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AAMAS2024 notification for paper 500

1 message

AAMAS2024 Main track <aamas24main@easychair.org> 21 December 2023 at 16:26
To: Dengji Zhao <dengji.zhao@gmail.com>

Dear Dengji Zhao,
We are delighted to inform you that your AAMAS 2024 submission “Incentives for Early Arrival in Cooperative Games” (#500) has been accepted for publication as a full paper and for oral presentation at the conference. Congratulations!

As every year, the reviewing process was thorough and highly selective. The program committee reviewed a total of 883 completed submissions. It accepted 229 of them as full papers and a further 191 as extended abstracts, resulting in an acceptance rate of 25% for full papers and an overall acceptance rate of 47%.

You will find your final reviews both at the end of this message and on EasyChair. We hope that you will find the feedback received helpful and we ask you to carefully consider all of it when preparing the camera-ready copy of your paper. The camera-ready copy of your paper is due on 8 Feb 2024. You are allowed 8 pages + references in the proceedings. See here for camera ready instructions: https://www.scomminc.com/pp/acmsig/aamas.htm. Please follow these instructions strictly!

Almost all papers received at least three reviews, with some papers receiving four reviews. After the author's response, each paper was handled by a meta reviewer who coordinated the discussion and wrote a meta-review summarizing the discussion and recommendation. In many cases, reviews (and reviewers’ opinions) may have changed during the discussion. Area Chairs oversaw the reviewing process of each paper in one of the AAMAS topic areas, providing expertise and guidance when needed, and were consulted on meta-reviews. The Area Chairs provided a final recommendation to the program chairs, who made the final decision.

In principle, the title and the authors of your paper must be exactly as specified at submission time. However, if you have a good reason for wanting to change these (e.g. typos, order of authors), then you can request permission to do so by replying to this email by 15 Jan 2024. Please include the submission number, the old title, the proposed changes, and the reason for wanting to change it. Please recall that making changes other than these, such as adding extra authors, is not possible, and later changes to these details will not be possible as well.

The instructions for preparing your manuscript remain the same as those referred to in the Call for Papers. So you can start working on this already if you wish. If you chose to submit supplementary material for review, then you should now deanonymize and polish this material and make it publicly and permanently available (e.g., using a service such as Zenodo for code and data, or arXiv for additional proof details). We recommend that you include a reference to the supplementary material in the camera-ready version of your paper (listed as an item in your bibliography). The idea is that it should be possible for people to cite your supplementary material independently from and in addition to citing your paper.

As you know, the conference will be held as an in-person event. For your paper to be published, you must register your paper and at least one of its authors by the early bird registration deadline.

We are looking forward to seeing you at AAMAS 2024 in Auckland in May! In addition to the technical program, we are planning several co-located events including the Doctoral Consortium, Workshops and tutorials, and other events. Please keep an eye on the news about the program here https://www.aamas2024-conference.auckland.ac.nz/. Information on the conference will be continually updated.

All the best

Natasha Alechina and Virginia Dignum
AAMAS2024 Program Co-chairs

SUBMISSION: 500
TITLE: Incentives for Early Arrival in Cooperative Games

---------- METAREVIEW ----------
All reviewers agree that this paper is well-written and its technical contributions are nice.

---------- REVIEW 1 ----------
SUBMISSION: 500
TITLE: Incentives for Early Arrival in Cooperative Games
AUTHORS: Yaoxin Ge, Yao Zhang, Dengji Zhao, Zhihao Gavin Tang, Hu Fu and Pinyan Lu

---------- Summary of contribution ----------
The authors study cooperative games, i.e., games, where the input is a set of agents together with values achieved by every subset of agents. The goal is to decide on a distribution of the value achieved by the grand coalition. Specifically, the authors propose an online model of cooperative games where agents arrive in sequence. Whenever an agent arrives, the current set of agents has to decide on a value distribution of the value achieved by the current coalition. The authors introduce three axioms for this setting:
- online individual rationality (OIR): an agent's allocated value does not decrease over time
- incentive for early arrival (I4EA): an agent receives weakly more allocated value when arriving earlier
- Shapley fairness (SF): if the agents arrive in random order, then they are exactly allocated their Shapley value.
It is easy to satisfy OIR and SF by simply giving agents their Shapley value in every step; the challenge is to combine I4EA and SF. The authors propose the rewarding first critical player algorithm (RFC) which achieves all three axioms for 0/1-valued games, whenever this is possible. In particular, this achieves all three axioms for submodular and supermodular 0/1-valued games. In the final part of the paper, the authors investigate a decomposition technique of more general value functions and reason about its capabilities for achieving all three axioms.
---------- Significance / Importance ----------
SCORE: 3 (Substantial contribution or strong impact.)
---------- Soundness ----------
SCORE: 3 (Correct.)
---------- Novelty ----------
SCORE: 3 (Novel - approach and/or application are new and only a few other similar approaches and/or applications exist.)
---------- Scholarship ----------
SCORE: 2 (Relevant literature cited but could be expanded.)
---------- Clarity ----------
SCORE: 3 (Well organized and well written.)
---------- Reproducibility ----------
SCORE: 0 (N/A - nothing to reproduce.)
---------- Ethical and Societal Impact ----------
not relevant
---------- Summary of review ----------
I like the paper, it is well written, the topic is relevant to AAMAS and I found the introduced model, axioms, and results interesting. I especially liked the examples because they

illustrated exactly the questions that I had while reading the paper. I have a few suggestions that could be implemented for a final version.
---------- Review ----------
UPDATE AFTER AUTHOR RESPONSE
I am happy to see that the authors value our feedback and promised changes accordingly.
It might be a good idea to add the two examples from the authors response as motivating examples.

COMMENTS

- In the related work, I miss two streams of literature.
1.) 0-1 valued monotone games are well-known under the names voting games or simple games. A standard reference is Taylor and Zwicker: "Simple Games. Desirability Relations, Trading, Pseudoweightings" The authors should check the literature on these games and discuss relevant related work.
2.) I miss a deeper discussion of online algorithms literature. In particular, there is such literature on online coalition formation games, see Flammini et al.: "On the Online Coalition Structure Generation Problem" (JAIR 2021), Bullinger and Romen: "Online Coalition Formation under Random Arrival or Coalition Dissolution" (ESA 2023). The latter might be interesting because these authors also consider uniformly random arrival of agents.

- While the paper is interesting from an academic perspective, there seems not to be a lot of applicability (which in my view is okay for a theoretical contribution). Since the paper is mostly relevant for 0/1-valued games, it would be good to give a motivation for such games and, even better, give a real example where agents behave like in the proposed model. Maybe, the authors come up with something or find something in the literature on voting games. Similarly, it would be good to give more motivation for SF.

- Proof of Theorem 4.5: From the notation, it is not clear to me if the subset relations in the second condition are meant to be strict (they should be). If they were both weak subsets, then the second condition would be satisfied whenever we find a set S with S^* = {i} because we could take T = S.

FURTHER COMMENTS

- There are quite a few typos, so the authors should carefully polish the paper, e.g.,
 * p.1,c.2,l.3: a irrevocable -> an irrevocable
 * p.1,c.2, second paragraph: exists -> exist
 * p.2,c.1, second paragraph: thecooperation -> the cooperation
 * p.2,c.1, fourth paragraph: that, they -> delete comma
 - Section 1: "Hence, we use the Shapley value [14], a well-known and widely accepted classic solution to traditional cooperative game, as a benchmark for fairness": Please back this up with references.
 - Section 2: "Hence, our approach is more similar to a mechanism design perspective where we design a value distribution method" -> I had to read this several times, can you reformulate?
 - Section 2: "cooperative games were considered where only those coalitions of players are feasible that respect a given precedence structure or permission structures on the set of players" Could you be more specific? What kind of precedence/permission structures?
 - Section 2: "The main difference of these studies from ours is that, they treated the players' joining order or structural relationships as a constraint on the value" I don't understand what you want to say about the other studies. Could you please rephrase?
 - Section 3: it The authors define N = {1,2,...,n} but in examples, players are called A, B, C. It would be good to make this consistent.
 - Definition 4.2 hits margin of column
 - it would be better to move footnote 2 to the end of the sentence because in the current position, it looks like a square.
---------- Questions for Authors ----------
1.) Do the authors have a conjecture whether RFC is the unique function satisfying OIR, SF, and I4EA, whenever these can be satisfied?
2.) I wonder if there is a natural interpretation of supermodular and submodular functions for 0/1-values. Are the authors aware of a simpler characterization/interpretation of these concepts for this restriction?
---------- Overall recommendation (full paper) ----------
SCORE: 8 (A very good paper, a strong accept.)
---------- Overall recommendation (extended abstract) ----------

SCORE: 10 (An excellent candidate for extended abstract, a very strong accept.)
---------- Reviewer's confidence ----------
SCORE: 7 (I have up-to-date knowledge in the area.)

---------- REVIEW 2 ----------
SUBMISSION: 500
TITLE: Incentives for Early Arrival in Cooperative Games
AUTHORS: Yaoxin Ge, Yao Zhang, Dengji Zhao, Zhihao Gavin Tang, Hu Fu and Pinyan Lu

---------- Summary of contribution ----------
In coalition formation, a Shapley distribution of payoffs is based on the order of arrival of agents within coalitions. However, this distribution does not encourage agents to arrive as early as possible. This paper proposes a payoff distribution scheme that assigns payoffs to each new arrival in such a way as to prevent agents from leaving the coalition during formation (their payoff is not decreasing), are incentivized to arrive as soon as possible and coincide with Shapley's value. The mechanism proposed by the authors concerns simple monotonic games and consists in rewarding the first critical player, i.e. the first player arriving (weakly) before the marginal player, and whose absence reduces the value of the coalition to 0. The authors show the properties of this mechanism and the conditions under which it produces solutions. The authors also propose a scheme for the additive decomposition of a game into simple monotonic subgames, on which the mechanism can be applied.
Interestingly, just because the mechanism does not provide an incentive on one of the sub-games does not mean it does not provide an incentive overall.
---------- Significance / Importance ----------
SCORE: 3 (Substantial contribution or strong impact.)
---------- Soundness ----------
SCORE: 3 (Correct.)
---------- Novelty ----------
SCORE: 2 (Moderate - approach and/or application have been developed before, but significant improvements are presented.)
---------- Scholarship ----------
SCORE: 3 (Excellent coverage of related work.)
---------- Clarity ----------
SCORE: 3 (Well organized and well written.)
---------- Reproducibility ----------
SCORE: 3 (Authors describe the implementation and domains in sufficient detail.)
---------- Summary of review ----------
The article is very interesting, sound and present a novel contribution. The article is pedagogically written. It is clearly of interest in the field of coalition formation.
---------- Review ----------
Update after the rebuttal

I thank the authors for their answer which was clear.

The article fits in perfectly with the theme of the conference. It is particularly interesting and I enjoyed reading it. To my knowledge, this type of mechanism (to ensure the earliest possible arrival of agents) has not been proposed in the literature, and it is a new contribution. The article itself is well written and I did not find any errors in the theorems and proofs. The authors repeatedly give examples (Section 3, Section 4.3, Section 5.1 and Section 5.2) that make it easy to follow the point. The article does not present any experimental results or additional material, but the proposed algorithm and method are sufficiently well described to be implemented.

I have only minor comments that can perhaps help to improve the article.

1. In Section 3, the authors consider $p^\pi(i)$ the set of players who arrive (weakly) before i. This notion of weakly is not entirely clear, as the authors do not consider simultaneous arrivals. Perhaps we could instead speak of the set of players arriving at least as early as i (and therefore including i). The authors use the symbol $\succ$ to

indicate that j arrives before i, but they use $\succeq$ in Definition 4.2, which is problematic because the symbol has not been defined.

2. It seems to me that Section 4.1. lacks an example that would make it easier to understand the notion of the critical player central to the mechanism. This is presented in Example 4.8 but, as a reader, I would have liked to have had a short example as soon as Definition 4.1 to make sure I had understood correctly.

3. Theorem 4.5 characterizes simple monotonic games in which the proposed mechanism is not incentive-based. The authors show the only three-agent game that satisfies this criterion. It would have been interesting to have an idea of the number of such games as a function of the number of agents, or in other words, to know whether the number of games increases drastically with the number of agents. Do the authors have any insight into this?

4. Finally, an interesting research direction that perhaps deserves to be mentioned in the conclusion is that of taking into account the simultaneous arrival of agents. From the point of view of use on a real application, even if Shapley's value does not consider simultaneous arrivals and this should not exist in practice (in the sense that it is improbable for two agents to arrive perfectly simultaneously), it seems to me that penalizing agents who would arrive with an infinitesimal delay in relation to the others. It might then be interesting to consider simultaneous arrivals, or to consider not just an order relationship, but the durations between arrivals.
---------- Questions for Authors ----------
Do you have a hint about the number of unsolvable games with respect to the number of agents?
---------- Overall recommendation (full paper) ----------
SCORE: 9 (An excellent paper, a very strong accept.)
---------- Overall recommendation (extended abstract) ----------
SCORE: 8 (A good candidate for extended abstract, accept.)
---------- Reviewer's confidence ----------
SCORE: 7 (I have up-to-date knowledge in the area.)

---------- REVIEW 3 ----------
SUBMISSION: 500
TITLE: Incentives for Early Arrival in Cooperative Games
AUTHORS: Yaoxin Ge, Yao Zhang, Dengji Zhao, Zhihao Gavin Tang, Hu Fu and Pinyan Lu

---------- Summary of contribution ----------
The paper analyses the cooperative setting in game theory where players can choose a strategy to decide the time of arrival in a coalition.
The authors study two trivial mechanisms as baselines to incentivize the early arrival of players. They define the crucial properties of I4EA and OIR to capture the incentive.
Then, they propose a novel mechanism RFC that they study for 0-1 monotone games. RFC is compared with the baselines and the meaningful properties of I4EA and OIR are shown in defined subclasses of cooperative games.
Finally, they extend RFC to non-0-1 monotone games by suggesting a decomposition in such games, studying its theoretical properties with meaningful examples.
---------- Significance / Importance ----------
SCORE: 3 (Substantial contribution or strong impact.)
---------- Soundness ----------
SCORE: 3 (Correct.)
---------- Novelty ----------
SCORE: 3 (Novel - approach and/or application are new and only a few other similar approaches and/or applications exist.)
---------- Scholarship ----------
SCORE: 2 (Relevant literature cited but could be expanded.)
---------- Clarity ----------
SCORE: 3 (Well organized and well written.)
---------- Reproducibility ----------
SCORE: 0 (N/A - nothing to reproduce.)

---------- Summary of review ----------
The paper is well-written, easy to follow, and technically sound.
The theoretical treatment is well paired with examples and counterexamples for the proven statements and the claims.
The problem faced is novel with interesting applications.
---------- Review ----------
The paper is well-written, and technically sound and the reasoning is easy to follow.
The theoretical treatment is well paired with examples and counterexamples for the proven statements and the claims.
The problem faced is novel with interesting applications.
---------- Questions for Authors ----------
A broadening of the literature about the game decomposition into 0-1 games could be beneficial for the overall presentation.
Please avoid using the term "valuation" or "generation function" when referring to the characteristic function of the cooperative game. It can be confused with terms like "value" or "0-1 valued".
I would suggest providing better justification for the treatment of submodular and monotone games in the online setting. In other words, are there any significant examples, as real applications where the early arrival should be incentivized, to consider submodularity and monotonicity as cardinal properties for modeling?
I suggest also choosing different Greek letters to indicate different ordering, i.e., substituting \pi VS \pi' with \pi VS \sigma to facilitate the reading.
---------- Overall recommendation (full paper) ----------
SCORE: 10 (This is best-paper material.)
---------- Overall recommendation (extended abstract) ----------
SCORE: 10 (An excellent candidate for extended abstract, a very strong accept.)
---------- Reviewer's confidence ----------
SCORE: 7 (I have up-to-date knowledge in the area.)