

Publications of Jonathan Gadea Harder

This document lists all peer-reviewed publications of Jonathan Gadea Harder, Chair for Algorithm Engineering, Hasso Plattner Institute, Potsdam, Germany. This listing was automatically generated on April 24, 2024. An up-to-date version is available online at hpi.de/friedrich/docs/publist/gadeaharder.pdf.

Conference papers

- [1] Gadea Harder, J., Krogmann, S., Lenzner, P., Skopalik, A., [Strategic Resource Selection with Homophilic Agents](#). In: *International Joint Conference on Artificial Intelligence (IJCAI)*, pp. 2701–2709, 2023.

The strategic selection of resources by selfish agents is a classic research direction, with Resource Selection Games and Congestion Games as prominent examples. In these games, agents select available resources and their utility then depends on the number of agents using the same resources. This implies that there is no distinction between the agents, i.e., they are anonymous. We depart from this very general setting by proposing Resource Selection Games with heterogeneous agents that strive for joint resource usage with similar agents. So, instead of the number of other users of a given resource, our model considers agents with different types and the decisive feature is the fraction of same-type agents among the users. More precisely, similarly to Schelling Games, there is a tolerance threshold $\tau \in [0, 1]$ which specifies the agents' desired minimum fraction of same-type agents on a resource. Agents strive to select resources where at least a τ -fraction of those resources' users have the same type as themselves. For $\tau = 1$, our model generalizes Hedonic Diversity Games with a peak at 1. For our general model, we consider the existence and quality of equilibria and the complexity of maximizing social welfare. Additionally, we consider a bounded rationality model, where agents can only estimate the utility of a resource, since they only know the fraction of same-type agents on a given resource, but not the exact numbers. Thus, they cannot know the impact a strategy change would have on a target resource. Interestingly, we show that this type of bounded rationality yields favorable game-theoretic properties and specific equilibria closely approximate equilibria of the full knowledge setting.

- [2] Berger, J., Böther, M., Doskoč, V., Gadea Harder, J., Klodt, N., Kötzing, T., Löttsch, W., Peters, J., Schiller, L., Seifert, L., Wells, A., Wietheger, S., [Learning Languages with Decidable Hypotheses](#). In: *Computability in Europe (CiE)*, pp. 25–37, 2021.

In language learning in the limit, the most common type of hypothesis is to give an enumerator for a language, a W -index. These hypotheses have the drawback that even the membership problem is undecidable. In this paper, we use a different system which allows for naming arbitrary decidable languages, namely programs for characteristic functions (called C -indices). These indices have the drawback that it is now not decidable whether a given hypothesis is even a legal C -index. In this first analysis of learning with C -indices, we give a structured account of the learning power of various restrictions employing C -indices, also when compared with W -indices. We establish a hierarchy of learning power depending on whether C -indices are required (a) on all outputs; (b) only on outputs relevant for the class to be learned or (c) only in the limit as final, correct hypotheses. We analyze all these questions also in relation to the mode of data presentation. Finally, we also ask about the relation of semantic versus syntactic convergence and derive the map of pairwise relations for these two kinds of convergence coupled with various forms of data presentation.