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AAAI 2015 Notification

AAAI-15 <aaai15@easychair.org>   9 November 2014 at 05:03
To: Dengji Zhao <dengji.zhao@gmail.com>

Dear Dengji Zhao,

We are pleased to inform you that your paper, "Balanced Trade Reduction for Dual-Role Exchange Markets" (2144), has
been accepted for presentation at the Twenty-Ninth AAAI Conference on
Artificial Intelligence (AAAI-15). A total of 1991 papers were submitted to
the technical conference. The program committee accepted a total of 531 papers
in all technical tracks, for an acceptance rate of 26.67%. AAAI is a highly
selective conference, and you are to be congratulated on your paper's
acceptance. Attached to this message are comments from the reviewers of your
paper.

In order to encourage more interaction and discussion among participants, our
technical sessions will consist of an integral mix of oral and poster
presentations. During the review process all submissions were evaluated on the
same criteria and high standards. The decisions on the presentation format
will be based on generality of interest, and are expected to be announced
within one month.

All accepted papers will be published in the proceedings in an identical
format (7 pages plus up to two optional added purchased pages), and all papers
will be grouped together by subject area in the proceedings. (Please see below
for more detailed instructions.)

Every paper received at least two (and in 99.94% of the cases received at
least three) reviews which were provided by over 991 members of the program
committee as well as additional auxiliary reviewers. The review process for
each paper was overseen by one of 90 senior program committee members, who
monitored the reviews of the papers and initiated discussion after the author
feedback period. During the review process, author feedback was taken into
account for the final discussion, and when necessary, additional reviews were
collected. Discussions were often very detailed and, in most cases, led to
resolution of issues brought up by the reviewers. Senior program committee
members wrote a meta-review for papers where further clarification was
required. Finally, the program cochairs and track chairs read the
meta-reviews and the reviews, initiated discussions with the senior program
committee members, and made a final calibration for differences among
individual reviewer scores in light of the overall decisions. While it is
impossible for a process of this scope to be flawless, the entire
organization (program committee members, additional reviewers, senior program
committee members, cochairs, and staff) expended tremendous effort to be as
fair and careful as possible.

Please pay careful attention to the reviewers' comments as you revise your
paper to make it even better. Formatting and submission instructions (author
kit) for the final version of your paper can be found at
http://www.aaai.org/Publications/Author/aaai-submit.php. All papers must
comply with the AAAI style. Please begin revising and reformatting your paper
immediately because both processes can be time-consuming. You will be allotted
seven (7) pages in the proceedings. Up to two (2) additional pages may be

purchased at a cost to the authors of US $275 per page. The "camera-ready" version of your paper and all source files, along with a signed copyright form, are due no later than November 20, 2014 at 5:00pm PST (California time). This is a firm deadline. Please see the author kit at the URL above for further instructions. Please note that the submission of your paper is a two-step process. You will be required to open an account (or add AAAI-15 as one of your conferences) at the submission site in advance of submitting your paper files. We suggest that you complete this process now (and no later than November 19) to avoid delays when you are ready to submit your paper.

Subject Classification: The submission software includes a list of topics for you to assign your paper to a subject classification in the proceedings. Please choose carefully, as you will be unable to change the classification after submission. Complete details about this and other submission requirements will be included in a separate message to you.

One signed AAAI copyright form must be submitted for each accepted paper. The copyright form can be found in the author kit. Please mail the signed form to AAAI (2275 East Bayshore Road, Suite 160, Palo Alto, CA 94303, USA). Only the primary author of the paper needs to sign the document.

At least one author is required to register for the conference and be available to present the paper, and we encourage all authors to attend if possible. Registration information will be available at http://www.aaai.org/Conferences/AAAI/aaai15.php in about a week.

Thank you again for submitting your paper to the conference. In addition to an outstanding technical program, this year's conference continues the tradition of a series of prominent invited speakers, a variety of special events, an extensive demo program, a Senior Member track featuring state-of-the-field presentations by senior members of the AAAI community (including the Blue Sky Ideas competition), a "What's Hot" track highlighting the best work from sister conferences and competitions, and a special Robotics Program.

Due to the large program, we are currently investigating whether AAAI-15 can be extended by half a day, that is, to be held from January 25-30, 2015. We will inform you very soon about the outcome of this effort so that you can book your travel. Once we determine the length of the full conference, please plan to be present during the entire technical program, as scheduling this large number of papers requires maximum flexibility.

For more details on all AAAI-15 events, please see http://www.aaai.org/Conferences/AAAI/aaai15.php.

We look forward to seeing you in Austin!

Sincerely,

Blai Bonet and Sven Koenig
AAAI-15 Program Cochairs

----------------------- REVIEW 1 --------------------
PAPER: 2144
TITLE: Balanced Trade Reduction for Dual-Role Exchange Markets
AUTHORS: Dengji Zhao, Sarvapali D. Ramchurn, Enrico H. Gerding, David Parkes and Nick Jennings

Significance of the Contribution: 8 (+++)
Soundness and Positioning with Respect to Related Work: 8 (+++)
Depth of Theoretical and/or Experimental Analysis (as appropriate): 8 (+++)

Quality of Presentation: 8 (+++)
SUMMARY RATING: 4 (++++)

----------- COMMENTS FOR THE AUTHORS -----------
I shall first summarize the contributions of this paper and my views on them:
— The authors propose a novel double-auction market model, which they name the dual-role exchange, where each agent can report both a bid (as a buyer) or an ask (as a seller) for one unit of a commodity but if the market mechanism selects her as a participant, she is assigned only one status (buyer/seller). The model purportedly applies to at least two important and much-studied real-life problems — carpooling/ride-sharing and electric vehicle charging (elaborated in Introduction paragraph 2). Each agent's type is given by the pair $(v\_b, -v\_s)$ representing the agent's valuations for a unit when she buys it and when she sells it respectively. In some sense, this is a generalization of a traditional double-auction exchange since the desire/ability to participate as a seller only can be captured by $v\_b = 0$ and that as a buyer only by $v\_s = \infty$, an important point to note being that a trader can be allocated as a buyer in the dual-role exchange even if $v\_b = 0$ (free disposal).
— The authors first explore the idea of designing a mechanism for solving this matching problem by using an existing approach, McAfee's Trade Reduction Mechanism, which is known to be dominant-strategy incentive compatible, individually rational, and budget-balanced but not efficient (social welfare-maximizing) for a finite market size for the classical double-auction model. They show that this mechanism is not truthful for the dual-role exchange in general but retains the truthfulness property under the assumption that all traders have "marginally decreasing" valuations i.e. $v\_b < -v\_s$. I think, if correct, this is an interesting result in its own right since the "marginally decreasing" assumption seems to correspond to the well-known endowment effect in behavioral economics. However, the authors themselves give an example where this assumption is violated (for the ride-sharing problem).
— Finally, the authors put forward their own solution, based on VCG and McAfee's approach, which they term the Balanced Trade Reduction, and analyze its merits and drawbacks: it is truthful (Theorem 3) and provides at least as much social welfare as McAfee's approach (Proposition 1); however, their approach might end up with unbalanced numbers of buyers and sellers, as a remedy for which they suggest the use of "backups" (e.g. a taxi company as a backup for a ride-sharing market); moreover, their approach is not budget-balanced but to mitigate the deficit, they propose a (truthfulness-preserving) extension called the k-balanced trade reduction.

The results are believable and potentially useful, and the proofs are prima facie correct although I was not able to verify all of them. Although a few additional issues need to be addressed in order to make the model as well as the solution approach more realistic (as acknowledged in the Conclusion section), this contribution is an important first step towards recognizing and formalizing dual-role exchanges, to the best of my knowledge. However, I have the following questions/comments:
— It is not clear to me how the "efficient allocation" for the extension of McAfee's approach to the dual-role exchange or for the Balanced Trade Reduction is computed (this is the crucial first step for each mechanism). For the traditional double-auction case, this can be achieved by simply sorting all bids and all asks, and then comparing them element by element. But the corresponding problem for the dual-role case seems more complex. Perhaps I am missing the obvious but could the authors shed some light on this?
— In the "balanced payment setting", what is meant by the "increase for both VCG payments" being "balanced"? Moreover, in step 1. of the Balanced payment setting box, why is it necessary to assume i's report as $(\infty, -\infty)$ for calculating payment as a buyer rather than $(v\_b, -\infty)$ (the same goes for payment as a seller)?
— I am not sure that the issue of backups has been adequately addressed. Since there is no a priori guarantee that the numbers of buyers and sellers will be matched, the backup costs are uncertain and could potentially be prohibitively high, especially for the k-balanced variant. It seems that by choosing k appropriately, one could achieve a trade-off between the mechanism's deficit and the backup costs, and the authors say something vaguely along these lines in Proposition 2 and the preceding paragraph. Do they have any principled guidelines for picking k, or any other thoughts on this issue? Moreover, have the authors thought about a mechanism that could work without a backup, or an impossibility result which shows that backups are necessary to satisfy some desiderata (this is more of a big-picture question, please feel free to ignore it in the response)?
— Just a clarification, the term "truthful" in the statements of Theorems 2 and 3 means "dominant strategy incentive compatible", right?
— The use of the word "valuation" to describe both the agent's type and her realized valuation after allocation is slightly confusing. Also, there is a discrepancy between the use of the word "efficient" in Proposition 1 and its definition in The Model section.

The presentation is for the most part clear and self-contained with citations provided wherever necessary. But there are several typos and/or grammatical errors that sometimes impede the flow of reading, e.g.
Introduction: "and et. al." —> "etc."?
The Model: "dominate strategy" —> "dominate strategy" —> "dominant strategy" —>"" , "well know"—>"well-

known".

McAfee's Trade Reduction: "The idea is that removing …" —> "The idea is to remove …"? "where b for buyer" —> "where b stands for buyer", Theorem 2 Proof: "i switches" —> "b_i switches".

The Balanced Trade Reduction: "necessary smaller" —> "necessarily smaller", "wiling" —> "willing", "hight" —> "high", "Before describe …" —> "Before we describe …", "… until reaches …" —> "… until they reach …", "seek of simplicity" —> "sake of simplicity", "simply solution" —> "simple solution".

Deficit Control and the Generalization: " capable to switch" —> "capable of switching".

Conclusion: "before participate in" —> "before participating in", "which performances" —> "which performs".

----------------------- REVIEW 2 ---------------------
PAPER: 2144
TITLE: Balanced Trade Reduction for Dual-Role Exchange Markets
AUTHORS: Dengji Zhao, Sarvapali D. Ramchurn, Enrico H. Gerding, David Parkes and Nick Jennings

Significance of the Contribution: 6 (+ (slightly positive))
Soundness and Positioning with Respect to Related Work: 7 (++)
Depth of Theoretical and/or Experimental Analysis (as appropriate): 6 (+ (slightly positive))
Quality of Presentation: 6 (+ (slightly positive))
SUMMARY RATING: 1 (+ (slightly positive))

----------- COMMENTS FOR THE AUTHORS -----------
This paper studies a variation of the classical double auction in which each trader can be seller or buyer in the same auction, but it can play only one role. This role is decided by the mechanism in order to maximize the social welfare. The main contributions are as follows (the authors limit their analysis to single-unit single-item auctions):

* proof that the McAfee auction is not truthful in general setting, given that a trader could prefer to report untruthfully its valuation as buyer or its valuation as seller to make the mechanism exclude the trader as buyer or seller respectively (in the optimal allocation)
* proof that the McAfee auction is truthful when the valuation if the trader is marginal decreasing
* provision of a new mechanism that is truthful
* analysis of the deficit due to the proposed mechanism

The paper is well written and is clear. The motivations argued by the authors are rather weak. I mean, the authors provide some applications to motivate the importance of the analysis (first page, left column), but these examples do not convince completely me (specifically, I do not think that such examples are single commodity cases, if studied in detail). I suggest the authors to strengthen the examples. Said that, the analysis provided by the authors is interesting "per se".

I have no specific comments on the results: they are clear and interesting.

The potential weakness is that the paper is purely economic and no computational issue is present. This is not a problem for me, but this point should be motivated in the paper.

In terms of computational issues, I have some question for the authors. For instance:

* what is the computational complexity of finding the best allocation when a trader can play only one role, chosen by the mechanism? It could be a hard problem.

* if the problem were hard, any idea on how to obtain a mechanism that is scalable? given that the mechanism design problem is not single parameter

MINOR COMMENT
* in more positions, "As discussed in the last section" -> "previous section" I guess

----------------------- REVIEW 3 ---------------------
PAPER: 2144
TITLE: Balanced Trade Reduction for Dual-Role Exchange Markets
AUTHORS: Dengji Zhao, Sarvapali D. Ramchurn, Enrico H. Gerding, David Parkes and Nick Jennings

Significance of the Contribution: 7 (++)
Soundness and Positioning with Respect to Related Work: 8 (+++)
Depth of Theoretical and/or Experimental Analysis (as appropriate): 8 (+++)
Quality of Presentation: 9 (++++)
SUMMARY RATING: 4 (++++)

----------- COMMENTS FOR THE AUTHORS -----------
The paper deals with dual-role exchange markets where each trader can be
both a buyer and a seller (but not both at the same time). The authors
point out the vulnerability of the well-known McAfee's mechanism, and
propose a modified solution mechanism. The proposed mechanism is as efficient
as McAfee's, strategy-proof, individually rational, and weakly budget balanced,
although it is not strictly budget balanced (i.e., needs a deficit) and does
not always choose the same number of buyers and sellers. They further make
a discussion on how these drawbacks could be solved in realistic environments.

The paper is organized and written very well, and provide a certain amount
of theoretical results that are sound and solid. Almost all the technical
terms are with intuitive explanation for non professional readers.

As a summary, I really enjoyed reading this paper and like to support for
accepting it. There are some minor comments/suggestions, listed below.

* The Model: since \theta_i constains two values, it should be referred
  valuation vector, as the authors first did in the beginning of the section.

* about allocation function \pi, doesn't it need to specify who trade
  with whom? Defining like that seems natural to me (although it does not affect
  the sound of the paper)

* Right before Def 2: a dominate strategy -> a dominant strategy

* The end of page 2: the well known McAfee's ... -> the well known McAfee's ...

* Page 4, hight -> high

* The intuition of the proposed mechanism: the idea to reduce the deficit
  with keeping incentive compatibility seems quite similar to the Groves
  mechanisms. Is there any conceptual relation/difference between the Groves
  mechanisms and the proposed one?

* About unbalanced number of sellers and buyers, do the authors think it
  possible to provide any impossibility result, e.g., no mechanism that is
  IR, SP, BB (or weakly BB), and always choose the same number of sellers
  and buyers? Such a result would much strengthen/justify the proposed
  mechanism.

------------------------ METAREVIEW -----------------------
PAPER: 2144
TITLE: Balanced Trade Reduction for Dual-Role Exchange Markets

The individual reviews express the opinions of the PC members well. No metareview is needed.