the unique stack raised by Sasha, I asked the same for their AAAI submission and Iagree with Alessio that paragraph 2 in Section 3 gives an answer to this remark.

Best,

Catalin

 Aniello Murano (#24866) wrote 1 week, 4 days ago:

Dear Sasha, dear all,

Pushdown verification has a long tradition in the formal verification community and recently in AI.
In open system verification, pushdown models are just two player games in which there is one global stack. I am referring to papers such as Pushdown Module Checking (by Moshe Vardi, myself et al) and Pushdown games (by Walukievicz). In the basic case the stack is used as a shared counter. In MAS, I see the one stack model as a reasonable and valid one. In particular it can model the case that just one agent has a recursive behavior. This would fit perfectly with the setting of module checking vs ATL

specification, where the environment is recursive.

Additional motivations may be found in multi-agent programming languages where one needs the stack to handle the recursion, although I am not an expert of this field.

BTW, as it is pointed out by the authors, having two "indipendent stacks" makes in general the model checking problem undecidable.

Of course, this unswers your comment n.1. All the other concerns still remain.

Nello

Alessio Lomuscio (#27436) wrote 1 week, 4 days ago:

Dear Sasha

I raised very similar points in my own review. However, I'd like to wait for the authors to answer these concerns before we discuss this further.

Best

-A

Sasha Rubin (#21281) wrote 1 week, 4 days ago:

Dear all:

The main concern seems to be the importance of the model to AI.

1. The model requires a single stack for decidability; thus one can think that the environment stores this stack (the author point out that this models the case that all agents have their own stacks but are forced to push/pop to maintain the same height of their stacks).

Question: are finite-state agents in an environment with a single stack relevant to AI/MAS?

2. To get decidability the authors restrict to regular/simple indistinguishability relations.

Question: are these restrictions relevant to AI/MAS? what sort of agents do these restrictions capture?

My guess is that having memoryless strategies with simple indistinguishability relations capture "agents of imperfect-recall"; and having finite-state strategies with regular indistinguishability relations (not studied here) capture "agents of bounded-recall".

Sasha

Alessio Lomuscio (#27436) wrote 2 weeks ago:

Dear Catalin

Just a courtesy reminder the deadline for all reviews is today.

Best

-A